## Title

Trust in the Medical Profession and Health-Related Quality of Life in Patients with Hypertension



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# Trust in the Medical Profession and Health-Related Quality of Life in Patients with Hypertension

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Nursing

by

Lilia Susana Meltzer

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ABSTRACT OF THE DISSERTATION

Trust in the Medical Profession
and Health-Related Quality of Life
in Patients with Hypertension

by

Lilia Susana Meltzer
Doctor of Philosophy in Nursing
University of California, Los Angeles, 2016
Professor Ronald D. Hays, Co-Chair
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Hypertension is a precursor to cardiovascular disease and a major contributor to disability from stroke and coronary heart disease. Prevalence of hypertension among US adults has remained unchanged (30%) from 1999 to 2016, and analyzed national data indicate that 90% of adults with uncontrolled hypertension have a usual source of health care and insurance. Under-resourced race/ethnic minorities are disproportionately affected by hypertension and its adverse cardiovascular outlook, particularly stroke. Hispanics have less awareness of hypertension, receive less management of the disease, are less likely to take prescribed medicines, and have lower blood pressure control than non-Hispanics (Whites, African Americans, and Asians). Hispanics comprise 16% of the US population and have a high poverty rate (26%), similar to African Americans.

This study examined associations of trust in the medical profession with health-related quality of life (HRQOL) in adults with hypertension and the extent to which the effect of trust was mediated by improving medication adherence and enhancing resilience. In addition, it evaluated whether the effects of trust vary by ethnicity (Hispanic vs. non-Hispanic). The hypothesized relationships were derived from the Vulnerable Populations Conceptual Model's (VPCM) domains of resource availability, relative risk, and health status; the VPCM is a population-based model with focus on the social conditions that influence the differential vulnerability to adverse health outcomes of minority groups. It was posited that among adults under medical treatment for hypertension, having trust in the medical profession is related to greater medication adherence and resilience and, in turn, better HRQOL.

A cross-sectional survey was conducted with 201 adults (101 Hispanics and 100 non-Hispanics), recruited from a medical practice consisting of five cardiologists. The study included the Patient-Reported Outcomes Measurement Information System (PROMIS®) Global Health Items; Trust in Doctors Generally Scale; Connor-Davidson Resilience Scale-25; and Morisky Medication Adherence Scale-8. Structural equation modeling was used to evaluate the hypothesized associations (direct and indirect effects) among variables.

The proposed model fit the data well and most of the hypothesized associations were supported. The model explained 37% of the variance in global mental health and 15% of the variance in global physical health. A simultaneous group analysis indicated that ethnicity (i.e., non-Hispanic vs. Hispanic) did not moderate the associations between trust, resilience, medication adherence, and HRQOL. Two alternative theoretically plausible models proposing different directional relationships were tested and these also fit the data well indicating that causality cannot be inferred when cross-sectional designs are used. Findings suggest that trust in the medical profession serves as a protective mechanism for improving health outcomes in adults with hypertension by promoting medication adherence and enhancing resilience regardless of Hispanic ethnicity.

The dissertation of Lilia Susana Meltzer is approved.

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TO

My husband, Paul, for his commitment to supporting my passions…

My children, Natalie and Steven, for all the laughs and treasured memories…

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and

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# CHAPTER 1

# INTRODUCTION

## Background

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in the United States (US) and the third most frequently reported chronic condition to cause functional limitations for working-age and older adults after arthritis and musculoskeletal problems (Barbour et al., 2013/CDC 2016; Hootman et al., 2009/CDC, 2016). Hypertension is a major independent risk factor for CVD, and a significant contributor to disability and premature death from cardiovascular complications including stroke, coronary heart disease (CHD), and end-stage renal disease (Go et al., 2014/AHA, 2016). Nearly 80 million adults (one out of every three) have hypertension; 82% are aware of having the disease, 75% are under treatment, and 48% have inadequate control; in addition, racial and ethnic minorities are disproportionately affected (Go et al., 2014/AHA, 2016). Ethnicity (Hispanic), older age, increased body weight, lower education and income level have been found to be strongly associated with disease prevalence (Guo, He, Zhang, & Walton, 2012). Hispanics have lower hypertension awareness, lower treatment rates, and worse control than non-Hispanics. (Mozaffarian et al, 2016/AHA Fact sheet).

Hispanic or Latino refers to people with ancestry in Mexico, Cuba, Puerto Rico, Spain, and Spanish-speaking countries of South and Central America, the Dominican Republic or any Spanish culture regardless of race; black or African American identifies those having origins in any of the Black racial groups of Africa (U.S. Census Bureau, 2010a). It should be noted that Mexican-Americans are the predominant Hispanic subgroup in Southern California and the literature about Hispanics more generally is likely to apply to them.

Advancements in health care including strategies targeting health promotion and disease prevention have increased life expectancy and survival from chronic and acute illnesses

over the past two centuries; however, racial and ethnic minorities have poorer health outcomes than whites, particularly from highly preventable and treatable conditions such as hypertension and CVD (Bonow, Grant, & Jacobs, 2005). The Framingham Heart Study of cardiovascular disease prospective population epidemiologic research, which began in 1948 (Dawber, Meadors, & Moore, 1951), has largely contributed to the advancement of preventive cardiology, and has demonstrated the importance of risk stratification in the treatment of hypertension to prevent downstream complications (Kannel, 2000). The concept of evidence based medicine refers to providing the best available research (objective evidence) to patient care; however, the transition from research to clinical practice of best scientific evidence fails to benefit vulnerable and disadvantaged groups, as treatments decisions are not always solely based on effectiveness of medical interventions (Rogers, 2004). The Institute of Medicine (IOM, 2002) has pointed to the importance of demonstrating the trustworthiness of the medical profession by delivering the most beneficial medical care across all segments of the population, in efforts to increase patients' adherence to treatment recommendations and diminish health disparities.

Inequities in health in the US were first documented in 1906 by sociologist and public health activist Burghardt DuBois, and they still persist (IOM, 2001). These disparities have been attributed to factors such as poor disease awareness and knowledge (Bonow et al., 2005); diminished access to care, language and cultural barriers, and physicians' lack of cultural sensitivity and social biases in the provision of care (IOM, 2002) including cardiac diagnostic and revascularization procedures (Kaul, Lytle, Spertus, DeLong, & Peterson, 2005). It has been suggested that there is a social gradient in health that results from a lifetime of exposure to hostile social conditions, cultural bias, and racism (Marmot, Shipley, Hemingway, Head, & Brunner, 2008). In the US, and globally among developed nations, CVD can be viewed as a marker for health inequities; the negative effect on cardiovascular health of lifelong exposure to adverse social conditions associated with minority race/ethnicity and low socioeconomic status (SES) is well established (Marmot et al., 2008). Concurrently, in efforts to improve cardio-

vascular health the AHA (2013) issued a statement recommending the inclusion of patient-reported health status, which encompasses symptom burden, functional status, and health-related quality of life (HRQOL), as an important metric of cardiovascular health in clinical research and practice, as well as in disease surveillance (Rumsfeld et al., 2013). HRQOL refers to the evaluation of quality of life, in the context of health and illness, across the various domains of health: physical, mental, emotional, and social functioning (Hahn et al., 2007).

The impact that cardiovascular diseases have on HRQOL, particularly in the context of social depravation (McEwen & Gianaros, 2010), may be modulated by an individual's level of resilience, versus vulnerability, to cope with potential stressors (Seery, 2011). Resiliency has been described as the process of coping with adverse life circumstances in a way that results in strengthening of health protective factors (Richardson, 2002). Conceptually, resilience has been defined as an aggregate of personal strengths that includes self-efficacy, coping, and hope (Gillespie, Chaboyer, & Wallis, 2007); self-esteem and internal locus of control (Garmezi, 1991; Rutter, 1987). In extension, self-esteem and internal locus of control have been shown to have a significant effect on stress perception and in the regulation of cortisol, a physiological response to adaptation to stress in young adults; in the elderly, these personality traits have been found to modulate patterns of cognitive and global brain volume decline associated with aging (Pruessner et al., 2005). Cortisol is the product of activation of the hypothalamic-pituitary-adreno-cortical axis; prolonged activation such as in the context of exposure to chronic stress has been shown to have negative consequences on health, particularly cardiovascular health (Seery, 2011).

Similarly, studies have shown the cumulative effect of segregation and lack of resources, particularly human capital (income, education, housing), on patterns of downward assimilation across generations of Mexican Americans (Portes & Rumbaut, 2001). Data from the National Health and Nutrition Examination Survey (NHANES) 2007-2012, a multistage probability sample of the US civilian non-institutionalized population, indicate that Mexican Americans have

exceedingly lower hypertension control rates than whites and non-Hispanic blacks, respectively, 44%, 56%, and 50% (AHA, 2016). In addition, acculturation to the US and older age are strong predictors of hypertension in Mexican Americans (Espino & Maldonado, 1990). Acculturation stressors (discrimination, legal status, and linguistic barriers) have been shown to be negatively associated with self-rated physical health (Finch & Vega, 2003). Thus, consideration of the context of broader historic and contemporary socioeconomic disparities is an important backdrop for understanding the diminished health of US Hispanics of Mexican origin. It has been noted that continued waves of immigration from Mexico have influenced the Mexican American experience in the US, shaping negative societal perceptions of this group (Telles & Ortiz, 2008).

## Statement of the Problem

CVD affects 37% of the US adult population and accounts for 17% of national health-care expenditures; during the past decade, its cost has increased at an annual rate of approximately 6% (Heidenreich et al., 2011). The total medical costs of CVD in 2008 were $273 billion and indirect costs, resulting from lost productivity from disease related morbidity and premature mortality, were $172 billion in 2010 (Heidenreich et al., 2011). Notably, most of these expenditures are associated with the treatment of hypertension and its comorbidities or sequel including CHD, stroke, and heart failure, amounting to $131 billion annually (Heidenreich et al., 2011). Prevalence of hypertension in US adults has been constantly high since 1999 and has remained unchanged (30%) from 1999 to 2014 (Yoon, Carroll, & Fryar, 2015/CDC). NHANES 2003-2010 data indicate that approximately 90% of adults with hypertension have a usual source of health care and health insurance; hence, suggesting missed opportunities to control the disease and its adverse cardiovascular outlook (CDC, 2012). Additionally, individuals with obesity, hypertension, and diabetes or with any of these conditions combined have been found to have significantly worse HRQOL than those without these factors; women with all three risk factors had the greatest deficits in HRQOL (Banegas et al., 2007). It should also be noted that

the risk of CHD, the most prevalent and lethal sequel of hypertension, increases with the extent of risk factors involved (O'Donnell & Kannel, 2002).

Risk of hypertension has been associated with low socioeconomic status (SES), black race, and Hispanic ethnicity (CDC, 2013). Hispanics, or Latinos, have the lowest hypertension control rates when compared to non-Hispanics blacks and Whites 44%, 50%, 56*%,* respectively; and they also have the lowest disease awareness rates 79%, 86%, 83%; and the lowest treatment rates 70%, 77%, 78% (Mozaffarian et al., 2016/AHA). Hispanics also have the lowest disease awareness rates 78%, 87%, 81% and the lowest treatment rates 70%, 80%, 77% (Yoon, Burt, Louis, & Carroll, 2012). Poverty rate for Hispanics is similar to non-Hispanic blacks and highly exceeds the national average, 27% live in poverty as compared to 10% of whites; Hispanics are also the largest and fastest-growing minority in the US, composing 16 % (50.5 million) of the total population (US Census Bureau, 2010b). There is a high incidence of hypertension among Mexican-Americans who constitute 63% of US Hispanics (US Census Bureau, 2011); and since 1993, there has been an increase in prevalence of CVD (AlGhatrif et al., 2011).

Additionally, clustering of major CVD risk factors, particularly obesity/overweight and diabetes, is common among Hispanics with hypertension (Bersamin, Stafford, & Winkleby, 2009). Chronic conditions such as hypertension and its associated comorbities present special challenges for elderly Hispanics and tend to affect HRQOL. For example, in older Mexican-Americans associations between age, severity of hypertension, and cognitive decline have been reported (Insel, Palmer, Stroup-Benham, Markides, & Espino, 2005). In elderly Hispanics, the burden associated with the chronic nature of hypertension and the need for daily pharmacological therapy can impact mental health and diminish HRQOL (Hayes, Denny, Keenan, Croft, & Greenlund, 2008).

The importance of hypertension control to contain disease progression and prevent complications is well documented (Yoon et al., 2015/CDC). Due to the silent or asymptomatic

nature of hypertension, disease awareness is essential to treatment adherence and to prevent adverse outcomes (Patel, Wood, & Espino, 2012). In Hispanics, poor disease awareness among those diagnosed, including younger adults, and significantly higher rates of uncontrolled hypertension may contribute to higher comorbidity (incidence and prevalence) rates and disease related mortality when compared to non-Hispanics (Roger et al., 2012). For example, Hispanic women are 20% more likely to have a stroke than non-Hispanic white women (CDC, 2012). In high-functioning older Hispanic adults, hypertension has been shown to be a risk factor for all cause-mortality (Odden et al., 2012). Poor hypertension control and non-adherence to treatment regimens in Hispanics have been associated with lack of access to healthcare, linguistic barriers, and poor patient-provider communication (Ventura et al., 2011); suboptimal disease knowledge and awareness and lack of culturally competent clinical management (Bersamin et al., 2009; Patel et al., 2012). Hispanics have also been found to have greater distrust of their physicians than non-Hispanics (Berrios-Rivera et al., 2006). These differences in ethnicity, comorbidity rates, and mortality related to hypertension partly point to deficiencies in patient education and along treatment pathways; and largely, to a major public health problem (Bersamin et al., 2009; Yoon et al., 2012).

The IOM (2002) report on racial and ethnic disparities in health care notes that minority patients' mistrust of health care providers may be related to their general experiences of discrimination and perceived, or actual, mistreatment by providers. Notably, the IOM (2002) emphasized the importance of building patients' trust in order to foster treatment adherence and participation in clinical research by issuing recommendations for cross-cultural curricula, including strategies to avoid stereotyping, to help physicians develop and apply cultural competence skills in the clinical decision-making process (Betancourt & Maina, 2004). In line with these issues, studies indicate that trust in physicians, general trust or trust in the medical profession, may have a beneficial influence on individual-level health behaviors including adherence to treatment recommendations, motivation to seek medical care rather than self-

treat, and in the development of interpersonal physician trust (Hall, Camacho, Dugan, & Balkrishnan, 2002). Trust in one's physician has been shown to be associated with adherence to treatment and satisfaction with care (Safran et al., 1998). According to patients' narratives, compliance with antihypertensive medication regimens requires a trusting doctor-patient relationship (Sarradon-Eck, Egrot, Blance, & Faure, 2010). In contrast to interpersonal trust, trust in physicians has been found to be associated with being white (greater trust) and with better HRQOL (Kao, Green, Zaslavsky, Koplan, & Cleary, 1998). In addition, patient-centered behavior of physicians has been found to be strongly associated with trust; specifically, exploration of patients' illness experiences and visit length have been associated with greater trust (Fiscella et al., 2004). Physicians' attitudes and behaviors including sensitivity to concerns, reassurance, and support have also been found to be independent predictors of trust in physicians among Hispanics and non-Hispanics; however, Hispanics reported lower levels of trust than non-Hispanics (Berrios-Rivera et al., 2006).

Factors that foster resilience have been explored at the individual and social levels, through organizations, communities, and entire populations (Nucifora, Langlieb, Siegal, Everly, & Kaminsky, 2007). Aligning with this notion, patient trust has been described as the scarcest of medical resources, and as a form of social capital due to its role in promoting social and individual well-being (Illingworth, 2002). For example, it has been noted that individuals residing in areas with diminished social capital tend to report poor health which suggests that the influence that social capital has on health outcomes of communities and its members, can be partially explained through its role in promoting health behaviors, access to resources, and facilitating social processes (Kawachi, 1999). Trust may play a critical role in how underserved minority groups interact with the healthcare system and its various institutions, including the medical profession. On this view, the main hypothesis guiding this study proposed that having trust in the medical profession may enhance resilience and treatment adherence in patients with hypertension and, in turn, trust may influence HRQOL. In addition, it was predicted that the

strength of the associations of trust, resilience, and medication adherence with HRQOL would vary between Hispanics and non-Hispanics.

## Purpose of the Study

Trust in the medical profession among Hispanics with preventable and modifiable conditions has rarely been examined, and the relationship of trust with HRQOL in those with hypertension is unknown. Hence, the overarching goal of this study was to investigate whether trust in physicians, or in the medical profession, plays a role in improving HRQOL in patients with hypertension. The purpose of the study was to examine the influence of trust in the medical profession on HRQOL in adults with hypertension. Specifically, this study examined if trust operates by enhancing resilience and improving treatment adherence, and whether these associations vary by ethnicity (Hispanic vs. non-Hispanic).

The three specific aims were as follows: 1) to assess the overall relationship (total effect) between trust in the medical profession and HRQOL; 2) to assess whether the association of trust in the medical profession with HRQOL is mediated by patient resilience and medication adherence; and 3) to determine whether these associations vary by Hispanic ethnicity (Hispanic vs. non-Hispanic).

## Summary

Racial, ethnic, and socioeconomic disparities are pervasive in the US and deeply rooted in society. Aligning with national efforts on preparing a workforce that is more responsive to patients' needs (IOM, 2001), outcomes from this study have potential to translate knowledge into practice and elucidate aspects of the medical interaction that are amenable to change and can be target for improving health and functioning. Many sources and pathways to resilience at both the macro and micro levels of society, including biological and social systems (family, community, and environmental resources) interact to foster, or inhibit, the dynamic process of resiliency (Herrman et al., 2011). Trust in one's physician lays the foundation for therapeutic relationships, facilitating the key role of physicians in identifying patients' strengths and

vulnerabilities that can guide, or undermine, health behaviors and wellness. Trust is a core component of the patient's perspective about the quality of care (Donabedian, 1990) and is essential to the doctor-patient relationship (Thom, Hall, & Pawlson, 2004). Trusting relationships among patients and physicians are essential to effective disease management; physicians, however, are more powerful agents than patients (IOM, 2002) in the clinical encounter for laying the ground work to reshaping health care for underserved and vulnerable minority patient populations.

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# CHAPTER 2

# THEORETICAL FRAMEWORK

This chapter presents the theoretical foundation guiding this research, drawing upon the Vulnerable Populations Conceptual Model (Flaskerud & Winslow, 1998); the socio-demographic profile of hypertension in Hispanics within the context of health disparities; and a brief narrative of the historical events that have influenced the poor social standing of Mexican Americans, who comprise the majority (63%) of US Hispanics, (US Census Bureau, 2011). Consideration of the context of broader historic and contemporary socioeconomic inequalities is an important backdrop for understanding the diminished health of US Hispanics of Mexican origin, and studying health-related quality of life (HRQOL) in adults with hypertension.

## Philosophical Underpinnings

Multiple structural factors impact the upward generational mobility of certain ethnic minorities, such as Mexican Americans, reflecting a societal failure to support their integration to the US mainstream or dominant white Anglo-Saxon Protestant middle class, largely as a result of ethnocentric views and racial bias (Telles & Ortiz, 2008). Philosophical and theoretical perspectives on assimilation in support of the argument that assimilation is the dominant discourse (Alba & Nee, 2003), minimize the role of race/ethnicity and ignore the negative societal reception experienced by certain immigrant groups (Telles & Ortiz, 2008). Continued waves of immigration from Mexico have influenced the Mexican American experience in the US, shaping negative societal perceptions of this group (Telles & Ortiz, 2008). As noted by Telles and Ortiz (2008), almost 50 years after discrimination has been made illegal and three decades of university-based affirmative action, race and ethnicity still matter. For example, their education study using intergenerational longitudinal data of Mexican Americans from immigrants to fifth generations, showed a lack of educational achievement through the fourth generation (Telles & Ortiz, 2008). Other studies have shown the cumulative effect of segregation and lack

of resources, particularly human capital (income, education, housing), on patterns of downward assimilation across generations of Mexican Americans (Portes & Rumbaut, 2001).

**Critical Social Theory**

The philosophical doctrine of Karl Marx (1818-1883) was a precursor to the development of critical social theory (CST), which falls within postmodern views, and is concerned with advancing the emancipatory function of knowledge and the role of criticism and free speech as facilitators of education and collective empowerment (Rodgers, 2005). CST originated in Germany around 1924 in the Institute of Social Research commonly known as the Frankfurt School, led by a group of intellectuals with radical tendencies inviting perspectives different from the prevailing doctrine of positivism (Rodgers, 2005). Frequent themes among the scholars were discussions of Marx's philosophy; these were influenced by the social and political climates characterizing the social processes that contributed to the conditions of domination of some people during this historical period (Fontana, 2004). Although Marx's political philosophy inspired the origins of CST, eclectic views among members of the Frankfurt School influenced the reappraisal of his doctrine, expanding his body of work beyond the ideas of economic and class struggles, toward a focus on exposing structural forces that favored hegemony and social oppression (Browne, 2000). False consciousness, a main epistemological component to CST, refers to the lack of awareness of the pervasive social impact of political agendas, largely manipulated by those with power to maintain control under oppressive conditions (Browne, 2000). Jurgen Habermas' (1989) theory of communicative action depicts a more contemporary approach to SCT.

The term critical social justice has been described in reference to the inequalities in health experienced by certain groups in relation to the distribution of power and allocation of resources, and provides an ethical lens through which to evaluate such dynamics. Consistent with the ontological origin of CST, critical inquiry seeks to reveal hidden power structures and ideologies in support of emancipation and autonomy, to create a more just society so individuals

are not trapped in coercive relationships (Rodgers, 2005). The Vulnerable Populations Conceptual Model developed by Flaskerud and Winslow (1998) aligns with the theoretical underpinnings guiding this study.

## Vulnerable Populations Conceptual Model

The Vulnerable Populations Conceptual Model (VPCM) is an integrative framework that incorporates social, historical, and biological reasoning to allow examination of public health problems in the broader context of social justice. As a population-based framework, the VPCM aims to decrease power differentials and foster collective self-efficacy within the community and its members. Flaskerud and Winslow (1998) conceptualized vulnerable populations as social groups who are at higher relative risk for poor health outcomes including higher morbidity (disease incidence and prevalence rates) and premature mortality due to inadequate socioeconomic and environmental resources. Vulnerable groups are those living in poverty, women, children, immigrants, the elderly, gay men and women, and race/ethnic minorities (Flaskerud & Winslow, 1998). The VPCM situates the study of health disparities within the context of social systems; this notion is embodied within its three relational propositions: *relative risk, health status,* and *resource availability.*

*Resource availability* encompasses micro and macro level issues; this domain directs attention upstream, to the social determinants of populations' health beyond conventional explanations of cultural or genetic differences (Crimmins, Kim, Alley, Karlamangla, & Seeman, 2007), and to the interdependence of health on socio-structural forces. It considers assets that when inequitably allocated promote social displacement**,** namely: human capital (income, housing, education, and employment); social status; social integration; and access to, and quality of, health care (Flaskerud & Winslow, 1998). *Relative risk* addresses the risk ratio represented by patterns of differential vulnerability to ill health among groups who are exposed to adverse social conditions. It also considers protective resources such as resilience (personal communication with Dr. Flaskerud on August 8, 2011). *Health status* describes the societal

influence on the poor health experienced by minority groups and the psychobiological vulnerability that results when social devaluation is coupled with poverty, evidenced by morbidity and mortality rates within the community. Three interrelationships have been proposed among these domains: *resource availability and relative risk; relative risk and health status;* and *health status and resource availability* (Flaskerud & Winslow, 1998), (Figure 2.1).

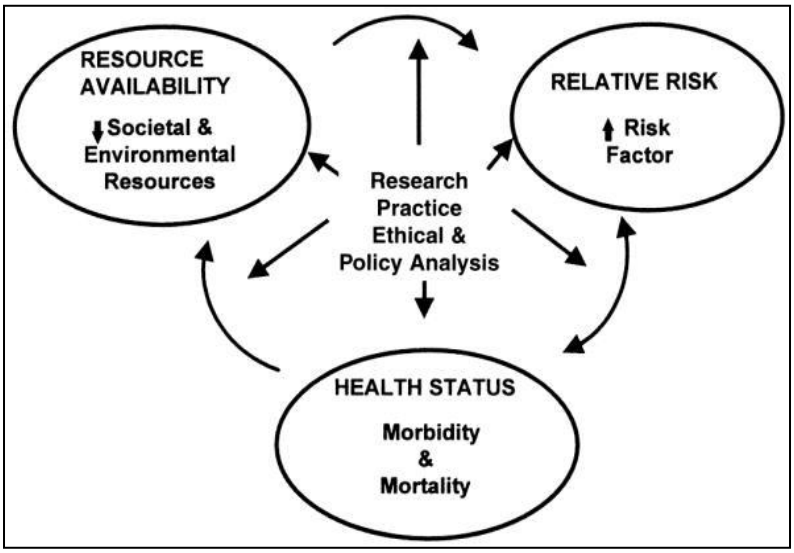


*Figure 2.1*. Vulnerable Populations Conceptual Model (Flaskerud & Winslow, 1998)

**Operationalization of the VPCM's Theoretical Concepts**

***Resource availability.*** The conceptualization of resource availability for this study represents social, economic, and environmental factors that influence HRQOL in patients with hypertension. The VPCM posits that limited availability of social resources increases risk for disease (Flaskerud & Winslow, 1998). Aligning with this view, the study's independent variable, trust in the medical profession was measured under this construct. Medical trust was conceptualized as a *perceived disease-preventive social resource* influencing HRQOL in adults with hypertension due to its potential for improving health outcomes by motivating individuals to seek medical care rather than self-treat.

***Relative Risk*.** Variables measured under this construct include the hypothesized intervening variables: resilience and medication adherence. Hispanics with hypertension are at higher risk for poorly controlled BP and, in turn, higher disease-related morbidity than non-Hispanics; they have fewer socioeconomic resources than non-Hispanics and frequently encounter cultural and linguistic barriers when seeking medical care. Resilience may function as a protective mechanism by facilitating adaptation to adverse social conditions.

***Health Status.*** HRQOL, the study's main outcome variable, was measured under this construct. *Functional ability* and *productivity* are concepts extracted from the VPCM; these are represented within the studied latent variables, global physical and mental health, HRQOL.

Structural equation modeling methods were used to test the relative fit of the VPCM constructs with this study's hypothesized associations between observed and latent variables (trust in the medical profession, resilience, medication adherence, and HRQOL), as described in Chapter 4.

## Conceptualization of Hispanics as a Vulnerable Population

Hispanics comprise the largest and fastest growing minority in the US (16%) and have a high poverty rate (26%), similar to African Americans (US Census Bureau, 2013). Prevalence of hypertension in Hispanics has been found to be inversely correlated with SES and to be higher among the more acculturated, defined by years living in the US, place of birth, and language spoken at home (Moran et al., 2007; Rodriguez, Hicks, & Lopez, 2012). Data from the California Health Interview Survey 2001-2007, indicated that greater number of years of US residence was associated with higher disease prevalence among all foreign-born subgroups except those born in Mexico, who reported lower odds of hypertension (Rodriguez et al., 2012). Compared to US born Hispanics, those born in Mexico and South America report lower prevalence of hypertension than those born in Central America and the Caribbean; speaking English at home is associated with higher disease prevalence (Moran et al., 2007; Dominguez et al., 2015/CDC)). Suboptimal hypertension control and non-adherence to treatment regimens

in Hispanics have been associated with inadequate access to healthcare (Ventura, Pina, & Lavie, 2011); linguistic barriers, suboptimal disease knowledge and awareness, poor patient-provider communication, and deficits in the quality of clinical management (Bersamin, Stafford, & Winkleby, 2009).

Mexican Americans have lower hypertension control rates than whites and non-Hispanic blacks, respectively, 39%, 55%, and 48% (Gu, Burt, Dillon, & Yoon, 2012). Analyses of NHANES (1999-2004) data examining physiologic measures of BP, body mass index, and diabetes in Mexican Americans (n = 2780) aged 25-84 years, indicated that 62% had no health insurance and among those with hypertension 65% of young adults (25-34 years) were unaware of having hypertension and 71% were untreated; among adults under treatment, 56% had suboptimal control and 23% had advanced disease, stage 2 hypertension or greater: systolic BP ≥160 or diastolic BP≥100 mmHg (Chobanian et al., 2003; Bersamin et al., 2009). In addition, 55% of men and 51% of women were overweight or obese; and clustering of CVD risk factors was common in both genders, 23% of men and 24% of women had all three conditions diabetes, hypertension, and overweight or obesity (Bersamin et al., 2009).

**The Historical Context of Mexican Immigration**

As follows, a brief review of the history of Mexican-origin people in the US provides a contextual perspective for the variables under study.

Various waves of immigration were absorbed by the US in the past, particularly from northern and western Europe during the 18$^{th}$ and 19$^{th}$ centuries, and from southern and central Europe since the 1870s with the settling of Italians, Greeks, and Poles. These groups encountered social barriers from the American mainstream, which developed with the settling of colonial northern Europeans, mostly in response to their low literacy levels, low SES, and physical characteristics that differed from others in the country (Alba & Nee, 2003; Waters, 1990). However, the immigration trajectory of white Europeans points to an eventual assimilation, upward mobility, and full integration to mainstream society by the third generation

(Jimenez, 2009; Telles & Ortiz, 2008; Waters, 1990) in contrast to other ethnic groups, such as Mexican Americans, who have been marginalized and racialized, mostly as a result of ethnocentric societal values and structural barriers (Portes & Rumbaut, 2001; Telles & Ortiz, 2008). Thus, consideration of the historical context is relevant to the identification of underlying factors that have influenced the Mexican American experience in the US, and that may contribute to health disparities. The rest of the material covered in this section is summarized from Telles and Ortiz (2008, Chapter 4).

After Mexico declared independence from Spain in 1821, American immigrants encouraged by the US government settled in the Mexican state of Texas, and by 1830 Americans outnumbered Mexicans so the Mexican government prohibited further American immigration. American colonization started in the 1930s and in 1836, after a several battles with Mexican militias, Americans gained control of the territory and declared independence from Mexico. In 1845, Texas was annexed to the US and, consequently, Mexico lost about half of its national domain; the Mexican-American war followed and Americans gained additional territory, New Mexico and Alta California. In 1848, the treaty of Guadalupe Hidalgo sealed conflicts and ended the war with Mexico ceding California and New Mexico to the US. These series of events in the 19$^{th}$ century, left the Mexican people at great disadvantage and permanently impacted their situation in the US at all levels: socially, economically, and politically, placing them in a position of marginalization and sublimation in the standards of American society as a "partly colored race" (Telles & Ortiz, 2008, p.76), and inferior ethnic minority. Negative stereotypes persisted through the late1960s, but the support of the Kennedy-Johnson administration influenced changes in civil rights legislation; the 1964 Civil Rights Act and the Voting Rights Act of 1965, extended to linguistic minorities in 1975, opened some opportunities for minorities. In response to a sense of racial affirmation among Mexican Americans, the term Chicano emerged symbolizing cultural and political independence from the unsuccessful pursuit of their social acceptance as whites (Telles & Ortiz, 2008).

A 1978 amendment to the 1965 Immigration Act greatly limited the number of individuals migrating from Latin America including Mexico and led to a major wave of undocumented immigrants in search of job opportunities. At a later time, in 1986, amnesty was given through the Immigration Reform and Control Act. The problem of illegal immigration reemerged in the 1990s with the arrival of undocumented Mexicans, giving rise to public protests and anti-immigrant rallies. A changing economy, largely as a result of the end of the cold war, decreased work opportunities in main geographical areas that supported the Mexican American labor force. Industrial restructuring in urban areas shaped the job market from unionized and well paid blue-collar jobs to mostly a service oriented economy and a cheap-labor market, lacking job security and benefiting white-collar workers. These changes were followed by an ethnic restructuring bringing Latin American as well as Asian immigrants to the city to earn low-wages, placing them at the poverty level (Telles & Ortiz, 2008, Chapter 4).

Hispanics with hypertension will be conceptualized as a vulnerable population, that is, a social group at increased relative risk for poor health outcomes such as morbidity (disease incidence and prevalence rates) and premature mortality, due to inadequate social and environmental resources.

## HRQOL in Vulnerable Populations

Poor self-perceived health has been associated with known risk factors for hypertension such as smoking (Colsher et al., 1990); and with demographic and social factors including race/ethnicity, advanced age, female gender, and limited access to healthcare (Marmot et al., 1991). Individuals without health insurance are half as likely as those with insurance to have adequate hypertension control, regardless of type (CDC, 2013). Surveillance of health status in minority communities (reported during January-December 2009) on African American, Hispanic, Asian, and American Indian populations indicated that Hispanic women have worse health (median = 32%) than their counterparts including men, across all racial/ethnic groups (Liao et al., 2011). Additionally, stressful acculturation experiences such as discrimination, legal status,

and linguistic barriers have been shown to be negatively associated with self-rated physical health in adults of Mexican origin (Finch & Vega, 2003).

**Female Gender**

Studies consistently report worse HRQOL for women than men across health domains (Borrell & Dallo, 2008; Urizar & Sears, 2006). Cross-sectional analyses of the National Health Measurement Study on a sample of 3648 African American and white adults aged 35-89 years indicate that gender differences in HRQOL are largely explained by other sociodemographic variables such as SES (Cherepanov et al., 2011). In particular, gender differences on the SF-36 Physical Component Summary (PCS) and Mental Component Summary (MCS) were partially explained by income and marital status, and men had better estimated health than women on three latent dimensions of health: physical and psychosocial health, and pain (Cherepanov et al., 2011). Although concerns have been expressed (Orfila et al., 2006) as to whether discrepancies among studies are related to differential reporting patterns in health, a study of 544 older adults in Spain evaluating these concerns found significant associations between female gender, prevalence of chronic and debilitating conditions (depression, diabetes, arthritis, and back pain), worse performance-based functional capacity, and worse HRQOL among elderly females when compared to their male counterparts ($p < 0.001$) (Orfila et al., 2006). After controlling for all other variables including socio-demographic characteristics and lifestyle factors, functional capacity, depression, diabetes, arthritis, and back pain accounted for 42% of the variance in the Nottingham Health Profile (Hunt, McEwen, & McKenna, 1985), which is a generic measure of HRQOL (Orfila et al., 2006).

Additionally, among individuals with CVD, women tend to report more unhealthy days than men (Hayes et al., 2011). A study of coronary artery bypass graft (CABG) surgery found that preoperative depression (one day before) predicted worse physical HRQOL one year later; after adjusting for depression, education, and partner status (“living alone” as a marker for social isolation), female gender was still associated with worse role functioning (Kendel et al., 2011).

Maatouk et al. (2012) found a prospective association between female gender, depression, and worse physical health in patients with hypertension; their study indicated that a previous history of depression was correlated with poorer physical health only in women. A cross-sectional study found that hypertensive women had lower mental health and more symptoms than men (Erickson, Williams, & Grupen, 2004).

Various explanations have been proposed for a female preponderance in depression including the impact of social and cultural values on women's perceptions with regard to role expectations and constraints (Bifulco, Brown, Moran, Ball, & Campbell, 1998). Similarly, analysis of semi-structured-interviews with ten women suggested that barriers experienced by women to recovery after CABG were related to limited access to care, gender role expectations and prevailing traditional views with regard to the subordinate role of women in society (Hawthorne, 1993). Further elucidation of the determinants of gender differences in depression is needed; low social support, genetic and biological factors have limited associations with gender differences (Piccinelli & Wilkinson, 2000).

**Hispanic Ethnicity**

Chronic conditions including hypertension and its associated comorbities present special challenges for elderly Hispanics, and can have an effect on HRQOL (Maatouk et al., 2012; Rothrock et al., 2010). Longitudinal findings from a study evaluating cognitive decline and changes in systolic BP (SBP) in 2859 Hispanic adults ≥ 65 years, showed positive associations between age, severity of hypertension, and cognitive decline (e.g. alertness, memory), (Insel, Palmer, Stroup-Benham, Markides, & Espino, 2005). Epidemiologic data currently points to the importance of SBP, in addition to pulse pressure (PP) and a graded influence of BP, in the diagnosis and treatment of hypertension while past focus has been on diastolic BP (DBP) and categorical hypertension (O'Donnell & Kannel, 2002). A major component of BP is PP, which is the difference between SBP and DBP; the rise in SBP and PP in middle-aged and older adults is mostly due to an increased stiffness of the large arteries (Franklin et al., 1999).

Among high-functioning older Hispanic adults, hypertension has been shown to be a risk factor for all cause-mortality (Odden et al., 2012). In elderly Hispanics, the burden associated with the chronic nature of hypertension and the need for daily pharmacological therapy can negatively affect mental health, and lead to diminished HRQOL (Hayes, Denny, Keenan, Croft, & Greenlund, 2008). Suboptimal prescribing in hypertension, which contributes to adverse drug interactions and the inadequate use of multiple drugs or polypharmacy, has been found to be associated with lower extremity functional limitations in elderly Hispanics (Pugh et al., 2007).

There is a paucity of studies examining HRQOL in Hispanics with hypertension, particularly in young and middle-aged adults. However, Hispanics have lower hypertension control rates than non-Hispanics Blacks and Whites, respectively, 41%, 48%, and 56%; lower disease awareness 78%, 87%, and 81%; and lower treatment (disease management) rates 70%, 80%, and 77% (Yoon, Burt, Louis, & Carroll, 2012). Trends from the National Health and Nutrition Examination Survey (NHANES) 2001-2010, a multistage probability sample of the US civilian non-institutionalized population, indicate that Hispanics with hypertension are less likely than their non-Hispanics counterparts to take prescribed medications (Gu et al., 2012). Notably, outcomes from clinical trials indicate that ethnicity is not associated with inferior BP control when Hispanics and non-Hispanic whites have equal access to treatment at no cost (Cooper-DeHoff et al., 2006; Cooper-DeHoff et al., 2007; Margolis et al., 2007). Disparities in ethnicity, comorbidity rates, and mortality related to hypertension partly point to deficiencies in patient education and management along treatment pathways and, largely, to a major public health problem (Bersamin et al., 2009; CDC, 2013).

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# CHAPTER 3

# LITERATURE REVIEW

## Introduction

Adults with hypertension tend to report worse health-related quality of life (HRQOL)--that is, functioning and well-being--than those who are normotensive, or without the condition (Alonso et al., 2004; Rothrock et al., 2010). Hypertension is a risk factor for stroke (Beckett et al., 2008); kidney disease (Soni, Porter, Lash & Unruh, 2010); and cardiovascular disease (CVD), the number one cause of premature death in the US (Go et al., 2013). Suboptimal blood pressure (BP) control is the leading risk factor associated with cardiovascular deaths (Lloyd-Jones et al., 2009). Racial/ethnic minorities are more likely to have uncontrolled hypertension and are at higher risk than non-Hispanic whites for hypertension-related cardiovascular morbidity (disease incidence and prevalence), (Go et al., 2013). Hispanics with hypertension have less disease awareness, and lower control and treatment rates (disease management) than non-Hispanics (Guo, He, Zhang, & Walton, 2012); they also have high poverty rates (26%), similar to African Americans (US Census Bureau, 2013). In addition, national trends from the National Health and Nutrition Examination Survey (NHANES) 2001-2010, a multistage probability sample of the US civilian non-institutionalized population, indicate that Hispanics with hypertension are less likely than their non-Hispanics counterparts to take prescribed medications (Gu, Burt, Dillon, & Yoon, 2012).

Poor BP control and non-adherence to treatment regimens among Hispanics with hypertension have been associated with limited access to healthcare (Ventura, Pina, & Lavie, 2011), and greater acculturation to the US (Espino & Maldonado; 1990). Other factors include linguistic barriers; suboptimal disease knowledge and awareness; poor patient-provider communication; and deficits in the quality of clinical management (Bersamin, Stafford, & Winkleby, 2009; Betancourt, Carrillo, & Green, 1999; Perez-Stable & Salazar, 2004).

The influence of socioeconomic conditions on health is most frequently measured by educational attainment and household income in the US (Krieger, Williams, & Moss, 1997). Low educational attainment and poverty are related to inadequate access to care and lack of healthcare coverage (Frieden, 2011); individuals with low socioeconomic status (SES) are at risk for developing diabetes, hypertension, and contracting human immunodeficiency virus (Meyer et al., 2013). Non-adherence in adults with chronic conditions is a public health problem of epidemic proportion; however, adherence is not predicted by socioeconomic factors or demographic characteristics (Frieden, 2010; Haynes, McKibbon, & Kanani, 1996).

The Seventh Report of the US Joint National Committee (JNC 7) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (Chobanian et al., 2003) has emphasized the need for building patients' trust in their clinicians in order to improve treatment adherence (Lenfant, Chobanian, Jones, & Rocella, 2003). It has been noted that even the most effective antihypertensive treatments cannot be effective if patients fail to remain under medical care (Frieden, 2010). In addition, public confidence in the trustworthiness of national guidelines for management of hypertension is important to improve treatment adherence (Sox, 2014).

Public mistrust of health care systems (providers and institutions) poses a threat to accessing care (Mohseni & Lindstrom, 2007; Russell, 2005). Racial/ethnic inequalities in both health and healthcare have been associated to "*real or perceived mistreatment by providers*" (National Research Council, 2003, p. 12), even when healthcare is available (CDC, 2012). These disparities have also been related to the impact of structural factors, such as social discrimination, as barriers to seeking healthcare among racial/ethnic minority groups, largely arising from distrust of healthcare institutions (Berk & Schur, 2001). Hispanics have been found to have greater distrust of their physicians than non-Hispanics (Berrios-Rivera et al., 2006).

Trust in the medical profession has been associated with patients' motivation to seek medical care rather than self-treat and following doctors' recommendations (Hall, Camacho, Dugan, & Balkrishnan, 2002a). Trust in the medical profession may promote adoption of health-

related behaviors in patients with treatable chronic conditions, such as hypertension, by increasing utilization of medical care and adherence to treatment recommendations; subsequently, it may improve HRQOL. In addition, trust may function as a protective mechanism by enhancing patient resilience, given the vulnerability associated with the demands placed by chronic illnesses on patients and their families (Thorne & Robinson, 1988), particularly in the context of limited SES resources. Resilience or the ability to cope in a manner that promotes positive adaptation regardless of traumatic experiences (Garmezi, 1991), has been found to mitigate the negative impact of lifetime exposure to adverse social or personal circumstances (Karatsoreos & McEwen, 2011).

The purpose of this study was to investigate the potential role of trust in the medical profession in enhancing resilience and medication adherence for adults with hypertension, and to assess if these associations vary by ethnicity (Hispanic vs. non-Hispanic). This chapter presents a synthesis of the literature elucidating specific topics relevant to the variables under investigation, including the socio-demographic profile of hypertension in Hispanics and non-Hispanics within the context of disparities in both health and healthcare.

## Hypertension

### Definition of Hypertension

**Basic physiology of blood pressure regulation.** The primary function of blood pressure (BP) is to force an adequate blood supply to the tissues through the vascular system; hence, the regulation of BP (both short-term and long-term) is a complex physiologic function that requires the integrated support of cardiovascular, renal, neural, endocrine, and local tissue control systems (Hall et al., 2012). The multiple systems involved in regulation of BP indirectly influence cardiac function or vascular resistance (e.g. through hormonal activity); in addition, other contributing factors such as cardiac output, reflecting cardiac pumping ability, affect vascular capacity, transcapillary (intracellular) fluid exchange and extracellular fluid volume (Hall et al., 2012).

Hypertension is most commonly defined based on the classification proposed by the Eight Report of the US Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) (James et al., 2014). Stage 1 hypertension for adults 60 years or older is defined as untreated systolic blood pressure (BP) equal to or greater than (≥) 150mm Hg, or diastolic BP ≥ 90 mm Hg; for those who are 59 years or less, stage 1 hypertension is defined as a diastolic BP ≥ 90 mm Hg. Stage 2 hypertension is untreated systolic BP ≥160 or diastolic BP≥100 mmHg (James et al., 2014).

**Primary or essential hypertension and secondary hypertension.** Primary or essential hypertension is the most frequent form of the disease, accounting for approximately 95% of all cases and is usually defined as elevated BP for which an identifiable secondary cause (e.g. renovascular disease) cannot be determined (Hall et al., 2012). Age-related changes in the cardiovascular system contribute to arterial stiffness and development of primary hypertension (Franklin, Kahn, Wong, Larson, & Levy, 1999; Pettersen, Bugenhagen, Nauman, Beard, & Omholt, 2014).

Some types of secondary hypertension have a genetic basis while others are caused by cardiovascular diseases (CVDs) or target-organ damage related to disorders such as diabetes; in addition, hypertension can also be caused by iatrogenic effects of certain drugs such as oral contraceptives and sympathomimetics (e.g. amphetamines), as well as by genetic and familial predisposition (Elliott, 2006; Hall et al., 2012). Familial and, possibly, genetic associations may reflect environmental influences (Elliott, 2006). Factors influencing HRQOL in those with secondary hypertension are beyond the scope of this study; thus, only patients with a diagnosis of primary hypertension will be included.

## Epidemiology of Hypertension

**Prevalence.** Hypertension is a highly modifiable risk factor for CVD and, largely, a disease of industrialized countries that rises with age and is strongly associated with diet and a sedentary life style (Whelton, 1994). In western societies, more than 20% of adults have

hypertension (Hall et al., 2012); population prevalence is highly determined by age and race/ethnicity (Elliott, 2006). In the US, 50% of those aged 60-69 and 75% of those over 70 years have hypertension (Lloyd-Jones et al., 2009). In 2009-2010, prevalence rates were comparable in men (31%) and women (29%) and they have remained unchanged, showing no improvement from 1999-2010 (Guo et al., 2012). National trends from 1999 to 2010 in hypertension awareness (defined as having been diagnosed with the disease), management (taking medication or adopting lifestyle modifications), and control (SBP < 140 mmHg and DBP <90 mmHg) indicated that the awareness rate was 74%, management rate was 72%, and control rate was 47% (Guo et al., 2012). In addition, awareness was lower in men (70%) than women (81%); management was lower in men (66%) than women (81%); and control was lower for men (40%) than women (56%) and for older than for middle-aged (40-59 years) adults (Guo et al., 2012). Younger adults (20-39 years) had the lowest hypertension awareness and management rates across gender and ethnic groups, and Mexican Americans had lower awareness and management rates than non-Hispanic Blacks and Whites (Guo et al., 2012). Low hypertension prevalence and small sample size in the younger adult group, and unreliable data in Hispanics before 2007 to 2008 posed limitations to conduct trend analysis in these groups (Guo et al., 2012). NHANES has been conducted yearly since 1999, and starting in 2007 changes were made to the domains being oversampled in the NHANES target population [US civilians non-institutionalized]; a main change is the oversampling of the entire Hispanic population rather than the Mexican American subgroup alone, which has been oversampled since 1988; (http://www.cdc.gov/nchs/nhanes/nhanes2007-2008/generaldoc_e.htm).

**Aetiology.** The aetiology of hypertension reflects various factors including genetic predisposition; environmental influences; iatrogenic causes (induced inadvertently by drug treatments); excess alcohol (alcohol has a vasoconstrictor effect and it also increases caloric intake); as well as unknown components (Elliott, 2006). For example, environmental influences can contribute to consumption of foods with high sodium and fat contents, and physical inactivity

(Elliott, 2006). Other identified markers and risk factors for development of hypertension include obesity; sleep apnea, less educational attainment, lower SES, and psychosocial stressors (Go et al., 2013). According to current clinical guidelines for identification and treatment of obesity, overweight is defined as a body mass index (BMI) ≥ 25 kg/m$^2$ and obesity as a BMI ≥ 30 kg/m$^2$ (U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute, 1998). Additionally, prognosis of hypertension is highly determined by concomitant risk factors such as diabetes and smoking, coupled with genetic and environmental factors; the variability observed in CVD morbidity (disease-related complications such as stroke) in individuals, communities, and countries may be partially explained by the cumulative effect and clustering (combinations) of the various risk factors (Elliott, 2006).

Epidemiological data from the long-standing Framingham Heart Study, representing a community-based population sample (n=5209) aged 30-62 years at its initiation in 1948-1951 (Dawber, Meadors, & Moore, 1951), have yielded information on major risk factors for CVD. Notably, five and ten year risk estimates for development of CVD as well as prevention algorithms, widely used for clinical-practice guidelines, are mostly based on multiple logistic models derived from the Framingham cohorts in which levels of traditional risk factors, such as age and systolic blood pressure, are assigned weights (points) to predict (separately for men and women) cardiovascular events (stroke, heart failure, claudication, CVD death, and CHD) (Lloyd-Jones, 2010). For example, overweight and obesity are leading risk factors for primary hypertension. The long-term effects of overweight status on risk of developing hypertension have been documented in vascular risk assessment estimates from multivariate regression equations in the Framingham Offspring study (Garrison, Kannel, Stokes, & Castelli, 1987). Framingham risk scores (FRS) indicated that 78% of primary hypertension cases in men and 65% in women were associated with increased weight gain (Garrison et al., 1987). More recently, 44 years of follow-up data in the Framingham cohort indicated that overweight status is highly associated with (the age-adjusted) relative risk and with population attributable risk, that

is, the proportion of hypertension in the population that can be attributed to excess weight, for development of hypertension (Wilson, D'Agostino, Sullivan, Parise, & Kannel, 2002). Interestingly, heightened anxiety was found to be a psychological predictor of later incidence of hypertension in men, but not women, in a Framingham cohort (n=1123) that was followed for 20 years without evidence of hypertension at baseline (Markovitz, Matthews, Kannel, Cobb, & D'Agostino, 1993).

Relative risk for a disease, death, or other outcome refers to the ratio of the incidence rate or chance of disease development among members of a population exposed to a risk factor to the incidence in a similar population not exposed to the factor; absolute risk is the incidence rates or number of individuals exposed to a disease when the exposed population is know with certainty (McGraw-Hill's online medical dictionary, 2002). Prehypertension is associated with increased relative and absolute risks for unfavorable CVD outcomes in all age groups (Go et al., 2013).

**Subgroup excess risk.** Racial and ethnic minorities in the US, and worldwide, are disproportionately afflicted by poor health (Marmot & Bell, 2009). A phenomenon that has been identified as the social gradient in coronary heart disease (CHD) in the Whitehall study of British Civil Servants (Marmot, Rose, Shipley, & Hamilton, 1978), highlights the association between population patterns of health and disease with population distributions of affluence and scarcity, respectively. Social inequalities such as inadequate access to quality healthcare increase individuals' vulnerability to poor health (IOM, 2002). Vulnerable populations have been described as groups who by virtue of lacking social and economic resources are at high risk of poor physical, mental, and/or social health (Aday, 1994). The notion of vulnerability relates to the epidemiological concept of risk, an individual's probability for disease development within a given period of time (Aday, 1994). However, both individual and community risk factors, or lack thereof, contribute to the differential susceptibility to adverse health outcomes in underserved

groups as evidenced by higher comparative morbidity, premature mortality, and worse HRQOL (Aday, 1994; Meyer et al., 2013).

**Risk Factor Clustering and CVD Outcomes**

Population studies have demonstrated that hypertension is a major contributor to atherosclerotic CVDs including coronary artery disease (CAD), the most lethal sequel of hypertension, and that risk of CAD increases with the extent of risk factor clustering (Kannel, 2000). It is important to note that hypertension occurs in isolation only in about 20% of cases, as it is most frequently accompanied by other metabolic risk factors particularly obesity; glucose intolerance; and dyslipidemia, evidenced by elevated total cholesterol, elevated low density lipoprotein and triglyceride levels, and/or reduced high density lipoprotein cholesterol levels (Kannel, 2000).

The Metabolic Syndrome is a unique pathophysiologic condition that encompasses hypertension, dyslipidemia, central (upper body) obesity, and insulin resistance or glucose imbalance (Alberti, Zimmer, & Shaw, 2006). Clustering of these risk factors predisposes individuals to diabetes (Alberti & Zimmet, 1998), and markedly elevates the risk of adverse outcomes including mortality among middle-age (51-61 years) and older-age adults (≥ 70 years), use of health services, and impairments in HRQOL (Oldridge, Stump, Nothwehr, & Clark, 2001). For example, a study conducted in Spain among 3567 adults ≥ 60 years found that those with hypertension, obesity, diabetes, or a combination of these factors tend to report worse HRQOL than those without these conditions (Banegas et al., 2007). Men with diabetes, and women with both obesity and hypertension had worse physical and mental HRQOL across all domains ($p \leq 0.05$) than those without these factors; men with all three conditions had worse physical functioning ($p < 0.001$) and women with all three factors had significantly worse HRQOL than men in every domain ($p < 0.001$), (Banegas et al., 2007).

## Health-Related Quality of Life

The World Health Organization (WHO, 1948) defined health as not merely the absence of disease but as a state of full physical, mental, and social well-being. Encompassing the major dimensions of health, this definition points to the importance of the various aspects of health such as the ability to work productively and participate in social life. Drawing from the basic notion that life has two dimensions, quantity and quality, the assessment of quality of life in the context of health and illness is referred to as health-related quality of life (HRQOL),(Ware, 1987), broadly defined as the extent of an individual's functioning and to his/her perceived well-being (Wood-Dauphinee, 1999). The term quality of life emerged around 1920, and measures to evaluate HRQOL have existed since the early 1970s (Wood-Dauphinee, 1999). Evaluation of HRQOL is a main focus area of Healthy People 2020, a national initiative for health promotion and disease prevention, reflecting one of the overarching goals of our nation to promote quality of life throughout the lifespan of all populations (http://healthyeople.gov). The American Heart Association (Rumsfeld et al., 2013) released a scientific statement advocating the inclusion of patient-reported health as an important measure of cardiovascular outcome encompassing aspects of HRQOL (symptom burden and functional status); the document also notes that patient-reported health status is predictive of costs of care, hospitalization, CVD events, and mortality.

As survival from CVD continues to improve, assessment of HRQOL becomes an increasingly important outcome measure complimenting traditional outcomes such as mortality (Rumsfeld et al., 2013). Measurement of patient-reported outcomes in clinical practice can provide important information that may not be captured by objective data (Hahn et al., 2007). Clinician-reported outcomes may not accurately reflect patients' perceptions of their illnesses (Campbell, Quilty, & Dieppe, 2003). Relative to the study of trust in the medical profession, inclusion of HRQOL in the clinical setting has been associated with improved patient-doctor communication (Detmar, Muller, Schornagel, Wever, & Aaronson, 2002). Similarly, in a

randomized trial (n = 1651) conducted in a community-practice setting, assessment of HRQOL was correlated with improved patient-physician interaction and satisfaction with care, particularly in the areas of cognitive/physical functioning and fall prevention in older adults (Wasson et al., 1999; http://www.isoqol.org/UserFiles/file/UsersGuide11-11.pdf). As follows, an overview of the potential of these measures to enhance screening and evaluation in the practice setting is presented.

**Measurement of HRQOL**

A major distinction among HRQOL instruments is whether they are *generic* or *specific*. *Generic* instruments are designed to evaluate HRQOL across diseases, populations, and interventions; these have two basic forms: 1) profile measures, designed to yield scores across health domains and 2) preference-based measures, designed to produce a single summary score (Hays, 2005). *Specific or disease-targeted* measures are used to provide information on the most relevant aspects of HRQOL relative to a specific condition (Hays, 2005).

**Generic HRQOL instruments.** HRQOL in this study will be measured by the Patient-Reported Outcomes Measurement Information System (PROMIS®) Global Health items (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009). The PROMIS® is a National Institutes of Health Roadmap initiative designed to develop and evaluate self-reported outcomes; the PROMIS initiative establishes a national resource for health outcomes research (Cella et al., 2007), which includes efficient and precise evaluation and measurement of patient-reported outcomes of care (patient satisfaction and HRQOL), traditional clinical endpoints (death, adverse events), and physiological indicators (Kane, 1997). Ten PROMIS Global Health items representing physical, mental, and social health domains will be administered to assess HRQOL in adults with hypertension (Hays et al., 2009). These domains mirror the PROMIS health framework (http://www.nihpromis.org; Cella et al. 2007), and build upon widely used *"legacy*" instruments (Cella et al., 2010) such as the Short Form (SF-36) health survey (Ware & Sherbourne, 1992). Aligning with the *legacy* measures, scores were calibrated on a T-score metric so norm-based

standardized scores have means of 50 and SDs of 10 in the general US population (Hays et al., 2009; Ware, Kosinski, & Keller, 1996).

The SF-36 health survey (Ware & Sherbourne, 1992), which comprises 36 items included in the Medical Outcomes Study (MOS; Stewart, Hays, & Ware, 1988), is the most widely used generic instrument to compare the relative burden of disease across different groups and to assess HRQOL in those with chronic illnesses. The MOS was a four year observational study of adults with chronic conditions (N=9385), conducted in three US cities, to evaluate the influence of patients, providers, and health systems' characteristics on outcomes of care (Stewart et al., 1988). The SF-36 assesses eight health concepts using multi-item scales, 20 out of 35 items are framed to target a four weeks reporting interval, and an additional item evaluates change in perceived health during the last 12 months (Hays, 2005). This instrument yields eight multi-item scales and two summary scores: the Physical Component Summary (PCS) score and the Mental Component Summary (MCS) score (McHorney, Ware, Lu, & Sherbourne, 1994). Its shorter version, the 12-item Short Form Health Survey (SF-12), contains 12 items selected from the MOS (Ware et al., 1996).

The precision of HRQOL (self-report) instruments has been found to be comparable to commonly used clinical data (physiological instruments) in a systematic review evaluation clinical measurement studies, in which error in HRQOL measurement was compared to clinical measurement (Hahn et al., 2007). Reliability refers to the ability of an instrument to consistently measure what it purports to measure; reliability coefficients vary from 0.0 to 1.0, 1.0 indicates no measurement error and 0.0 indicates that all of the observed variance is due to measurement error (Burns & Grove, 2009). Conceptually, reliability is the proportion of true variance to total variance in a tool, and it is never proven but it is dependent on the sample characteristics, population dependent, and the circumstances under which is evaluated.(Burns & Grove, 2009).

**Comorbity analysis.** Across the spectrum of chronic illnesses, even those affected by a single condition consistently report poorer general, or global, HRQOL than those without an existing condition; however, the magnitude of detriment in HRQOL is influenced by the number and, particularly, the extent of functional impairment posed by comorbidities (Rothrock et al., 2010). The presence of depression is highly reflective of differences in HRQOL, independent of the potential effect of socio-demographic characteristics such as race/ethnicity and age (Rothrock et al., 2010). However, it is recommended to conduct a sensitivity analysis by excluding depression from the model because of its overlap with the HRQOL outcome variable (Hays, Reeve, Smith, & Clauser, 2014).

## HRQOL and Hypertension

In the evaluation of HRQOL, physical health is measured in terms of individuals' ability to perform a variety of physical activities including self-care and limitations due to physical health problems; in contrast, mental health measurement includes experiences that are not always evidenced by overt symptoms or behaviors (Ware, 1987). Thus, assessment of mental health includes anxiety; depression; behavior/emotional control and stability of emotions as well as psychological well-being, particularly, frequency and intensity of feelings of emotional distress and positive effect (Ware, 1987). Health perceptions, representing the overall rating of self-assessed general health including feelings of well-being, vitality, and energy level (Ware, 1987), are important aspects of HRQOL in hypertension since it is often regarded as an asymptomatic condition by clinicians and patients (Gudmundsdottir, Hoieggen, Stenehjem, Waldum, & Os, 2012).

### Longitudinal Predictors of HRQOL in Adults with Hypertension

Evaluation of HRQOL in hypertensive patients has elucidated factors that impact the ability to cope with illness burden and adapt to long-term related disabilities, such as kidney disease (Soni et al., 2010). Investigators from the Epidemiologic Study of Health Risks (ESTHER), a population-based cohort study of 9 953 adults aged 50-74years conducted in

Germany, evaluated longitudinal predictors of HRQOL over a follow-up period of five years in 4203 hypertensive patients (Maatouk et al., 2012). From the pool of the ESTHER data, variables identified in previous studies as risk factors for CVD were selected, and associations between SF-12 PCS and MCS and the selected variables were measured; variables yielding P values below 0.20 in the correlation analysis were retained, 0.20 level was used as the screening criterion to avoid exclusion of variables previously identified as important risk factors for CVD (Maatouk et al., 2012). The mean SF-12 PCS of the subjects at follow-up after 5 years was 40.3 (SD = 9.9) with values ranging from 11.1 to 61.2, and the mean MCS was 48.1 (SD = 9.7), range 13.6 to 67.5; in addition, gender specific analysis at follow-up showed that women had worse SF-12 PCS and MCS scores than men (Maatouk et al., 2012). Having a history of depression and having diabetes were related to worse SF-12 PCS scores in women, while dyslipidemia and number of antihypertensive medications predicted worse SF-12 MCS only in men (Maatouk et al., 2012).

The strongest predictors of worse SF-12 PCS at the five year follow-up were: BMI and both SF-12 PCS and MCS baseline scores ($p < 0.001$), while predictors of worse MCS at the five ear follow-up were: history of depression and both SF-12 PCS and MCS baseline scores ($p < .001$) (Maatouk et al., 2012). Additional findings indicated that the SF-12 PCS at the five year follow-up was worse for those with a higher BMI, presence of macroalbuminuria,(which was defined as urinary albumin >200mg/l), and smokers ($p < 0.05$); and the SF-12 MCS was worse among those with dyslipidemia and smokers ($p < 0.05$) (Maatouk et al., 2012). Albuminuria, or proteinuria, is a measurable marker for the onset and progression of chronic kidney disease and CVD, as well as changes in renal function in patients with hypertension (Kuritzky, Toto, & Van Buren, 2011). Macroalbuminuria is a type of albuminuria that is characterized by high levels of albumin in the urine (> 200 mg/l), its presence indicates that the kidney is leaking albumin, a blood protein. Normal urinary albumin values are < 20mg/l; urinary albumin excretion levels are associated with increased risk of cardiovascular events (Cerasola, Cottone, & Mule, 2010).

## Psychosocial Factors Influencing HRQOL in Adults with Hypertension

**Labeling.** Hypertension labeling has been characterized as a phenomenon, often referred to as the labeling phenomenon (Lefebvre, Hursey, & Carleton, 1988), due to widely observed patterns reflecting its negative psychological effects and behavioral consequences, including consistent absenteeism from work (Haynes, Sackett, Taylor, Gibson, & Johnson, 1978). A study conducted at a teaching medical center in Spain of 466 patients indicated those with known hypertension had worse SF-36 mental health, general health, vitality, and physical functioning than those who were unaware of having the condition (Mena-Martin et al., 2003).

Analyses of NHANES (2001-2004) data from 8303 adults (20 years or older), indicated that those who had awareness of having hypertension tended to report fair or poor health status, more activity-limited days, more mentally unhealthy days, and more physically unhealthy days associated with current antihypertensive treatment (Hayes et al., 2008). African Americans diagnosed with hypertension reported worse mental health than whites including greater depression, independent of SES; however, regardless of racial differences both groups reported similarly poorer physical health than non-labeled individuals (Spruill, Gerber, Schawrtz, Pickering, & Ogedegbe, 2012). Consistent findings have been documented by studies assessing self-rated health (SRH). Barger and Muldoon (2006) data analysis on an adult NHANES (1988-1994) population showed that hypertension labeled individuals, in all three major racial/ethnic groups (Hispanics and non-Hispanics blacks and whites), were more likely to report poorer SRH; the effects of labeling were independent of established predictors of SRH such as concurrent chronic conditions (Goldberg, Gueguen, Schmaus, Nakache, & Goldberg, 2001).

**Symptoms.** Hypertension is often referred to as the “silent killer” (Hayes et al., 2008 p.646) because symptoms that impact functional status and well-being, such as pain in rheumatoid arthritis, are frequently absent, particularly in the early stages of the disease (Hall et al., 2012). For example, a study evaluating chronic conditions in eight countries among the

general population (sample sizes ranging from 2031 to 4084), showed that those with hypertension had lower HRQOL than those without the condition in all SF-36 domains, although these differences were small in magnitude (Alonso et al., 2004). Evaluation of functional status and well-being in the MOS in 9385 adults with nine common chronic conditions indicated that patients with hypertension, independent of comorbidities, had lower health perceptions than those without chronic conditions; however, hypertension had the smallest impact on HRQOL while gastrointestinal disorders, angina (chest pain of cardiac origin), and congestive heart failure had the greatest impact across most health domains including physical functioning, social and role functioning, mental health and/or bodily pain (Stewart et al., 1988).

Although often regarded as a silent condition, hypertension has been found to be associated with a variety of symptoms including dizziness, headaches, palpitations, fatigue, and depression (Kjellgren et al., 1998). The perception that hypertension is a silent condition may be influenced by the fact that symptoms reported by hypertensive patients often reflect non-specific symptoms described by patients in the clinical setting (Bulpitt & Fletcher, 1985). Compounding the problem, side effects from antihypertensive drugs have also been associated with general symptoms encountered in primary care patients such as fatigue, heartburn, and lightheadedness (Erickson, Williams, & Gruppen, 2001). For example, a population-based multi-center study comparing perceived symptoms between patients on antihypertensive drug treatment and hypertensive patients without drug treatment, found that the majority of the patients in both groups experienced symptoms to a similar extent (Kjellgren et al., 1998). Another population-based study of randomly selected adults (N= 1430) aged 45-89 found that those who reported having hypertension had significantly worse, age-adjusted, general health scores across three different health status measures (the SF-36; time trade-off assessment; and Quality of Well Being index) than those who reported not having hypertension; in addition, a significant decline in general health was associated with use of a greater number of antihypertensive drugs (Lawrence, Fryback, Martin, Klein, & Klein, 1996).

## Trust

This section presents a review of studies bearing on institutional trust and, specifically, trust in the medical profession in relation to its potential role in enhancing HRQOL in patients with hypertension. Trust is a core component of the patient's perspective about the quality of care (Donabedian, 1990). Traditionally, trust has played a central role in the medical encounter and the patient-doctor relationship has been considered a mechanism for cultivating trust (Peabody, 1927). Patients' trust in their physician, or interpersonal trust, is associated with adherence to medical recommendations, satisfaction with care, and better self-reported health ($p < .001$), (Safran et al., 1998b). Trust in the medical profession, or general trust, is correlated with patients' desire to seek medical advice rather than self-treat, and with the amount of control that physicians should have in treatment decisions (Balkrishnan, Dugan, Camacho, & Hall, 2003). Hence, general trust provides a means for improving access to care by increasing utilization of medical care and adherence to recommended regimens. However, few studies have examined trust in the broader context of the health care system and medical institutions (Hall, 2006). Trust researchers have largely focused on interpersonal physician trust, particularly since the publication of Anderson and Dedrick's (1990) Trust in Physician scale (Hall, 2006). Trust in the medical profession among Hispanics with preventable and modifiable conditions has rarely been examined, and the relationship of trust with HRQOL in patients with hypertension is unknown. This study will assess trust in the medical profession, a form of institutional trust, as opposed to interpersonal trust or trust in one's physician. An 11-item scale developed by Hall et al. (2002a) will be used to measure trust in the medical profession, this study's main independent variable.

### Defining Attributes of Trust

Conceptual analysis can be used as a tool in research and theory development to help refine ambiguous concepts and produce a precise operational definition through identification of defining attributes, antecedents, consequences, and empirical referents associated with the

concept (Walker & Avant, 2011). Antecedents refer to criteria that must be present prior to the concept, but they are not necessarily causal factors; consequences are circumstances that result from the concept or follow its occurrence (Walker & Avant, 2011). Antecedents and consequences guide the identification of attributes and can provide support for the contextual application of a concept, but they cannot actually be part of the concept (Walker & Avant, 2011). Empirical referents are categories or classes of actual phenomena that demonstrate the occurrence of the concept, these also provide a means for measuring the defining attributes; in some cases the defining attributes and empirical referents may be the same (Walker & Avant, 2011). Antecedents of trust include relevant prior experience, risk and expectations of positive consequences, perceptions of competence, reliability, and trustworthiness of the trustee (Johns, 1996). Defining attributes of trust are vulnerability, willingness, reliance, person(s) or thing(s), relationship, performance and expectation (Johns, 1996).

Various definitions of trust have been proposed across disciplines (Goudge & Gilson, 2005; Pearson & Raeke, 2000; Thom, Hall, & Pawlson, 2004; Wallston, Wallston, & Gore, 1973). There seems to be general consensus that trust refers to a willingness to accept vulnerability under conditions of interdependence and risk (Mayer, Davis, & Schoorman, 1995; Rousseau, Sitkin, Burt, & Camerer, 1998). Drawing from rational choice theory as a framework for understanding social and economic behavior, social science scholars acknowledge the element of vulnerability in relations of trust and conceptualize it as a cognitive judgment, with no moral content, based on the knowledge that the trusted individual's motivations are in the trustee's best self-interest (Hardin, 1996; Warren, 1999). Additionally, trust is not a behavior, such as collaboration, or a choice such as accepting interdependence; it is a psychological state and an attitude that can either cause or lead to these actions (Rousseau et al., 1998).

**The Phenomenon of Trust in Healthcare Relationships**

Trust in healthcare relationships (Thorne & Robinson, 1988) has not been investigated sufficiently (Hall, Dugan, Zheng, & Mishra, 2001). Theoretically, trust should strengthen the

patient-provider relationship and support the development of a health partnership (Pearson & Raeke, 2000) in which treatment decisions are reached through participatory decision-making, reflecting a patient-centered approach. Berrios-Riviera's et al. (2006) study indicated that physicians' sensitivity to concerns and patient-centeredness are independent predictors of trust in physicians. Interactions between patients and healthcare providers can be challenging, and attitudes of health professionals can impact satisfaction with care (Gilson, 2003). However, it should be noted that trust is distinct from satisfaction, or the assessment of past experiences (Hall et al., 2001); trust characterizes a relationship or considers behavioral traits as these can generate trust, it is highly future oriented and denotes an increased willingness to take risks (Hall et al., 2001). For example, Thom and colleagues (1999) found that interpersonal trust is a strong predictor of medication adherence, satisfaction with care received by a physician, and continuity of care with the physician, at six months, controlling for baseline satisfaction.

Theorists differentiate interpersonal trust, which represents a specific relationship between two people, from system trust which characterizes attitudes toward social organizations and institutions (Goold, 1998; Mechanic, 1998). Although interpersonal trust and general trust are qualitatively similar, they are only moderately correlated with each other (Hall et al., 2002a). The attributes of physician trust do not fully pertain to institutional trust, or trust in the medical profession, and the factors that predict these types of trust are also different (Hall, 2006). But one common and fundamental attribute is the vulnerability of the recipient of care; trust originates in the context of a psychological state of vulnerability resulting from the need to receive medical care (Hall et al., 2002a).

**Interpersonal trust or trust in one's physician.** The study of patients' trust in physicians has increasingly gained attention during the past few decades due to challenges created by cost-containment mechanisms that have impacted on the provision of medical services and eroded the quality of the doctor-patient relationship (Safran et al., 1998b). Economic restraints and changes in the delivery of healthcare have created demands on the

doctor-patient relationship and limited physicians' ability to provide continuity of care (Illingworth, 2002). Concurrently, research findings indicate that managed care reimbursement systems and capitation have a negative effect on the level of trust that patients have for their personal physicians (Kao et al., 1998).

From the perspective of patients with chronic illnesses, trust in their personal physician is viewed as the foundation for a therapeutic relationship that fosters mutual collaboration in illness management (Thorne & Robinson, 1988). Mechanic and Meyer ( 2000) explored conceptions of trust using an open-ended interview guide to understand how patients with chronic or terminal conditions made assessments of trust in their physicians and healthcare plans and concluded that trust is an iterative process, in which patients repeatedly evaluate their physicians against their own expectations and knowledge. Interpersonal competence, including caring, compassion, and concern, emerged as the most important provider characteristics guiding participants' determinations of trust in their doctors; another common theme was a deep concern that the physician would advocate on behalf of their well-being with healthcare plans (Mechanic & Meyer, 2000).

Interestingly, while trust in the medical profession has diminished in the past two decades, patients' trust in their personal physician has remained consistently high (Blendon & Benson, 2001); on the average, interpersonal trust has been found to be about one-fourth higher when both types institutional trust ("physicians in general") and interpersonal trust ("your doctor") were measured in the same population (Hall et al., 2002a). Various explanations have been suggested for this difference. It has been noted that this emphasis reflects the highly individualist characteristic of American society and the fragmented nature of our healthcare system, as well as the high value that the doctor-patient relationship holds for most individuals (Hall, 2006). High level of interpersonal trust may also be a coping response to the cognitive dissonance that patients would otherwise experience if they cannot trust their doctor, in the context of the uncertainty and vulnerability that accompany ill health and the need for medical

care (Hall, 2006). Additionally, Hays and Ware (1986) demonstrated that people are generally inclined to rate their own personal medical care more favorably than the care that others (people in general) receive; higher response rates for provider-specific questions indicated a type of selection bias tending to skew survey responses in favor of the socially accepted response. These findings suggest that general items (items with a general referent) on surveys assessing satisfaction with medical care are more likely to yield lower ratings than items with a personal referent (Hays & Ware, 1986).

**Conceptualizing Trust in the Medical Profession**

Relative to the development of their Trust in the Medical Profession scale, Hall et al. (2002a) note that drawing from theoretical work and previous research on medical trust (Hall et al., 2001; Mechanic & Meyer, 2000; Pearson & Raeke, 2000; Thorne & Robinson, 1988), they initially proposed five overlapping domains in the conceptualization of trust in the medical profession, namely: fidelity, competence, honesty, confidentiality, and global trust. However, the domain of confidentially was dropped from the final scale due to poor correlation with other scale items, suggesting that physicians' commitment to maintain confidentially may not have been of concern to the study's population (N=502), (Hall et al., 2002a). Additionally, Hall and colleagues (2002a) found that the various dimensions of trust including competency, fidelity, and honesty were undistinguishable for the participants, suggesting that people do not seem to differentiate among these domains when evaluating trust in the medical profession. Thus, consistent with previous findings on interpersonal trust (Hall et al., 2002a; Kao et al., 1998; Safran et al., 1998a; Thom et al., 1999), factor analyses indicated that trust in the medical profession is unidimensional; global trust seems to encapsulate the various domains of trust (Hall et al, 2002a).

**Trust in the Medical Profession and HRQOL**

Trust is essential to an effective health system as it underpins the accountability and collaboration that are necessary, within health systems, to health production and maintenance

(Gilson, 2003). Across nations, effective health systems are important to society, and a trust-based system can contribute to strengthening social values through its role in fostering cooperation and collective action (Gilson 2006). From this view, trust has been described as an important source of social capital for communities and nations (Putnam, 1995), and as the scarcest of medical resources (Illingworth, 2002). Findings from a population-based survey of 18-80 year olds in Sweden showed a significant association between trust in the healthcare system, or institutional trust, and poor self-rated health suggesting that this relationship might be partly mediated by access to healthcare through the potential role of trust in the promotion of healthcare-seeking behaviors (Mohseni & Lindstrom, 2007). Women had lower levels of trust in the healthcare system (35%) than men (31%), and consistent with previously discussed gender differences, they were more likely than men to report fair or poor self-rated health (33% and 29%, respectively). Additionally, low self-rated health was significantly associated with older age, low educational attainment, and low SES (Mohseni & Lindstrom, 2007).

In the US, lack of trust in the healthcare system is notably high, and it was found to be associated with worse self-reported health in a general-population sample of 961 adults (Armstrong et al., 2006). Trust and effective interactions between patients and physicians may promote healthcare-seeking behaviors (Hall et al., 2001). Trust is viewed as a global attribute of medical relationships (Hall et al., 2001). While patients trust in an individual physician is highly influenced by their assessment of the doctor's characteristics and seems to have a faith-based component, general trust is a more global concept reflecting patients' generalized attitudes and views of the medical profession (Hall, 2006). Trust in the medical profession may foster the development of interpersonal trust, and it may influence important health behaviors, such as adherence to treatment (Hall et al., 2002a).

## Medication Adherence

Chronic hypertension is the most commonly diagnosed condition by US physicians in the office setting (Hing, Cherry, & Woodwell, 2006). Detection of hypertension and treatment efforts

are essential in targeting those at high risk and in potentially reducing the burden of chronic illness associated with cardiorenal disease (Whelton, 1994). Despite national guidelines and initiatives, lack of adherence to treatment is a major barrier to achieving hypertension control, and Hispanics are less likely to take antihypertensive medications than non-Hispanics (Gu et al., 2012). Adherence to a medication regime refers to the extent to which patients take a drug as prescribed by their healthcare providers, the term compliance is used interchangeably but adherence is generally preferred because it implies a shared responsibility between patient and provider (Osterberg & Blaschke, 2005).

Non-adherence to antihypertensive treatment is a complex and multifaceted issue, and it is associated with significant medical and social costs; although interventions to improve adherence have been effective in clinical trials evidence suggests that these results are not consistently translated to, or sustained in, clinical practice (Hart & Bakris, 2004). In 2010, the WHO called for development of novel interventions that can foster treatment adherence in those diagnosed with hypertension; however, in the US and globally treatment and medication controlled rates remain low (Ikeda et al., 2014). Estimates of lack of adherence range from 30-50%, and interventions simply targeting patient education have not shown success, whereas motivational strategies seem to be partly effective (Schroeder, Fahey, & Ebrahim, 2004). There are two broad types of non-adherent behaviors: unintentional (i.e. forgetfulness, lack of time and cost of drugs) and intentional, or decision based (i.e. replacing drugs with alternative medicines) (Horne, Clatworthy, Polmear, & Weinman, 2001; Marshall Wolfe, & McKevitt, 2012).

**Patient-Related Factors Influencing Adherence to Antihypertensive Agents**

**Lifestyle and psychosocial risk factors**. Smoking, frequent consumption of fast-food (≥ 2 times per week), and depression have been found to be significantly related to non-adherence to antihypertensive medications (Aggarwal & Mosca, 2010). A meta-analysis of qualitative and quantitative studies evaluating the role of barriers to hypertension control identified lack of symptoms, fear of dependence on antihypertensive drugs, side effects,

forgetting to take medications as prescribed, and lack of motivation as frequently reported barriers to adherence (Khatib et al., 2014). Cultural factors and inability to afford the cost of medications (Barnes & Lu, 2012) are associated with non-adherence among Hispanics (Horowitz, Tuzzio, Rojas, Monteith, & Sisk, 2004).

**Illness attributions.** Patient denial and non-adherence to treatment has been attributed to stress and its management (Anthony, Valinsky, Inbar, Gabriel, & Varda, 2012). Heurtin-Roberts (1993) notes that health beliefs about hypertension and illness behavior are part of individuals' efforts at adaptation to chronic illness; in the context of social and economic deprivation, health beliefs and behaviors that may influence hypertension are among the few resources available that help people gain a sense of control over their environment and their experience of chronic illness (Heurtin-Roberts, 1993).

A lack of knowledge can inhibit self-management of hypertension (Bokhour et al., 2012; Knight et al., 2001). For example, some Hispanics believe hypertension is a temporary condition and that they can control its causes (Barnes & Lu, 2012; Kronish, Leventhal, & Horowitz, 2012). Patel and Taylor (2002) reported a significant inverse relationship between patients' perceptions of control over their B/P and medication adherence ($p < 0.01$), but no relationship was found between medication adherence and illness attributions, such as stress and family history.

**Healthcare System Factors Influencing Adherence to Antihypertensive Agents**

Health system barriers impact hypertension control and medication adherence. Physicians' behaviors such as failure to intensify medication therapy and apply treatment guidelines in high-risk populations (Berlowitz et al., 1998) account for over 66% of the therapeutic ineffectiveness to attain standard-of-care goals (Phillips et al., 2001). For example, Hyman and Pavlik (2000) found that in a national final sample of 379 primary care physicians 41% were unaware or unfamiliar with JNC guidelines. This failure adds to the burden of morbidity (Borzeckiet al., 2003) and mortality, particularly in racial/ethnic minorities and the

elderly (Hart & Bakris, 2004). A meta-analysis indicated that the most frequently reported health care provider barriers to management of hypertensive patients were disagreement with clinical recommendations, high workload, lack of time and resources, and lack of reimbursement and low salaries (Khatib et al., 2014).

Other frequently cited provider barriers are poor physician-patient communication (Barrier, Li, & Jensen, 2003; Betancourt et al., 1999; Kronish et al., 2012; Ogedegbe, Harrison, Robbins, Mancuso, & Allegrante, 2004), and patients' perceptions of discrimination in relation to biased attitudes and care standards (Blair et al., 2013; Douglas, Ferdinand, Bakris, & Sowers, 2002). Additionally, several studies point to the need for greater shared decision- making (Osterberg & Blaschke, 2005), and a strong doctor-patient relationship to engender trust and foster treatment adherence (Blair et al., 2013; Bokhour et al. 2012; Kronish et al., 2012; Sarrandon-Eck et al., 2010). Studies have found that patients with chronic conditions including hypertension had slightly lower HRQOL than the general population; but the majority of the variance in HRQOL is not explained by the conditions patients have, suggesting that other factors such as style of medical care and patient characteristics are important (Stewart et al., 1989).

**Medication Adherence and HRQOL**

Many studies underline the important role of physicians in tailoring drug regimens to attain desired goals for B/P control (Beckett et al., 2008; Croog et al., 1994). Certain types of agents such as angiotensin converting enzyme (ACE) inhibitors have been found to improve HRQOL, including cognition and sexual function (Croog et al., 1986; 1994; Fogari & Zoppi, 2004). However, suboptimal prescribing including polypharmacy and drug interactions can have negative effects on HRQOL (Pugh et al., 2007). Potential side effects from anti-hypertensive drugs are numerous; thus, adequate clinical management is essential (Schindler, 2008). Symptom-related distress reported by patients on antihypertensive drugs are not uncommon. A cross-sectional study using a multi-stage population based sample (n=1858)

indicated that taking antihypertensive medications, regardless of B/P control status, was associated with worse HRQOL than having hypertension and not using medication (Trevisol., Moreira, Fuchs, & Fuchs, 2012). A study conducted in Poland assessing optimal B/P values in relation to HRQOL in 11,498 white patients treated for hypertension showed that lower SF-12 mental component summary score (MCS) was associated with number of antihypertensive drugs (reflecting severity of disease) and the presence of multiple comorbidities (Zygmuntowicz et al., 2013). Lower SF-12 physical component summary score (PCS) was strongly associated with duration of drug therapy, multiple comorbidities, and older age (Zygmuntowicz et al., 2013).

Pharmacological therapies present special challenges for the elderly. Polypharmacy has been found to be significantly associated with detrimental changes in lower extremity physical function over a 7-year study period in elderly Hispanics with comorbid conditions such as hypertension, diabetes, cancer, and stroke (Pugh et al., 2007). Antihypertensive drugs can contribute to depression and they might worsen specific domains of health such as cognitive function, social and role functioning including sexual function; which may have already been deteriorated as a result of advanced age or the disease itself (Fogari & Zoppi, 2004). But prospective randomized clinical trials have shown that even in those 80 years and older, drug treatment is associated with significant decrease in cardiovascular events (Beckett et al., 2008).

Depression has been found to be significantly associated with non-adherence to hypertension drug regimens (Aggarwal & Mosca, 2010) and lower HRQOL (Maatouk et al., 2012; Rueda & Perez-Garcia, 2013; Saboya, Zimmermann, & Bodanese, 2010). In contrast, psychological resources such as perceived self-competence are positively correlated with HRQOL (Rueda & Perez-Garcia, 2006). Schoenthaler, Ogedegbe, and Allegrante (2009) showed that self-efficacy served as a mediator of the effects of depressive symptoms on medication adherence in adults (n=167) with hypertension. Conceptual analysis of adherence to CVD health recommendations also suggested that adherence is influenced by self-efficacy along with motivation, the meaning of health, and sources of credible health information (Cohen,

2009). In support of the importance of the medical relationship in the attainment of hypertension control, patient-centered care and ability to reach therapeutic goals are among the attributes of successful adherence (Cohen, 2009). Notably, self-efficacy and personal competence (Rutter, 1985) are characteristics of resilient individuals.

## Resilience

Resilience is an aggregate of strengths that reflect an individual's ability to adapt in a positive manner despite experiences of significant adversity or trauma (Werner, 1997). Resilient qualities include positive outlook, self-discipline, internal locus of control, self-esteem (Garmezi, 1991); self-efficacy and planning skills (Rutter, 1987). Additionally, resilience is a dynamic and interactive process that can be influenced by factors such as age, gender, cultural origin and, particularly, within a person's varying life circumstances (Garmezi et al., 1984; Luthar & Cicchetti, 2000; Rutter, 1987; Rutter, 2006). The experience of adversity can increase resistance to later stress and lead to positive adaptation and hardiness, or a steeling effect as coined by Rutter (1981), rather than sensitization or vulnerability; however, positive adaptation is highly determined by effective coping (Rutter, 2006).

Conceptual analysis suggests that self-efficacy, coping, and hope are attributes of resilience (Gillespie, Chaboyer, & Wallis, 2007). Perceptions of self-efficacy result from the appraisal people give to their own performance (O'Leary, 1985). For example, Schoenthaler et al. (2009) found a significant relationship between self-efficacy and medication adherence in hypertensive patients. This finding implies that self-efficacy fosters a sense of competence to carry out health-related behaviors (Bandura, 1977; O'Leary, 1985). In the elderly, self-efficacy and internal locus of control have been shown to predict the neural regulation of cortisol in response to stress, and to attenuate age-related patterns of cognitive and global brain volume decline (Pruessner et al., 2005).

Resilience inquiry originated from the phenomenological identification of clusters of protective factors that helped high-risk children cope and overcome stressful life circumstances,

and develop into caring and competent adults (Garmezy et al., 1984; Garmezy, 1991; Rutter, 1985; Werner, 1997). Rutter (1987) noted that important mechanisms seem to protect individuals from the psychological risks associated with adversity, by operating particularly at key turning points in their lives. Rutter (1987) described these mechanisms in relation to four major processes: reduction of risk impact, reduction of negative chain reactions, establishment and maintenance of self-esteem and self-efficacy, and opening up of opportunities. More recently, behavioral (Cicchetti & Blender, 2006; Rutter, 2007) and psychobiological stress researchers (McEwen, 1998) have contributed to elucidation of the gene-environment interplay, the influence of early life experiences on gene expression and development of regulatory systems; this work has helped advance the delineation of vulnerability, risk and protective processes at the genetic level (Masten, 2007; Rutter, Moffitt, & Caspi, 2006).

Connor and Davidson (2003) found that resilience is modifiable and can be improved with therapeutic interventions in patients with depression, anxiety, and stress vulnerability. A randomized, double-blind clinical trial indicated that greater improvement in resilience was associated with higher levels of global improvement in post-traumatic stress disorder (PTSD) among persons receiving pharmacological treatment with a selective serotonin reuptake inhibitor (SSRI), fluoxetine (Connor, Sutherland, Tupler, Malik, & Davidson, 1999). SSRIs are also used for treatment of depression and anxiety, which are comorbid disorders in PTSD; non-pharmacological approaches for these conditions include cognitive or behavioral therapy (Hidalgo & Davidson, 2000). Additionally, studies on the neural basis of social cooperation suggest that altruistic behaviors (Rilling et al., 2002) may promote resilience (Richardson, 2002). In older adults, volunteer work was found to be a predictor of well-being independent of race, gender, or social integration (Morrow-Howell, Hinterlong, Rozario, & Tang, 2003); resilience in the elderly has been associated with a sense of mental and physical vitality (Wagnild, 2003).

## Psychobiological Influences on Health Status

**Biological pathways.** Stress responses are crucial to survival because they have a major role in supporting an organism's adaptation to a changing environment. In 1936, Hans and Selye pioneered research on biological effects of exposure to stressful stimuli, underlying the concept of the General Adaptation Syndrome (Selye 1998). From this perspective, resilience refers to the ability of an organism to respond to stressors by adequate initiation and timely termination of allostatic responses, which reflect the physiological changes that take place in response to environmental, social and physical disturbances (Karatsoreos & McEwen, 2011). In extension, the concept of allostasis describes the neural and endocrine mechanisms, mediators of adaptation, involved in attaining physiologic regulation and stability (Karatsoreos & McEwen, 2011). These mediators are such as the autonomic nervous system (epinephrine, nonadrenalin), metabolic hormones, and cortisol (Karatsoreos & McEwen, 2011). It is important to note that the brain is the main organ involved in the control of the stress response because it establishes the stressor; subsequently, it initiates the physiological and behavioral processes that can be either adaptive or harmful (McEwen; 2007). Although stress hormones such as cortisol have a protective short-term effect and promote adaptation, exposure throughout the life course to these hormones can have maladaptive effects and can contribute to stress-induced structural remodeling of certain regions of the brain which are targets for stress hormones, such as the hippocampus (McEwen; 2007). Structural remodeling alters physiologic and behavioral responses (McEwen; 2007). In line with these findings, the fourth wave of resilience is concerned with the roles of psychobiological and neural systems that affect adaptive behavior (Masten, 2007).

Additionally, beyond the acute stress response to tragic life events, daily events that create a state of chronic stress influence physiologic systems; overtime, this tear and wear on the body leads to allostaitic load (McEwen, 1998). The concept of allostasis and allostatic load can be viewed as a cascade of cause and effect that is initiated by primary stress mediators,

such as cortisol; allostatic load encompasses the cumulative effect of stressors including developmental experiences that influence reactivity and behavioral patterns, health related behaviors, and genetic load (McEwen, 1998). Chronic or long-term exposure to stress mediators can have a negative effect on body systems and lead to disease (Mcwen, 1998). As an example of allostatic load, biomedical studies have shown that in non-human primates B/P surges accompanied by elevation of catecholomines (stress hormones) corresponded with social confrontations among dominant males for position in an unstable dominance hierarchy, and led to development of coronary artery atherosclerosis (Manuck, Kaplan, Adams, & Clarkson, 1988). A follow-up study found that the use of beta-adrenergic blocking drugs, used to inhibit heart rate and B/P responses to stress, slowed the disease process but only on those animals who were behaviorally predisposed to develop lesions, dominant monkeys (Kaplan, Adams, Clarkson, Manuck, & Shively, 1991).

Seeman and colleagues (1997) developed a measure of allostatic load (a risk score consisting of 10 parameters reflecting physiologic activity across multiple regulatory systems) to examine the association between change in allostatic load and outcomes of aging. Data were drawn from the Mac Arthur studies of successful aging in a cohort of high-functioning community dwelling adults aged 70-79 years (Seeman, Singer, Rowe, Horwitz, & McEwen, 1997). Findings indicated that higher baseline scores were significant predictors, at the 2.5 years follow up, of higher risk for incident CVD and greater detriments in physical and cognitive functioning, independent of sociodemographic factors (Seeman et al., 1997). A follow-up study evaluating change in allostatic load and all-cause mortality over 4.5 years found a significant relationship between increase in biological markers of allostatic load and mortality (Karlamangla, Singer, & Seeman, 2006).

**Psychosocial and Behavioral Influences on Health**

**Psychosocial factors.** Considerable epidemiologic evidence indicates that in human society, differences in social ordering, low SES (Marmot et al., 1978), and other factors such as

residing in an unsafe neighborhood (Mujahid et al., 2008) predict health risks and play an important role in the social gradients of CVD (Marmot et al., 2008). For example, components of the metabolic syndrome (i.e. BP, fasting plasma glucose) and inflammatory markers (i.e. fibrinogen and C-reactive protein) point to a social gradient, and levels of these biological markers show a progressive increase as the social hierarchy descends (Marmot et al., 2008). At the lower end of the scale, these mirror the cumulative burden of socioeconomic deprivation and adverse life events, and the allostatic load that adverse social conditions place on the physiological systems that support stress adaptation (McEwen & Seeman, 1999).

Additionally, these gradients operate beyond poverty (Marmot et al., 1978). Studies have demonstrated the impact of economic scarcity on functional status, and cognitive and mental health, independent of SES (Lynch, Kaplan, Cohen, Tuomilehto, & Salonen, 1996). For example, Bobak and colleagues (2007) examined the association between health status and societal characteristics in former communist European countries and the former Soviet Union. Multilevel analyses of societal (country-level) measures of income inequality indicated that corruption and economic hardship (gross domestic product per capita) but not income inequalities, were associated with poor self-rated health (Bobak, Murphy, Rose, & Marmot, 2007). These associations were independent of individuals' socioeconomic conditions, suggesting that certain societal factors compromise health and well-being, and operate over the full range of SES (Bobak et al., 2007).

**Behavioral factors.** Personality factors and negative mood states have been associated with development and progression of CVD and hypertension (Smith & Blumenthal, 2011). These include Type A behavior patterns (Munakata et al., 1999); hostility (Niaura et al., 2000); and negative affective states such as depression (Maatouk et al., 2012) and anxiety (Markovitz et al., 1993). Negative affect is a trait characterized by negative emotional experiences and emotional distress particularly anxiety and depression (Smith & Blumenthal, 2011). Several studies have found that anxiety is frequently comorbid with depression (Paul,

1988), particularly in persons with CVD (Kapfhammer, 2011) and hypertension (Jonas & Lando, 2000). As part of a larger analysis, Marshall et al. (2003) examined the concordance of the structure of self-reported symptoms of depression and anxiety, as conceptualized in the Tripartite Model of Depression and Anxiety (Clark & Watson, 1991) in depressive and hypertensive patient groups. The tripartite model groups symptoms of anxiety and depression into three subtypes: general distress; somatic anxiety (physiologic hyper-arousal); and anhedonia (low positive affect specific to depression) vs. positive affect. Data were extracted from the MOS (Tarlov et al., 1989), and 38 items originating from the MOS battery (Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995) assessing well-being and functional status were selected for the analysis because as a group, these items were found to be representative of each of the domains depicted in the tripartite model (Marshall et al., 2003). The patient sample consisted of two groups with an existing (48 months) diagnosis of either depression (n= 315) or hypertension (n= 403), which allowed for testing of the model in those with mental and physical problems (Marshall et al., 2003). As identified in both patient groups, confirmatory factor analysis provided statistical support for the concordance of the three primary symptom domains (MOS battery) with the symptoms group posited by the tripartite model; additional analyses suggested that applicability of the model might not extend to the study of individual differences in mental health (Marshall et al., 2003). Confirmatory factor analysis (CFA) was a preferred analytic method over exploratory factor analysis (Hays, Marshall, Wang, & Sherbourne, 1994); CFA has been previously used to evaluate the discriminatory ability of self-report scales taping mood constructs to distinguish depression and anxiety (Feldman, 1993).

In contrast to negative mood states, positive affect which refers to an individual's ability to experience pleasurable engagements and positive emotions has been found to be inversely correlated with depression (Watson, Clark, & Carey, 1988). Positive emotions have been associated with lower B/P in older Hispanics (Ostir et al., 2006). Psychological well-being was found to predict recovery from cardiovascular complications (Fitzgerald, Tennen, Affleck, &

Pransky, 1993; Ostir et al., 2002); and perceived health competence predicted global well-being and social support in patients with hypertension (Rueda & Perez-Garcia, 2006). Resilience, however, differs from self-competence and positive mental health as it is not an attribute or a personality trait; in addition, the construct of resilience considers a relative resistance to overcoming adversity or high-risk environmental experiences (Rutter, 2006).

## Vulnerable Populations and HRQOL

**Resilience vs. vulnerability.** The provision of treatment of mental disorders and co-occurring problems such as homelessness, present serious challenges to our nation's economy (IOM, 1985). Poor mental health erodes human potential (Luthar & Ciccheti, 2000) and impacts intimate and social relationships (Herrman et al., 2011). Research outcomes indicate that the state of both physical and mental health influence mortality in older adults, and it also contributes to cognitive impairments, and loss of functioning and independence (Lee, 2000). Depression has been found to impose long-term limitations on many domains of functioning and well-being which were comparable to, or greater than, detriments experienced by patients with disabling conditions such as arthritis and diabetes (Hays et al., 1995).

Additionally, the impact of negative emotions on HRQOL in those with hypertension is well documented. Saboya et al. (2010) found that anxiety and depression were significantly associated with hypertension and diminished HRQOL. Extracting data from the NHANES I Epidemiologic Follow-up Study (Finucane et al., 1990), Jonas and Lando (2000) examined the prospective relationship of negative affect symptomatology (combined symptoms of anxiety and depression) in the subsequent development of hypertension on a sample of African Americans and whites (n=3310) who were normotensive and had no chronic conditions at baseline. Four waves of follow-up (22 years maximum) and an adequate number of hypertension cases allowed for evaluation of the effect of race on women (Jonas & Lando, 2000). Sixteen percent of the sample reported high baseline negative affect; white women reported 50% higher levels than men, and African American women reported more than twice the level of men (Jonas &

Lando, 2000). Through four waves of follow-up, high negative affect was found to be associated with treated hypertension in baseline risk-adjusted models; in addition, relative risk for treated hypertension was similar for all men and white women, but it was markedly higher for black women (Jonas & Lando, 2000).

Data analysis from the 1987 National Medical Expenditure Survey on self-reported health, sociodemographic characteristics, and 5 year mortality in 19,812 adults 21 years and older, indicated that lower SES and being black were associated with worse self-reported health and higher mortality; Latinos had better health and lower morality; and women had worse health but lower mortality (Franks, Gold, & Fiscella, 2003). Although findings on the effects of SES on mortality were supported by the correlation with self-rated health, the effects of race/ethnicity and gender on mortality were suggestive of independent pathways (Franks et al., 2003).

***The Hispanic health-paradox*.** The Hispanic paradox (Markides & Coreil, 1986) is a term used to describe the better than expected health of Hispanics living in the US, given their lower SES. Although a Hispanic mortality advantage has been observed among older individuals, men, and those born in Mexico (Markides & Eschbach, 2005), discrepancies between studies provide partial support for the existence of a Hispanic paradox (Espinosa, Jung, & Hazuda, 2013; Vega & Sribney, 2011). Thus, researchers continue studying this complex phenomenon. For example, Crimmins, Kim, Alley, Karlamangla, and Seeman"s (2007) findings did not support the existence of a Hispanic paradox in relation to biological risk profiles. Analyses of biological differences in risk profiles by race/ ethnicity and nativity in Hispanics and Whites [when controlling for SES (education and income level), health behaviors (lack of exercise, smoking status, percentage of fat in diet), and health insurance status], indicated that foreign-born Hispanics had a total risk profile similar to Whites and better than US-born Mexican Americans (Crimmins et al., 2007). Differences in higher levels of risk in foreign-born Hispanics than Whites were explained by SES; however, the higher biological risk profile in US-born Mexican Americans was not explained by differences in SES, health behaviors, or access to

healthcare (Crimmins et al., 2007). The investigators noted that the disproportional biological risks profiles observed in US-born Mexican Americans relative to Whites may arise from generations of social disadvantage, not captured in their SES index (Crimmins et al., 2007). Similarly, other studies found that vulnerability is an intergenerational process evidenced by a pattern of downward mobility that starts with immigrant parents, extends across generations, and it is aggravated by acculturation to mainstream America among US-born Mexican parents and their children (Telles & Ortiz, 2008; Vega & Sribney, 2011).

Biological risk profiles have been used for analyses of various health outcomes, and studies have shown that the total number of multisystem indicators within abnormal range is a better predictor of health outcomes (morbidity) than individual physiologic markers or risk factors, particularly when dysregulations in individual systems are small (Seeman et al., 2004). For example, a summary measure of allostatic load, a multisystem measure of physiologic dysregulation combining ten biological measurements, was developed to evaluate its association with future functional decline (over seven years) in an elderly cohort of men and women from the MacArthur studies of successful aging (Karlamangla, Singer, McEwen, Rowe, & Seeman, 2002). The constructed allostatic load score was found to be an independent predictor of decline in both physical and cognitive domains of functioning; notably, diastolic BP was the largest contributor to the allostatic load score for predicting cognitive decline (Karlamangla et al., 2002).

## Summary

### Systems Thinking

This study sought to elucidate the role of trust in the medical profession in enhancing HRQOL for Hispanics and non-Hispanics with hypertension, through its potential influence on resilience and medication adherence. Socio-structural and cultural factors pose barriers to adequate hypertension control for underserved minorities, and those who provide care for these groups are frequently confronted with suboptimal treatment options as healthcare resources are

limited (Candib, 2007). In an era when health care is bound by economic restrain, trust may provide an alternative for improving utilization of health care and adherence to antihypertensive regimens that is amenable to change without further impacting an already distressed healthcare system. Despite the epidemiological contribution of ecological analyses, using variables that describe groups of individuals (Piantadosi, Byar, & Green, 1988), research gaps point to the need for further elucidation of protective social and cultural factors that affect health at the individual level, as potential pathways to psychobiological resilience (McEwen & Seeman, 1999).

Building upon the vulnerability/deficit model, a paradigm shift directs the study of resilience to the dynamics of adaptation and change; particularly, placing focus on positive adaption outcomes and their antecedents (Garmezi et al., 1984; Luthar & Cicchetti, 2000; O'Leary, 1985). Behavioral investigators are engaged in a fourth wave of resilience research characterized by multiple levels of analysis, emphasizing processes and a social systems approach (Masten & Obradovic, 2006). Under this lens, resilience is viewed as a broad systems construct reflecting the ability of macro and micro regulatory level-systems to support positive adaptation and recovery from adversity (Masten, 2007). The notion of vulnerability and resilience originated in the study of trauma and risk perception in efforts to prepare for major disasters such as health emergencies, terrorism, or natural disasters (Flynn, Burns, Metz, & Slovic, 1992). Studies on risk perception have found that socio-structural factors including power, SES, alienation, and public trust in institutions and their leaders are strong determinants of individuals' perceptions of environmental health-risks and their appraisal of these risks (Griffin, Neuwirth, Dunwoody, & Giese, 2004). For example, white men have been found to perceive environmental health-risks to be much smaller (less threatening) than white women and non-whites (Flynn, Slovik, & Mertz, 1994).

As broad systems concepts and multidimensional phenomena, resilience and trust can be viewed in relation to their synergistic interaction in a major crisis. In times of public danger,

integration of strategic interventions to promote resilience is critical given the interdependence of social, individual, ecological, and communication systems in these situations (Masten, 2007). In extension, under conditions of crisis in which beyond the technical reliability of communication systems, effective communication management is essential to facilitate mobilization of multiple resources, institutional trust has been found to play an important role in building resilience at the individual and community levels (Longstaff & Yang, 2008). In this context, the technical reliability of communication systems becomes meaningless if individuals do not trust the source sending the message (Griffin et al., 2004). Thus, trusted communication sources can potentially empower communities and their members by facilitating positive change and adaptation under adverse conditions; however, trusted communication must be planned as it can only be established overtime (Olsson, Folke, & Berkes, 2004). Additionally, to the extent that adaptation is inherently multilevel (Gottesman & Hanson, 2005), a systems approach requires collaborative efforts in order to sustain adaptive processes influencing resilience (Masten, 2007).

Aligning with the social dimensions of trust and the influence of its relational nature across sectors, Kawachi and Kennedy (1999) noted that within society, the effects of income inequality on health may be mediated through the lack of investment in social goods such as healthcare; the psychological effects of social comparisons; and the erosion of social capital. Putnam (1995) defined social capital as those features of a social organization that foster cooperation for mutual benefit such as trust and networks. From this view, trust in health care institutions has been referred to as the scarcest of medical resources and as a form of social capital, in relation to its role in enhancing social and individual wellbeing (Illingworth, 2002); and its potential for facilitating citizen-health system cooperation and generating moral values in society (Gilson, 2006).

Hence, in the societal arena where multiple forces impact health outcomes, trust in the medical profession may be an important player. Aligning with Wagner's Chronic Care Model for

chronic diseases (Wagner, 1998), interventions that might hold potential for improving HRQOL in patients with hypertension, beyond pharmacological treatments, point to the need for enacting the premise underlying the patient-centered care framework by creating doctor-patient interactions founded on mutual trust and respect (Bodenheiner, Lo, & Casalino, 1999; Bodenheimer, Wagner, & Grumbach, 2002). In addition, evidence from clinical trials of self-management skills in chronic illness provides support for the value of promoting patients' disease-related problem solving skills through interventions that cultivate self-efficacy (Brown et al., 1986); these can enhance their ability to cope with health-related distress (Lorig et al., 2001) and support their quality of life (Bodenheimer, Lorig, Holman, & Grumbach, 2002). As posited by Bandura (1977; 2002), among the mechanisms of human agency none is more central than a sense of personal efficacy; beliefs of self-efficacy dominate cognitive processes responsible for adequate functioning. Notably, conceptual analysis suggests that self-efficacy and coping are attributes of resilience (Gillespie et al., 2007).

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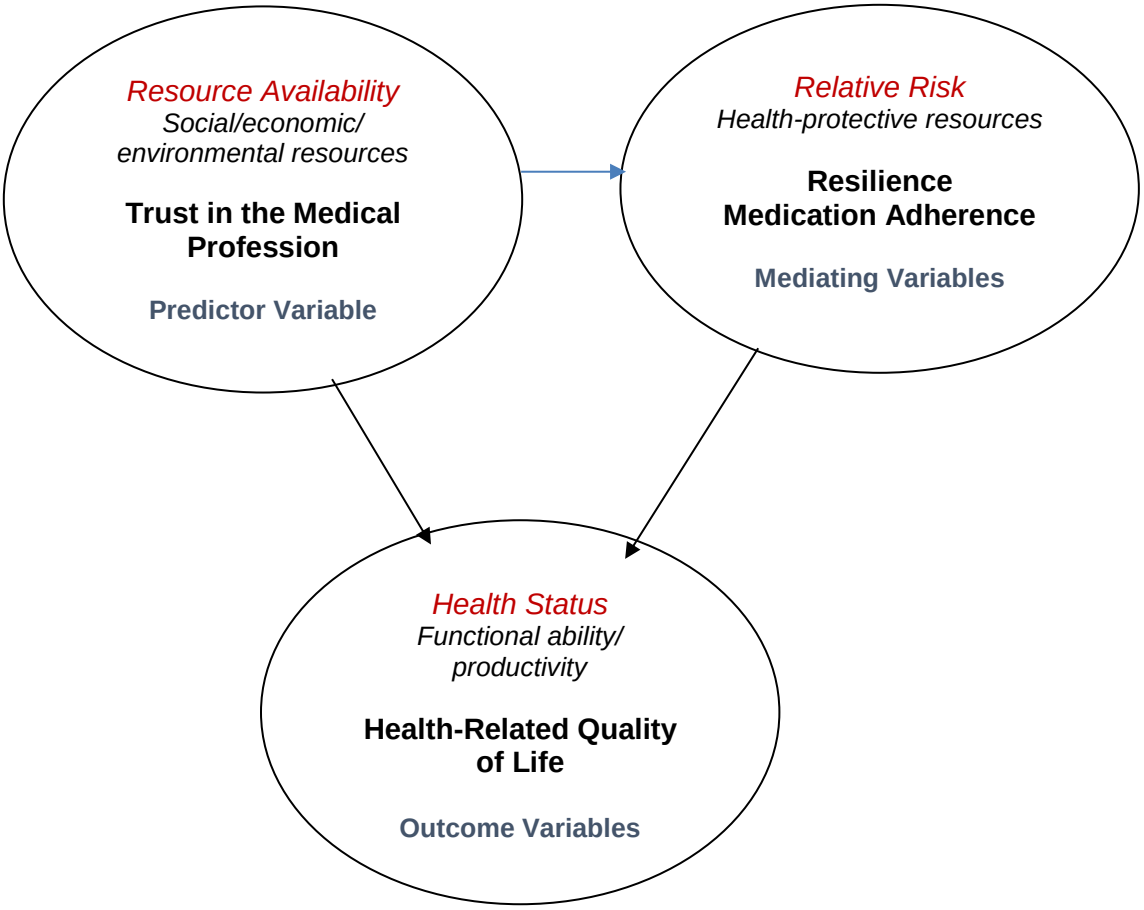
# CHAPTER 4
# RESEARCH METHODOLOGY

## Research Aim

This study investigated trust in doctors in general, that is, trust of the medical profession with "focus on aspects of treatment relationships generalized to practicing physicians at large rather than with respect to a particular physician" (Hall et al., 2002, pp.1435). Specifically, it examined whether greater trust in the medical profession was associated with better HRQOL in adults with primary or essential hypertension, and the extent to which the association is mediated by enhancing resilience and medication adherence. Resilience is an aggregate of strengths that reflect an individual's ability to cope and adapt in a positive manner, despite traumatic experiences or conditions of significant adversity (Werner, 1997). In addition, the study evaluated whether the effects of trust varied between Hispanics and non-Hispanics. The main hypothesis guiding this study proposed that having trust in the medical profession may enhance treatment adherence and resilience in adults with hypertension and, in turn, trust may influence HRQOL.

The three specific aims were as follows: 1) to assess the overall relationship (total effect) between trust in the medical profession and global physical and mental health, HRQOL; 2) to assess whether the association of trust in the medical profession with HRQOL is mediated by resilience and medication adherence; 3) to determine whether these associations vary by Hispanic ethnicity (Hispanic vs. non-Hispanic). The hypothesized relationships were derived from the Vulnerable Populations Conceptual Model's (VPCM, as introduced in Chapter 2) domains of resource availability, relative risk, and health status (Flaskerud & Winslow, 1998). Conceptualization of the studied variables in light of these theoretical concepts is depicted in Figure 4.1. Structural equation modeling (SEM) methods were used to test the relative fit of the VPCM's constructs with the specified interrelationships between observed and latent variables.

**Figure 4.1.** Theoretical Model of Hypothesized Relationships with the Constructs of the Vulnerable Populations Conceptual Model.




**Research Questions and Corresponding Hypotheses**

**First Aim.** To examine the total effects of trust in the medical profession on HRQOL, the following research questions and hypotheses were proposed:

RQ1: Is trust in the medical profession associated with global physical and mental health, HRQOL, in adults with hypertension?

H1: There will be a positive association between trust in the medical profession and global physical and mental health, HRQOL, in adults with hypertension.

RQ2: Is there a relationship between trust in the medical profession and resilience in adults with hypertension?

H2: There will be a positive association between trust in the medical profession and resilience.

RQ3: Is there a relationship between trust in the medical profession and medication adherence in adults with hypertension?

H3: There will be a positive association between trust in the medical profession and medication adherence.

RQ4: Is there a relationship between resilience and global physical and mental health, HRQOL, in adults with hypertension?

H4: There will be a positive relationship between resilience and global physical and mental health, HRQOL.

RQ5: Is there a relationship between medication adherence and global physical and mental health, HRQOL, in adults with hypertension?

H5: There will be a positive relationship between medication adherence and global physical and mental health, HRQOL.

**Second Aim.** To assess whether the association of trust in the medical profession with HRQOL is mediated by resilience and medication adherence, the following research questions and hypotheses were proposed:

RQ6: Is the relationship between trust in the medical profession and global physical and mental health, HRQOL, mediated by resilience?

H6: Resilience will mediate the relationship between trust and global physical and mental health, HRQOL.

RQ7: Is the relationship between trust in the medical profession and global physical and mental health, HRQOL, mediated by medication adherence?

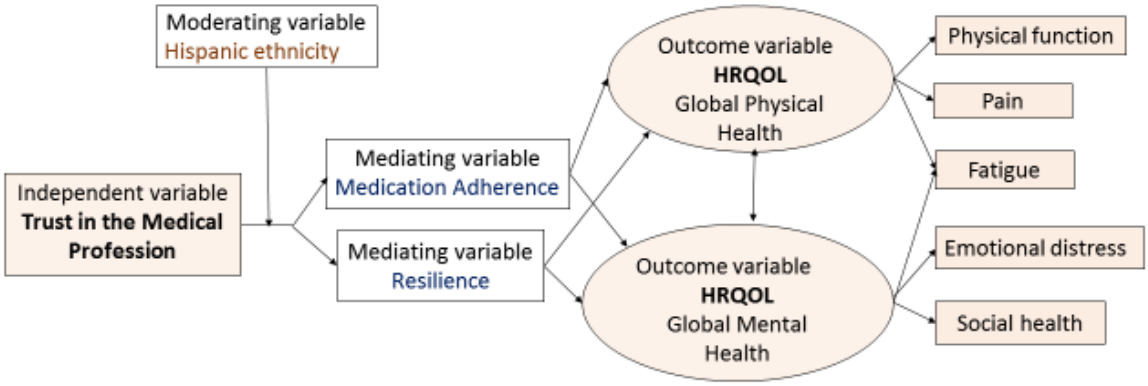
H7: Medication adherence will mediate the relationship between trust in the medical profession and global physical and mental health, HRQOL.

**Third Aim.** To assess whether the associations between trust in the medical profession, resilience, medication adherence, and HRQOL differ by ethnicity (Hispanic vs. non-Hispanic), the following research question and hypothesis were proposed:

RQ8: Do the direct and indirect associations of trust in the medical profession, resilience, and medication adherence with global physical and mental health, HRQOL, vary between Hispanic and non-Hispanic adults with hypertension?

H8: The strength of the associations of trust in the medical profession, resilience, and medication adherence with global physical and mental health, HRQOL, will vary between Hispanics and non-Hispanics.

**Figure 4.2.** Hypothesized Model




## Research Design and Sample

A cross-sectional survey of Hispanic and non-Hispanic patients was conducted for this study.

### Setting

Participants were recruited from a medical practice consisting of five board certified cardiologists with three offices located adjacent to major medical centers in Orange County. The physicians were non-Hispanic white males; 48 to 65 years old; married; trained in their cardiology specialty in the US; and had been in private practice between 15 to 35 years. None

of them spoke Spanish; however, the majority of the office's staff were of Hispanic origin and fluent in their language.

## Inclusion and Exclusion Criteria

Implementation is described next, under Procedure.

### Inclusion Criteria

1. Hispanic and non-Hispanic adults, 18 years or older.

2. Adults with primary or essential hypertension including those with asymptomatic cardiovascular disease (Kannel, 2000; Moran et al., 2015).

3. Currently under medical treatment for hypertension for at least 6 months.

### Exclusion Criteria

1. A clinical diagnosis of secondary hypertension.

2. Comorbidities related to severe or symptomatic heart disease: angina, congestive heart failure, and/or severe valvular disease.

3. All patients with left ventricular systolic dysfunction with abnormal ejection fraction (< 50%) by echocardiography (Coyne et al, 2000).

4. A history of myocardial infarction, percutaneous coronary intervention, or coronary artery bypass graft surgery within the past two years.

5. The following comorbid conditions due to their potential impact on HRQOL: stroke with residual physical or mental disability; symptomatic peripheral vascular disease; severe rheumatoid arthritis; kidney disease requiring dialysis; severe gastrointestinal disease; advanced chronic obstructive pulmonary diseases; metastatic cancer; liver disease; epilepsy; multiple sclerosis; Parkinson's disease; spinal cord injury; and/or lupus erythematosus.

## Procedure

The UCLA Institutional Review Board, Office of Protection to Research Subjects, approved the study and determined that oral consent for the research could be obtained (UCLA IRB approval # 15-000247). Signed informed consent was waived under federal regulations, 45

CFR 46.117(c)(2). However, in compliance with the medical group's Health Insurance Portability and Accountability Act (HIPAA) policies and procedures, participation in the study required signed informed consent for release of medical information.

Eligibility to participate in the study was determined by the physicians prior to the PI initiating contact with prospective participants; thus, patients with other severe medical conditions besides those listed in the study's criteria may have been excluded. Medical records were not accessed at any time for this study. It should be noted that patients within the five cardiologist medical group were not always seen by the same doctor since the physicians covered for each other and alternated taking weekend and night call for the group.

Patients who met the study's eligibility criteria were informed about the study during their office visit by one of the physicians, who also handed each potential subject a flyer broadly describing the study to determine their willingness to speak to the PI. Those who expressed interest were told to notify the office staff upon checking out so they could be directed to an on-site office and meet the PI. The PI invited each prospective participant to a private office provided by the medical group for data collection procedures through the duration of the study. She explained the study noting that participation required signing a consent form (*Authorization for Use and Disclosure of Medical Information)* to allow the PI to obtain health data from the Summary View print-out. Prospective subjects were assured that participation was voluntary, data would be kept confidential and would be destroyed once all work related to the study was completed. All participants were given a copy of the information sheet (*Information about Participating in this Research*), describing the purpose of the study and indicating that the medical group had no affiliation with the study and were only providing the office space for data collection.

**Data Collection**

Data collection procedures took place Monday through Friday during office hours (8AM-5PM), and were completed within a seven-month period (July, 2015 to early February, 2016).

Surveys were completed on site and the majority were self-administered unless requested otherwise by the participant in which case the PI read each question and noted the answer, while also placing the survey in-progress on a desktop in a manner that could be visualized and followed. The same procedures were used for English and Spanish speaking participants. For Spanish-speaking participants, all materials and information were provided in Spanish by the PI, who is bilingual. Spanish translations of the study's measures were obtained from the authors (Connor & Davidson, 2003; Hall et al., 2002; Morisky et al., 2008). The PROMIS Global Health items (Hays et al., 2009) were developed under a government grant and translations in multiple languages are available in the public domain; thus, authors' permission was not required (PROMIS Health Organization and PROMIS Cooperative Group 2008-2012).

Participation in the study took a total of about 30 minutes. In order to minimize sampling bias, efforts were directed to recruit and survey potential subjects at different times of the day and throughout the week. Willingness to participate was fairly consistent throughout and the majority of those who met inclusion criteria were interested in taking to the PI and participated with the exception of some who had early morning appointments and had to be at work shortly thereafter or had rides waiting for them. An average of 6 to 8 subjects were recruited per week and about 2 potential subjects per week declined, mostly when they were notified about the study by the physicians rather than after meeting the PI.

**Clinical Data Collection.** Clinical and physiological data were obtained from the *Summary View* print-out (i.e., medical history, medications, blood pressure, and BMI). Normal weight is a BMI of 18.5-24.9 kg/ $m^2$, overweight is defined as a BMI of 25-29.9 kg/$m^2$, and obesity as a BMI ≥ 30 kg/ $m^2$ (U.S. Department of Health and Human Services, NHLBI, 1998).

## Operational Definitions

This section presents the operational definitions for the studied variables and their conceptualizations within the VPCM's constructs. The instruments that were used to measure

the studied variables are cited but the rationale for their selection and their psychometric properties are provided later in this chapter.

**Definitions**

**Patients with hypertension**. These were individuals under treatment for primary or essential hypertension, as delineated in the inclusion criteria.

**Hypertension control**. This was defined as systolic BP ≤ 140 and diastolic BP ≤ 90 mmHg (Chobanian et al., 2003/JNC 7). This threshold aligns with evidence-based guidelines and recommendations for management of high blood pressure in adults provided by the Eight Joint National Committee (JNC 8) because patients with CVD risk factors including dyslipidemia were included in the study (James et al., 2014; SPRINT Research Group, 2015)

**Hispanic ethnicity**. Hispanic ethnicity refers to people with ancestry in Mexico, Cuba, Puerto Rico, Spain, Spanish-speaking countries of South and Central America, the Dominican Republic, or any Spanish culture regardless of race (U.S. Census Bureau, 2010).

**Health-Related Quality of Life (HRQOL)**. HRQOL encompasses functioning and well-being in physical, mental, and social health (Stewart, Hays, & Ware, 1988). Functioning refers to the ability to perform and the actual performance of activities of daily living; well-being refers to global perceptions of wellness including pain and feelings of anxiety, depression, and happiness (Stewart et al., 1988). HRQOL was measured by the Patient-Reported Outcomes Measurement Information System (PROMIS®) Global Health items (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009).

**Trust in the medical profession**. Trust in the medical profession is a cognitive judgment with no moral content attached, based on the rational expectation (Hardin, 1996) that physicians will put self-interests aside and will act in good will, primarily in the interests of the patient, irrespective of the patients' ability to control physicians' actions. This definition differentiates general trust from interpersonal trust; general trust is a more global concept, reflecting patients' generalized attitudes and views of the medical profession (Hall et al., 2002;

Hall, 2006). The Trust in Doctors Generally Scale (Hall et al., 2002) was used to measure the study's main independent variable.

**Resilience**. Resilience is a form of mental capital that reflects an individual's ability to cope and adapt in a positive manner despite adverse personal and/or social circumstances, by drawing from cognitive and emotional resources (Beddington et al., 2008). The Connor-Davidson Resilience Scale-25 (CD-RISC-25) was used to assess resilience.

**Medication adherence**. Medication adherence is the extent to which patients with hypertension take antihypertensive agents as prescribed by physicians. It was self-reported using the Morisky Medication Adherence scale-8 (MMAS-8), (Krousel-Wood et al, 2009; Morisky et al., 2008; Morisky & DiMatteo, 2011). In addition, on the same day the surveys were administered, BP readings were recorded and, as noted above, dichotomized as controlled/uncontrolled: systolic BP ≤ 140 and diastolic BP ≤ 90 mmHg.

## Instruments

Subjects were asked to complete the following measures: 1) PROMIS®) Global Health Items; 2) Trust in Doctors Generally Scale; 3) CD-RISC-25; 4) MMAS-8; and 5) a demographic data sheet developed for this study assessing race/ethnicity, language spoken at home, use of interpreters, education, number of people in household, marital status, employment, annual income, neighborhood safety and sense of community, satisfaction with medical care, and interpersonal physician trust (primary care doctor). These instruments were selected based on their conceptual relevance to the studied variables, their ability to shield high quality data, and their fit to the characteristics of study's sample.

Psychometric characteristics (e.g. reliability and validity) of the instruments are summarized below. Reliability refers to the ability of an instrument to consistently measure what it purports to measure; reliability coefficients vary from 0.0 to 1.0 where 1.0 indicates no measurement error and 0.0 indicates that all of the observed variance is due to measurement error, (Hays & Reeve, 2008). Reliability is the proportion of true variance to total variance;

validity refers to the degree to which an instrument measures what it is intended to measure (Hays & Reeve, 2008).

**PROMIS Global Health Items**

Ten PROMIS Global Health Items representing physical, mental, and social health domains were administered to assess HRQOL (Hays et al., 2009). These domains are reflected in the PROMIS health framework (http://www.nihpromis.org; Cella et al. 2007), and build upon widely used *"legacy"* instruments (Cella et al., 2010; Schalet et al., 2014) such as the SF-36 health survey (Ware & Sherbourne, 1992).

Global health refers to an individual's general health perceptions, rather than to specific aspects of health; the PROMIS Global Health items represent five health domains: physical function, pain, fatigue, emotional distress, and social health (Hays et al., 2009). Physical and mental scale scores were derived from analyses of 10 global-health items on a general US population sample of 21,133 adults. Eight of these items were selected to develop two 4-item global health scales, which summarize physical and mental health (Hays et al., 2009). The remaining two items were: 1) Global01, poses the most widely used question in population surveys assessing overall health: *"How would you rate your health in general?* (Hays, Spritzer, Thompson, & Cella, 2015); 2) Global09, satisfaction with social roles. Four of the ten items use a 7-day recall period, whereas the rest tap current health status in general. Nine of the items have five response options while the item rating pain in general, Global07, uses a 0-10 scale with 10 representing the worse pain level, recoded to 5 categories (Hays et al., 2009).

The 4-item global physical health (GPH) and global mental health (GMH) scales were estimated to have Cronbach's alphas of 0.81 (M = 3.79, SD = 0.76) and 0.86 (M = 3.60, SD = 0.76), respectively (Hays et al., 2009).

Construct validity of the global health items was supported by correlations with comparable multi-item scales from PROMIS (Hays et al., 2009). Exploratory and confirmatory factor analyses supported underlying dimensions of physical and mental health. The GPH scale

comprises four items on overall physical health, physical function, pain, and fatigue; the GMH scale encompasses four items on quality of life, mental health, satisfaction with social activities, and emotional problems. One of the single items, Global01 (general health) was excluded from the two multi-item PROMIS global health scales as it exhibited collinearity with a similarly worded item, Global03 (physical health). Global09 (satisfaction with social roles) was also excluded due to its nearly equal associations with both physical and mental health. Hays et al. (2015) found that the product-moment correlation of the single item, Global01, with the global physical health scale was 0.81.

Hays et al. (2009) recommend scoring the scales using eight items, while separately scoring the two single items (Global01, general health, and Global09, satisfaction with social roles). Scores were calibrated on a T-score metric so norm-based standardized scores have means of 50 and standard deviations of 10 in the general US population (Hays et al., 2009). It should be noted that the brevity of these scales minimizes response burden, even when compared to other practical measures of HRQOL such as the SF-36, which requires 7-10 minutes to complete. This facilitates their implementation in the clinical setting (Hays et al., 2009). Accordingly, in the current study, only the two 4-item global health scales were used to measure physical and psychological health. The two single items were administered but are not included in the analysis.

**Trust in Doctors Generally Scale**

This scale was used to measure the independent variable, trust in the medical profession. The *Trust in Doctors Generally Scale* (Hall et al., 2002), contains 11 items scored using a 5-point scale. The instrument's focus is on doctors in general; it does not inquire about aspects of trust that pertain to trust in the system of medicine or the organized medical profession, such as medical ethics and medical education (Hall et al., 2002). The instrument was tested in a US general sample of 502 adults with both sources of payment and a stable source of medical care.

Cronbach's alpha was estimated to be 0.89 (Hall et al., 2002). The scale has a single-factor structure and taps the main domains of trust: honesty, competence, and fidelity (Hall et al., 2002). In addition, consistent with findings on interpersonal physician trust (Kao, Green, Zaslavski, Koplan, & Cleary, 1998; Thom et al., 1999), factor analyses indicated that general trust is unidimensional; that is, people do not seem to differentiate trust in the medical profession between the dimensions of competence, fidelity, and honesty. Construct validity was examined using several methods including bivariate correlations (product-moment correlations with interpersonal physician trust and satisfaction with care). Further, Spearman rank-order correlation was used to assess consistency with adherence to physicians' recommendations and two-sample t-tests to assess variables with dichotomized responses (e.g. having sought a second opinion); exploratory analysis was used to identify latent dimensions between items.

**Connor-Davidson Resilience Scale-25 (CD-RISC-25)**

This instrument contains 25 items each rated on a 5-point scale; the total score has a possible range of 0-100 with higher scores reflecting greater resilience (Connor & Davidson, 2003). The CD-RISC-25 was developed as a self-rated assessment to quantify resilience and as a clinical measure to evaluate the modifiability of resilience in response to pharmacologic treatment in patients with depression, anxiety, and stress reactions (Connor & Davidson, 2003). The content of the scale is based on theoretical work reflecting the second wave of resiliency inquiry which focused on identifying resilient qualities (Richardson, 2002), and on empirical studies including hardiness (Kobasa, 1979) and the phenomenological identification of characteristics of survivors, such as adaptation to change in the face of adversity (Rutter, 1985).

Preliminary analysis of the CD-RISC-25 in diverse groups (a community sample, primary care patients, outpatients under psychiatric care and subjects in clinical trials of anxiety disorders) showed satisfactory internal consistency and test-retest reliability (Connor & Davidson, 2003). Test-retest reliability was evaluated in two groups that showed no clinical change in two consecutive visits, ICC = 0.87. Internal consistency reliability for the full scale

was 0.89 (n = 577), and item-total correlations corrected for item overlap with the total ranged from 0.30 to 0.70. The instrument has shown high internal consistency reliability (Cronbach's alpha = 0.92) in a general population sample (n = 1395) of women over the age of 60 (Lamond et al., 2008).

The CD-RISC-25 is a unidimensional measure of resilience (Connor & Davidson, 2003). Its unidimensional structure was tested by assessing its independence from positive and negative effect (two broad affective constructs) in a sample of 1775 individuals 20-24 years old. The CD-RISC-25 also showed convergent and divergent validity with other positive indicators of psychological health including hardiness (Kobasa Hardiness scale; Kobasa et al., 1979) and perceived stress (Perceived Stress scale; Cohen, Kamarck, & Mermelstein, 1983). Evaluation of sensitivity to treatment effects or responsiveness among PTSD subjects in a clinical trial indicated greater improvement of CD-RISC-25 score in proportion to the extent of global clinical improvement (Connor & Davidson, 2003).

**Morisky Medication Adherence Scale-8 (MMAS-8)**

Self-reported medication adherence was measured using the MMAS-8 (Krousel-Wood et al, 2009; Morisky et al., 2008; Morisky & DiMatteo, 2011). The MMAS-8 was administered to a random sample of hypertensive patients attending a hypertension clinic, located within a large teaching hospital (Morisky et al., 2008). Subsequently, the psychometric properties of the measure were evaluated as part of a randomized experimental, pre and post-test study design project, conducted over12 months to assess the effects of clinic and community-based interventions on BP control in 1367 primarily low-income, minority patients (Ward, Morisky, Lees, & Fong, 2000). The MMAS-8 items address the most commonly reported reasons for nonadherence in hypertension: forgetting to take the medication (40%), being busy (28%), and traveling (20%) (Voils et al., 2014). Confirmatory factor analysis indicated that the eight-item scale is unidimensional, with all items loading onto a single factor (Morisky et al, 2008; Morisky & DiMatteo, 2011). Each item measures a specific medication-taking behavior (Morisky et al.,

2008). Response categories are yes/no for 7 of the items; the 8th item has a 5-point polytomous response scale.

As demonstrated by Morisky and his colleagues (2008), the internal consistency reliability was satisfactory (α = 0.83); the MMAS-8 score was found to be significantly associated with BP control (chi-square = 6.6; $p < .05$) in a sample of 1367 hypertensive patients. The correlation of the MMAS-8 with a previously developed 4-item medication-taking scale, the Morisky Medication Adherence Scale (Morisky, Green, & Levine, 1986) was significant ($r = 0.64$; $p < 0.05$). Sensitivity of the MMAS-8 in differentiating patients with poor BP control was 93% and specificity 53% (Ward et al. 2000).

## Data Analysis Plan

### Procedure for Data Analysis

**Descriptive statistics and assessment of reliability**. Frequencies and percentages were reported for variables measured using either a nominal or ordinal scale. The mean and standard deviation were reported for variables measured using either an interval or ratio scale. Reliability was assessed via Cronbach's alpha. Per Nunnally and Bernstein (1994), a coefficient alpha of .70 or higher is indicative of adequate reliability for group comparisons.

**Exploratory factor analyses**. Exploratory factor analyses (EFA) were conducted to determine the number of underlying factors. Principal components analysis (PCA) was used to extract the factors. Three criteria were used to determine the number of factors to retain: the scree plot, Guttman's (1954) weakest lower bound, and parallel analysis (Catell, 1966). An Oblimin (oblique) procedure was used to rotate the factors (when the PCA yielded more than one factor).

**Parceling of resilience items**. As Little, Cunningham, Shahar, and Widaman (2002) point out, models using single-item indicators are less parsimonious than those using parcels as item indicators and often increase measurement error. Because the resilience measure consisted of 25 items, parcels were created using the item-to-construct balance method, as

recommended by Little and colleagues (2002). The item-total correlations from the reliability analyses were used to create the four parcels. The correlations were sorted from lowest to highest. Items with the highest item-total correlation anchored each of the parcels. The items with the next highest item-to-construct loadings were added to the anchors in the reverse order. The item with the highest loading among the anchor items were matched with the lowest loading item from the second selection. This basic procedure where lower loaded items were matched with higher loaded items was repeated until all items were categorized into parcels. The mean of the items categorized into each parcel was then computed and used in subsequent procedures.

**Testing the hypotheses pertaining to the first aim**. Structural equation modeling procedures were conducted to test hypotheses. Per Anderson and Gerbing (1988), a two-step procedure was followed to test the structural models. The measurement model was tested first via a confirmatory factor analysis. Thereafter, the structural model was tested. Per Kline (2011), the fit of both the measurement and structural models was assessed via the chi-square statistic and several fit indices (described in the section on structural equation modeling). EQS Version 6.3 was used to test the measurement and structural models. AMOS 23 was used to generate the direct, indirect, and total effects because only AMOS allows for significance testing of such effects (Kline, 2011). Models were estimated using maximum likelihood (ML) with robust statistics (ML-Robust), useful when variables are not normally distributed.

**Testing the hypotheses pertaining to the second aim**. To test for the mediating effects of resilience and medication adherence on trust and HRQOL, bootstrapping procedures were conducted (N = 5000 samples) using the AMOS 23 program. Per Kline (2011), a variable is deemed a mediator when the following criteria are met: the independent variable significantly predicts the mediator; the mediator significantly predicts the dependent variable; and the indirect effect is statistically significant. Bootstrapping procedures were conducted to determine the significance of the direct and indirect effects.

**Testing the hypothesis pertaining to the third aim**. To determine whether ethnicity (i.e., non-Hispanic vs. Hispanic) moderated the relationships specified in the structural model, a multi-group analysis was conducted using the EQS Version 6.3 program. Per Byrne (2006), all factor and cross-loadings, all structural paths, and all covariances were constrained equal across the two groups. Lagrange Multiplier (LM) tests of equality constraints were used to test for invariance across groups.

**Evaluating alternative models.** Structural equation models specify directional associations but causality cannot be concluded from them, especially with cross-sectional data. Hence, it is important to compare hypothesized with alternative models (Kline, 2011). As such, we evaluate alternatives to the indirect effects model that included direct effects only models and other alternative models.

## Description of Structural Equation Modeling (SEM)

### Application of SEM to evaluation of HRQOL

SEM is a useful technique for health outcomes research (Hays et al., 2005), which includes the evaluation and measurement of patient-reported outcomes of care (patient satisfaction and HRQOL), traditional clinical endpoints (death, adverse events), and physiological indicators (Kane, 1997). SEM methods can be used to assess the equivalence of measurement and structural paths in different subgroups (Hays, Marshall, Wang, & Sherbourne, 1994). SEM enables evaluation of theories underlying the various processes that influence health outcomes. For example, Coyne and colleagues (2000) adopted the Wilson and Cleary (1985) conceptual framework positing relationships between clinical status and HRQOL in studied patients (N = 1,587) two years post-myocardial infarction. SEM was used to identify two pathways through which the severity of cardiac disease affects HRQOL after suffering a myocardial infarction; one is a direct pathway reflecting a positive correlation between cardiac function and HRQOL, as reported, but there is also an indirect pathway, which is mediated by the experience of cardiac symptoms (Hays et al., 2005).

**Overview of SEM**. SEM represents a combination of factor analysis (Spearman, 1987; Tucker, 1955) and path analysis, or simultaneous equations (Wright, 1934). As such, the general SEM model has two main components: a measurement model, which relates the indicators (measured variables) to the latent variables (factors), and a structural model which delineates the hypothesized relationships between the constructs (Hays, Revicki, & Coyne, 2005). It allows for estimation of relationships among latent variables that account for measurement error, modeling of multiple dependent variables, and the simultaneous estimation of direct and mediated effects of one variable on another (Hays & White, 1987).

***The measurement and structural models***. The measurement model is a multivariate regression model that estimates relationships between a set of observed (measured) dependent variables and a set of continuous latent variables or factors (Tabachnick & Fidell, 2007). The measurement model is evaluated through confirmatory factor analysis (CFA), whereby factor structures are hypothesized a priori and verified empirically rather than derived from the data, as in exploratory factor analysis (EFA), (Lei & Wu, 2007). In contrast to EFA, CFA is a confirmatory technique that is used to test theory and requires analysis of an a priori hypothesis about potential relationships among measured and latent variables (Tabachnick & Fidell, 2007). CFA allows an indicator to load on multiple factors, and it also allows residuals or errors to correlate (if these indicators have common causes besides the latent factors within the model) (Lei & Wu, 2007).

The application of SEM analysis requires that a priori hypotheses are specified regarding expected relationships among latent variables in the structural model (Hays et al., 2005). Specification of directionally of paths is theoretically driven (Hays & Revetto, 1990). Modification of the model can also be implemented, as long as it is guided by theory.

***Estimation procedure*.** Maximum likelihood (ML) method was used for model estimation (Bollen, 1989b; Joreskog, 1978). The ML estimator is widely used and has important properties; for example, ML estimates are consistent, they converge in probability to the true

value of the population parameters under estimation as sample size increases; and the model chi-square is often used for testing overall model fit (Wang & Wang, 2012). The ML estimator assumes that the observed variables are multivariate normally distributed or there is no excessive kurtosis of the variables (Bollen, 1989b). However, since some of the study's variables were not normally distributed, corrections were applied. Specifically, robust statistics (i.e., adjusted standard errors) and the Satorra-Bentler scaled chi-square were requested (Satorra & Bentler, 1988), as these are useful when variables are not normally distributed.

***Evaluation procedure*.** The extent to which a measurement and structural model is consistent with the data is evaluated using the chi-square statistic and goodness-of-fit indices. Fit indices quantify the degree of correspondence among a hypothesized latent variable model and the empirical data (Kenny & McCoach, 2003). Model fit is based on the discrepancies between the observed sample and the estimated (based on the model) covariance matrices (Barrett, 2007). The chi-square statistic is an overall test of model fit (Bentler, 1990). Good model fit is indicated by a non-significant chi-square (Tabachnick & Fidell, 2007). But the chi-square statistic is highly sensitive to sample size and it often rejects the model when a large sample size is used (Bentler, 1990). On the other hand, when a small sample size is used, it lacks power to discriminate between a good and a poor fitting model (Kenny & McCoach, 2003). To supplement the chi-square statistic, several alternative indices control for the effect of sample size, and some also account for model degrees of freedom (Lei & Wu, 2007).

Based on empirical work by others (Bentler & Yuan, 1999; Heslin et al., 2011; Hu, Bentler, & Kano, 1992), three fit indices were chosen to assess overall model fit: the Root Mean Square Error of Approximation (RMSEA), (Steiger, 1990); the Comparative Fit Index (CFI), (Bentler, 1990); and the Non-Normed Fit Index (NNFI). The RMSEA measures average lack of fit (of the specified model to the population) per degree of freedom, by adjusting for the model degrees of freedom (Steiger, 1990); values of 0.06 or less indicate a close-fitting model (Hu & Bentler, 1999). In line with the model chi-square statistic, the RMSEA also provides a

confidence interval (CI) around its calculated value; the CI ranges from zero to positive infinity and the RMSEA is commonly reported with its 90% CI (Browne & Cudeck, 1993). The p-value examines the alternative hypothesis ($H_{A:}$ RMSEA > 0.05); if p > 0.05, the null hypothesis cannot be rejected and the specified model has a close fit (Browne & Cudeck, 1993). The CFI compares the specified model with the null model that assumes all variables are uncorrelated (Bentler, 1990). It measures the increase in fit relative to the null baseline model; higher values reflect a larger improvement over the baseline model. The CFI performs well with small sample sizes (Bentler, 1990). It is normed to the 0 to 1 range; a value of ≥ .95 is considered indicative of a good-fitting model (Hu & Bentler, 1999). The NNFI measures relative fit by comparing noncentrality per degree of freedom (Bentler & Bonett, 1980). Like the CFI, a value of ≥ .95 indicates good model fit.

**Power Analysis**

MacCallum, Brown, and Sugawara's (1996) RMSEA test of close fit (versus exact fit) was used to estimate the number of participants needed to attain statistical power of .80. MacCallum et al. (1996) use the Root Mean Square (RMS) or ε as a measure of model discrepancy. This measure of discrepancy is affected by the degrees of freedom; reasonable power is attained with a moderate to large number of degrees of freedom and moderate sample sizes. As shown in Table 1, with $\varepsilon_0 = .05$, $\varepsilon_1 = .08$, and $\alpha = .05$, the minimum sample size needed to attain statistical power of .80 ranges from 71 to 153. Given that the proposed model consisted of five latent constructs, with an average of four indicator variables for each construct, the minimum number of participants needed to attain power of .80 would be 97.

**Table 4.1. Minimum Sample Size as a Function of Degrees of Freedom for a Five Latent Variable Model**

| Indicators per Latent Variable | df | Minimum N |
|---|---|---|
| Three indicators | 80 | 153 |
| Four indicators | 160 | 97 |
| Five indicators | 265 | 71 |

Note. Assumptions are $\varepsilon_0 = .05$, $\varepsilon_1 = .08$, $\alpha = .05$, and $\beta = .80$, where $\varepsilon_0$ is the RMSEA null value and $\varepsilon_1$ is the RMSEA alternative value.

In summary, application of SEM technique to this study allowed not only assessment of the consistency of the hypothesized model with the relationships within the observed data, but also testing the relative fit of the VPCM constructs with the specified interrelationships between observed and latent variables. Multidimensional phenomena such as resilience and trust can be best evaluated using SEM because it allows for simultaneous evaluation of hypothesized relationships (Tabachnick & Fidell, 2007). Many computer programs are available for SEM; this study used EQS Version 6.3 because of its flexibility and ability to impute when data is non-normal (Savalei, Bonett, & Bentler, 2015).

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# CHAPTER 5

# RESULTS

The study examined associations of trust in the medical profession with health-related quality of life (HRQOL) in adults with hypertension and the extent to which the effect of trust was mediated by better medication adherence and health resilience. In addition, it evaluated whether the effects of trust varied by ethnicity (Hispanic vs. non-Hispanic). Hypotheses were derived from the Vulnerable Populations Conceptual Model's domains of resource availability, relative risk, and health status, positing that having trust in the medical profession will be related to greater treatment adherence and resilience and, in turn, better HRQOL in adults with hypertension.

## Characteristics of the Sample

### Demographic Characteristics

The final sample consisted of 201 adults; 100 were non-Hispanic and 101 were Hispanic (93% of whom were of Mexican origin or descent). The mean age for non-Hispanics was 70 (*SD* = 10); the mean age for Hispanics was similar at 68 (*SD* = 14). The Non-Hispanic and Hispanic samples were similar in terms of employment and marital status (Table 5.1), the majority of the subjects were not employed and married or living with a partner. Non-Hispanics differed from Hispanics (see Table 5.1) in terms of race ($p < .001$), gender ($p < .01$), highest level of education ($p < .001$), primary language spoken at home ($p < .001$), combined family income ($p < .001$), and type of insurance ($p < 01$). The non-Hispanic sample consisted of fewer Whites (82%) and females (36%) than the Hispanic sample (98% and 56% respectively). The majority of non-Hispanic patients had more than a high school diploma (81%) while the majority of Hispanic patients completed high school at the most (77%). As expected, all non-Hispanic patients reported their primary language spoken at home was English while most of the Hispanic patients spoke Spanish (68%). Additionally, the majority of the non-Hispanic patients

had an annual family income of more than $40,000 (75%) but sixty one percent of the Hispanic patients had an annual family income of less than $40,000. The majority of non-Hispanics and Hispanics had health insurance and were non-smokers.

Table 5.1

*Frequencies, Percentages, and Chi-Square Results for the Demographic Variables for Non-Hispanic and Hispanic Subgroups*

| Variables | Non-Hispanic (*N* = 100) *n* (%) | Hispanic (*N* = 101) *n* (%) | $\chi^2$ | Sig. |
|---|---|---|---|---|
| Race | | | 14.39 | .000 |
| White | 82 (82) | 99 (98) | | |
| Non-White | 18 (18) | 2 (2) | | |
| Hispanic origin | | | 201.00 | .000 |
| US | 100 (100) | 0 (0) | | |
| Mexico | 0 (0) | 94 (93) | | |
| Other (Central/South America, Spain) | 0 (0) | 7 (7) | | |
| Gender | | | 8.44 | .004 |
| Male | 64 (64) | 44 (44) | | |
| Female | 36 (36) | 57 (56) | | |
| Education | | | 77.99 | .000 |
| Less than high school | 5 (5) | 58 (57) | | |
| High school | 14 (14) | 20 (20) | | |
| More than high school | 81 (81) | 23 (23) | | |
| Primary language spoken at home | | | 104.27 | .000 |
| English | 100 (100) | 32 (32) | | |
| Spanish | 0 (0) | 69 (68) | | |
| Employment status | | | .01 | .909 |
| Employed | 27 (27) | 28 (28) | | |
| Not employed or retired | 73 (73) | 73 (73) | | |
| Marital status | | | .79 | .374 |
| Married/Living with partner | 74 (74) | 69 (68) | | |
| Not married/No partner | 26 (26) | 32 (32) | | |
| Combined family annual income | | | 48.01 | .000 |
| Under $20,000 | 5 (5) | 44 (44) | | |
| $20,000 to $40,000 | 11 (11) | 17 (17) | | |
| More than $40,000 | 75 (75) | 35 (33) | | |
| Prefer not to respond | 9 (9) | 5 (5) | | |

(continued)

| Variables | Non-Hispanic (*N* = 100) *n* (%) | Hispanic (*N* = 101) *n* (%) | $\chi^2$ | Sig. |
|---|---|---|---|---|
| Health Insurance | | | 15.10 | .002 |
| None (self-pay) | 4 (4) | 5 (5) | | |
| Private | 24 (24) | 22 (22) | | |
| Medicare | 52 (52) | 30 (30) | | |
| Managed Care | 20 (20) | 44 (44) | | |
| Smoking History | | | .04 | .841 |
| Never | 86 (86) | 85 (85) | | |
| Former or current | 14 (14) | 15 (15) | | |
| Leisure time physical activity (consistently ≥3 times/week for ≥ 45min) | | | 2.75 | .097 |
| No | 82 (82) | 91 (90) | | |
| Yes | 18 (18) | 10 (10) | | |
| Needed an interpreter in past 12 months | | | -- | --- |
| No, family member present to translate | -- -- | 19 (19) | | |
| No, medical providers speak Spanish | -- -- | 5 (5) | | |
| No, I speak English | -- -- | 39 (39) | | |
| Yes | -- -- | 37 (37) | | |
| Did not need an interpreter | -- -- | 63 (63) | | |
| When interpreter needed, was there one available? | | | -- | --- |
| Never available | -- -- | 1 (3) | | |
| Sometimes available | -- -- | 17 (46) | | |
| Most of the time available | -- -- | 7 (19) | | |
| Always available | -- -- | 12 (32) | | |

**Additional Sociodemographic Characteristics**

**Neighborhood items.** To assess neighborhood characteristics: perceptions of safety and sense of community, two items were created in consideration of reported associations between certain neighborhood characteristics and race/ethnic differences in prevalence of hypertension (Mujahid, Diez-Roux, Cooper, Shea, & Williams, 2011). Each item (9 and 10) was coded from 1 to 5, representing a range from "extremely safe" to "not at all safe." The items were: (1) *"How safe do you feel in your neighborhood?"* and (2) ***"**How strong is the sense of community in your neighborhood?"* As summarized in Table 5.2, perceptions of safety ($p < .001$) and sense of community ($p < .001$) differed across ethnic groups. Non-Hispanics felt

significantly less safe in their neighborhoods than Hispanics. Further, non-Hispanics did not feel as much sense of community in their neighborhoods as Hispanics did.

**Health Care items.** To assess patients' general satisfaction with medical care (care provided by physicians in general); and patients' trust in own their primary care doctor (interpersonal physician trust) two items were used. Each item (11 and 12) was scaled from 1 to 6, representing a range from "strongly agree" to "prefer not to answer." The measure of satisfaction with medical care was extracted from the Short-Form Patient Satisfaction Questionnaire-18 (PSQ-18), (Marshall & Hays, 1994). The measure of patients' trust in their primary care providers was obtained from the Wake Forest Physician Trust Scale (Hall et al., 2002a). These items were: (1) *"The medical care I have been receiving over the past few years is just about perfect."* and (2) *"I completely trust the decisions my personal doctor makes about which treatments are best for me",* respectively. Participants' views about satisfaction with their medical care did not differ across ethnic groups. But participants' trust in their personal doctor ($p < .05$) differed across ethnic groups; Non-Hispanics scored lower than Hispanics in level of trust.

Table 5.2

*Means and Standard Deviations for the Sociodemographic Items for Non-Hispanic and Hispanic Subgroups*

| Items | Non-Hispanic ($N$ = 100) $M$ ($SD$) | Hispanic ($N$ = 101) $M$ ($SD$) | $t$ | $df$ | Sig. |
|---|---|---|---|---|---|
| How safe do you feel in your neighborhood | 1.67 (0.77) | 2.25 (0.97) | -4.67 | 199 | .000 |
| How strong is the sense of community | 2.63 (1.14) | 3.43 (1.00) | -5.25 | 199 | .000 |
| Medical care received is just about perfect | 1.92 (0.88) | 2.03 (0.98) | -0.83 | 197 | .406 |
| Completely trust treatment decisions my doctor makes | 1.69 (0.78) | 1.93 (0.91) | -2.00 | 197 | .047 |

*Note*. Study range for first two items was 1 to 5; study range for last two items was 1 to 5 for both the Non-Hispanic and Hispanic sample (respondents that chose Prefer Not to Answer, 6, were not included in the analyses).

**Clinical Characteristics**

Mean body mass index (BMI) for non-Hispanics was 31 (*SD* = 6); mean BMI for Hispanics was similar at 32 (*SD* = 6). As shown in Table 5.3, the percentages of normal, overweight, and obese non-Hispanics were similar to the percentages within the Hispanic sample. The non-Hispanic and Hispanic samples also had similar profiles in terms of hypertension control, prevalence of coronary artery disease (CAD), and presence of dyslipidemia; the majority of non-Hispanics and Hispanics had their hypertension controlled, did not have CAD, but had dyslipidemia. But the non-Hispanic sample differed from the Hispanic sample in terms of prevalence of atrial fibrillation ($p < .05$) and diabetes ($p < .001$). Non-Hispanics had a higher rate of atrial fibrillation (23%) than Hispanics (12%); but non-Hispanics had a lower rate of diabetes (20%) than Hispanics (46%). The majority of non-Hispanics and Hispanics experienced musculoskeletal pain, and were not involved at least 3 times per week in any type of leisure physical activity.

Table 5.3

*Frequencies, Percentages, and Chi-Square Results for Clinical Variables*

| Variables | Non-Hispanic (*N* = 100) *n* (%) | Hispanic (*N* = 101) *n* (%) | $\chi^2$ | Sig. |
|---|---|---|---|---|
| Hypertension controlled | | | .52 | .471 |
| No | 28 (28) | 33 (33) | | |
| Yes | 72 (72) | 68 (67) | | |
| Coronary artery disease | | | 1.03 | .599 |
| No | 63 (63) | 65 (64) | | |
| Yes | 37 (37) | 36 (36) | | |
| Atrial fibrillation | | | 4.32 | .038 |
| No | 77 (77) | 89 (88) | | |
| Yes | 23 (23) | 12 (12) | | |
| Diabetes | | | 15.92 | .000 |
| No | 80 (80) | 54 (54) | | |
| Yes | 20 (20) | 47 (46) | | |
| Body-mass index categories | | | 1.39 | .499 |
| Normal weight | 13 (13) | 8 (8) | | |
| Overweight | 36 (36) | 39 (39) | | |
| Obese | 51 (51) | 54 (54) | | |
| Dyslipidemia | | | .74 | .391 |
| No | 17 (17) | 22 (22) | | |
| Yes | 83 (83) | 79 (78) | | |
| Pain (non-cardiac source) | | | 3.05 | .218 |
| None | 15 (15) | 21 (21) | | |
| Musculoskeletal | 83 (83) | 80 (79) | | |
| Other | 2 (2) | 0 (0) | | |

**Pharmacological Treatments**

**Antihypertensive medications.** Non-Hispanics and Hispanics did not differ in terms of the number of prescribed anti-hypertensive drugs; the mean number of medications for Non-Hispanics was 2.37 (*SD* = 1.05) while the mean number for Hispanics was 2.17 (*SD* = .93). But the groups differed on the type of prescribed antihypertensive agents. As shown in Table 5.4, the percentage of non-Hispanics on Angiotensin Converting Enzyme (ACE) Inhibitors (37%) was significantly lower than the percentage of Hispanics on ACE inhibitors (52%). But the percentage of non-Hispanics on Angiotensin II receptor blockers (45%) was significantly higher

than the percentage of Hispanics on these type of drugs (25%). Table 5.4 lists additional pharmacological treatments.

Table 5.4

*Frequencies, Percentages, and Chi-Square Results for Pharmacological Treatments*

| Variables | Non-Hispanic (*N* = 100) *n* (%) | Hispanic (*N* = 101) *n* (%) | $\chi^2$ | Sig. |
|---|---|---|---|---|
| Angiotensin Converting Enzyme Inhibitors | | | 4.27 | .039 |
| No | 63 (63) | 49 (49) | | |
| Yes | 37 (37) | 52 (52) | | |
| Angiotensin II Receptor Blockers | | | 9.42 | .002 |
| No | 54 (54) | 76 (75) | | |
| Yes | 45 (45) | 25 (25) | | |
| Calcium Channel Blockers | | | .60 | .440 |
| No | 53 (53) | 59 (58) | | |
| Yes | 47 (47) | 42 (42) | | |
| Beta Blockers | | | .44 | .509 |
| No | 38 (38) | 43 (43) | | |
| Yes | 62 (62) | 58 (58) | | |
| Diuretics | | | .24 | .623 |
| No | 61 (61) | 65 (64) | | |
| Yes | 39 (39) | 36 (36) | | |
| Alpha Blockers | | | 3.82 | .282 |
| No | 87 (87) | 95 (94) | | |
| Yes | 13 (13) | 6 (6) | | |
| Antiplatelets: ASA | | | 1.45 | .228 |
| No | 43 (43) | 52 (52) | | |
| Yes | 57 (57) | 49 (49) | | |
| Antiplatelets: Plavix | | | 3.13 | .077 |
| No | 97 (97) | 92 (92) | | |
| Yes | 3 (3) | 9 (9) | | |
| Anticoagulants: Coumadin | | | 1.27 | .259 |
| No | 92 (92) | 88 (87) | | |
| Yes | 8 (8) | 13 (13) | | |
| Other Anticoagulants | | | 1.27 | .259 |
| No | 91 (91) | 96 (96) | | |
| Yes | 9 (9) | 5 (5) | | |

(continued)

| Variables | Non-Hispanic (*N* = 100) *n* (%) | Hispanic (*N* = 101) *n* (%) | $\chi^2$ | Sig. |
|---|---|---|---|---|
| Statins | | | .42 | .516 |
| No | 35 (35) | 31 (31) | | |
| Yes | 65 (65) | 70 (69) | | |
| Antidepressants | | | .86 | .353 |
| No | 87 (87) | 92 (91) | | |
| Yes | 13 (13) | 9 (9) | | |
| Antianxiety agents | | | .07 | .792 |
| No | 90 (90 | 92 (91) | | |
| Yes | 10 (10) | 9 (9) | | |

**Main Study Variables**

Table 5.5 shows reliability estimates for the main study variables (HRQOL, trust, resilience, and medication adherence). Nunnally and Bernstein (1994) recommended a minimum reliability of 0.70 or higher for research applications. All scales exceeded that threshold except the total MMAS-8 (Morisky et al, 2008), which had a coefficient alpha of 0.69. Corrected item-total correlations indicated that one of the medication adherence items (Item 5: "*Did you take your blood pressure medication/s yesterday?*") correlated only 0.07 with the sum of the other items in the scale. Cronbach's coefficient alpha for the Medication Adherence measure without this item increased to 0.73.

Non-Hispanics and Hispanics differed significantly in terms of the main study variables. Non-Hispanics had significantly higher global physical ($p < .001$) and global mental ($p < .001$) health scores. Non-Hispanics also had significantly higher trust ($p < .01$); resilience ($p < .05$); and medication adherence ($p < .01$) scores.

Table 5.5

*Reliability Estimates and Descriptive Statistics for HRQOL, Trust, Resilience, and Medication Adherence for Non-Hispanic and Hispanic Subgroups*

| Variables | Item *n* | α | Non-Hispanic (*N* = 100) Observed Range | Non-Hispanic (*N* = 100) *M* (*SD*) | Hispanic (*N* = 101) Observed Range | Hispanic (*N* = 101) *M* (*SD*) |
|---|---|---|---|---|---|---|
| [a]HRQOL | | | | | | |
| Global physical health*** | 4 | .76 | 20 to 68 | 46.27 (8.43) | 20 to 62 | 41.15 (7.69) |
| Global mental health*** | 4 | .75 | 28 to 68 | 50.99 (7.18) | 28 to 63 | 45.87 (7.07) |
| [b]Total trust score** | 11 | .90 | 22 to 54 | 39.77 (7.19) | 20 to 53 | 36.88 (7.10) |
| [c]Total resilience score* | 25 | .94 | 12 to 100 | 78.46 (13.57) | 9 to 100 | 73.67 (20.14) |
| [d]Total medication adherence score** | 8 | .69 | 3 to 8 | 7.22 (1.10) | 1 to 11 | 6.61 (1.80) |
| [d]Total medication adherence score without item 5** | 7 | .73 | 3 to 7 | 6.38 (1.09) | 1 to 10 | 5.77 (1.69) |

[a] Patient-Reported Outcomes Measurement Information System (PROMIS®) Global Health Scales. Scores are calibrated on a T-score metric so norm-based standardized scores have means of 50 and SDs of 10 in the general US population, by Hays et al., 2009. Potential range 30 to 80.
[b] Trust in Doctors Generally Scale, by Hall et al., 2002. Potential range 11 to 55.
[c] Connor-Davidson Resilience Scale-25 (CD-RISC-25), by Connor & Davidson, 2003. Potential range 0 to 100.
[d] Morisky Medication Adherence Scale-8 (MMAS-8), by Morisky et al., 2008. Potential range 0 to 11.
* $p < .05$. ** $p < .01$. *** $p < .001$.

## Exploratory Factor Analyses Results

Exploratory factor analyses (EFA) were conducted to evaluate the unidimensionality assumption for each of the 5 multi-item scales shown in Table 5.6. Three criteria were used to determine the underlying dimensions: the scree plot, Guttman's (1954) weakest lower bound, and parallel analysis (Cattell, 1966). An Oblimin (oblique) procedure was used to rotate the factors.

### Trust in the Medical Profession

While Guttman's weakest lower bound suggested two factors (Table 5.6), the scree plot in Figure 5.1 and the parallel analysis (Table 5.7) indicated a single factor, consistent with prior research (Hall, Camacho, Dugan, & Balkrishnan, 2002b).

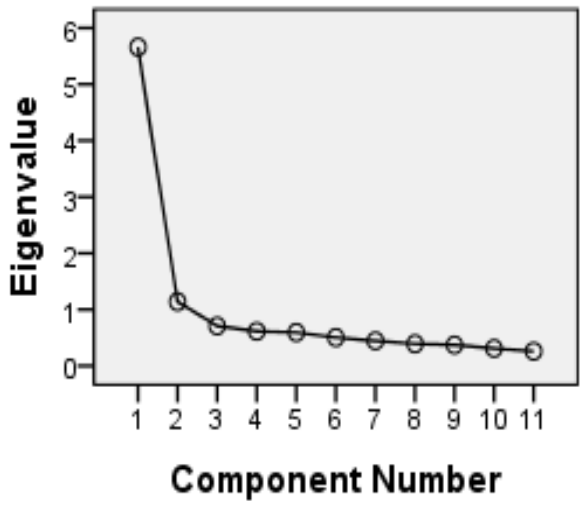



*Figure 5.1.* Scree plot of the principal component eigenvalues for the Trust in the Medical Profession measure

Table 5.6

*Eigenvalues and Percentages of Variance from the Principal Component Analyses*

| Measure | Total | % of Variance |
|---|---|---|
| Trust in the Medical Profession | | |
| Component 1 | 5.66 | 51.47 |
| Component 2 | 1.14 | 10.35 |
| Component 3 | 0.71 | 6.46 |
| Resilience | | |
| Component 1 | 10.94 | 43.76 |
| Component 2 | 1.73 | 6.93 |
| Component 3 | 1.24 | 4.95 |
| Component 4 | 1.04 | 4.15 |
| Component 5 | 0.99 | 3.95 |
| Medication Adherence | | |
| Component 1 | 3.01 | 42.95 |
| Component 2 | 0.98 | 13.99 |
| Global Physical Health | | |
| Component 1 | 2.34 | 58.58 |
| Component 2 | 0.70 | 17.39 |
| Global Mental Health | | |
| Component 1 | 2.29 | 57.18 |
| Component 2 | 0.74 | 18.61 |

Table 5.7

*Parallel Analysis Findings for the Study Measures*

| Measure | Raw Data | Means | Percentile (based on principal components) |
|---|---|---|---|
| Trust in the Medical Profession | | | |
| Root 1 | 5.66 | 1.39 | 1.50 |
| Root 2 | 1.14 | 1.27 | 1.35 |
| Resilience | | | |
| Root 1 | 10.94 | 1.71 | 1.82 |
| Root 2 | 1.73 | 1.59 | 1.68 |
| Root 3 | 1.24 | 1.50 | 1.57 |
| Medication Adherence | | | |
| Root 1 | 3.01 | 1.27 | 1.37 |
| Root 2 | 0.98 | 1.16 | 1.22 |
| Global Physical Health | | | |
| Root 1 | 2.34 | 1.16 | 1.25 |
| Root 2 | 0.70 | 1.04 | 1.10 |
| Global Mental Health | | | |
| Root 1 | 2.29 | 1.16 | 1.25 |
| Root 2 | 0.74 | 1.04 | 1.10 |

*Note*. Means and percentile random data eigenvalues based on 1000 data sets.

**Resilience**

Guttman's weakest lower bound suggested four factors (Table 5.6) while parallel analysis indicated a maximum of two factors (Table 5.7). The scree plot supported a single dimension, consistent with previous research (Connor & Davidson, 2003).

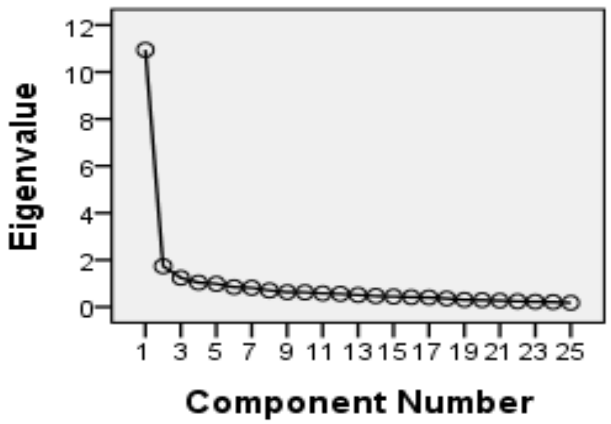



*Figure 5.2*. Scree plot of the principal component eigenvalues for the Resilience measure.

**Medication Adherence, and Physical and Mental HRQOL**

All three criteria (Guttman's weakest lower bound, parallel analysis, and scree plot) provided support for a single underlying dimension for Medication Adherence (Figure 5.3, Tables 5.6 and 5.7), Global Physical Health (Figure 5.4, Tables 5.6 and 5.7), and Global Mental Health (Figure 5.5, Tables 5.6 and 5.7).

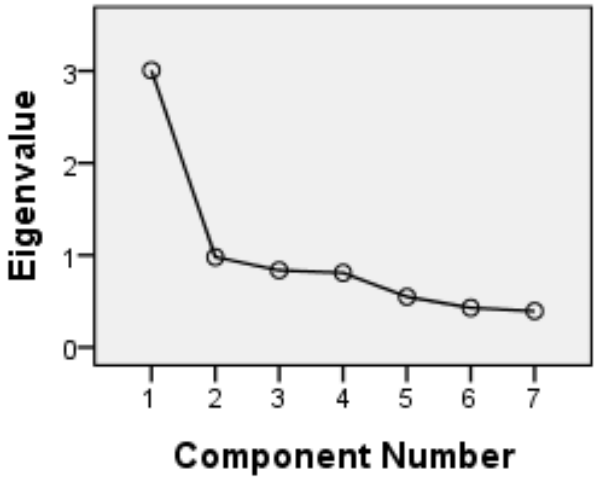



*Figure 5.3*. Scree plot of the principal component eigenvalues for the Medication Adherence measure

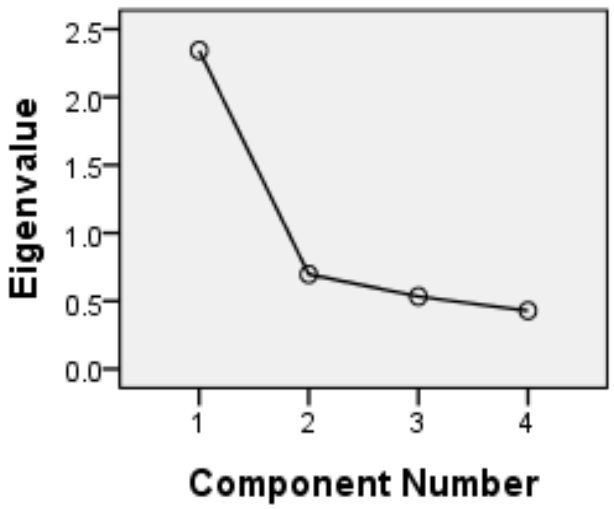



*Figure 5.4*. Scree plot of the principal component eigenvalues for the PROMIS Global Physical Health Scale

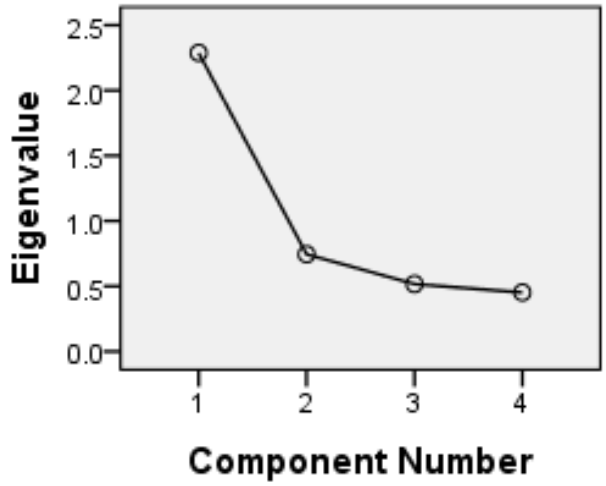



*Figure 5.5*. Scree plot of the principal component eigenvalues for the PROMIS Global Mental Health Scale

**Hypotheses Tests**

To test the first set of hypotheses assessing the direct effects of the study variables on HRQOL, a direct effects structural model (i.e., a model where trust was posited to have a direct effect on HRQOL) was tested. To test the second set of hypotheses assessing the mediating effect of resilience and medication adherence on trust and HRQOL, an indirect effects structural model (i.e., the proposed structural model) was tested. To test the third set of hypotheses assessing the moderating effect of ethnicity (Hispanic vs. non-Hispanic), a multiple group analysis using the proposed structural model was conducted.

As noted in the previous chapter, model testing is a two-step process. The first step involves testing of the measurement model via a confirmatory factor analysis; the second step includes the structural model. The fit of the models was assessed via the Satorra-Bentler (S-B) chi-square and the fit indices described in Table 5.8.

Table 5.8

*Fit Indices and their Threshold Values*

| Index | Threshold | Reference |
|---|---|---|
| Non-Normed Fit Index (NNFI) | ≥ .95 | Hu & Bentler, 1999 |
| Comparative Fit Index (CFI) | ≥ .95 | Hu & Bentler, 1999 |
| Root Mean Square Error of Approximation (RMSEA) | ≤ .06 | Brown & Cudeck, 1993 |

**Results for the Measurement Models**

**Trust in the Medical Profession measurement model**. The single-factor model fit the data well, as shown in Table 5.9. The NNFI was 0.95 and the CFI was 0.96; both were at or above their respective criteria. The RMSEA was 0.06 and within the acceptable range. Additionally, all items loaded significantly onto the Trust construct.

Table 5.9

*Unstandardized and Standardized Factor Loadings for the Trust in the Medical Profession Measurement Model*

| Item | *B* | *SE* | β |
|---|---|---|---|
| Trust 1 | .70 | .06 | .74 *** |
| Trust 2 | .39 | .08 | .38 *** |
| Trust 3 | .56 | .06 | .69 *** |
| Trust 4 | .73 | .06 | .78 *** |
| Trust 5 | .68 | .05 | .75 *** |
| Trust 6 | .59 | .06 | .68 *** |
| Trust 7 | .36 | .08 | .34 *** |
| Trust 8 | .58 | .05 | .73 *** |
| Trust 9 | .77 | .07 | .74 *** |
| Trust 10 | .75 | .06 | .74 *** |
| Trust 11 | .77 | .06 | .79 *** |

*Note*. *B* = unstandardized factor loading. *SE* = standard error. B = standardized factor loading. S-B Scaled $\chi^2(44) = 75.66$, $p < .001$; NNFI = 0.95; CFI = 0.96; RMSEA = 0.06, 90% CI (.04, .08).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Resilience measurement model**. As noted in the previous chapter, single-item indicators are less parsimonious and can increase measurement error (Little, et al., 2002). Because the resilience measure consisted of 25 items, parcels were created using the item-to-construct balance method (as explained in the Methodology chapter) (Little et al., 2002). The composition of the parcels is shown in Table 5.10.

Table 5.10

*Resilience Parcels*

| | Parcels and Items | $r^1$ |
|---|---|---|
| ***Parcel One*** | | |
| 3 | When there are no clear solutions to my problems, sometimes God can help. | .27 |
| 11 | I believe I can achieve my goals, even if there are obstacles. | .77 |
| 20 | In dealing with life's problems, sometimes you have to act on a hunch without knowing why. | .56 |
| 21 | I have a strong sense of purpose in life. | .70 |
| 24 | I work to attain my goals no matter what roadblocks I encounter along the way. | .65 |
| ***Parcel Two*** | | |
| 9 | Good or bad, I believe that most things happen for a reason. | .34 |
| 14 | Under pressure, I stay focused and think clearly. | .73 |
| 15 | I prefer to take the lead in solving problems rather than letting others make all the decisions. | .69 |
| 16 | I am not easily discouraged by failure. | .59 |
| 25 | I take pride in my achievements. | .63 |
| ***Parcel Three*** | | |
| 2 | I have at least one close relationship that helps me when I am stressed. | .40 |
| 8 | I tend to bounce back after illness, injury, or other hardships. | .73 |
| 10 | I give my best effort no matter what the outcome may be. | .61 |
| 12 | Even when things look hopeless, I don't give up. | .67 |
| 13 | During times of stress/crisis, I know where to turn for help. | .63 |
| ***Parcel Four*** | | |
| 4 | I can deal with whatever comes my way. | .66 |
| 6 | I try to see the humorous side of things when I am faced with problems. | .55 |
| 17 | I think of myself as a strong person when dealing with life's challenges. | .72 |
| 22 | I feel in control of my life. | .65 |
| 23 | I like challenges. | .61 |

(continued)

| | Parcels and Items | $r^1$ |
|---|---|---|
| ***Parcel Five*** | | |
| 1 | I am able to adapt when changes occur. | .56 |
| 5 | Past successes give me confidence in dealing with new challenges. | .71 |
| 7 | Having to cope with stress can make me stronger. | .64 |
| 18 | I can make unpopular or difficult decisions that affect other people, if it is necessary. | .62 |
| 19 | I am able to handle unpleasant or painful feelings like sadness, fear, and anger. | .65 |

[1] Corrected item-total correlations are presented as per the reliability analysis.

The single-factor model fit the data well, as shown in Table 5.11. The NNFI was 0.99 and the CFI was 0.98; both were above their respective criteria. The RMSEA was 0.07, and slightly above the acceptable range. All parcels loaded significantly onto the Resilience construct.

Table 5.11

*Unstandardized and Standardized Factor Loadings for the Resilience Measurement Model*

| Item | *B* | *SE* | β |
|---|---|---|---|
| Parcel 1 | .63 | .06 | .82 *** |
| Parcel 2 | .66 | .06 | .90 *** |
| Parcel 3 | .63 | .07 | .81 *** |
| Parcel 4 | .71 | .05 | .89 *** |
| Parcel 5 | .72 | .05 | .90 *** |

*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. Satorra-Bentler Scaled $\chi^2(5) = 10.54$, $p = .061$; NNFI = 0.96; CFI = 0.98; RMSEA = 0.07, 90% CI (.00, .14).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Medication Adherence measurement model**. Because six out of the seven items were measured using a dichotomous response scale, the estimation method used to test this model was least squares with retest (Byrne, 2006). In addition, because EQS Version 6.3 allows for the odds-ratio approach (Savalei, Bonnett, & Bentler, 2015), this approach was used via the binary statement in EQS.

As shown in Table 5.12, the medication adherence model did not fit the data well. The NNFI was only 0.58 and the CFI was 0.72; these values fell far below the acceptable criterion of > 0.95. Further the RMSEA was very high at 0.34. Because this model did not fit the data well, a single sum total score (i.e., all items, except for item 5, were summed) was created and used in subsequent structural model tests.

Table 5.12

*Unstandardized and Standardized Factor Loadings for the Medication Adherence Measurement Model with Poor Model Fit*

| Item | *B* | *SE* | β |
|---|---|---|---|
| MMAS 1 | .81 | .07 | .81 *** |
| MMAS 2 | .87 | .09 | .87 *** |
| MMAS 3 | .75 | .05 | .75 *** |
| MMAS 4 | .69 | .04 | .69 *** |
| MMAS 6 | .89 | .10 | .89 *** |
| MMAS 7 | .55 | .03 | .55 *** |
| MMAS 8 | .75 | .05 | .75 *** |

*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. $\chi^2(14) = 328.83$, $p < .001$; NNFI = 0.58; CFI = 0.72; RMSEA = 0.34, 90% CI (.30, .37).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Global Physical Health measurement model**. The findings in Table 5.13 reveal that the single-factor model fit the data well. The NNFI was 0.98 and the CFI was 0.99; both were above their respective criteria. The RMSEA was 0.05 and within the acceptable range. All items loaded significantly onto the Global Physical Health construct.

Table 5.13

*Unstandardized and Standardized Factor Loadings for the Global Physical Health Measurement Model*

| Item | *B* | *SE* | β |
|---|---|---|---|
| PROMIS 3 | .65 | .06 | .71 *** |
| PROMIS 6 | .89 | .07 | .77 *** |
| PROMIS 7 | .54 | .08 | .53 *** |
| PROMIS 8 | .56 | .07 | .67 *** |

*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. Satorra-Bentler Scaled $\chi^2(2) = 3.05$, $p = .218$; NNFI = 0.98; CFI = 0.99; RMSEA = 0.05, 90% CI (.00, .16).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Global Mental Health measurement model**. The findings in Table 5.14 indicate that the single-factor model fit the data well. The NNFI and the CFI values were 1.00; both were above their respective criteria. The RMSEA was 0.02 and within the acceptable range. All items loaded significantly onto the Global Mental Health construct.

Table 5.14

*Unstandardized and Standardized Factor Loadings for the Global Mental Health Measurement Model*

| Item | *B* | *SE* | β |
|---|---|---|---|
| PROMIS 2 | .67 | .06 | .72 *** |
| PROMIS 4 | .74 | .08 | .74 *** |
| PROMIS 5 | .70 | .06 | .69 *** |
| PROMIS 10 | .44 | .07 | .47 *** |

*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. Satorra-Bentler Scaled $\chi^2(2) = 2.16$, $p = .339$; NNFI = 1.00; CFI = 1.00; RMSEA = 0.02, 90% CI (.00, .14).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Proposed measurement model**. The proposed measurement model for the four latent variables (i.e., Trust in the Medical Profession, Resilience, Global Physical Health, and Global Mental Health) and the observed Medication Adherence Scale fit the data well. As shown in

Table 5.15, the NNFI and CFI values were acceptable at 0.96. In addition, the RMSEA was low and acceptable at 0.04. This measurement model was used in the subsequent structural equation model tests.

Table 5.15

*Correlations between the Latent and Observed Constructs in the Proposed Measurement Model*

| Construct | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 Trust in the Medical Profession | | | | |
| 2 Resilience | .18 * | | | |
| 3 Global Physical Health | .35 *** | .22 * | | |
| 4 Global Mental Health | .50 *** | .43 *** | .80 ** | |
| 5 Medication Adherence (observed total score) | .25 ** | .09 | .10 | .19 * |

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

**Testing the First Set of Hypotheses (via the Full Model with Direct and Indirect Effects)**

The Full Model with Direct and Indirect Effects (and its standardized path coefficients) is depicted in Figure 5.6. As noted in Table 5.16, this model fit the data well: the NNFI, CFI, and the RMSEA values were all within acceptable range. Trust in the medical profession, resilience, and medication adherence accounted for 37% of the variance of global mental health and 15% of the variance of global physical health.

**First hypothesis**. It was hypothesized that trust would be positively associated with HRQOL. The findings in Table 5.16 reveal that trust was positively associated with global physical health, $\beta = .32$, $p < .001$. Trust was also positively associated with global mental health, $\beta = .43$, $p < .001$. Therefore, this hypothesis was supported.

**Second hypothesis**. It was hypothesized that trust would be positively associated with resilience. As shown in Table 5.16, trust was positively associated with resilience, $\beta = .18$, $p < .05$. As such, the second hypothesis was supported.

**Third hypothesis**. It was hypothesized that trust would be positively associated with medication adherence. The findings in Table 5.16 show that trust was positively associated with medication adherence, β = .25, $p < .05$. Thus, this hypothesis was supported.

**Fourth hypothesis**. It was hypothesized that resilience would be positively associated with HRQOL. The findings in Table 5.16 indicate that resilience was not significantly associated with global physical health; but resilience was positively associated with global mental health, β = .34, $p < .001$. Accordingly, the fourth hypothesis was only partly supported.

**Fifth hypothesis**. It was hypothesized that medication adherence would be positively associated with HRQOL. Medication adherence was not significantly associated with either global physical or mental health (see Table 5.16). Therefore, this hypothesis was not supported.

Table 5.16

*Unstandardized and Standardized Coefficients for the Full Model with Direct and Indirect Effects*

| Path | *B* | *SE* | β |
|---|---|---|---|
| Trust to Resilience | .12 | .05 | .18 * |
| Trust to Medication Adherence | .36 | .13 | .25 * |
| Trust to Global Physical Health | .22 | .07 | .32 *** |
| Trust to Global Mental Health | .30 | .07 | .43 *** |
| Resilience to Global Physical Health | .18 | .10 | .16 |
| Resilience to Global Mental Health | .38 | .10 | .34 *** |
| Medication Adherence to Global Physical Health | .00 | .04 | .01 |
| Medication Adherence to Global Mental Health | .03 | .03 | .06 |

*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. Satorra-Bentler Scaled $\chi^2(267) = 344.66$, $p < .001$; NNFI = 0.96; CFI = 0.96; RMSEA = 0.04, 90% CI (.03, .05).
* $p < .05$. ** $p < .01$. *** $p < .001$.

**Total effect of trust on global physical health**. As shown in Table 5.17, the standardized direct effect of trust on global physical health was .32 ($p < .001$) and the

standardized indirect effect was .03 ($p$ = .217). Thus, its standardized total effect on global physical health was .35 ($p$ < .001).

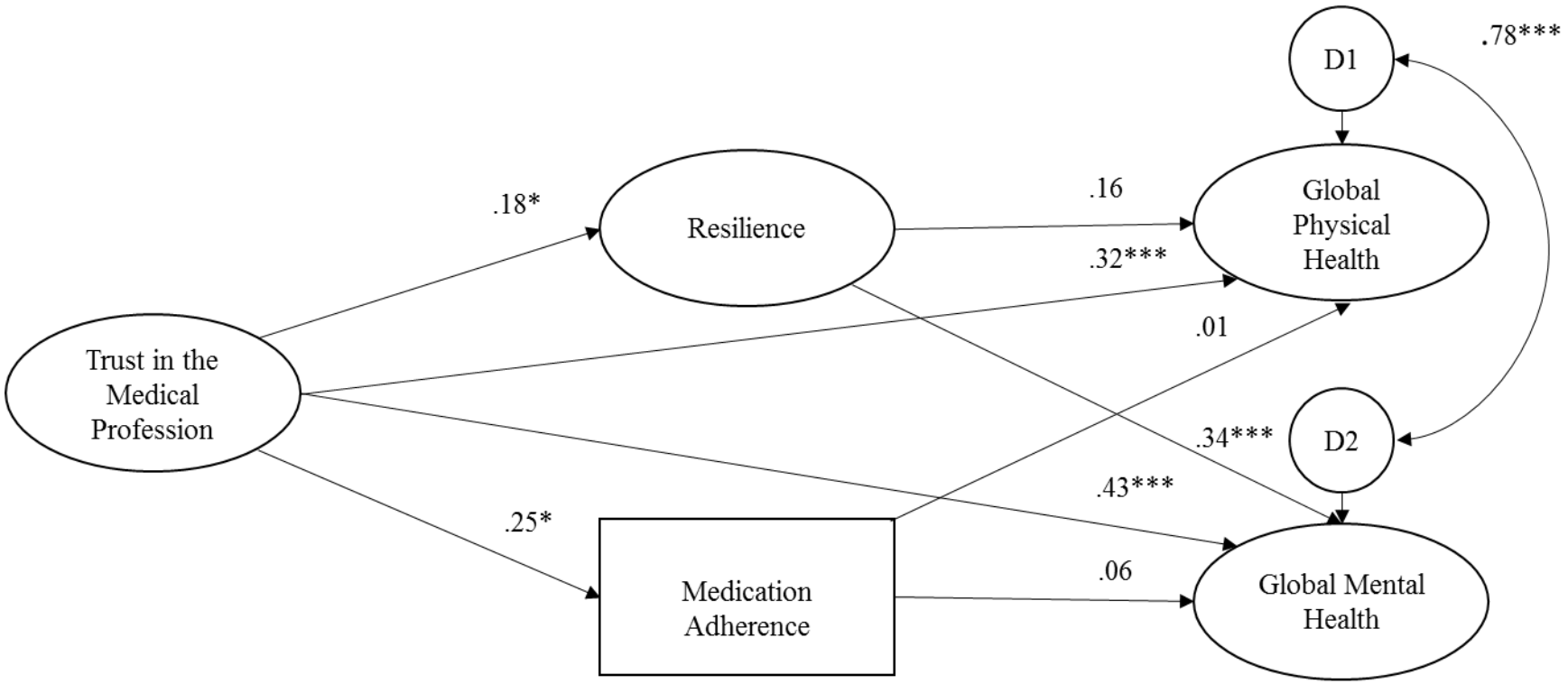
**Total effect of trust on global mental health**. The findings in Table 5.17 reveal that the standardized direct effect of trust on global mental health was .43 ($p$ < .001) and the standardized indirect effect was .07 ($p$ < .05). Therefore, its standardized total effect on global mental health was .50 ($p$ < .001).

Table 5.17

*Standardized Direct, Indirect, and Total Effects of Trust on HRQOL for the Full Model with Direct and Indirect Effects*

| | Global Physical Health | | Global Mental Health | |
|---|---|---|---|---|
| Effect | β | *SE* | β | *SE* |
| Direct | .32 *** | .09 | .43 *** | .09 |
| Indirect | .03 | .03 | .07 * | .04 |
| Total | .35 *** | .08 | .50 *** | .07 |

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




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

$\chi^2(267) = 344.66$, $p < .001$; NNFI = .96; CFI = .96; RMSEA = .04, 90% CI (.03, .05).

*Figure 5.6.* Standardized path coefficients for the full model with direct and indirect effects.

**Testing the Second Set of Hypotheses (via the Complete Mediation Model)**

The Complete Mediation Model (and its standardized path coefficients) is depicted in Figure 5.7. This model fit the data well: the NNFI was close-to-acceptable, the CFI was acceptable, and the RMSEA was also acceptable. Together with the direct effects model, the indirect effects model was used to test the mediating effects of resilience and medication adherence on HRQOL. As noted in the previous chapter, a variable can be deemed a mediator when three criteria are fulfilled (Kline, 2011). First, the exogenous construct should significantly predict the mediator. Second, the mediator should significantly predict the endogenous construct. Third, the indirect effect (of the exogenous construct on the endogenous construct via the mediator) should be statistically significant but the direct effect (of the exogenous construct on the endogenous construct) should not be significant for full mediation to occur; if both indirect and direct effects are statistically significant, then partial mediation is said to occur.

**Sixth hypothesis**. It was hypothesized that resilience would mediate the relationship between trust and HRQOL. As shown in Table 5.18, trust significantly predicted resilience, $\beta = .19$, $p < .05$; as such the first criterion for mediation was met. Resilience significantly predicted global physical health, $\beta = .22$, $p < .05$; thus, the second criterion was fulfilled. But as shown in Table 5.19, although the indirect effect of trust on global physical health was statistically significant, its direct effect was also significant (see Table 5.17). Accordingly, resilience partially mediated the relationship between trust and global physical health.

Per the findings in Table 5.18, as noted in the previous paragraph, trust significantly predicted resilience. Resilience also significantly predicted global mental health, $\beta = .42$, $p < .001$; therefore, the second criterion was fulfilled. But as shown in Table 5.19, although the indirect effect of trust on global mental health was statistically significant, its direct effect was also significant (per Table 5.17). Thus, resilience partially mediated the relationship between trust and global mental health. The sixth hypothesis was supported.

Table 5.18

*Unstandardized and Standardized Coefficients for the Complete Mediation Model*

| Path | *B* | *SE* | β |
|---|---|---|---|
| Trust to Resilience | .17 | .07 | .19 * |
| Trust to Medication Adherence | .51 | .17 | .25 ** |
| Resilience to Global Physical Health | .24 | .11 | .22 * |
| Resilience to Global Mental Health | .46 | .11 | .42 *** |
| Medication Adherence to Global Physical Health | .04 | .03 | .08 |
| Medication Adherence to Global Mental Health | .08 | .03 | .16 * |

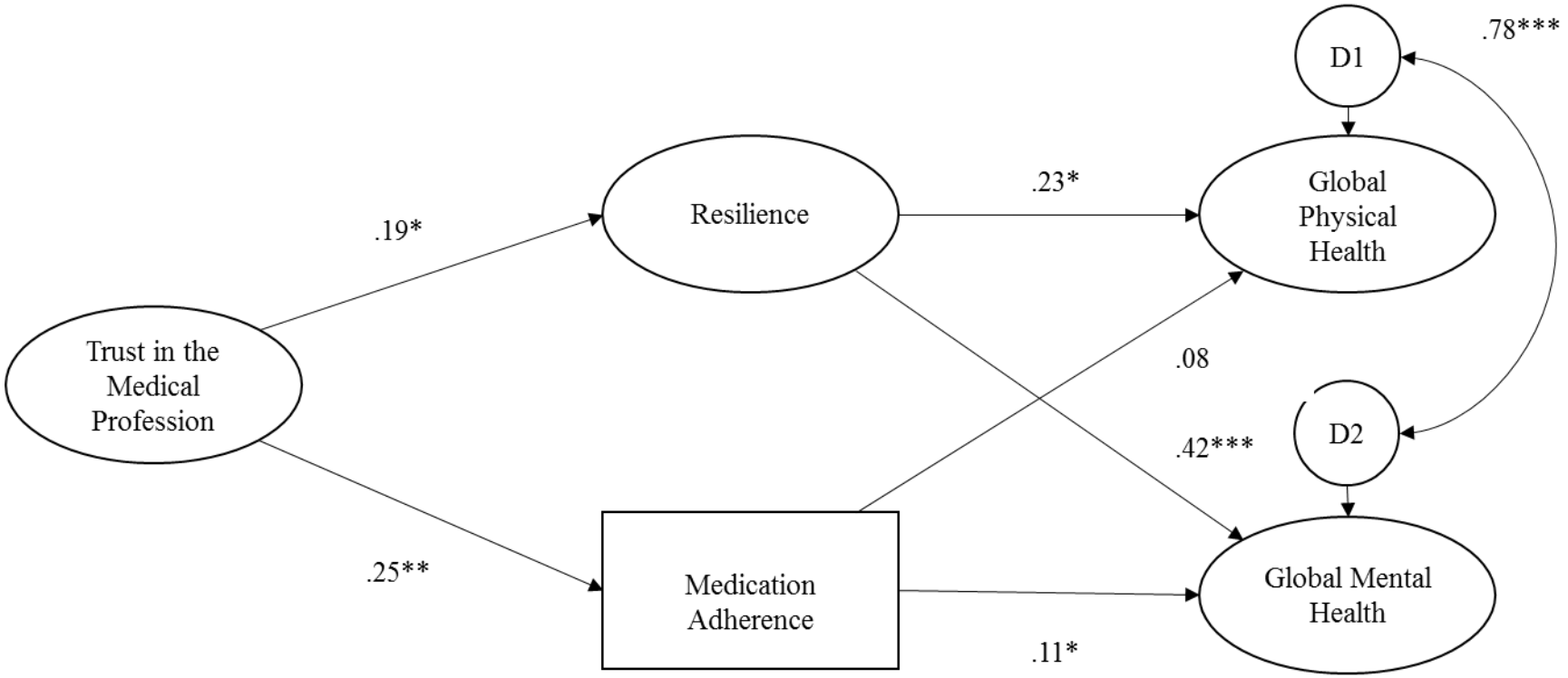
*Note*. *B* = unstandardized coefficient. *SE* = standard error. B = standardized coefficient. S-B Scaled $\chi^2(269) = 371.71$, $p < .001$; NNFI = 0.94; CFI = 0.95; RMSEA = 0.04, 90% CI (.03, .05).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5.19

*Standardized Indirect and Total Effects of Trust on HRQOL for the Complete Mediation Model*

| | Global Physical Health | | Global Mental Health | |
|---|---|---|---|---|
| Effect | β | *SE* | β | *SE* |
| Indirect | .06 * | .04 | .12 ** | .05 |
| Total | .06 * | .04 | .12 ** | .05 |

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




$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

$\chi^2(269) = 373.29$, $p < .001$; NNFI = .94; CFI = .95; RMSEA = .04, 90% CI (.03, .05).

*Figure 5.7*. Standardized path coefficients for the complete mediation (proposed) model.

**Seventh hypothesis**. It was hypothesized that medication adherence would mediate the relationship between trust and HRQOL. As shown in Table 5.18, trust significantly predicted medication adherence, β = .25, $p < .01$; as such the first criterion for mediation was met. But medication adherence did not significantly predict global physical health, β = .08, *NS*. Because the second criterion was not met, medication adherence did not significantly mediate the relationship between trust and global physical health.

Per the findings in Table 5.18, as noted in the previous paragraph, trust significantly predicted medication adherence. Medication adherence also significantly predicted global mental health, β = .16, $p < .05$; therefore, the second criterion was fulfilled. But as shown in Table 5.19, although the indirect effect of trust on global mental health was statistically significant, its direct effect was also significant (per Table 5.17). Thus, medication adherence partially mediated the relationship between trust and global mental health. The seventh hypothesis was partly supported.

**Testing the Third Set of Hypotheses (via a Simultaneous Group Analysis)**

**Eight Hypothesis**. It was hypothesized that the strength of the associations of trust in the medical profession, resilience, medication adherence, and HRQOL would vary between Hispanics and non-Hispanics. As noted in the previous chapter, a simultaneous or multi-group analysis was conducted to determine whether ethnicity (i.e., non-Hispanic vs. Hispanic) moderated the relationships specified in the structural model. Per Byrne (2006), all factor and cross-loadings, all structural paths, and all covariances of the indirect effects model were constrained to be equal across the two groups. The Lagrange Multiplier (LM) test of equality constraints was used to test for invariance across groups.

The multi-group model fit the data only adequately, S-B Scaled $\chi^2(567) = 736.65$, $p < .001$. The NNFI at 0.90 and the CFI at 0.91 were below the acceptable thresholds but the RMSEA was within the acceptable range at 0.06. The univariate LM test results revealed that freeing up the between-group constraints on the path coefficients would not lead to significant

improvement in the model fit. Only three constraints differed significantly across the groups: the loading of Trust 1 ("*Doctors in general care about their patients' health just as much as their patients do*.") on the Trust construct ($p < .001$), the loading of Trust 5 ("*Doctors are totally honest in telling their patients about all of the different treatment options available for their conditions.*") on the Trust construct ($p < .05$), and the loading of PROMIS Global10 ("*In the past 7 days: How often have you been bothered by emotional problems such a feeling anxious, depressed or irritable?"*) on the Global Mental Health construct ($p < .05$). This pattern of findings indicate lack of measurement equivalence in terms of the Trust in the Medical Profession construct.

Given that most of the model parameters were invariant across the two ethnic groups, ethnicity did not significantly moderate the associations between trust, resilience, medication adherence, and HRQOL. As such, the eighth hypothesis was not supported.

**Evaluation of Proposed Complete Mediation Model**

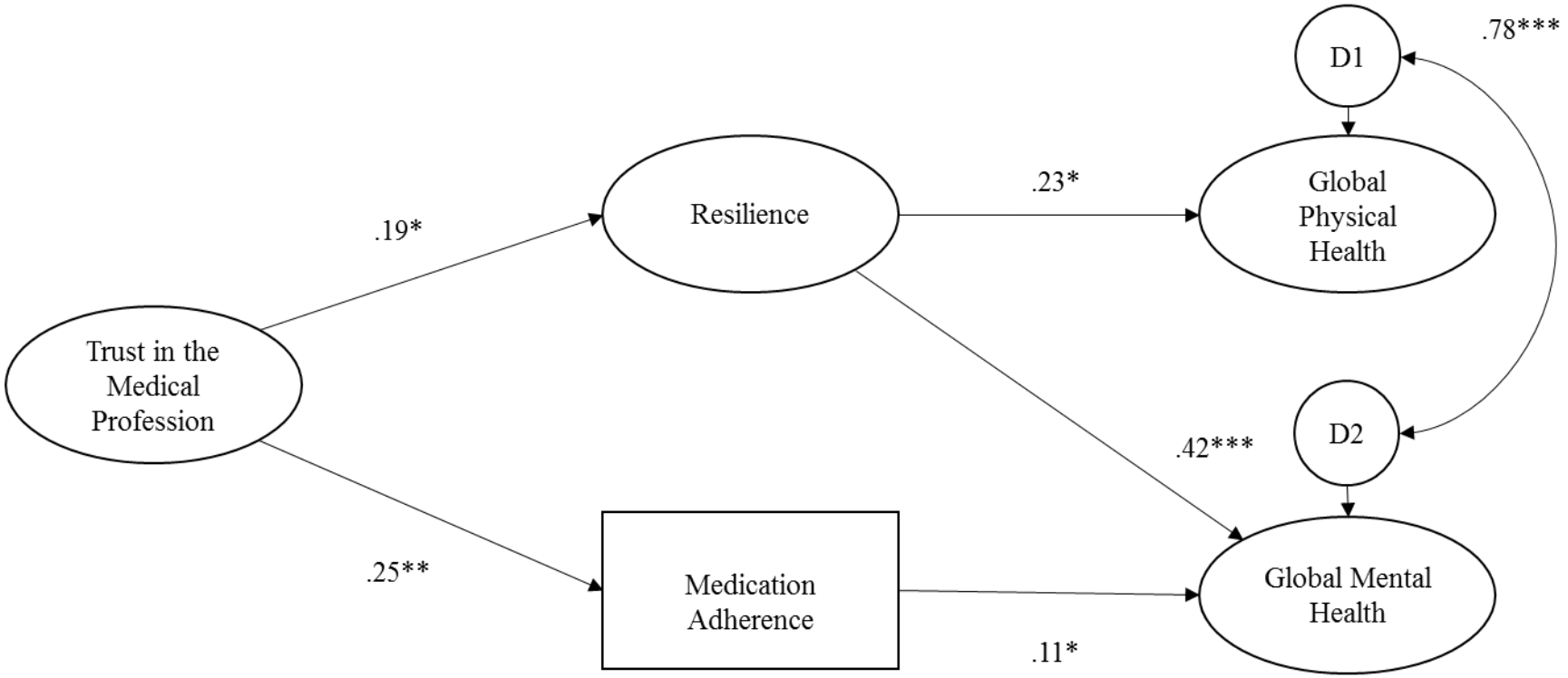
The fit of the proposed Complete Mediation model was compared to the fit of the proposed model with only statistically significant paths (depicted in Figure 5.8), the full model as well as two other alternative models (depicted in Figures 5.9 and 5.10). As shown in Table 5.20, the full model fit the data best.

Table 5.20

*Fit Indices for the Proposed and Alternative Models*

| Index | Proposed | Proposed Significant Only | Full Model | Alternative One | Alternative Two |
|---|---|---|---|---|---|
| NNFI | .94 | .94 | .96 | .95 | .95 |
| CFI | .95 | .95 | .96 | .95 | .96 |
| RMSEA | .04 | .04 | .04 | .04 | .04 |

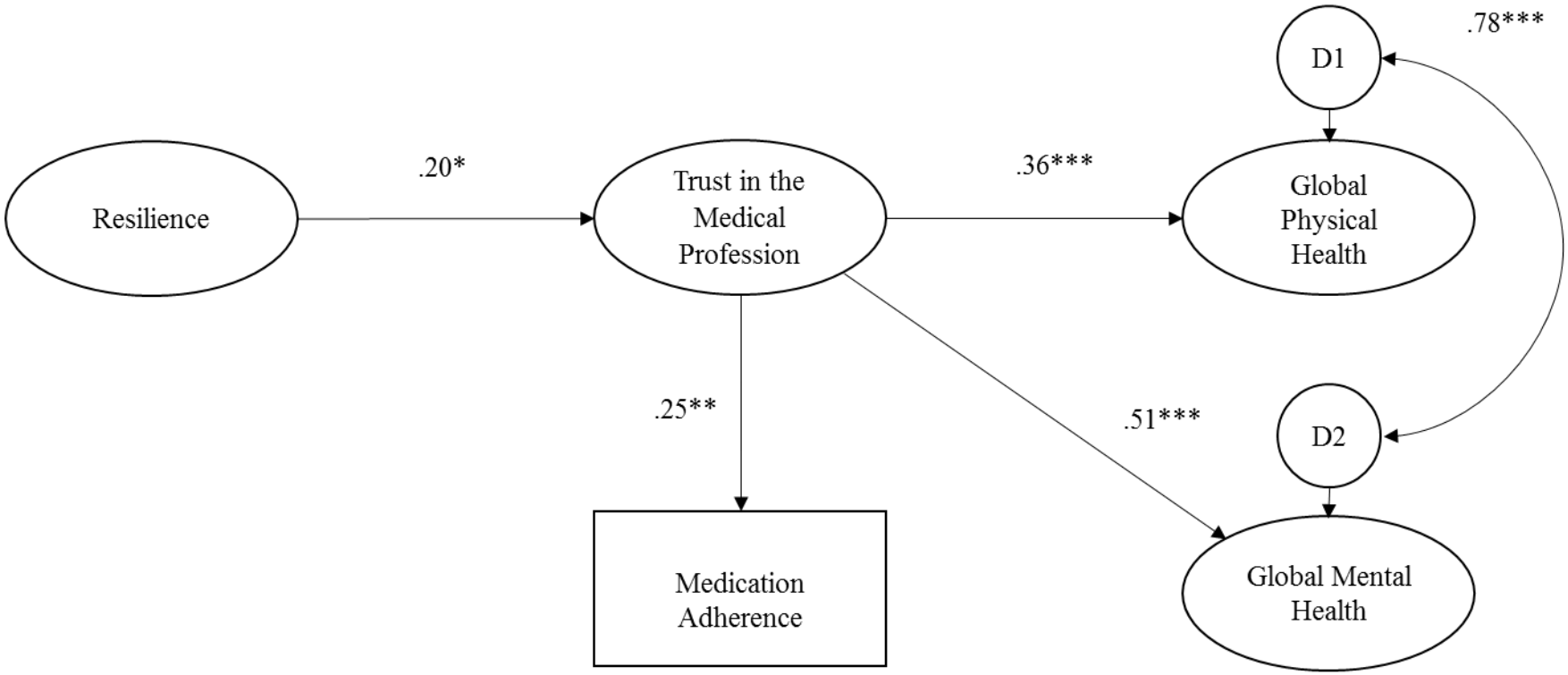
*Note*. NNFI = Non-normed fit index. CFI = Comparative fit index. RMSEA = Root mean square error of approximation.




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

$\chi^2(270) = 373.29$, $p < .001$; NNFI = .94; CFI = .95; RMSEA = .04, 90% CI (.03, .05).

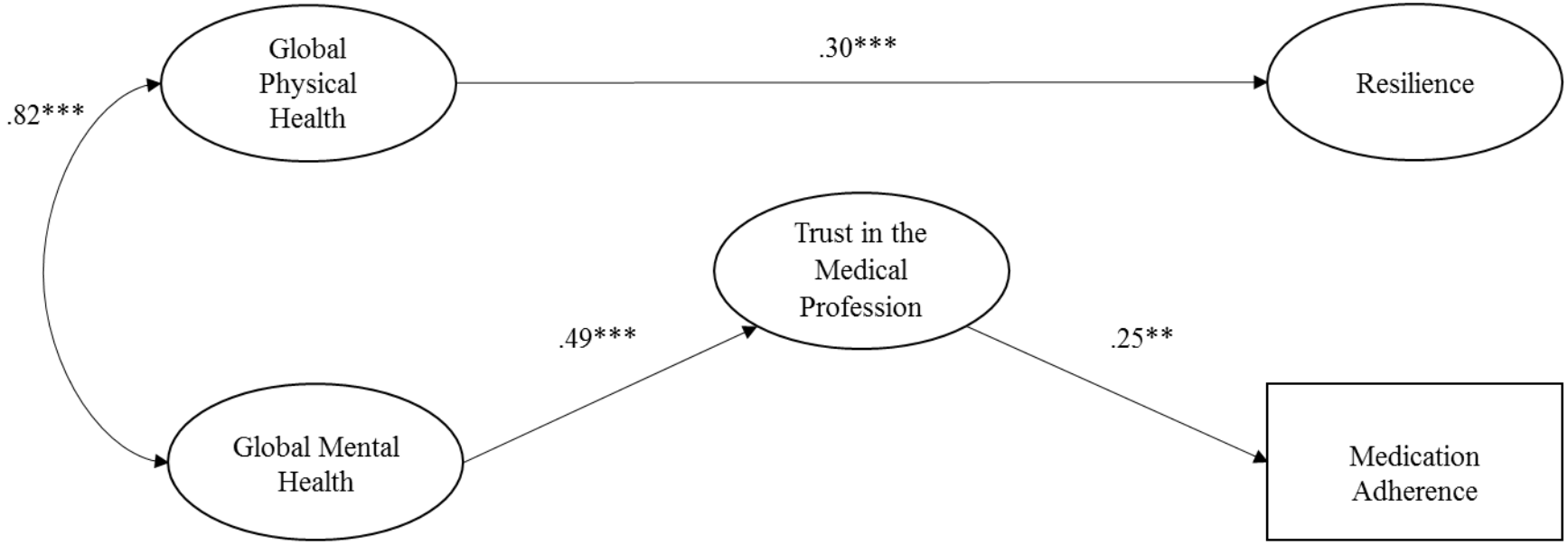
*Figure 5.8*. Standardized path coefficients for the complete mediation (proposed) model with only statistically significant paths.




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

$\chi^2(271) = 365.26$, $p < .001$; NNFI = .95; CFI = .95; RMSEA = .04, 90% CI (.03, .05).

*Figure 5.9*. Standardized path coefficients for the first alternative structural model.




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

$\chi^2(272) = 360.20$, $p < .001$; NNFI = .95; CFI = .96; RMSEA = .04, 90% CI (.03, .05).

*Figure 5.10*. Standardized path coefficients for the second alternative structural model.

## Summary of Findings

Trust was positively associated with global physical and mental health (first hypothesis). Trust was also positively related to resilience (second hypothesis) and medication adherence (third hypothesis). While resilience was not significantly associated with global physical health, it was positively related to global mental health (fourth hypothesis). Medication adherence was not significantly associated with global physical or mental health (fifth hypothesis). Resilience partially mediated the relationship between trust and global physical and mental health (sixth hypothesis). But medication adherence did not significantly mediate the relationship between trust and physical and global mental health (seventh hypothesis). Ethnicity did not moderate the relationships posited in the proposed structural model.

Although the proposed structural model fit the data well and most of the study hypotheses were supported, two alternative theoretically plausible models were tested and these also fit the data well; the alternative models proposed different directional relationships. For example, although the proposed model hypothesized that trust would be positively associated with resilience (which was supported), the first alternative model posited that resilience would be positively associated with trust (which was also supported). Further, the proposed model hypothesized that resilience would be positively associated with global physical health (which was supported). But the second alternative model conjectured that global physical health would be positively associated with resilience (and this was supported). The importance of considering alternative models when using structural equation modeling has been demonstrated (Hays & White, 1987). Concurrently, in this study, the alternative models fit the data just as well as the proposed model indicating that causality can be difficult to ascertain when measures are taken at one point in time; rather, only associations between constructs can be concluded when cross-sectional designs are used.

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# CHAPTER 6

# DISCUSSION

The first part of this chapter provides an overview of the purpose of the study and the theoretical framework, followed by the study's hypotheses and interpretation of findings. The later part of the chapter presents implications for practice, research, and policy; limitations; recommendations for future research; and conclusions.

This study investigated the role of trust in the medical profession in enhancing health-related quality of life (HRQOL) in individuals with hypertension. Specifically, it examined the extent to which the effect of trust is mediated by medication adherence and resilience, and whether these associations varied by ethnicity (Hispanic vs. non-Hispanic). Hypotheses were derived from the Vulnerable Populations Conceptual Model (VPCM), a model that focuses on the social conditions that influence the vulnerability to poor health outcomes (Flaskerud & Winslow, 1998).

The VPCM proposes interrelationships between its three main constructs: 1) *resource availability* and *relative risk*: a lack of resources (social, economic, and/or environmental) increases risk for disease; 2) *relative risk* and *health status*: risk factor exposure influences health status; and 3) *health status* and *resource availability*: poor health has a negative effect on functional ability and productivity (ability to work) and may deplete community and personal resources (Figure 6.1). *Resource availability* is conceptualized as social, economic, and environmental resources that are available at the individual and community levels and influence health including human capital, social support, and access to care. Empirical indicators of human capital include income, education, employment, and languages spoken; health insurance and use of medical care are empirical indicators of access to care. *Relative risk* considers susceptibility to risk for disease as represented by patterns of differential vulnerability to poor health in under-resourced groups, and it also considers personal traits such self-efficacy and resilience that might be health protective. Health status describes the psychobiological

vulnerability that results when social devaluation is coupled with poverty, evidenced by high morbidity (disease estate) and mortality rates in the community (Flaskerud & Winslow, 1998).

Trust in the medical profession, a form of institutional trust, was conceptualized in this study as a social resource and was measured under the resource availability construct. This conceptualization draws from the notion of social capital, a term coined by Coleman (1988), reflecting those features of social structures (i.e. organizations, institutions) such as networks, norms of reciprocity, obligations and expectations, and trust, which constitute resources that enable individuals to function more effectively and, in turn, enhance cooperation for mutual benefit (Putnam, 1995). From this perspective, medical trust has been described as a form of social capital, due to its ability to promote health-seeking behaviors and motivate access to care (Gilson, 2003; Calnan & Roowe, 2006). Illingworth (2002) views trust as a social good, and the scarcest of medical resources. It was hypothesized that having trust in the medical profession *(resource availability)* was related to better treatment adherence, greater resilience *(relative* risk/health-protective factors*)* and, in turn, better HRQOL *(health status)*. In addition, it was predicted that the strength of the associations of trust, resilience, and medication adherence with HRQOL would vary between Hispanics and non-Hispanics.

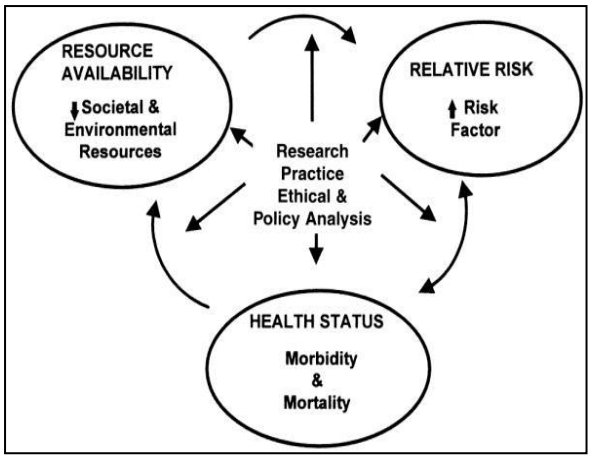


*Figure 6.1*. Vulnerable Populations Conceptual Model (Flaskerud & Winslow, 1998).

## Research Hypotheses

**First Aim.** To assess the *total effects* of trust in the medical profession on global physical and mental, HRQOL, the following hypotheses were proposed:

**H1:** There will be a positive association between trust in the medical profession and HRQOL in adults with hypertension.

**H2**: There will be a positive association between trust in the medical profession and resilience.

**H3**: There will be a positive association between trust in the medical profession and medication adherence.

**H4**: There will be a positive relationship between resilience and HRQOL.

**H5**: There will be a positive relationship between medication adherence and HRQOL.

**Second Aim.** To examine whether the association of trust in the medical profession with HRQOL was *mediated* by resilience and medication adherence, the following hypotheses were proposed:

**H6:** Resilience will mediate the relationship between trust and HRQOL.

**H7**: Medication adherence will mediate the relationship between trust in the medical profession and HRQOL.

**Third Aim.** To assess whether the associations between trust in the medical profession, resilience, medication adherence, and HRQOL differed by ethnicity (Hispanic vs. non-Hispanic), the following hypothesis was proposed:

**H8:** The strength of the associations of trust in the medical profession, resilience, and medication adherence will vary between Hispanics and non-Hispanics.

## Interpretation of Findings

Findings are discussed relative to the literature on trust, resilience, treatment adherence, and health outcomes.

**Hypotheses Tested via the Direct Effects Model**

The direct effects model fit the data well: the NNFI, CFI, and the RMSEA values were all within acceptable range (Figure 5.6).

**H1: There will be positive associations between trust in the medical profession and HRQOL in adults with hypertension.**

This hypothesis was supported. As shown in Table 5.16, trust in the medical profession was positively associated with global physical and mental health; $\beta = .32$, $p < .001$; $\beta = .43$, $p < .001$ respectively (Figure 5.6).

These results support the proposed link between *resource availability* and *health status* in the VPCM and suggest that trust promotes better health in patients with hypertension. Previous analyses of HRQOL in adults with hypertension have not used a public health conceptual framework using SEM (Erikson, Williams, & Gruppen, 2004). Most prior studies have evaluated correlates of medical trust (Berrios et al., 2006), and focused on interpersonal trust (Kao et al., 1998; Safran et al., 1998; Thom et al., 1999). For example, one study used path analysis to evaluate models of interpersonal trust in medical relationships and found that trust predicts lower treatment anxiety and, in turn, enhances pain tolerance (Caterinicchio, 1979).

Aligning with the study's conceptualization of medical trust as a social resource with potential for enhancing global health, this finding suggests that general trust is an important aspect of health care relationships. Findings from several studies point to the contribution of trust in the promotion of wellbeing. For example, studies evaluating the effect of health-system trust on self-reported health in the US, indicate that lack of trust in the healthcare system (measured by the Health Care System Distrust scale) is associated with worse self-reported health in a general-population sample of 961 adults (Armstrong et al., 2006). A survey of 18-80 year olds in Sweden found associations between distrust in the health care system and poor

self-rated health, suggesting that this may be partly mediated by access to healthcare through the role of trust in the promotion of health-seeking behaviors (Mohseni & Lindstrom, 2007).

**H2: There will be a positive association between trust in the medical profession and resilience in patients with hypertension.**

This hypothesis was supported. As shown in Table 5.16 and Figure 5.6, trust in the medical profession was associated with resilience ($\beta = .18$, $p < .05$). This finding provides support for the link between the domains *resource availability* and *relative risk* /health protective factors in the VPCM, and suggests that trust may decrease vulnerability to ill health in patients with hypertension. Hall et al. (2002) found that trust in the medical profession is associated with patients' desire to seek medical care rather than self-treat ($p < .001$).

Presently, little is known about the role of medical trust as an institutional resource with potential to foster patient resilience. Resilience has been described as an aggregate of personality traits that reflect an individual's ability to adapt in a positive manner despite adverse life circumstances (Werner, 1997). Resilient qualities include positive outlook, locus of control, self-efficacy, and planning skills (Rutter, 1987). In the context of chronic conditions, having trust in the medical profession might be perceived as a support system; a social resource that facilitates coping with the need for ongoing medical management. Thorne and Robinson's (1988) qualitative findings suggested that trusting medical relationships foster patients' self-esteem and sense of competency with illness management. Hence, the effect of trust on resilience may represent a relationship between trust and perceptions of enhanced self-efficacy. Using a broader lens, this finding can be viewed from a social systems perspective (Masten, 2007) as it directs attention to the interrelatedness of macro and micro level factors, institutional trust and patient resilience respectively, in the creation of conditions that facilitate change and adaptation in the face of adverse circumstances and, in turn, promote wellness and protect health.

**H3: There will be a positive relationship between trust in the medical profession and medication adherence in patients with hypertension.**

This hypothesis was supported. As shown in Table 5.16 and Figure 5.6, trust in the medical profession was associated with medication adherence (β = .25, $p < .05$). This finding aligns with the relationship posited by the VPCM between the *resource availability* and *relative risk* domains, and suggests that trust can enhance efforts to improve adherence in those under medical treatment for hypertension.

In support of the clinical relevance of this result, the Seventh Report of the US Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7, Chobanian et al., 2003) emphasized the need for building patients' trust in order to improve treatment adherence (Lenfant, Chobanian, Jones, & Rocella, 2003). The importance of enacting this observation is supported by the conceptual and empirical literature on trust. Drawing from Habermas (1989) theory of communicative action, Thiede (2005) describes trust is an antecedent in the utilization of (processing and using) health information and a facilitator of interactive or social processes. But national data suggest that hypertension management fails at crucial points across an efficient treatment pathway (Bersamin, Stafford, & Winkleby, 2009). It is notable that analyzed data from the National Health and Nutrition Examination Surveys 2003-2010, indicate that 90% of adults with uncontrolled hypertension have a usual source of health care and insurance; hence, reflecting a missed opportunity to control the disease and its adverse cardiovascular outlook (CDC, 2012).

Additionally, studies suggest that many factors that compound the problem with poor BP control can be targeted by conveying the importance pharmacological treatments and providing patients with the information they need for the effectiveness of prescribed regimens. For example, physicians' communication skills and bedside manner influence patients' perceptions of physicians' competency, and predict trust (Hall et al., 2001). Further, Hall, Camacho, Dugan, and Balkrishnan (2002) found associations between trust in the medical profession and *always*

*following doctors' recommendations* (Spearman correlation = 0.46, p < .001) in a survey of 502 adults.

**H4: There will be a positive relationship between resilience and HRQOL in adults with hypertension.**

The fourth hypothesis was partially supported. As shown in Table 5.16 and Figure 5.6, resilience was not associated with global physical health but it was significantly related to global mental health (β = .34, *p* < .001). These findings provide partial support for the link between the *relative risk* and *health status* constructs: health-protective factors (resilience) lower risk for disease and contribute to better health; among those with hypertension, resilience may enhance mental HRQOL. Resilience has been described as a form of mental capital, that is, an individual's cognitive and emotional resources (Beddington et al., 2008).

Further, this study's adoption of the definition of health proposed by the World Health Organization (1948) as not merely the absence of disease but a state of physical, mental, and social well-being, provides additional conceptual support for the role of resilience in supporting global mental health. Encompassing the main dimensions of health, this definition reflects the interrelatedness of the various aspects of health including the ability to engage in social life. For example, a population-based cohort study of adults 50 years and older indicated that those who reported higher levels of psychological wellbeing had better global cognitive function and performance across all cognitive domains, namely: time orientation, immediate and delayed verbal memory, prospective memory, verbal fluency, numerical ability, cognitive speed, and attention (Llewellyn, Lang, Langa, & Huppert, 2008). Among adults 50-70 years old, resilience predicted lower healthcare utilization (physicians' visits and hospitalizations) and higher self-rated health (Ezeamama et al., 2016). In contrast to the health-protective effect of resilience, a study indicated that the effect of impairments on psychosocial domains of health were comparable to or greater in magnitude than detriments experienced by those with disabling conditions such as arthritis and diabetes (Hays et al., 1995).

**H5: There will be a positive relationship between medication adherence and HRQOL in patients with hypertension.**

The fifth hypothesis was not supported. As shown in Table 5.16, medication adherence was not associated with global physical or mental health (Figure 5.6).

**Medication adherence and global physical health**. It should be noted that subjects with symptomatic advanced coronary artery disease were excluded from participating in the study; thus, this non-significant result might be partly attributable to the absence of symptoms in hypertension. For example, Knight et al. (2001) found that hypertensive patients who had episodes of angina, or chest pain, were more likely to have adequate BP control than those who did not have symptoms which suggests that the presence of symptoms that impact physical health and functioning may not only influence treatment experiences but may also encourage adherence. A meta-analysis evaluating patients' reports on barriers to adherence identified lack of symptoms, drugs side effects, forgetting to take medications as prescribed, and lack of motivation as the most frequent contributors to low adherence (Khatib et al., 2014).

**Medication adherence and global mental health.** Khatib and colleagues (2014) report suggests that evaluation of psychosocial health in the clinical setting may facilitate identification of patients' attributes (strengths and vulnerabilities) as well as comorbidities, such as depression (Aggarwal & Mosca, 2010; Rueda & Perez-Garcia, 2006), that can place hypertensive individuals at risk for low adherence and, ultimately, poor health outcomes.

Although not statistically significant, the clinical value of these findings cannot be ignored because of their implications for patient education and counseling. Studies indicate that 50% of adults discontinue antihypertensive medications within 6 to 12 months after initiation (Burnier, 2006). Non-adherence is prevalent (31%) in US adults (Tong, Chu, Fang, Wall, & Ayala, 2016). And national data shows that 36 percent of those under treatment do not have adequate BP control (Guo et al., 2012). Similarly, additional findings from this study indicated that 28 percent of non-Hispanics and 32 percent of Hispanics did not have their BP under control (systolic BP ≤

140 mm Hg and diastolic BP ≤ 90 mm Hg). Further, Non-Hispanics had higher medication adherence scores than Hispanics ($p < .01$); they also had better global physical and mental health ($p < .001$).

Conceptually, the association between *relative risk* and *health status* identified by the VPCM provides support for the worse adherence, lower BP control rates, and lower HRQOL observed in Hispanics compared to non-Hispanics; however, the model does not substantiate the findings relative to this hypothesis, that is, the lack of association of adherence with global physical and mental health. These, however, can be explained in light of the Health Belief Model (Becker, 1974) which posits that individuals' adoption of health behaviors (e.g. adherence) is influenced by their perceived susceptibility to an illness and their appraisal of its seriousness, as well as by the benefits of taking action or engaging in a given health behavior. For example, aspects of illness perception in hypertension were found to be associated with compliance when a distinction was made between control and cure in treatment beliefs, compliance was found to be associated with a strong belief in the ability of a treatment to cure hypertension rather than just control it (Ross, Walker, & MacLeod, 2004).

**Total Effect of Trust in the Medical Profession on HRQOL.**

The total effect of trust on Global Physical Health was .35 ($p < .001$), and its total effect on Global Mental Health was .50 ($p < .001$), (Table 5.17). Trust, resilience, and medication adherence accounted for 15% of the variance of Global Physical Health, and 37% of the variance of Global Mental Health.

**Hypotheses Tested via the Indirect Effects Structural Model**

**H6: Resilience will mediate the relationship between trust and HRQOL.**

This hypothesis was supported, resilience partially mediated (direct and indirect effects of trust on global physical and mental health were significant) the association of trust with global physical and mental health. Mediational analysis results suggest that better HRQOL can be partially explained through the association between higher levels of trust and greater resilience.

This finding elucidates the role of resilience as a health-protective mechanism and support the associations between VPCM constructs of resource availability, relative risk, and health status (social resources, medical trust, can enhance health-protective factors such as resilience and, in turn, lead to better health). There is a lack of empirical work testing integrated models encompassing health system factors and personal resources as pathways to HRQOL as well as a need for studies that identify factors that are amenable to intervention and can foster resilience (Miller et al., 2011). This finding provides support for development of strategies that target social modifiable risk factors, such as low levels of medical trust, and promote resilience.

**H7: Medication adherence will mediate the association of trust in the medical profession with HRQOL.**

This hypothesis was partly supported; medication adherence partially mediated the relationship of trust with global mental health but did not mediate the association of trust with global physical health. Mediational analysis results suggest that enhanced global mental health in hypertension may be explained through the association between greater levels of trust and higher adherence. Medication adherence was conceptualized as a health-protective behavior and measured under the VPCM construct of relative risk. This conceptualization provides support for the interrelationships posited among the VPCM constructs of resource availability, relative risk, and health status as noted above. Thus, medical trust may be viewed as a social resource with potential to motivate important health-seeking behaviors in hypertension such as adherence to prescribed treatments; in turn, compliance may promote a sense of self-efficacy (Criswell, Weber, Xu, & Carter, 2010) and contribute to enhanced global mental health.

**Hypothesis Tested via a Simultaneous Group Analysis**

**H8: The strength of the associations of trust in the medical profession, resilience, and medication adherence with HRQOL will vary between Hispanic and non-Hispanic adults with hypertension.**

This hypothesis was not supported. As indicated by the multi-group analysis, the associations among the variables in the multi-group model were similar for Hispanic and non-Hispanics. Although Hispanics differed from non-Hispanics in terms of their means for the studied variables (Table 5.5), the associations between these variables did not differ as a function of ethnicity. Hence, this finding suggests that medical trust can foster medication adherence, enhance resilience, and global physical and mental HRQOL in patients with hypertension regardless of Hispanic ethnicity.

In the context of race/ethnic health disparities, this result underscores the instrumental value of general trust and is substantiated by the conceptual literature emphasizing the salience of institutional trust as a social good, due to its contribution in promoting collective well-being (Gilson, 2006; Illingworth, 2002). Further, it aligns with theoretical views describing trust as a form of social capital due to its role in promoting population health (Kawachi et al., 1997).

**Additional Findings**

The study evaluated a sample of Hispanics and non-Hispanics with similar medical profiles. Results indicated that Hispanics had significantly higher prevalence of diabetes than non-Hispanics (46% and 20% respectively) while prevalence of atrial fibrillation (AF) was higher for non-Hispanics. Both subgroups had similar, and high, rates of dyslipidemia, obesity (BMI ≥ 30kg/$m^2$), and a sedentary lifestyle. Hispanics had less trust in the medical profession ($p < .01$), lower medication adherence ($p < .01$), less resilience ($p < .05$), and worse HRQOL (global physical and mental health, both ps $< .001$) than non-Hispanics. Hispanic participants had significantly lower income and education levels than non-Hispanics (both ps $< .001$) and 68% spoke primarily Spanish. In addition, although most participants (94%) had health insurance, enrollment in managed care plans was higher for Hispanics (44%) than non-Hispanics (20%). Lastly, Hispanics had more trust in their own doctor ($p < .001$), and greater satisfaction with their medical care than non-Hispanics ($p < .001$). These findings support the interrelations proposed by the VPCM between the constructs of: 1) *resource availability and relative risk* indicating that

a lack of resources (social, economic, and/or environmental) increases relative risk; and 2) *relative risk and health status*: risk factor exposure exacerbates morbidity (physiologic and psychologic disease processes) and leads to poor health.

Although Hispanics participants reported lower adherence than non-Hispanics ($p < .01$), blood pressure (BP) control rates were similar for Hispanics (68%) and non-Hispanics (72%). Aligning with this finding, outcomes from clinical trials indicate that ethnicity is not associated with inferior BP control when Hispanics and non-Hispanic whites have equal access to treatment at no cost (Cooper-DeHoff et al., 2006; Cooper-DeHoff et al., 2007; Margolis et al., 2007). But the extent and type of exposure to health information do influence health knowledge and partly explain socioeconomic differences in the adoption of health behaviors (Berger & Leigh, 1989). For example, qualitative studies suggest that low education, cultural beliefs, and linguistic barriers influence patients' explanatory models of disease and may impede their ability to connect to the biomedical model (Kronish, Leventhal, & Horowitz, 2012; Sarrandon-Eck et al., 2010); Hispanics tend to believe that hypertension is a temporary condition and they can control its causes (Barnes & Lu, 2012; Kronish, Leventhal, & Horowitz, 2012). Sarradon-Eck's et al. (2010) findings direct attention to the social and symbolic logics embedded in the cultural factors that influence personal medication practices, and emphasize the importance of trusting relationships in helping patients accept and integrate prescribed treatments into their daily routines. Concurrently, anthropologist Heurtin-Roberts' (1993) findings situate illness behavior and health-beliefs in the context of human adaptation (person-environment fit), pointing to the role of culturally-influenced adaptive responses in facilitating coping with hypertension; from this view, health beliefs and illness behaviors are one of the few means by which underserved groups can control the behavioral environment available to them and, subsequently, their illness experience.

Additionally, enrollment in managed care plans was higher for Hispanics (44%) than Non-Hispanics (20%). Hence, relative to the discussion trust, the lower levels of general

medical trust observed in Hispanics may be partly related to the influence of health system factors such as cost-containment efforts and time constraints during the medical encounter on patients' perceptions of providers as well as socio-structural factors particularly lack of culturally competent care (Betancourt, Green, & Carrillo, 2003) and patient-provider language discordance. For example, the implementation of a language immersion training program showed improved physician' language skills, communication, and trust between non-Latino physicians and Latino patients (Barkin, Balkrishnan, Manuel, & Hall, 2003). In addition, the level of patient trust has been found to vary by type of delivery system and tends to be lower in those enrolled in health maintenance organizations (Reschovsky & Kemper, 1999). Managed care systems can affect trusting medical interactions by restricting choice of providers, and placing constraints on physicians' treatment decisions and disclosure of required therapies (Mechanic & Schillinger, 1996).

Nevertheless, findings indicated that Hispanic participants had significantly higher levels of interpersonal physician trust and satisfaction with care than non-Hispanics although, as previously noted, they had lower resilience, worse global physical and mental health, and less resources (lower income and education) than non-Hispanics. These findings provide support for the interrelationship between the VPCM constructs of *health status and resource availability* proposing that poor health increases the need for social and economic resources, and may further deplete individual and community resources. In extension, qualitative findings suggest that the vulnerability associated with having poor health and few resources may lead to the need for a more secure and intimate form of trust (Tarrant et al., 2010). Conceptually, interpersonal physician trust has a stronger emotional component, an element of faith, which is not a salient characteristic of general trust (Hall, 2006).

## Implications

The main implications of this study in the areas of practice, policy, and research can be viewed in the broader context of key issues within the US health care system: access to care,

cost of care, and effectiveness of care, relative to the high and unchanged prevalence (30%) of hypertension since 1999 and the suboptimal population treatment control rates (64%) in hypertension (Guo et al., 2012). The underlying premise of this study is founded on theoretical and empirical literature suggesting that trust can play a central role in the way underserved minorities interact with the healthcare system and its various institutions including the medical profession. Accordingly, findings have social, practical, and theoretical implications; and provide contextual breadth to the propositions put forward by the VPCM.

Theoretically, findings align with the perspective that trust is an important element of an effective health system as it underpins the accountability and collaboration that are necessary within its various institutions to health production and maintenance (Gilson, 2003). In addition, the evaluation of two different types of medical trust (interpersonal and general trust) implied that patients have expectations of medicine as a trustworthy institution and view physicians as qualified recipients of their trust. Results provide support for the study's conceptualization of trust in the medical profession as a cognitive judgment with no moral content attached (Hardin, 1996) based on patients' rational expectations that physicians will put self-interests aside and will act in good will, primarily in the patients' interests. From this angle, medical trust has significant instrumental value because it is grounded in the expectation that physicians are competent; thus, it is functional in the sense that enables patients to seek care when needed (Tarrant, Dixon-Woods, & Colman, 2010).

Additionally, findings have social implications which need to be viewed within the context of individuals' social outreach, acknowledging that "reality is socially constructed" (Berger & Luckmann, 1967, p.1). Patient trust has been described as the scarcest of medical resources and as a social good, due to its role in promoting social and individual well-being (Illingworth, 2002). But multiple factors, including social capital (Ahern & Hendrix, 2003) and access to, and cost of, health care interact to shape individuals' experiences with their medical care and how care is delivered by the medical community. For example, studies indicate that those residing in

areas with diminished social capital tend to report poor health, which suggests that the influence that social capital has on health outcomes of communities and its members can be partly explained through its role in facilitating social processes, access to resources, and promoting health behaviors (Kawachi, Kennedy, & Glass, 1999).

Clinical implications point to the importance of providing culturally competent care (Betancourt, 2006) and demonstrating the trustworthiness of the medical profession (IOM, 2002). Trustworthiness is an antecedent to building trusting relationships; ability, benevolence, and integrity are main components of trustworthiness and characteristics of a trustee (Mayer, Davis, & Schoorman, 1995). Implications for the medical profession are grounded on the ethical basis of medical practice, elucidating the need to integrate an ethic of care based on principles, rules, and duty with one based on the virtues inherent to the profession (i.e., benevolence, humility, therapeutic parsimony, self-effacement, trust, and compassion), (Pellegrino & Thomasma, 1993).

A fundamental attribute of trust is the vulnerability of the recipient of care (Johns, 1996); trust originates in the context of a psychological state of vulnerability resulting from the need to receive medical care (Thom, Ribisl, Steward, & Luke, 1999). Accordingly, this study's findings suggest that for underserved Hispanics with chronic and preventable conditions such as hypertension and diabetes, having trust in their personal doctor may hold significant meaning. Hispanics, and other vulnerable groups, are at greater risk for poor health when trust is undermined as they have less socioeconomic resources than the mainstream society to purchase trust-building experiences, which may be obtained by the way of consults with various specialists, individualized therapy sessions, or legal representation as needed (Illingworth, 2002). Thus, the consequences of misplaced trust under conditions of poverty may be devastating (Inglehart, 1999). Using this lens, trust in the medical profession can be viewed as a product of cultural security (Thiede, 2005). From a different angle, the lower trust and

satisfaction with care observed in non-Hispanics may reflect underlying social processes (Putnam, 1995).

Additional clinical implications point to the need for better hypertension control; 32 percent of Hispanics and 28 percent of non-Hispanics did not have their BP under control. This finding aligns with national data and suggests that hypertension control remains a challenge, even when health insurance coverage is in effect and medical management is undertaken by specialists. Further, the lack of effect of medication adherence on the physical health domain of HRQOL observed in this study has implications for patient counseling as it may influence treatment perceptions and adherence.

Public health implications include implementing culturally tailored community-based programs promoting disease awareness, health literacy, healthy eating, and physical activity. Obesity, dyslipidemia, and lack of physical activity were prevalent among study participants suggesting that poor dietary habits and a sedentary lifestyle are likely to contribute to their suboptimal control rates. Policy implications include anticipating areas of increased need such as psychosocial health; public health programs that foster resilience, enhance mental health, and sustain well-being need to be situated at the heart of policy-making. Studies indicate that resilience can be cultivated through behavioral and other non-pharmaceutical interventions (Beddington et al., 2008). This study's findings align with a growing body of evidence suggesting that resilience is a health-protective factor and an important human resource that offers potential for enhancing global health in middle age and older adults (Ezeamama et al., 2016); longitudinal studies have shown its role in sustaining adaptive coping styles, quality relationships, integration in the community, and HRQOL into old age (Hildon et al., 2009; Kirkwood, Bond, May, & McKeith, & Teh, 2014).

### Strengths and Limitations

This study used the Patient-Reported Outcomes Measurement Information System (PROMIS®) Global Health Items (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009) for the

measurement of HRQOL. The utility of PROMIS® Health Items extends to economic applications and as outcome measures in clinical studies, and for the evaluation of treatment including comparative effectiveness research (Schalet et al., 2015), monitoring populations health, and estimating quality-adjusted-life years (Hays et al., 2016). The PROMIS® Global Health Items (Hays et. al., 2009) have been targeted by Healthy People 2020 for measurement of HRQOL across the decade (https://www.healthypeople.gov/2020/topics-objectives/topic/health-related-quality-of-life-well-being).

Another methodological strength of the study is the consistency of data collection methods, all participants were recruited by the principal investigator, who is bilingual (English-Spanish), and all surveys (English and Spanish) were completed in a private office specifically designated for the study throughout the duration of data collection procedures. In addition, participants' eligibility was determined based on documented medical history and corroborated by the physicians. And the use of objective data (medical history and medications) including physiological parameters (blood pressure and BMI) substantiates the findings. Additionally, reliability estimates for multi-item scales exceeded the recommended threshold for research applications of 0.70 (Nunnally & Bernstein, 1994), except for the Morisky Medication Adherence Scale-8 (MMAS-8) (Morisky, Ang, Krousel-Wood, & Ward, 2008). The observed low reliability of item 5 ("*Did you take your blood pressure medication/s yesterday?*") for the MMAS-8 warrants consideration in future studies when surveys are self-administered.

Nevertheless, this study has several limitations that need to be considered in drawing generalizations from its findings. Although several of the findings were supported by previous studies, the cross-sectional design limits the inferences one can draw since causality can go in both directions, as shown by the specified alternative models.

In addition, findings in other settings such as community clinics may differ because participants were recruited from a cardiology practice, and the majority (96%) had health insurance. It is also possible that being under the care of specialists may motivate patient

adherence and contribute to better hypertension control. For example, Hyman et al. (2000) evaluated self-reported treatment practices in a national sample of 1200 primary care physicians and found that 41 percent of physicians were unaware or unfamiliar with Joint National Committee (JNC) treatment guidelines; many primary care physicians had higher blood pressure thresholds for the diagnosis and treatment of hypertension than the 140/90 mm Hg criterion recommended by the JNC7. Lastly, researcher bias due to the investigator's investment in her study as well as the possibility that participants gave responses they deemed to be socially acceptable, social desirability bias (Hays & Ware, 1986), cannot be ruled out.

## Recommendations

This study's limitations imply the need for a longitudinal design evaluating how trust relates to measurable health outcomes and through what mechanisms, in addition, future studies should evaluate what levels and forms of trust (e.g. system, institutional, interpersonal) contribute to positive health outcomes.

It should be noted that trust is not clearly defined in the literature and definitions vary across disciplines (Goudge & Gilson, 2005); however, beyond interdisciplinary lenses, there is a common network of ideas which points to the importance of applying an integrative approach and conducting an analytic synthesis to conceptualizing trust, to avoid missing its meaning and diversity across institutions and organizational settings (Mayer & Davis, 1995; Rousseau et al., 1998) For example, theorists differentiate interpersonal trust, which represents a specific relationship between two people, from system trust, which characterizes global attitudes toward social organizations and institutions (Goold, 1998; Mechanic, 1998). Researchers have found that while interpersonal trust and general trust are qualitatively similar, they are only moderately correlated with each other; and the factors that predict these types of trust are also different (Balkrishnan et al., 2003; Hall et al., 2002). Thus, when empirical studies don't specify conceptual differences, their ability to represent the true functioning, or behavior, of trust is limited.

Findings also imply that the study and evaluation of trust requires consideration of the individualist characteristic of American society, and the fragmented nature of the US healthcare system (Hall, 2006), as well as the political processes surrounding trust (Goudge & Gilson, 2005). For example, the influence of health system changes on the extent of public trust suggests that context is essential to understanding trust; in extension, the effect of system changes is not uniform across society due to mediating factors such as socioeconomic status (Goudge & Gilson, 2005). Thus, the examination of medical trust in Hispanics residing in the US requires an understanding of the social and historical context of Mexican immigration (Telles & Ortiz, 2008).

Lastly, in light of the value that the doctor-patient relationship seems to holds for adults with chronic illnesses (Thorne & Robinson, 1988; Hall, 2006), the lower levels of interpersonal trust reported by non-Hispanic participants compared to Hispanics merits further investigation. Notably, studies indicate that while trust in the medical profession has diminished in the past few years, patients' trust in their personal physician has remained consistently high (Blendon & Benson, 2001; Hall et al., 2002).

## Conclusions

Collectively, findings provide a unitary account of institutional and individual factors, trust and resilience respectively, that offer opportunity for improving medication adherence and enhancing HRQOL in patients with hypertension. Trust in the medical profession and resilience appear to be protective resources that can influence health. In addition, results offer insight on the potential implications of trust for important health care processes, and direct attention upstream pointing to the need for developing strategies that cultivate and sustain patient trust.

The erosion of trust (Jacobs, 2005) is a central issue of concern facing the medical profession because trust is not only an essential element to the effective delivery of medical care but is also a concept that resonates for patients and their doctors, and is important in its own right. At the organizational level, managed care systems can create decontextualized

demands on the role of physicians in cost containment efforts and, subsequently, undermine patient trust, while the costs of for profit-care continue to escalate. Perhaps, one of the greatest safeguards against the erosion of trust, and the costly organizational strategies that are put in place to protect against opportunism and exploitation, is to invest in creating organizational platforms that support collaboration in the form of a teamwork culture and build sustainable relationships towards a shared goal of patient welfare.

Socio-structural factors pose barriers to adequate hypertension control for underserved minorities, and those who provide care for these groups are frequently confronted with suboptimal treatment options as healthcare resources are limited. Trust lays the foundation for therapeutic relationships, facilitating the key role of physicians in identifying patients' strengths and vulnerabilities that can protect, or inhibit, health-seeking behaviors and wellbeing. Trusting relationships among patients and physicians are essential to effective disease management; physicians, however, are more powerful agents than patients (IOM, 2002) in these relationships for laying the ground work to diminishing disparities in healthcare for the vulnerable and the dispossessed.

It is hoped that this study's findings motivate physicians working with under-resourced minorities to situate lifestyle and health behaviors within patients' limited socioeconomic outreach, as this may interfere with their ability to follow treatment recommendations.

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