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The Associations of Chronic Stress, Social Support, Health Behaviors and Metabolic Syndrome among Hispanic Women

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DOCTOR OF PHILOSOPHY IN NURSING

THE ASSOCIATIONS OF CHRONIC STRESS, SOCIAL SUPPORT, HEALTH BEHAVIORS AND METABOLIC SYNDROME AMONG HISPANIC WOMEN

by

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TITLE OF DISSERTATION: The Associations of Chronic Stress, Social Support, Health Behaviors and Metabolic Syndrome Among Hispanic Women

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Abstract

Background: Metabolic syndrome (MetS) prevalence is 25% among Mexican American women 30 – 49 years of age, compared to 22% among non-Hispanic Whites in the United States. Little is known about the additional contributions of chronic stress, social support and health behaviors to the development of MetS among this population.

Purpose: Describe the associations between chronic stress, social support, and health behaviors and the presence of MetS in Hispanic women living in an underserved community.

Methods: A retrospective cohort study design. The Adult Treatment Panel III clinical criteria was used to determine the presence of MetS. The Chronic Stress Burden Scale measured chronic stressors and the Enriched Social Support Instrument measured three aspects of social support. Staying Healthy Assessment required for MediCal recipients was used as a measurement for health behaviors. Descriptive inferential statistics and odds ratios with 95% confidence intervals estimated the magnitude of associations.

Findings: The sample of 150 Hispanic women, mean age 44.80 ([6.32]) years, were primarily of Mexican origin with limited acculturation, (66.7% preferred Spanish), and 70% had public health insurance. Among 57% (n = 86) with MetS, nearly 90% were overweight/obese compared to 75% without MetS. Sociodemographic factors associated with MetS were public health insurance or none (p=.003) and family history of heart disease or stroke (p=.015). The following social determinants were associated with MetS: unhealthy eating habits (OR 2.13; 95% CI 1.05,4.30), limited healthy food access (OR 3.18; 95% CI 1.42, 7.14) and lack of physical activity (OR 2.43; 95% CI 1.24, 4.78)

adjusted for health insurance. No differences between the two groups were found for social support scores (p=0.521). However, the mean difference in the number of chronic stressors was statistically significantly higher among cases with MetS (2.47 [SD 1.66]) than those without (1.94 [SD 1.39]). The odds of having MetS increased 26% for each increase in the number of moderate to very stressful chronic stressors (OR 1.26; 95% CI 1.01, 1.57). Study cases with MetS had twice the odds of being physically inactive or engaged in unhealthy eating.

Implications for Research: Future research is needed to understand the role of ethnicity as a moderator of the associations between cardio-metabolic health and chronic stressors is important for Hispanic women. Innovative longitudinal interventional health outcomes research can provide an understanding of the complex contributing factors affecting the health of this high-risk group.

Dedication

I thank God for guiding me with its strength, wisdom, and knowledge to accomplish this mission. And for the protection and love of our blessed mother of God throughout this journey. I dedicate this research work to my dear to my heart family: my parents, Ricardo and María Concepción, my three sisters, María Dolores, María Conchita, and Laura Aurelia, my nieces and nephews, my extended family and friends for their unconditional love and support during this lifetime opportunity.

This dissertation research work is also dedicated to the memory of my loving grandmothers, Nana Laura and Abuelita Aurelia for their faithful, loving care, and for providing admirable life teaching lessons to all their grandchildren.

This PhD research work is a gift to all Hispanic families and diverse populations. My mission is making positive change and improving the health and wellbeing of vulnerable populations.

"If you want to change the world, go home and love your family."
"Many people mistake our work for our vocation. Our vocation is the love of Jesus."

--- St. Teresa of Calcutta

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--- Edna Ramona

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CHAPTER I

INTRODUCTION

The Hispanic population living in the United States (U.S.) has increased dramatically in the last 20 years, now compromising the nation's largest ethnic minority group. The U.S. Hispanic population reached a record 59.9 million in 2018, according to newly released U.S. Census Bureau population estimates (U.S. Census Bureau, 2019). The proportion of the Hispanic population in the U.S. grew from 16% in 2008 to 18% in 2018 and this percentage is expected to increase to 29% (111 million) by 2060 (U.S. Census Bureau, 2018). Therefore, the health of the population, particularly the prevention of chronic disease, is important not only to the individuals but for the healthcare system as a whole.

Background and Significance

An important risk factor contributing to the leading causes of death in Hispanics, specifically heart disease, stroke, and type 2 diabetes, is the high prevalence of those who are overweight and obese. Obesity is one of the leading causes of the development of metabolic syndrome. The Hispanic population living in the United States has a higher prevalence of metabolic syndrome compared to other ethnic groups (Heiss et al., 2014). The national data from the National Health and Nutrition Examination Survey ([NHANES], 2012) which only captures Mexican Americans, shows an overall metabolic syndrome prevalence of 25% among Mexican American women 30 - 49 years of age, compared to 22% among non-Hispanic whites (Moore et al., 2017). According to the Hispanic Community Health Study (Gallo et al., 2014) which includes Hispanics from other countries, not exclusively from Mexico, metabolic syndrome prevalence was

present in 36% of Hispanic women of whom 96% were obese compared to 75% among men in the study.

The focus on metabolic syndrome among Hispanics is critical since it is characterized by a cluster of metabolic abnormalities: elevated blood pressure, abnormally high glucose and lipid levels, and excess abdominal fat. Metabolic syndrome is associated with an increased risk of type 2 diabetes, stroke and cardiovascular disease (CVD), all leading causes of death and disability among the U.S. population and the Hispanic sub-population (Ortiz et al., 2015). The associated increase in type 2 diabetes risk needs highlighting since Hispanics tend to develop type 2 diabetes at a younger age and therefore, live with the disease for a longer period of time (Heiss et al., 2014). Additionally, the cardiovascular disease risk disparity between young and middle-aged Hispanic women and those of other races or ethnicities is driven by their high rate of metabolic syndrome.

Besides differences in lifestyle health behaviors among Hispanics, they disproportionally experience a whole range of adverse social determinants of health such as lower incomes, lower education, increased rates of hazardous occupations, and less access to health care services to name a few (Ahnquist et al., 2012). Particularly related to Hispanics is the concern of immigration. Whether entering the United States documented or undocumented, immigrant populations experience higher levels of stress, mental health problems such as depression, and a sense of isolation (Ahnquist et al., 2012). Layered on top of this are the significant psychosocial and structural barriers faced by immigrants, including difficulty accessing health care due to limited health care coverage, low socioeconomic status, lack of transportation and language barriers, in addition to the fear

of deportation. Ongoing immigration policy and changes in the present political climate only compound the “normal” stressors from immigration and lack of social support among this disadvantaged population.

There is a clear association between the number of adverse experiences and adverse aspects of social determinants of health and increased chronic stress (McEwen,1998). This chronic stress exerts a biological effect on an individual through increased allostatic load which triggers disruption in circadian rhythms and an increased production of stress hormones which in turn result in multi-cytokine responses and inflammation. Inflammation is one of the primary pathological physiological process for the classic signs of metabolic syndrome and underlies most chronic diseases such as type 2 diabetes, cardiovascular disease, and cancer (Emanuela et al., 2012).

Gaps in the Literature

As a result, Hispanic women deserve additional attention to mitigate their risks and offered intervention strategies targeted at decreasing these metabolic risks. The Multi-Ethnic Study of Atherosclerosis ([MESA], Ortiz et al., 2015) is the only study that has examined both stressors and potential mediators, such as social support, on the risk of developing metabolic syndrome in Hispanic subgroups. Additionally, few studies have examined other enabling or adverse factors among middle-aged Hispanic women that may also contribute to metabolic syndrome, such as language barriers, food access and lack of transportation. These could make it difficult for a Hispanic woman to access primary care services on a regular basis. This lack of regular health care access to primary care may be why minority women who are considered overweight or obese have limited health promotion disease awareness (Moore et al., 2017). No population-based

study has examined the association between the burden of chronic stress and psychosocial factors in predicting the onset of metabolic syndrome among Hispanic women. Without more fully understanding the interplay between adverse and enabling factors in the lives of middle-aged Hispanic women, particularly those with lower incomes, it will be difficult to identify targeted primary and secondary preventive interventions approaches for metabolic syndrome. Without these, it will be difficult, and challenging to improve the observed disparities in health outcomes among Hispanic women compared to other sub-populations with better health rates.

Study Purpose

This research study among Hispanic women addressed multiple health behavior factors associated with risk of metabolic syndrome by measuring chronic stress with the Chronic Stress Burden Scale (CSBS) that was developed by the landmark epidemiological Hispanic community health study/sociocultural study of Latinos (SOL). Other psychosocial and demographic factors were used, which assisted in identifying high-risk health behaviors, preventive screening measures, and health education during routine health care visits among underserved Hispanic women.

Utilizing the electronic medical record (EMR)**,** the primary purpose of this research study was to describe the associations between chronic stress, social support and other psychosocial stressors including (healthy eating, physical activity, food access and family safety), high risk health behaviors and the presence of metabolic syndrome as determined by the Adult Treatment Panel III (ATP III) of the National Cholesterol Education Program ([NCEP], Alberti et al., 2009) in Hispanic women living an underserved community.

Specific Research Aims

The specific aims of this research study were among middle-aged Hispanic women between the ages of 35 to 55 were to:

***Aim 1*:** Describe participants' sociodemographic characteristics, chronic stress, social support, and psychosocial stressors and the presence of metabolic syndrome.

***Aim 2*:** Describe significant differences between selected sociodemographics, chronic stress, social support and psychosocial stressors and the presence of metabolic syndrome.

***Aim 3*:** Describe the odds of meeting the metabolic syndrome criteria for the independent variables identified as significant in the bivariate analysis accounting for any covariates consistent with the study's conceptual model.

Theoretical & Conceptual Framework

Allostatic load and Pender's health promotion model were used as the theoretical framework for this research study. The allostatic load theory assisted to understand the development of disease and to quantify the magnitude of stress and how stress can affect health. The health promotion model represented a theoretical perspective that explored the multiple factors and relationships contributing to health promoting behaviors and therefore the enhancement of health and quality of life (Pender et al., 2005).

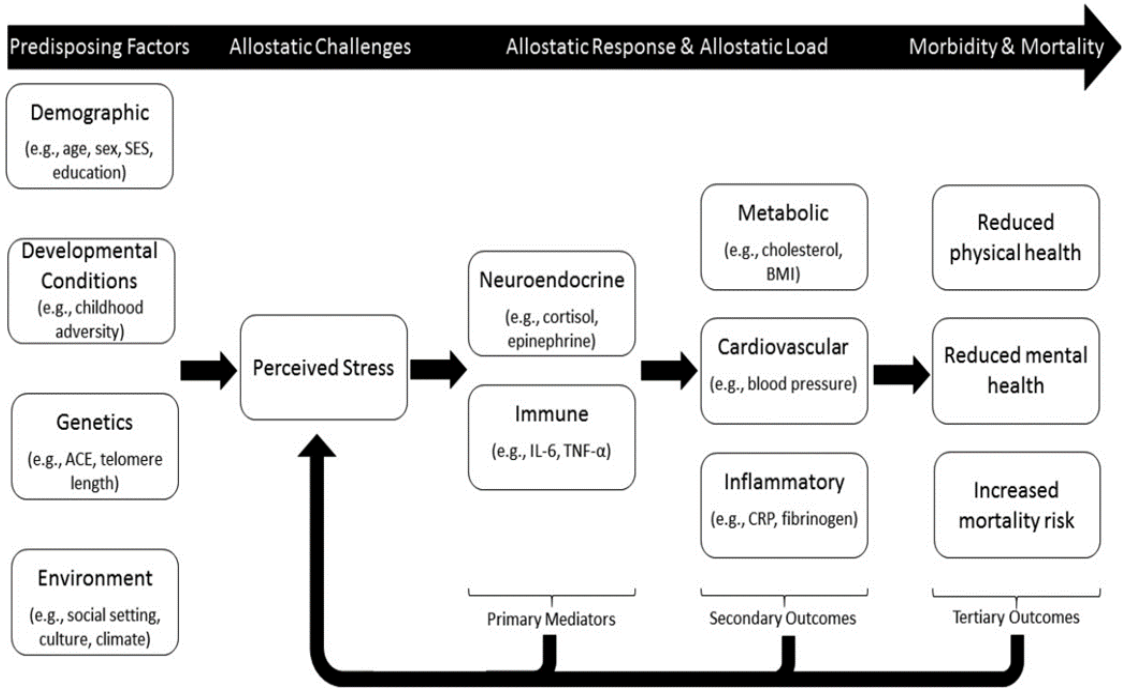
Allostatic Load Theory

The concept of allostatic load holds promises for scientific researchers to operationalize a holistic view of multiple stressors and to quantify their effects on health.

Allostatic load theory refers to the chronic exposure of neuroendocrine responses resulting from repeated physiological and environmental challenges that an individual reacts to as being particularly stressful. Moreover, allostatic load is a useful conceptual framework to capture physiological dysregulation related to chronic stress (Rosemberg et al., 2017). Figure 1 illustrates the components of allostatic load theory. McEwen (1998) proposed the concept of allostatic load to explicate how chronic life stressors, including toxic and traumatic stress, impact individuals' health via the physiological responses to such chronic stressors. The concept of allostatic load has been applied in research across various disciplines and findings have generally confirmed that cumulative effects of social and environmental stressors increase the risks for physiological dysregulation and ill-mental and physical health, especially among vulnerable groups (Read & Grundy, 2012). More studies are needed to affirm the role of allostatic load as a potential mediator between multiple chronic stressors and health outcomes. However, the clinical value of this concept is that it could serve as a signal of health risk early enough to lead to interventions that may prevent further deterioration of health and thus prevent future associated morbidity and mortality.

Figure 1

Allostatic Load Research Theoretical Framework



Note. Allostatic Load Research Theoretical Framework. Reprinted from "Allostatic load and biological anthropology," by Edes, A.N., and Crews, D.E. (2017), *American Journal of Physical Anthropology*, *162 Suppl 63*, 44–70. Copyright 2021 by Wiley. Reprinted with permission.

Pender's Health Promotion Model

The health promotion model (HPM), originally developed in the early 1980s by Nola Pender is a framework that serves as a guide for exploration of the complex biopsychosocial processes that motivate individuals to engage in health behaviors directed toward the enhancement of health (Pender et al., 2005). The health promotion model is widely represented in the nursing literature and is the underpinning framework for over 100 research studies (Pender et al., 2005).

One of the major theoretical perspectives from which HPM is derived is the social cognitive theory (SCT). The social cognitive theory is a model that explains the nature of behavioral change in the context of larger social structures. The nature of human agency, or the ability to control life events, is explained as a triadic reciprocal relationship between behavior, interpersonal factors (cognitive, affective, biologic), and external factors (Bandura, 1997).

Components of the Health Promotion Model

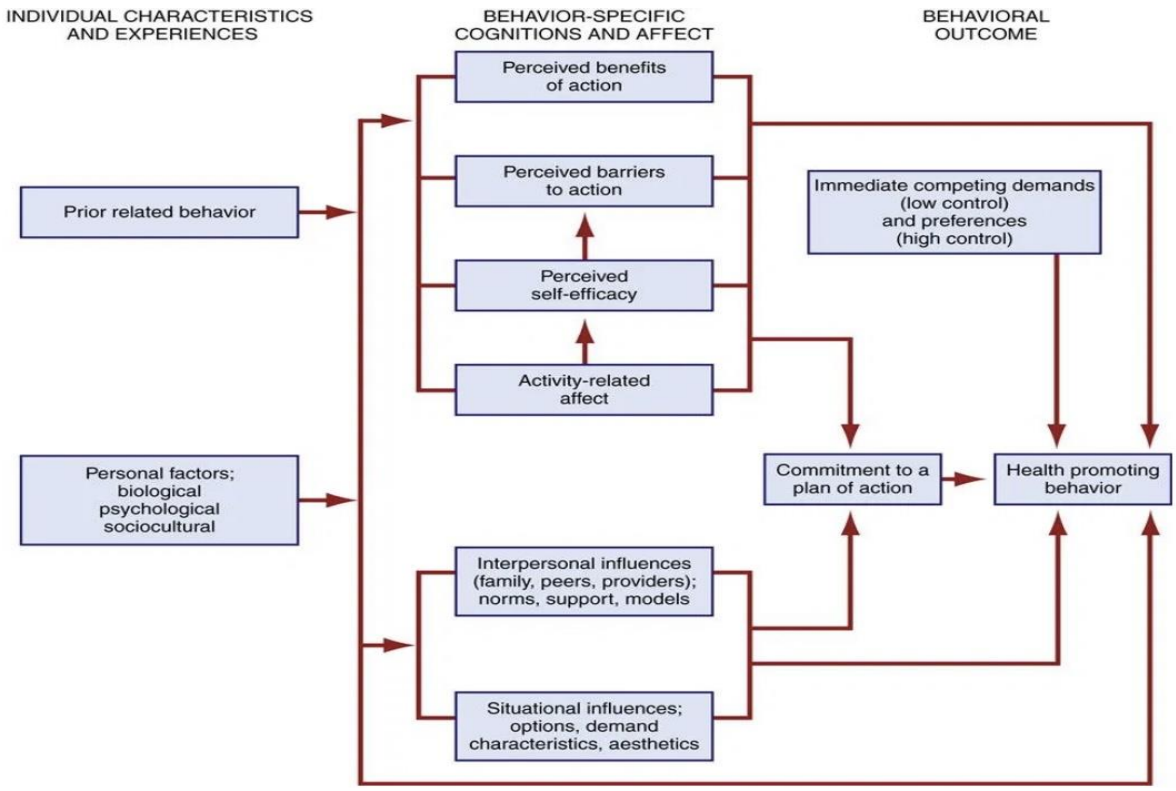
The health promotion model classifies health behavior determinants into three specific propositional groupings: (a) individual characteristics and experiences, (b) behavior specific cognitions and affects, and (c) situational/interpersonal influences. The individual characteristics and experiences are innate factors (gender, age, genetics), and experience factors that inform future behavior. These background factors are largely unmodifiable. The behavior-specific cognitions and affect category includes perceived benefits-barriers to behavior, perceived self-efficacy, and affect cues to behavior. These factors are the target of most of the health promotion model research to date. The situational and interpersonal influences are social and environmental factors that influence health behavior (Pender et al., 2005) Figure 2 provides an overview of Pender's health promotion model.

For this research study, allostatic load theory and Pender's health promotion model will be used as a theoretical model to measure the description of the associations between chronic stress, social support, psychosocial stressors, and health promotion behaviors. Therefore, allostatic load and the HPM constitute an appropriate framework for describing the relationships between multiple factors affecting health promotion

lifestyle behaviors among Hispanic women with the presence and absence of metabolic syndrome. Figure 3 provides an overview of how these two theoretical concepts were implemented into the study and the hypothesized relationships from the literature.

Figure 2

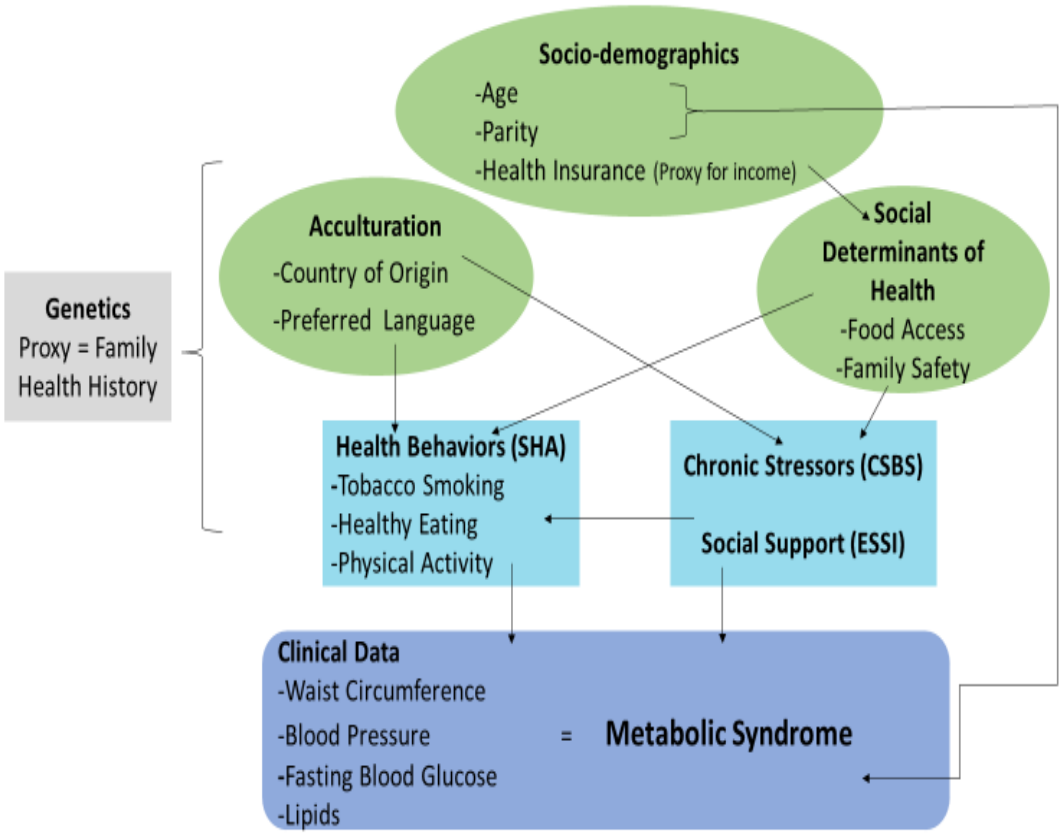
Pender's Health Promotion Model Research Theoretical Framework



Note. Adapted from *The Nola Pender Health Promotion Model, by Psych-Mental Health NP,* n.d. (https://pmhealthnp.com/nola-pender-health-promotion-model), public domain.

Figure 3

Study Conceptual Model for the Study of the Associations of Chronic Stress, Social Support, Health Behaviors and Metabolic Syndrome.



CHAPTER II

REVIEW OF THE LITERATURE

The review of the literature is divided into three parts. First, there will be a review of the definitions of the main research study concepts and where applicable, choice of measurement approaches. The second part will address key study concepts of chronic stress, social support, health behaviors and their role in metabolic syndrome. This section will review the results of major research studies among Hispanics that included these concepts and it will conclude with literature related to key study variables. The final will describe the existing knowledge gaps and highlight how this study research study will address some of these research gaps.

Measuring Metabolic Syndrome

Physiology of Metabolic Syndrome

During the last three decades, while prevalence of metabolic syndrome has increased, our understanding of the physiology of this disease has also increased. All fats are no longer considered the same. Adipocytes are now categorized as white adipocytes, brown adipocytes, and beige adipocytes. The brown and beige adipocytes are morphologically and functionally different than white adipocytes. These cells have more mitochondria in the cytoplasm enriched with more uncoupling protein and able to produce more thermogenesis (Tamashiro et al., 2011). Rather than being an inert energy storage depot, adipocytes are now known to be metabolically active, secreting over a dozen of hormones affecting the appetite, satiety, and energy metabolism of the body. While the first known adipocyte hormone, leptin, suppresses appetite and a genetic

absence of it causes massive obesity, other hormones like adiponectin have just the opposite effect. Adiponectin increases insulin sensitivity, and pancreatic beta cell survival and functionality (Luppino et al., 2011). Adipocytes play an important role for storing fat for times when calories are scarce. However, in the setting of overnutrition, adipocytes respond by mounting an immune response. This immune response can result in chronic low-level inflammation that can result in insulin resistance, the production of inflammatory hormones such as c-reactive protein (CRP) and interleukin-6 (IL-6), and fatty acids (Esposito & Giugliano, 2004). All of these factors are related to the defining characteristics of metabolic syndrome such as high body mass index (BMI) or abdominal fat, abnormal blood glucose, and elevated lipids. CRP and IL-6 are independent risk factors in women for cardiovascular disease. It is also known that inflammation is a strong contributing factor to other health outcomes besides cardiovascular disease and diabetes, such as arthritis and cancer (Zhou et al., 2007).

Defining Metabolic Syndrome

With the successful conquest of many of the old infectious diseases in the world, non-communicable diseases have become the major cause of morbidity and mortality not only in the developed world but also in less developed countries. Among all these non-communicable diseases, metabolic syndrome has become an epidemic globally (Alberti et al., 2009). Metabolic syndrome, also known as Syndrome X, and insulin resistance in the health care literature, is not a single disease but a constellation of cardiovascular disease risk factors and had been defined slightly differently by various organizations (Alberti et al., 2009).

Since it is a syndrome being defined and not by a specific disease, defining its characteristics is not straightforward. Part of the concern is different parameters may be more predictive of risk for different longer-term outcomes in different populations. For example, a population in Southeast Asia where insulin resistance is prevalent in one fifth of the population may find this is a critical to defining the syndrome as found in the World Health Organization (WHO) definition (Ranasinghe et al., 2017). A different ethnic population or region with a different economy where cardiovascular disease is highly prevalent may identify lipid levels as important as glucose levels. Therefore, it is not surprising there are varying definitions among global and national organizations. The three most popular definitions used for surveys and health care systems are found in Figure 4. All organizations require an individual to meet a minimum of three out the five criteria to be identified as having metabolic syndrome. Two of the organizations require at least one of the criteria.

Figure 4

Metabolic Syndrome Criteria for Women by Three Major Organizations

	Blood glucose (mg/dL)	Blood pressure (mmHg)	Waist (cm) or BMI (kg/m^2)	HDL cholesterol (mg/dL)	Triglycerides (mg/dL)
ATP III-NCEP (2009)	**Fasting ≥ 100 or treatment**	**≥130/85 or treatment**	**≥88cm or 35 inches**	**<50**	**≥150 or treatment**
IDF (2006)	Fasting >100 or diagnosis	>130/85	>80	<50 or treatment	>150 or treatment
WHO (2009)	Fasting: ≥110 2 h. post-meal: >140	>140/90	(ratio) >0.85 BMI >30	< 40	>150

Note. Bolded criteria used in this research study. All criteria require presence of a minimum of 3 out of 5 components. Abbreviations: BMI = body mass index; HDP = high density lipoprotein; ATP III -NCEP = Adult Treatment Panel III & National Cholesterol Education Expert Panel; IDF = International Diabetes Foundation; WHO = World Health Organization.

The National Cholesterol Education Program Expert Panel (NCEP) and the International Diabetes Federation (IDF) definitions are very similar except the waist parameter of 88 cm versus 80 cm in women and the fact IDF requires all women to meet the waist circumference criteria. Since the Adult Treatment Panel (ATP III) and the National Cholesterol Program Expert Panel criteria are endorsed by two major national U.S. organizations, the National Heart, Lung, and Blood Institute and the American Heart Association, these are the criteria that were used in this research study.

Key Study Concepts

Chronic Stress

Some kind of challenging event triggers a physiological stress response. Any major stressor, either positive or negative, activates a neuroendocrine response which activates the hypothalamic-pituitary-axis (HPA), which is commonly known as the "fight or flight response". The release of adrenaline and other hormones primes the cardiovascular, respiratory, and skeletal system, among others, to take action. This results in symptoms such as increased heart and respiratory rate, raised blood pressure, and increased glucose release for use my muscles in "flight". A stress response has both this objective physical effect and a subjective psychological effect is commonly acknowledged as distress (Mariotti, 2015). If the individual perceives the event to be one in which they can change and adapt to the situation, then the ability of the triggering event to activate the hypothalamic-pituitary-axis (HPA) becomes lessened or distinguished (Mariotti, 2015). However, if stressors persist, then the individual reaches a state of allostatic overload or chronic stress which not only causes physiological harm

from the repeated activation of the HPA but emotional distress which has psychosocial effects such as reduced quality of life or depression (Goldstein & McEwen, 2002).

What distinguishes mild stress from normal activities, such as strenuous physical activity, from what is seen as "chronic stress" is the predictability and control an individual has over the stressor (Koolhaas et al., 2011). Therefore, the phenomenon of chronic stress arises when an individual is repeatedly exposed to events over which they have little or no control (Cohen et al., 2007). In this case, individuals perceive that the demands of the environment exceed their adaptive capacity (Cohen et al., 2007). This results in both emotional psychological distress and an 'over-stressed' activation of the HPA. Overtime, this can lead to permanent physiological and functional changes to many body systems. This includes changes in both gray matter and neuronal plasticity in the brain (Mariotti, 2015). These changes have been associated with depression (Yang et al., 2015). Once the brain labels a stressor as "danger," it also activates the immune system, much as an infection does, triggering it to be prepared to prevent harm, repair damage, and eventually return to a healthy state. Furthermore, repeated activation, as in chronic stress, results in a chronic low-grade inflammatory response. In the absence of a real infection means these inflammatory hormones can exert harmful effects on the many body systems. This may be why stress is considered a major contributing factor to the six leading causes of death in the U.S. such as cancer, coronary heart disease, accidental injuries, respiratory disorders, cirrhosis of the liver, and suicide (Salleh, 2008). It is estimated that 60-90% of all doctor visits are stress-related (Perkins, 1994).

Chronic stress is highly prevalent among Hispanic adults in the United States. The American Psychological Association (APA) conducts a yearly survey of a representative

sample of the United States about stress. Their 2015 survey focused on the impact of racial discrimination. The report identified Hispanic adults as having the highest overall stress level at 5.9 (out of 10) compared to a population average of 5.1 (APA, 2016). In all categories of sources of stress, Hispanics scored the highest among race/ethnic groups. Three-quarters of Hispanics identified money, employment, and family responsibilities as sources of stress and 58% identified personal health concerns.

In a population of over 5,000 Hispanic adults, Gallo and colleagues (2014) showed an association between chronic stress and several health outcomes. In this study after adjusting for sociodemographic factors, they found chronic stress resulted in increased odds of type 2 diabetes, cardiovascular disease and stroke with odds ratios of 1.20, 122., and 1.26 respectively. Their findings related to these outcomes and perceived stress and traumatic events were much more modest (OR 1.03 and 1.15, respectively).

A recent study conducted by Kershaw et al. (2015), which used data from the Multi-Ethnic Study of Atherosclerosis study, found that individual-level sources of stress (i.e. health, job, relationship, and/or financial problems) were more strongly associated with incident coronary heart disease (CHD) than neighborhood-level stressors (i.e., excessive trash/litter, crime, poor access to food shops). In this study, CHD was defined as nonfatal myocardial infarction, resuscitated cardiac arrest, or coronary health disease death. Cox proportional hazard models showed that higher reported levels of individual stressors were associated with a 65% increased risk of incident CHD (95% CI, 1.23 – 2.22) compared to those in the lowest category, after adjusting for age, race/ethnicity, sex, income, marital status, field site, and neighborhood poverty. In contrast, there was a non-linear relationship between neighborhood stressors and incident CHD, such that

individuals in the medium category had 49% higher CHD risk compared to those in the low stress category; and those in the highest stress category had 27% higher incident CHD risk. While this study highlighted the importance of presence and perceived stressfulness from individual level sources of chronic stress, there are certain measurement concerns. The definition of chronic stress assigned individuals to one of three broad categorical levels of stress (low, medium, high stress). In contrast, the Chronic Burden Scale (CSBS) asks participants to endorse or deny ongoing financial, job, relationship, or health-related (both self and someone close to the participant) problems lasting at least 6 months. In addition, participants indicate how stressful the problems have been on a scale ranging from: 1 (not very stressful), 2 (moderately stressful), and 3 (very stressful). In the Kershaw et al. (2015) study, a CSBS score was created by summing the number of domains in which moderate-to-severe stress was reported. Possible scores ranged from 0 to 5; a sum score of 0 was considered low stress, 1 was medium stress, and 2 or more was high stress. As outlined in the Measures section of the current study, the indicator of health-related stress, which asks the participant to what degree he/she is stressed by his/her health status, was removed in our measure of stress. In maintaining Kershaw et al. (2015) definition, this study effectively uses one's own health status to predict later health status.

The CSBS has been used in prior multi-ethnic cohort studies. It was developed for The Hispanic Community Health Study/SOL. What has not been well explained is the mechanism by which chronic stress results in the health outcomes of interest. Studies attempting to show a relationship between chronic stress and inflammatory changes have been mixed. In the Framingham Health Study after controlling of many covariates, only

an association between chronic stress and interleukin (IL-6) was found in men (Reblin & Uchino, 2008).

Social Support

Mitchell and other researchers (2003) defined social support as the perception one is cared for, has assistance available from other people, and most importantly, one is part of a supportive social network. These supportive resources can be emotional, informational, companionship, financial assistance or personal advice. Social support can be measured as the perception that one has assistance available, the actual received assistance, or the degree to which a person is integrated in a social support system. Social support can come from many sources, such as family, friends, pets, neighbors, coworkers and organizations (APA, n.d.).

Prior work has found that those with high quality or quantity of social networks have a decreased risk of mortality in comparison to those who have low quantity or quality of social relationships, even after statistically controlling for baseline health status (Berkman et al., 2000; Rodríguez-Artalejo et al., 2006). In fact, social isolation itself was identified as an independent major risk factor for all-cause mortality (Berkman et al., 2000). For instance, social integration has been shown to affect mortality from diseases such as type 2 diabetes, while belonging support (characterized by interaction with friends, family, and other groups) was a consistent predictor of self-reported disease outcomes (included diabetes, stroke and CVD) in an elderly population. Most research in this area, however, has focused on links between structural aspects of support and cardiovascular disease outcomes (Tomaka et al., 2006).

Many epidemiological studies have concentrated on further linking measures of social support to physical health outcomes. In addition, a few other studies are also interested in outlining relevant pathways, including potential biological (inflammation) and behavioral (health behaviors) mechanisms. Research studies of the relationship in women besides the Framingham study have been limited with at least one in pregnancy. On the other hand, lack of social support could result in a change in behaviors such as less exercise, more smoking and poorer diet. These behavior changes have been associated with social isolation or support in studies with cancer and HIV (human immunodeficiency virus) patients (Reblin & Uchino, 2008).

Relevant to the study population McCurley and colleagues (2017) studied the relationship between socioeconomic status (SES), psychosocial factors, and cardiometabolic risk in nearly 5,000 Hispanics in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL). Specifically, this study examined multiple psychosocial risk (negative and positive cognitive-emotional factors) and resource factors (intrapersonal resources such as self-esteem; interpersonal resources such as social support). Confirmatory factor analysis and structural equation modeling were used to identify latent constructs and examine associations. Confirmatory factor analysis identified single latent factors for SES and psychosocial indicators, and three factors for metabolic syndrome including blood pressure, lipids, and metabolic factors. Structural equation modeling showed that lower SES was related to metabolic syndrome factors indirectly through higher psychosocial risk/lower resources (Y-Bχ2 (df = 420) = 4412.90, $p < .05$, RMSEA = .042, SRMR = .051). A statistically significant effect consistent with mediation was found from lower SES to higher metabolic risk (glucose/waist

circumference) via psychosocial risk/resource variables (Mackinnon's 95% asymmetric CI = −0.13 to −0.02). These findings indicate the effect of SES is indirect through its effect on psychosocial and resource factors. Essentially, people with strong social networks, are more optimistic and may have more other resources which leads to lower distress. This lower distress in turn does not stimulate an inflammatory response of the autonomic nervous and HPA systems. In sum, their research evidence suggested psychosocial resources and negative cognitive emotional factors may explain or relate in important ways to metabolic syndrome in Hispanics.

To conclude, the HCHS/SOL findings add to an expanding body of literature supporting the potential roles of psychosocial risk (e.g., depression, anxiety) and resource (e.g., social support, self-esteem) factors in the SES-metabolic health gradient for at-risk populations. Given the high prevalence of metabolic syndrome in United States among Hispanics, and the large and growing nature of this population, identifying modifiable aspects of the SES and metabolic syndrome relationship will be useful in improving understanding of cardiometabolic risk and identifying targets for primary prevention and chronic disease management.

The literature on social support and health is robust and continues to be an active area of research. However, there is a research gap that must be able to explain the contexts and mechanisms for why such associations exist especially among Hispanic women at risk of developing metabolic abnormalities. According to some research studies, clinical research is being fostered by increasing interdisciplinary perspectives on social support and health behaviors. We believe that such approaches will be crucial to

better develop primary or secondary support interventions that have beneficial influences on health outcomes.

The factors underlying the low SES-metabolic risk association are complex and may include differences in access to screening and preventative interventions, lifestyles factors, physiological stress pathways, psychosocial risk and protective factors (McCurley et al., 2017). As a result, in this research study, social support was measured with the ENRICHD Social Support Inventory (ESSI; Mitchell et al., 2003). This social support instrument has been administered for measuring social support in the post-MI population.

Some researchers have argued that social isolation itself is an independent major risk factor for all-cause mortality (Tomaka et al., 2006). Some clinical research has focused on expanding several areas of knowledge in social support. These include social support influences on morbidity, mortality, and quality of life in the population affected by chronic disease, understanding the mechanisms responsible for such associations, and how we might apply such findings to design relevant research interventions (Berkman et al., 2000). An important research question in this area centers on extending our understanding of links between social support in its various forms and the development of chronic disease such as metabolic syndrome among Hispanic women.

More recently, researchers have also focused their research efforts on working on elucidating the potential mechanisms that might explain how social support can influence such noteworthy health outcomes. One area of particular interest is related to biological mechanisms, is especially inflammatory processes (Uchino et al., 2010). However, research on such outcomes has thus far produced inconsistent findings. Researchers in the

Framingham Heart Study attempted to correlate social integration with serum markers of inflammation (i.e., monocyte chemo-attractant protein-1, CRP, IL-6, soluble intercellular adhesion molecule-1; Uchino et al., 2010).

A second potential pathway of interest relates to the influence of social support on health behaviors (Umberson, 1987). Although many prior studies treat such health behaviors as confounding variables, recent studies of support emphasize its potential role as mechanism leading to specific behaviors. Social support is related to broader types of health behavior, including fruit and vegetable consumption, exercising, and smoking cessation (Emmons et al., 2007). Besides being seen as an encouragement to engage in healthy behaviors, social support can also be viewed as willingness to collaborate with others. In the health context, those with higher social support be more willing to collaborate with their health care provider and build a trusting relationship and therefore, the person is more likely to adhere to treatment for various long-term medical issues). Conversely, the lack of support or isolation can become a barrier to health behavior adherence or adherence more generally, as was reported in a qualitative study of cancer survivor and HIV patients (Emmons et al., 2007).

Additionally, strong social support networks are associated with a decreased prevalence of depression (Werner-Seidler et al., 2017). This is important since psychological problems such as depression, anxiety, and psychological distress have been found to be related to chronic metabolic abnormalities, for example, insulin resistance, type 2 diabetes mellitus, and dyslipidemia (Werner-Seidler et al., 2017). Therefore, this is another pathway by which social support mediates the effects on mortality.

The (MESA) Multi-Ethnic Study of Atherosclerosis

The Multi-Ethnic Study of Atherosclerosis (MESA), a population-based prospective cohort study, sponsored by the National Institute of Health (NIH), is a longitudinal research study aimed to investigate the characteristics of subclinical atherosclerosis and other cardiovascular disease. The study began recruitment from 2000 through 2002 and has since followed a population-based sample of 6,814 American men and women aged 45 to 84, recruited from six university study centers throughout the United States. In the cohort there were a little over 1,400 Hispanic participants from mixed Hispanic origin making it a good dataset to examine different cardiometabolic parameters and risks. Several manuscripts relevant to this study have been published from the cohort focused on the Hispanic sub-set (Gallo et al., 2014; Ortiz et al., 2015) or analyzed results by race/ethnicity (Kershaw et al., 2015; Mujahid et al., 2011; Ranjit et al., 2007).

The MESA study tested the contribution of psychological factors to the risk for metabolic syndrome among the Hispanics/Latino subsample from the baseline study data. They also investigated whether social support moderates the effects and whether psychosocial variables mediated the association between inflammation and metabolic syndrome. The overall Hispanic sample showed that high levels of chronic stress independently predicted risk for metabolic syndrome. However, this association was found to be significant only in Mexican Americans and Puerto Rican Americans. An increased risk for metabolic syndrome was found among participants who reported high levels of chronic stress, independent of sociodemographic characteristics and lifestyle behaviors. Study participants that reported greater chronic stress had significantly higher

risk for metabolic syndrome and this relationship remained significant after accounting for level of inflammatory markers. This finding was consistent with previous studies that have suggested that exposure to greater chronic stress may increase the odds of developing metabolic syndrome. Furthermore, social support did not moderate the associations between chronic stress and metabolic syndrome for any Hispanic subgroup. It was expected that social support would moderate the relationship between chronic stress, depressive symptoms and metabolic syndrome in part because Hispanics have been characterized as having high levels of social support from family, and several studies have reported positive mental and physical health outcomes as a consequence of family support (Bird et al., 2001). Chronic stress was not associated with inflammatory markers in either the overall study sample or in each Hispanic subgroup (Kershaw et al., 2015; Mujahid et al., 2011; Ortiz et al., 2015; Ranjit et al., 2007).

Covariates/Confounders

In this research study, relevant covariates that have a known association and influence on metabolic syndrome and health behaviors were included. Covariates were parity, preferred language, and place of birth. These potential covariates were obtained from the EMR based on self- reported responses from questionnaires completed during the participant's initial wellness encounter. The mentioned covariates parity, preferred language and place of birth are important covariates, given the well-established relationships these variables have with the outcome of interest such as level of acculturation among Hispanic women. They may affect chronic stress, social support and the dependent variable metabolic syndrome. A confounding is a variable that is extraneous to the research question and that confounds understanding of the relationship

between the independent and dependent variables. Confounding variables can be controlled in the research design. In addition, controlling for a confounder variable opens up the pathway and it assists in reducing bias in the research study results (Polit & Beck, 2017).

Parity

Parity is defined as the number of times that a woman has given birth to a fetus with a gestational age of 24 weeks or more, regardless of whether the child was born alive or was stillborn (The American College of Obstetricians and Gynecologists [ACOG], 2013). Research study findings suggested that higher parity is associated with an increased prevalence of selected components of the metabolic syndrome among Hispanic women in the United States. The association between parity and metabolic syndrome was studied among 7,467 Hispanic women of diverse subgroups, aged 18 to 74 years, who participated in the HCHS/SOL from 2008 to 2011 (Vladutiu et al., 2016). The study showed multiparity was associated with an increased prevalence of abdominal obesity, low high-density lipoprotein cholesterol, and elevated fasting glucose, after adjustment for sociodemographic, behavioral, and reproductive characteristics. This association between multiple pregnancies among Hispanic women and a high prevalence of abdominal obesity suggests an increased high risk for metabolic dysregulation in this population (Vladutiu et al., 2016).

Women's reproductive cycle exposes them to different events or conditions that can be either protective or risks for metabolic syndrome. For example, women tend to have higher HDL (high-density lipoprotein) than men although some of this protective effect seems to diminish after menopause. Pregnancy is physiologically a state of insulin

resistance which is important to meet the continual glucose needs of the growing fetus. However, it can also be considered a cardiometabolic stress test. Nearly half of the women diagnosed with gestational diabetes mellitus (GDM) will develop type 2 diabetes in the next 5-8 years (Gunderson et al., 2015). On the other hand, lactation, particularly if done for longer periods of time and at a younger age, has been shown to increase insulin sensitivity resulting in lower blood glucose levels among women both with and without GDM, at least in the short-term (Gunderson et al., 2015).

The Hispanic population is the fastest-growing minority population in the United States, and Hispanic women report higher fertility and birth rates than their non-Hispanic counterparts (Martin et al., 2015). Thus, understanding the impact of parity on the metabolic syndrome is important for informing preventive efforts to decrease the prevalence of metabolic among Hispanic women. On the other hand, prior research studies have conflicting results, some suggested a linear association between increasing parity and an increased prevalence of abdominal obesity and lower high-density lipoprotein cholesterol, and others suggested no association between parity and waist circumference or high-density lipoprotein cholesterol. Several prior studies found no association between parity and elevated fasting glucose (Vladutiu et al., 2016).

Acculturation

Acculturation is the process by which new cultural elements and engagement in specific behaviors, including the lifestyle, diet, beliefs and values of a new country, are acquired (Abraido-Lanza et al., 2005). The cumulative experience of individuals with their environments to assimilate or adapt to change across their lifecycle further shapes the acculturation process. The process is a complex interplay between the characteristics

of the country or origin, those of the receiving society, that of the immigrant group and individual personal characteristics (Celenk & Van de Vijver, 2011). The process may vary across different U.S. communities and is directly related to both an individual's permissive adaptation to change and the characteristics of the adopted community. When high native cultural maintenance predominates in the community, the process is slow. Conversely, this acculturative process may accelerate if the host communities do not provide familiar cultural habits or lifestyle customs. Therefore, the acculturation process may be very different for individuals residing in border communities compared with those settling into communities more distant from Mexico since there is close proximity to the native culture. Whether a person acquires little of their new culture or becomes fully assimilated into the new culture can affect their health either negatively or positively (Abraido-Lanza et al., 2005). Potential reasons for negative effects of acculturation are that immigrants may bring with them a healthier diet than in the United States and might practice or be engaged in less toxic health habits. On the other hand, better environmental controls in the U.S. such as less pollution, access to safe community parks, family recreation for leisure activities, and better schooling opportunities might promote positive health behaviors among immigrant populations (Abraido-Lanza et al., 2005).

Espinosa De Los Monteros and colleagues (2008) examined the relationships between individual and area-based indicators of acculturation and metabolic syndrome risk factors among a sample of 145 Mexican American women aged 35 to 65, who were able to read and write in Spanish or English. Exclusion conditions included pregnancy, history of cardiovascular disease, renal, liver, serious mental disease, substance

dependence, use of medications known to affect the autonomic nervous system, and living in a group home. The Acculturation Rating Scale for Mexican Americans-II (ARSMA-II), developed by Cuellar et al. (1995), was used to measure four modes of acculturation (e.g. assimilation, integration, separation and marginalization). The ARSMA –II measured orientation toward Mexican (17 items) and Anglo cultures (13 items), yielding 2 subscales. Participants indicated their general feelings toward Anglo or Mexican culture on a 5-point Likert scale ranging from 1(not at all) to 5 (extremely often). A mean score for each subscale was calculated, with higher scores indicating greater Mexican or Anglo acculturation. Internal consistency for both scales was adequate (α=0.82 for the Mexican orientation scale and α=0.89 for the Anglo orientation scale). In addition, years since participants made the United States their permanent home was used to examine participants' exposure to the new country of residence set equal to age for those born in the United States. Moreover, two brief screening instruments were used to measure behavioral factors associated with energy imbalance and dietary patterns (a total of 27 items). Instruments were culturally adapted and translated in previous studies. (Espinosa De Los Monteros et al., 2008). Study research findings suggested among this sample of low SES, middle-aged women living along the California–Mexico border, individual-level U.S. acculturation (i.e., Anglo cultural orientation) was associated with increased consumption of fruits, vegetables, and fiber diet, increased odds of engaging in health enhancing levels of physical activity, and decreased odds of meeting clinical criteria for metabolic syndrome. Moreover, beyond the influence of individual-level factors, women living in more U.S. acculturated neighborhoods reported lower fat consumption. However, acculturation effects were shown to be independent of

education and income, suggesting the presence of additional pathways. Such pathways may include English language acquisition, increased access to heart-healthy food options, and recreational exercise facilities. Given the positive association between Unites States acculturation and SES, upward socioeconomic mobility may help explain the protective relationships suggested by this Mexican American women study (Espinosa De Los Monteros et al., 2008). Furthermore, U.S. acculturation may represent a reduction in exposure to certain types of stress that may impact metabolic syndrome risk factors. To conclude, the significance of all these variables in describing the observed relationships need to be addressed in future studies.

There are many scales to measure acculturation. These multidimensional scales measured different aspects of acculturation attitudes such as identification of nationality, behaviors such as food and media preference, and outcomes such as amount of physical activity or health outcomes (Celenk & Van de Vijver, 2011; Wallace et al., 2010). Thompson and Hoffman-Goetz (Carter-Pokras & Bethune,2009) in their systematic review of acculturation scales used in studies of the Hispanic population in the U.S. identified at least ten such scales. Their summary identified that the scales lacked a theoretical base and where probably not sensitive enough to identify a change in acculturation. However, many studies like this one that are retrospective must make use of commonly collected data. The three most common proxy measures used for acculturation with the strongest correlation with multidimensional acculturation scales are language spoken at home, length of time lived in the U.S., generational status or nativity (Cruz et al., 2008). Several studies identified language as the strongest predictor of acculturation among these proxy measures (Alegria, 2009). Therefore, this research

study collected two proxy variables for acculturation: preferred language and place of birth.

Research Gaps in the Review of Literature

This research study addresses research gaps in identifying and describing the associations between metabolic syndrome, chronic stress, social support and health promotion behaviors that may delay the possible development of type 2 diabetes and cardiovascular disease among Hispanic women. In addition, this research study assisted in identifying different health care and cultural barriers among Hispanic women living in an underserved community along the U.S./Mexican border. As a result, cultural humility unique to underserved settings must be considered. In addition, addressing the gap in identifying the associations between metabolic syndrome, and psychosocial factors is limited and represented an important avenue for investigation that may inform early interventions in the relationships between the multiple study variables including chronic disease risk among Hispanic women.

On the other hand, despite the distressingly multiple cardiovascular disease risk factors among the Hispanic population living in the United States, the Hispanic population experience lower all-cause and cardiovascular-specific mortality compared to non-Hispanic Whites. This epidemiological phenomenon is commonly referred as “The Hispanic Paradox” (Markides & Coreil, 1986). However, there are significant research gaps differences by Hispanic background and other known and potential confounding variables including parity, tobacco use, preferred language and place of birth but not limited to socioeconomic factors, acculturation, strong family support and neighborhood environment. According to some health care literature in regard to the Hispanic Paradox

phenomenon emphasized that caution must be stressed in how these findings are translated into clinical care of the Hispanic population. To summarize, despite the Hispanic paradox, chronic disease risk factor identification and reduction of risk and efforts to optimize management should be the goal for Hispanics as they are for the rest of the general population (Markides & Coreil, 1986). By focusing on potentially modifiable, health-relevant study variables, this research study may highlight opportunities for primary prevention of metabolic disorders among this high-risk population.

CHAPTER III

METHODS

Purpose

The primary purpose of this research study was to describe the associations between chronic stress, social support and other psychosocial stressors such as (healthy eating, physical activity, food access and family safety), high risk health behaviors and the presence of metabolic syndrome as determined by the ATP III-NCEP (Alberti et al., 2009) in Hispanic women living in an underserved community.

The specific aims of this research study were among middle-aged Hispanic women between the ages of 35 to 55 were to:

Aim 1: Describe participants' sociodemographic characteristics, chronic stress, social support, and psychosocial stressors and the presence of metabolic syndrome.

Aim 2: Describe significant differences between selected sociodemographics, chronic stress, social support and psychosocial stressors and the presence of metabolic syndrome.

Aim 3: Describe the odds of meeting the metabolic syndrome criteria for the independent variables identified as significant in the bivariate analysis accounting for any covariates consistent with the study's conceptual model.

Study Design

A retrospective cohort study design was used to describe the associations between chronic stress, social support and other psychosocial stressors and the presence of metabolic syndrome in Hispanic women. This study design was appropriate for examining the relationships between the multiple study variables. It was also an efficient

use of time and resources since it made use of already preexisting collected data from the EMR. This study used existing patient data that was recorded during 2019.

Setting

The study setting was a community clinic located in the city of Calexico, California, a border city with Mexicali, Mexico in Imperial County. Imperial County is a unique rural community established in 1907, and it is located in the far southeastern corner of California bordered by San Diego and Riverside Counties, the State of Arizona, and Mexico. This community clinic is a private, non-profit organization committed to providing comprehensive primary care services to accommodate all residents in the Imperial county. Approximately 9,600 to 10,000 patients receive health care services annually in this clinic site. The community clinic is staffed by a multidisciplinary team composed of experienced medical professionals, including physicians, nurse practitioners, medical assistants and administrative staff. In addition, the Centers for Medicare and Medicaid Services (CMS) insures 70% of this community clinic.

The California Department of Health Care Services (DHCS) requires health care providers to administer an Individual Health Education Behavioral Assessment to all Medicaid managed care patients as part of their initial wellness examination and all subsequent well care visits per Reference Title 22, California Code of Regulations, Sections 53851and 53910.5 (DHCS, 2013). This community clinic uses the Staying Healthy Assessment (SHA) to meet this requirement. The SHA identifies high-risk health behaviors, measures use of preventive screenings, health education needs, and identifies current health concerns and plan for medical treatment. The SHA must be conducted in a culturally and linguistically appropriate manner for all patients, including those with

disabilities. The SHA questions may be asked verbally and responses can be recorded directly in the patient's electronic medical record. Since this setting sees a large proportion of Medicaid managed care patients, it is routinely used in all initial visits for all patients. The SHA will be described in detail under the study variables section.

Study Sample

Any Hispanic woman between 35-55 years old, Imperial county community members and having initial wellness examination case data were eligible for participation. Cases with a diagnosis of type 1 diabetes or who were pregnant during this timeframe were not study eligible due to the fact that the parameters for metabolic syndrome cannot be applied to them during pregnancy. (Gunderson et al., 2015). A random sample of the eligible candidate cases was selected from the EMR.

Study Variables

Dependent Variable

Metabolic syndrome was the primary dependent variable for this research study. Since the ATP III-NCEP criteria is endorsed by two major national U.S. organizations National Heart Lung, and Blood Institute and American Health Association (Alberti et al., 2009), those criteria were used to determine the presence of metabolic syndrome (yes/no) in this study. The criteria included meeting three or more of the following metabolic syndrome components:

Blood pressure: ≥ 130mmHg for SBP and/or ≥85mmHg for DBP

Abdominal Obesity/Waist circumference: ≥ 35 inches or more than 88 cm in women

Triglycerides: Greater than or equal to ≥150mg/dl

HDL cholesterol: Less than or equal to≤ 50mg/dl

Fasting glucose: Greater than or equal to ≥100 mg/dl

Independent Variables

Chronic Stress

Chronic stress was measured using the CSBS which is an 8-item scale that assesses the number of current ongoing problems in major life domains (financial, work, relationship, health problems in self or close other, drug or alcohol problems in close other, caregiving, and other chronic stressors) lasting 6 months or more (Bromberger & Matthews,1996; Mujahid et al., 2011; Gallo et al., 2014). Each item is answered as "yes" or "no". For "yes" responses, participants indicate how stressful the problems have been on a scale ranging from: 1 (not very stressful), 2 (moderately stressful), and 3 (very stressful). The number of "yes" responses which were rated as moderate to very stressful were summed giving a scale range from 0 to 8. The CSBS was analyzed both as a continuous variable and a categorical variable. Categories were defined as in prior research as: 0 = low chronic stress, 1= medium chronic stress, 2 or more = high chronic stress (Mujahid et al., 2011).

This measure has been used in prior multi-ethnic cohort studies, including the Hispanic Community Health Study - Study of Latinos (Mujahid et al., 2011; Gallo et al., 2014). This instrument is available in English and Spanish. and it has shown to be psychometrically sound and appropriate to the Hispanic population. Most constructs were represented by multiple indicators to provide a thorough approach and estimated reliability of measurement. It has shown strong internal consistency in both languages, English Cronbach's $\alpha = .86$; Spanish Cronbach's $\alpha = .84$ (Gallo et al., 2014). The

following five domains (health (self), health (loved one), job, relationship, financial problems and if any ongoing problems lasted ≥6 months) were measured.

Social Support

Social support was measured using the Enriched Social Support Inventory (ESSI), a self-administered 7-item scale instrument (Mitchell et al., 2003). This instrument was originally developed for the purpose of identifying a short method for measuring social support with patients who had a myocardial infarction (Mitchell et al.,2003). It takes about 5 minutes to complete.

The ESSI evaluates three aspects of social support. First, structural support (the presence of a partner) is measured with one item. Second, instrumental support (presence of tangible help) is measured with 1 item. And third, emotional support (characterized as caring) is measured with 5 items. Structural support response options include "yes/no". The 6 instrumental and emotional support items are measured using a five-point Likert scale (1 = "None of the time", 5 = "All of the time"). Scores for the 6 items can range from 6 to 35 (5 points are given for the presence of a partner). In order to evaluate overall social support score, the 3 aspects of social support will be added using the following score: ≤12 = Low social support, > 12= moderate support (Burg et al., 2005).

The ESSI's content validity was determined by comparing it to three other scales: The Perceived Support Scale (24 items), the Social Network Questionnaire (a more complex inventory requiring listing up to 15 people and identifying each on 6 parameters), and the Inventory of Social Support (40 items). There was strong correlation between the ESSI and Perceived Social Support Scale of 0.64 but smaller statistically significant correlations with the other two scales in the range of 0.25 to 0.34 (Mitchell et

al., 2003). The Cronbach's alpha for the Mitchell et al. (2003) study (*N*=199; one-third non-Hispanic White subjects) was estimated 0.86. The mean total was 29.9 (SD 5.7) with a range from 9-35. Developers also examined using only the emotional support items (5 items) compared to all 7 items and found a very high correlation between results of 0.96. A test-retest of the ESSI in a sample of heart disease patients found no differences in the score after 1 month and found a modest correlation between the social functioning sub-scale of the SF-36 (Vaglio et al., 2004). This instrument was used in the Multi-Ethnic Study of Atherosclerosis (MESA) which is a similar population to the one for this retrospective study. The MESA study used only 6 items, omitting the dichotomous item asking for the presence of a partner (Ortiz et al., 2015). The Cronbach alpha in this study was estimated 0.88. Unfortunately, this study did not report the mean score or the standard deviation for the sample.

Health Behaviors

Healthy eating, physical activity, food access and family safety were also measured with multiple items from the SHA from the Department of Health Care Services, that was developed in the late 1990's and updated in 2013 for use in its MediCal managed program. Its aim is to assist health care providers and patients to better be able to develop a personalized plan of care and to facilitate documentation of certain Healthcare Effectiveness Data and Information Set (HEDIS) quality measures. Different SHA surveys are specific to different age groups and they are available in more than 10 languages. For this retrospective study, the adult form available either in English or Spanish language was used to screen the study population during their initial wellness examination visit. Although the managed care program requires it every 3-5 years, in this

study setting, the SHA survey is routinely re-administered during subsequent wellness follow-up visits. The Adult Staying Healthy Assessment has 27 items answered as: yes, no, or skip. It examines six aspects of health: nutrition and food access (7 items), family safety (5 items), physical activity (1 item), alcohol, tobacco and drug use (4 items), sexual issues (6 items) with a final item for other health concerns. After an intense literature search, it was concluded this is the first research study that have used the SHA as an instrument to identify high-risk health behaviors among the research study sample. There are no psychometric statistics available for the questionnaire and no evidence could be found for its use in any other research studies. Scoring entails measuring specifically the following 4 aspects of health: (healthy eating, physical activity, food access and family safety) answered dichotomously as a "yes" or "no" responses were summed individually. Healthy eating behavior was defined as having the sum of 3 or more out of 4 items and less than 2 items of unhealthy eating behavior. As a result, the 4 aspects of health were able to report the mean score and standard deviation for the study sample.

Covariates/Confounders

In this research study, relevant covariates that have a known relationship and influence on metabolic syndrome and health behaviors were included. Covariates have been determined to be parity, preferred language, and place of birth. These potential covariates were obtained from the EMR based on self- reported responses from questionnaires completed during the participant's initial wellness encounter.

Sample Size

Two research studies from the MESA health study reported the standard deviation of the CSBS as 1.88 and 1.21 (Gallo et al., 2014; Everson-Rose et al., 2014). Mitchell

and colleagues (2003) found a standard deviation for the ESSI of 5.7. Therefore, specifying a two-tailed alpha of 0.05 and 80% power, a sample size of 150 would be able to detect SD 0.5 (medium effect size; Lenth, 2006-09). This sample also should permit constructing a logistic regression model with up to 10 variables.

Analytic Approach

Descriptive statistics including percentages, means and standard deviations were used to address study aim 1. For study aim 2 bivariate analysis was conducted to determine significant differences between two independent groups, the presence of metabolic syndrome (yes/no) independent sample t-test was used. T-tests of association such as Pearson's r for all variables measured with continuous variables and chi-square for categorical variables were used. Aim 3 used multivariable logistic regression modeling with backward stepwise procedure. Odds ratios and 95% confidence intervals were calculated. The Statistical Package for Social Sciences (SPSS) version 26 for IBM was used to perform the required statistical analysis.

Study Procedures

In May 2020, the community clinic medical director and administrative staff were informed about the purpose of the study and permission to access data collection was obtained. Thereafter, the research proposal was presented to the dissertation committee and consequently the research proposal was submitted and approved by the Institutional Review Board (IRB) by the principal investigator's university. After IRB approval, an electronic medical record database search of cases that met the study inclusion criteria was obtained. Consequently, a list of 389 potential cases was obtained. As a result, 150 cases were randomly selected to participate in the study.

Due to the unprecedented coronavirus (COVID-19) global pandemic crisis, study data were securely obtained remotely from the EMR to mitigate the spread of coronavirus exposure following the recommended Centers for Disease Control Guidelines ([CDC], 2020). A study progress report of ongoing study challenges and logistics was remotely presented from the study site via zoom video conferencing to one of the study funding grantors, The Doris A. Howell Foundation for Women's Research during their monthly board members meeting on September 21, 2020 in La Jolla, CA.

Case data were obtained from initial wellness examination and follow up visits. The following measures from the EMR were obtained: 1) Basic social demographics including country of origin, preferred spoken language, health insurance, parity and family history; 2) Vital signs including blood pressure, waist circumference and BMI; 3) Lipid parameters and fasting blood glucose; 4) CSBS; 5) ESSI; 6) SHA data; 7) Criteria for determining presence of metabolic syndrome (i.e., waist circumference, systolic and diastolic blood pressures, fasting blood glucose, triglycerides and HDL-cholesterol levels).

All study case data were recorded by a non-identifiable study identity (ID) number and a Master list linking date of birth (DOB) to case ID was kept separately. To assure accuracy of data collection a random sample of 20% of the case data were double entered and compared for accuracy. During data analysis, descriptive analysis such as histograms were useful to evaluate for normal distribution of the sample and to identify outliers and values outside the normal ranges**.** Once study data were collected, logic checks were done to clean the study data discrepancies and obvious errors were corrected.

Protection of Human Subjects Considerations

All research study data collection procedures were approved by the appropriate community clinic administrators, university IRB for the protection of human subjects. All the research study instruments and forms were kept in a locked file cabinet in a secure place accessible solely by the research team. All electronic data obtained remotely was password protected. All study procedures required to protect the privacy of the cases confidential information were always maintained including using a study identification number for each case's data and maintaining a master list separately that linked the study ID number and DOB separately.

Summary

This chapter summarizes the specific study processes that were undertaken to address the study research aims and research questions. The methodology section becomes one of the most important parts of a scientific manuscript because it allows the reader to evaluate the validity of the study results (Polit & Beck, 2017). Overall, the goal of this chapter was to provide a clear and logical description of the specific research steps to be followed.

CHAPTER IV

RESULTS

The primary purpose of this research study was to describe the associations between chronic stress, social support and other psychosocial stressors such as healthy eating, physical activity, food access and family safety, high risk health behaviors and the presence of metabolic as determined by the National Cholesterol Program Expert Panel (NCEP) and Adult Treatment Panel (ATP III; Alberti et al., 2009) in Hispanic women living an underserved community.

Aim 1. Describe participants' sociodemographic characteristics, chronic stress, social support, and psychosocial stressors and the presence of metabolic syndrome.

Characteristics of the Study Sample

The mean age of Hispanic women in the study sample was 44.81 (SD = 6.32) years. Over 70% of the study sample had public health insurance or no insurance (see Table 1). More than half of the sample were born in Mexico (56.8%), with (39%) U.S. born. Two-thirds of the participants (67.4%) preferred Spanish as their primary language. More than half of the study sample (52.8%) reported being married or living with a partner (see Table 1).

The following family and obstetric history and health habits were also obtained from the cases' initial wellness visit encounter. Family history of chronic illness was prevalent with 71% having family heart disease or stroke history, followed by diabetes (65%) and cancer (35%). Given the age criteria for the study, unsurprisingly over 70% of the women were multipara. Tobacco use was reported by 17% of women. The only other

statistical difference between those with and without metabolic syndrome was health insurance type and family history of heart disease or stroke.

Table 1

Characteristics of Study Participants, Including Differences Based on Metabolic Syndrome Status

Characteristics	Total Sample *(N=150)* *n (%)*	Metabolic Syndrome *(n=86) (57.3%)* *n (%)*	No Metabolic Syndrome *(n=64) (42.7%)* *n (%)*
Age: years (SD)	44.81(6.32)	44.66 (6.51)	45.81 (6.09)
Health Insurance			
Medicaid	98 (65.3)	**63 (73.3)**	**35 (54.7)**
Private Insurance	44 (29.3)	17 (19.8)	27 (42.2)
Medicare	5 (3.3)	4 (4.7)	1 (1.6)
Uninsured	3 (2.1)	2 (2.3)	1 (1.6)
Place of Birth *missing: 4*			
Mexico	83 (56.8)	49 (58.3)	34 (54.8)
United States	57 (39.0)	31 (36.9)	26 (41.9)
Other	6 (4.1)	4 (4.8)	2 (3.2)
Preferred Language			
Spanish	100 (66.7)	58 (67.4)	42 (65.6)
English	50 (33.3)	28 (32.6)	22 (34.4)
Married or living with a partner	75 (52.8)	44 (31)	31 (21.8)
Parity Status *Missing: 6*			
0	13 (9.0)	7 (8.5)	6 (9.7)
1	28 (19.4)	15 (18.3)	13 (21.0)

2	37 (25.7)	23 (28.0)	14 (22.6)
3	48 (33.3)	26 (31.7)	22 (35.5)
4	15 (10.4)	10 (12.2)	5 (8.1)
5 or more	3 (2.1)	1 (1.2)	2 (3.2)
Health Habits			
Tobacco Smoking *missing: 6*	24 (16.8)	15 (18.1)	9 (15.0)
Family Disease History			
Heart Disease/Stroke *missing:10*	100 (71.4)	**65 (79.3)**	**35 (60.3)**
Diabetes *missing: 8*	92 (64.8)	58 (69.9)	34 (57.6)
Cancer *missing: 8*	50 (35.2)	27 (32.5)	23 (39.0)

Note. **Bolded:** *p*-value $\leq$ .025

Characteristics of Metabolic Syndrome in the Study Population

Over half the sample (57.3%) met the criteria for metabolic syndrome. Of the 86 meeting metabolic syndrome criteria, almost half of the cases met three criteria (46.5%). Additionally, (30.2%) met four criteria and (23.2%) met 5 or more of the criteria for metabolic syndrome. The most prevalent criteria met in the total study population was a large waist circumference followed by increased systolic blood pressure (see Table 2). A large proportion of the sample (46%) met the cut off for fasting glucose with the mean value above 100.

Table 2

Components of Metabolic Syndrome of the Sample Population Based on ATP III Criteria Mean (SD) and Number (Percent) Meeting Criteria

Metabolic Syndrome Criteria	Total Sample (*N=150)* *Mean (SD)*	Cut-off criteria met *n (%)*
Waist Circ. (inches)	36.46 (6.55)	99 (66.0)
Fasting Blood Glucose (mg/dL)	101.41 (28.28)	69 (46.0)
Triglycerides (mg/dL)	143.20 (77.28)	70 (46.7)
HDL-Chol (mg/dL)	55.37 (16.65)	52 (34.7)
Systolic Blood Pressure (mm/Hg)	128.33 (16.65)	77 (51.3)
Diastolic Blood Pressure (mm/Hg)	78.33 (9.32)	42 (28.0)

Nearly 90% of the sample were consider overweight or obese based on the classification of weight status guidelines endorsed by the World Health Organization. (see Table 3). Sixty-two percent of women in the sample were classified as obese with more than one-third in the class II and III categories. Those with metabolic syndrome, as expected, had statistically significantly higher BMIs than those without the syndrome.

Table 3

Classification of Weight Status by BMI on Study Population, and By Metabolic Syndrome Status (WHO Guidelines 2014)

		Total *N=148*	Metabolic Syndrome *N=85*	No Metabolic Syndrome *N=63*
		n (%)	*n (%)*	*n (%)*
Body BMI				
<24	(Normal Weight)	18 (12.2%)	2 (2.4)	16 (25.4)
25 – 29.9	(Overweight)	38 (25.7%)	8 (9.4)	30 (47.6)
30 – 34.9	(Obesity Class I)	41 (27.7%)	31 (36.4)	10 (15.9)
35-39.9	(Obesity Class II)	23 (15.5%)	19 (22.4)	4 (6.3)
>40	(Extreme Class III)	28 (18.9%)	25 (29.4)	3 (4.8)

Aim 2. Describe significant differences between selected sociodemographics, chronic stress, social support and psychosocial stressors and the presence of metabolic syndrome.

Sociodemographic

This research study identified that having a family history of heart disease or stroke was statistically significant among study cases with metabolic syndrome (p=.015). In addition, having public medical insurance (Medi-Cal) was statistically significant among study cases with metabolic syndrome (p=.003).

Chronic Stress

At least one stressor that lasted greater than 6 months and was rated as moderate to very stressful was present in 87.6% of study participants. The range of chronic

stressors ranged from 0 to 7 with an overall mean of 2.238 (SD 1.562). Using original CSBS chronic stress categories, participant ratings were: low in 12%, moderate in 25%, and high in 63%. More than 1 in 5 women reported 4 or more chronic stressors. The mean difference in the number of stressors on the Chronic Stress Burden Scale (CSBS) was statistically higher among those with metabolic syndrome compared to those without (p=0.040; see Table 4). Of the 7 major subscales measured, women with metabolic syndrome reported nearly twice the rate of moderate to very stressful events for someone close ongoing health problem, job difficulties, financial challenges, and relationship difficulties. (See Table 4).

Table 4

Reported Moderate-Very Stressful Chronic Stressors by Metabolic Syndrome Status

Chronic Stressors	Metabolic Syndrome *n (%)*	No Metabolic Syndrome *n (%)*
Personal health		
1. Have you had a serious ongoing health problem?	25 (64.1%)	14 (35.8%)
Close significant other health		
2. Has someone close to you had a serious ongoing health problem?	42 (61.7%)	26 (38.2%)
Job related		
3. Have you had ongoing difficulties with your job or ability to work?	45 (61.6%)	28 (38.3%)
Financial strain		
4. Have you experienced ongoing financial strain?	47 (62.6%)	28 (37.3%)
Relationship		
5. Have you had ongoing difficulties in a relationship with someone close to you?	37 (61.6%)	23 (38.3%)

Alcohol/drugs		
6. Has someone close to you had an ongoing problem with alcohol or drug use?	21 (55.2%)	17 (44.7%)
Caregiving		
7. Have you been helping someone close to you, who is sick, limited or frail?	22 (55%)	18(45%)
Other Problem		
8. Have you had another ongoing problem not listed here?	23 (57.5%)	17 (42.5%)

Social Support

Nearly all study participants, 97% (n = 138), scored as having moderate social support, a score greater than 12 on the ESSI. The overall mean ESSI score was 22.608 (SD 5.632). Social support score means between those with metabolic syndrome and those without metabolic syndrome were not different (p = 0.521).

Social Determinants of Health Behaviors

Several social determinants of health behaviors measured on the SHA were clinically and statistically different by metabolic syndrome status (see Table 5). Those with metabolic syndrome were more conscious of their weight than those without it. However, they were also more likely to have limited food access, less likely to report healthy eating habits and were less likely to endorse being physically active. All of these findings were highly statistically significant. The only factor with no difference by metabolic status was living in a safe environment.

Table 5

Bivariate Associations of Independent Variables by Metabolic Syndrome Status

Variables	Metabolic Syndrome *(N=82)*	No Metabolic Syndrome (*N=62)*	p-value
	n (%) or mean (SD)	*n (%) or mean (SD)*	
Chronic Stress (CSBS)*	2.47 (1.66) *	1.94 (1.39) *	0.040 [B]
Social Support*	22.3 (5.4) *	23.0 (5.9) *	0.521[B]
Conscious of Weight			.000 [A]
Yes	75 (89.3)	35 (54.7)	
No	9 (10.7)	29 (45.3)	
Healthy Eating			.034 [A]
Yes	34 (45.9)	38 (64.4)	
No	40 (54.1)	21 (35.6)	
Healthy Food Access			.001 [A]
Yes	45 (54.9)	51 (82.3)	
No	37 (45.1)	11 (17.7)	
Physical Activity			0.009 [A]
Yes	27 (32.5)	34 (54.0)	
No	56 (67.5)	29 (46.0)	
Safe Living Environment			
Yes	70 (88.6)	50 (86.2)	0.674 [A]
No	9 (11.4)	8 (13.8)	
Health Insurance			
Public/None	69(65.1)	37 (34.9)	.003 [A]
Private Insurance	17 (38.6)	27 (61.4)	
Family Heart Disease			
Yes	65 (65.0)	35 (35.0)	.015 [A]
No	17 (42.5)	23 (57.5)	

Note: *: Mean (standard deviation) are reported. [A]: Chi-square test was used, [B] : Two-sample t -test was used.

Aim 3. Describe the odds of meeting the metabolic syndrome criteria for the independent variables identified as significant in the bivariate analysis accounting for any covariates consistent with the study's conceptual model.

Among the sociodemographic and medical history variables, only family history of heart disease or stroke and having public health insurance varied by metabolic syndrome status. Family history precedes any individual risk factors and therefore, was not appropriate to include as a confounder variable. Health insurance status can be a proxy variable for having a job with private health insurance, income, and a marker for lower socioeconomic status indicators. It conceptually could be an intermediate variable between chronic stress and metabolic syndrome, so was not included as a confounder. However, relative to access to healthy food, public health insurance may be a proxy indicator of lower socioeconomic status could be considered a confounder, so was included in the logistic model potential confounder.

The results show for every increase in a moderate to severe chronic stressor, the odds of meeting criteria for metabolic syndrome increase 26% (OR 1.26; 95% CI 1.01, 1.57; see Table 6). For those with a greater number of stressors, this is an important increased risk. Those with metabolic syndrome were nearly 7 times increased odds of being aware of their weight. At the same time, they have over twice the odds of not being physically active or eating healthy. Those with metabolic syndrome had 3.81 increased odds of lack of access to healthy food independent of public health insurance status.

Table 6

Unadjusted and Adjusted Odd Ratios for Chronic Stress and Psychological Factors Associated with the Presence of Metabolic Syndrome

Variables	Metabolic Syndrome *(N=82)*	No Metabolic Syndrome *(N=62)*	Unadjusted Odds Ratio (95%CI)	Adjusted Odds Ratio (95%CI)*
	n (%) or mean (SD)	*n (%) or mean (SD)*		
Chronic Stress (CSBS)	2.47 (1.66)	1.94 (1.39)	1.26 (1.01, 1.57)	----------
Healthy Eating				
Yes	34 (45.9)	38 (64.4)	ref	
No	40 (54.1)	21 (35.6)	2.13 (1.05, 4.30)	----------
Healthy Food Access				
Yes	45 (54.9)	51 (82.3)	ref	ref
No	37 (45.1)	11 (17.7)	3.81 (1.74, 8.34)	3.18 (1.42, 7.14)
Conscious of Weight				
Yes	75 (89.3)	35 (54.7)	6.91 (2.96, 16.13)	----------
No	9 (10.7)	29 (45.3)	ref	
Physical Activity				
Yes	27 (32.5)	34 (54.0)	ref	
No	56 (67.5)	29 (46.0)	2.43 (1.24, 4.78)	----------

***Adjusted for health insurance status**

CHAPTER V

DISCUSSION

The study sample of 150 middle-aged Hispanic women were primarily from Mexican origin, 70% had public health insurance, and lived in a U.S./Mexican border city in the state of California. Among the sample, 57.3% (*n* = 86) met criteria for metabolic syndrome. In addition, nearly 90% were overweight or obese compared to 75% without metabolic syndrome. The following social determinant factors were associated with metabolic syndrome: unhealthy eating habits (OR 2.13; 95% CI 1.05,4.30), lack of physical activity (OR 2.43; 95% CI 1.24, 4.78), limited healthy food access (OR 3.18; 95% CI 1.42, 7.14) adjusted for health insurance. However, the mean difference in the number of chronic stressors was statistically significantly higher among cases with metabolic syndrome (2.47 [1.66]) than those without the syndrome (1.94 [1.39]). The odds of meeting criteria for metabolic syndrome increased 26% for each increase in the number of moderate to severe chronic stressor (OR 1.26; 95% CI 1.01, 1.57). Study cases with metabolic syndrome had twice the odds of not being physically active or eating healthy.

The prevalence of metabolic syndrome in this retrospective study at 57% was higher compared to other published data. It was more than twice the prevalence reported from the National Health and Nutrition Examination Survey (NHANES) which showed an overall metabolic syndrome prevalence of 25% among Mexican American women 30-49 years of age, the highest rate compared to non-Hispanic Blacks and Whites (Moore et al., 2017). It is also much higher than the 36% prevalence found in the Hispanic

Community Health Study (Gallo et al., 2014) which included different Hispanic subgroups of women.

Previous research has shown the catastrophic consequences of the obesity epidemic among middle-aged Hispanic women. In this study, it was found nearly 90% of the sample cases were consider overweight/obese based on the classification of weight status guidelines endorsed by the World Health Organization. Study findings from the landmark epidemiological Hispanic Community Health Study showed a 96% rate of obesity among middle-aged Hispanic women. Based on study sample findings, this research study can also confirm the alarming obesity epidemic health concern among this high-risk group in the United States. All these factors are related to the defining characteristics of metabolic syndrome, such as large waist circumference, or abdominal fat, abnormal high blood glucose, elevated lipids and high blood pressure. Lastly, in this study the following antecedents, unhealthy eating habits, lack of physical activity, limited healthy food access and family history of heart disease were strongly associated with metabolic syndrome, which lead into the development of chronic diseases such as type 2 diabetes, heart disease and stroke.

One of the primary aims in this retrospective study was to describe significant differences between chronic stressors and metabolic syndrome. In this study sample, the mean difference in the number of chronic stressors were statistically significantly higher among cases with metabolic syndrome than those without the syndrome ($p = 0.040$). For every increase in a moderate to very stressful chronic stressor, the odds of meeting criteria for metabolic syndrome increased 26% (OR 1.26; 95% CI 1.01, 1.57). Very few population-based studies have examined the association between the burden of chronic

stress and psychosocial factors in predicting the onset of metabolic syndrome among Hispanic women. The Multi-Ethnic Study of Atherosclerosis (MESA) is one of the few studies examining both chronic stressors and potential mediators, such as social support, on the risk of developing metabolic syndrome in Hispanic subgroups (Ortiz et al., 2015). This study identified an effect that was twice the one found in MESA. The MESA findings suggested an increased risk for metabolic syndrome among participants who reported high levels of chronic stress, independent of sociodemographic characteristics and lifestyle behaviors. The odds ratio for chronic stress was 1.12 (95%CI = 1.01, 1.23), indicating that the risk of being diagnosed with metabolic syndrome increased by 12% for each unit increase in chronic stress (Ortiz et al., 2015). The MESA also identified chronic stress was associated with risk for metabolic syndrome only in two Hispanic groups, suggesting that the role of psychological stress as a risk factor for developing metabolic syndrome may vary in the different Hispanic groups.

In this retrospective study the concept of chronic stress was operationalized through the use of the CSBS an 8-item scale that measured current ongoing major life stressors lasting ≥6 months (Gallo et al., 2014). McEwen (1998) proposed the concept of allostatic load to describe how chronic life stressors, including toxic and traumatic stress, impact individuals' health via the physiological responses to such chronic stressors. The concept of allostatic load had been applied in research across various disciplines and findings have generally confirmed that cumulative effects of social and environmental stressors increase the risks for physiological dysregulation and ill-mental and physical health, especially among vulnerable groups (Read & Grundy, 2012). This study's findings found that some psychosocial study variables including having public health

insurance, unhealthy eating, lack of physical activity, limited healthy food access, family history of heart disease may contribute to the allostatic load and are potential mediators between multiple chronic stressors and the presence of metabolic syndrome. Therefore, the clinical importance of allostatic load serves as an important measurement for screening high- risk health behaviors and at the same time leads into health promotion interventions that may prevent the occurrence of chronic stressors, metabolic syndrome and other potential chronic health disabilities affecting Hispanic women.

In addition, allostatic theory had been useful in describing how physiological and environmental factors influenced chronic stressors. The altered physiology across multiple systems secondary to stressors and related responses which stimulate neuroendocrine, metabolic, cardiovascular and immune responses and ultimately chronic disease states (McEwen, 1998). The understanding of allostatic load theory, chronic stress, psychosocial stressors, theoretical and operational definitions guided our understanding of the associations between study variables. The concept of allostatic load holds promises for researchers to operationalize a holistic view of multiple stressors and to quantify those effects on health (Rosemberg et al., 2017). In brief, to operationalize a concept is to delineate what it means and how it will be measured. Nursing research science is moving increasingly toward concepts that are defined and operationalized clearly, reliably and validly. This step is essential for successful participation in team science and to generating knowledge with widespread and lasting impact (Waltz et al., 2017). Clearly, this study's theoretical framework provides direction for future conceptually oriented research.

Another important study variable examined in this study was social support. In this study sample, no mean differences in social support scores were found between those cases with metabolic syndrome, mean 22.3 (*SD* = 5.4), and those without metabolic syndrome, mean 23.0 (*SD* = 5.9), (*p* = 0.521). Social support was not associated with the presence of metabolic syndrome among study cases. Nearly, 97% (*n* = 38) of the study sample reported moderate social support. An analysis from the MESA among multi-varied Hispanic groups, also concluded that social support was not associated with the presence of metabolic syndrome (Ortiz et al., 2005). In this study, 97% of the study cases rated in the ESSI instrument as having moderate support so without a range of support captured, no mean differences between the groups were identified. When nearly everyone had the same level of social support. ESSI construct validity was established on a small sample of patients post-MI or having heart procedures who were primarily non-Hispanic White. This Social support instrument has been used in other studies with other Hispanic population sub-groups. Clearly, Ortiz and colleagues did not find a wide range of social support using this instrument. This instrument may not capture perceived social support among Hispanics and therefore this social support instrument is unable to detect differences in it. Therefore, future research may require qualitative studies and instrument development among Hispanic population. Ortiz and colleagues (2005) expected that social support would moderate the relationship between chronic stress, depressive symptoms and metabolic syndrome in part because Hispanics have been characterized as having high levels of social support from family, and several studies have reported positive mental and physical health outcomes as a consequence of family support (Bird et al., 2001). Prior research has found that those with high quality or

quantity of social support have a decreased risk of mortality in comparison to those who have low quantity or quality of social relationships, even after statistically controlling for baseline health status (Berkman et al., 2000; Rodríguez-Artalejo et al, 2006). Other studies have argued lack of social support could result in a change in behaviors such as less exercise, more smoking, poorer diet. These behavior changes have been associated with social isolation or lack of support in chronic disease patients (Reblin & Uchino, 2008). It has been found that Hispanics live longer lives than non-Hispanic Whites in the United States, a phenomenon commonly referred to as the "Hispanic Paradox" (Markides & Coreil, 1986). Multiple study findings have shown Hispanics have a higher morbidity rate, more debilitating chronic health conditions and are also affected by a lower SES compared to non-Hispanic whites. These negative findings usually are associated with higher mortality rate and negative health outcomes. Some researchers proposed, positive effects of acculturation, lower rates of tobacco use, strong family ties and robust social networks are beneficial health effects and some of the reasons Hispanics live longer lives (Teruya & Bazargan-Hejazi, 2013). The fact that in both studies social support was so high may make it difficult to study this association when there is little heterogeneity among study participants.

It was unsurprising a large majority of the study sample had public health insurance or no health insurance (70.7 %) given the geographical location of the study. Based on some quality health indicators among underserved populations affected by chronic disease and other disabilities, Medi-Cal beneficiaries are in worse health than people with private health insurance (Decker et al., 2013). This study finding suggests Hispanic women with public or no health insurance generally from a lower SES could be

at a greatest risk to develop heart disease, type 2 diabetes or associated in high-risk health behaviors such as lack of physical activity, unhealthy eating habits, limited healthy food access. The HCHS/SOL of nearly 5,000 Hispanic/Latino adults documented a similar finding of lower SES associated with chronic disease. Historically, lack of health care access has been a challenge for the Hispanic population living in the United States. The Affordable Care Act expanded Medi-Cal insurance for people with low incomes following federal poverty level guidelines. However, whether Medi-Cal coverage improves health outcomes remains controversial. Several studies described differences in chronic disease prevalence between uninsured persons and those with Medi-Cal but have not been designed or powered to explore whether Medi-Cal coverage might cause these differences (Decker et al, 2013). Decker and colleagues (2013) implied that, nationally, Medi-Cal has been associated with improved access to outpatient medical care, and awareness and control of important chronic conditions. Medi-Cal recipients visited health care providers much more frequently than comparable uninsured individuals and were more likely to be aware of their hypertension and being overweight. In this retrospective study, those with public health insurance were more at risk to develop metabolic syndrome and engaged in high-risk health behaviors.

This study did not find a difference in metabolic syndrome by parity in the bivariate analysis. This differs from a study by Vladutiu and colleagues (2016), with data among 7,467 Hispanic women who participated in the HCHS/SOL. They found multiparity was associated with an increased prevalence of abdominal obesity, low high-density lipoprotein cholesterol, and elevated fasting glucose, after adjustment for sociodemographic, behavioral, and reproductive characteristics. Moreover, multiple

pregnancies among Hispanic women with a high prevalence of abdominal obesity suggested high risk for metabolic dysregulation (Vladutiu et al., 2016). The disparity in results may be partially explained by high prevalence of multiparity in this study, 70%.

As others have found, in this study a family history of heart disease or stroke was strongly statistically significant associated with metabolic syndrome (p = .015). Those of Mexican origin have a very diverse gene pool (Moreno-Estrada, et al., 2014) and therefore, having a particular phenotype, like the thrifty gene among Pima Indians which is responsible of their high rate of diabetes may not be relevant. However, the high prevalence of metabolic syndrome in Hispanics highlights a probable underlying genetic risk. It is clear for metabolic syndrome and other cardio-metabolic diseases, there is a strong gene-environmental interaction, including epigenetic changes that may be responsible to the clinical criteria for metabolic syndrome (Carson & Lawson, 2018). Therefore, there is a critical importance of focusing on cardiovascular health promotion and preventive measures among Hispanic women and their families starting early, as early as pregnancy. Preventive health behaviors, including lifestyle modifications, can reduce cardiovascular disease risks. These include changes in nutrition, increased physical activity, and methods to lessen the effects of chronic stress.

This is the first known study to use California's Staying Health Assessment (SHA) to describe individual perceptions and health behaviors in relation to a health outcome. In order to measure healthy eating and food access variables, study participants reported basic nutritional dietary guidelines such as fruits and vegetables consumption, avoidance of fried food and fast-food meals, high-carbohydrate content drinks and calcium-rich food intake. They also responded about weight perception, availability of

healthy foods, daily exercise activity and family safety in their community. In summary, the following social determinants factors identified such as unhealthy eating habits, lack of physical activity, lack of healthy food access were strongly associated with metabolic syndrome compared to cases with no metabolic syndrome. On the other hand, the only psychosocial factor measured on the SHA with no significant difference by metabolic syndrome status was living in a safe environment. As discussed previously, those with metabolic syndrome are much more aware of their weight. However, they have over twice the odds of not being physically inactive or not having healthy eating habits. The latter may be partially explained by the limited access to healthy food. The following high-risk health behaviors identified in this study provided confirmatory findings that metabolic syndrome among Hispanic women are strongly associated to high- risk health behaviors, characterized by unhealthy eating habits, lack of physical activity and limited healthy food access.

In 2014, the U.S. Department of Agriculture reported 22.4% of U.S. Hispanic households food access was significantly higher than the national average, 14.0%. Some Hispanic households had difficulty consistently obtaining adequate food for all household members because of limited economic resources for food. Previous studies suggested that limited food access among low-income Hispanic women was associated with a 1·1 kg/m^2 higher BMI (95% CI 0·4, 1·9 kg/m^2) and a 22% higher prevalence of obesity (95% CI 8, 38 %; Matthew et al., 2016). In other food access studies, Kaiser and colleagues (2004) observed that women with mild food insecurity were 30% more likely to be overweight (BMI >27·3 kg/m^2) than food-secure women. In fact, Adams and colleagues (2003) noted that after adjustment for income and education, the associations between

food insecurity and obesity were stronger among Hispanic and other minority women collectively, than among White women, in the 1998-99 California Women's Health Survey (Kaiser et al., 2004)

Further research is needed to study ethnic-specific community interventions to address the obesity epidemic, psychosocial factors associated to food access. Some studies argue that the relationship of obesity and food access is that foods that are less expensive and easily accessible tend to be higher in calories, glycemic index, fat and sodium with less nutritional value. These high calorie foods might contribute to the obesity epidemic, the development of type 2 diabetes, hypertension and hyperlipidemia (Adams et al., 2003). Therefore, based on the evidence from multiple study findings suggested that lack of healthy food access, physical inactivity, poor healthy habits, low socioeconomic status are strongly associated to the development of metabolic syndrome. More studies are needed to investigate biological changes that may occur due to unhealthy food access, which may in turn create a greater propensity for obesity and metabolic diseases in Hispanic women.

Study Limitations

It is important to recognize some of the limitations found in this retrospective cohort study design. This study limited its study population to women 35 to 55 years of age. Therefore, missing is the younger generation of women with a different acculturation process including differences in socio-demographics, language preference, country of origin, cultural traditions, family lifestyles and health behaviors thus requires further research investigation. This research site was limited to Hispanic women who reside in this community as well as accessed this clinic for their comprehensive preventive health

care services. Nearly 98% of study population had some type of health insurance. Health care access and lack of medical insurance were not identified as a barrier for Hispanic women in the sample. Therefore, whether these results apply to a disadvantaged and uninsured population of Hispanic women who live across the U.S./Mexican border will additionally require further research investigation. Generalizability is a potential limitation since the study site was limited to one agricultural U.S./Mexican border city in the state of California and all women were from Mexican descent. Similar research needs to be conducted with other Hispanic subgroups. Pre-existing data were recorded during 2019 by different members of the health care team, accuracy of electronic medical record data entry errors, incomplete and missing data could potentially be a threat to validity of study data.

Implications for Practice

This retrospective study contributes to the body of scientific research on the associations of chronic stressors, social support, health behaviors and the presence of metabolic syndrome among middle-aged Hispanic women. Allostatic load theory was used as a research conceptual framework to assist in the measurement and description of the associations between chronic stress, social support, psychosocial stressors and health promotion behaviors. Data from this study may assist researchers and health care professionals to identify Hispanic women unique social and health care needs. Pender's health promotion model may help in further research in obtaining a deeper understanding of the implementation of culturally appropriate interventions in promoting critically important health behaviors aimed at altering the epigenetic changes that likely occur between inherited genetics and these unhealthy behaviors. Therefore, chronic disease

prevention-management programs, and appropriate behavioral health research-based interventions and strategies in the clinical setting should be a priority among this targeted group. Hispanic women in an underserved area might be experiencing relationship difficulties, financial challenges, work-related stressors, personal, family or significant ongoing health concerns. This study indicates incorporation of an assessment of chronic stress in Hispanic women's lives is important to achieving improved health outcomes. Chronic stressors without the proper research-based interventions to lessen their effects can lead to more serious health concerns, such as development of metabolic syndrome, type 2 diabetes, cardiovascular disease and stroke, anxiety, and depression. An ideal approach would be interdisciplinary including social services, family counseling, fitness-nutritional guidelines and behavioral/mental health. The development of comprehensive women's health research-based interventions, such as healthy ways to cope with daily stressors including the importance of healthy eating, physical activity, relaxation techniques and chronic disease management that are culturally appropriate should also be designed. Addressing all these health care challenges facing Hispanic women could assist in reducing the magnitude and accumulation of long-term chronic stressors and will potentially improve their high-risk health behaviors, quality of life, physical and behavioral health outcomes.

This research study demonstrated that a large majority of Hispanic women between the ages 35 to 55 Hispanic women with public health insurance or no medical insurance were affected by metabolic syndrome. Notably poor healthy eating habits, lack of physical activity, limited healthy food access and family history of heart disease were strongly associated with metabolic syndrome. Therefore, based on study findings

healthcare professionals should focus on ways to educate and encourage Hispanic women, families and communities in how to engage in early health screening measures and cardio-metabolic risk reduction behaviors, focused on weight reduction, healthy eating, physical activity, and healthy food access. Previous research studies among this targeted group have identified multiple cultural barriers such as limited English proficiency, difficulty navigating the health system impeding Hispanic women in receiving culturally competent quality health care services. As a consequence, important consideration must be provided to the sociocultural perspective practices of this ethnic group. For this reason, the development of research-based health promotion program design, nursing research implementation and evaluation program interventions should be a priority among this underserved group. Health promoting interventions among Hispanic women and families could potentially improve health behaviors and might impede debilitating chronic illnesses that highly affects this disadvantaged population. Simultaneously, these strategies will help reduce health care utilization cost in this country. Research interventions need to be innovative and collaborative to promote community engagement. Community leaders, scientists, researchers, health care administrators and community members bring an essential understanding, expertise and trust to scientific population research. It is imperative to involve community members at all levels from research development toward research dissemination.

Implications for Health Policy

Expanding further understanding of the associations of metabolic syndrome, chronic stressors and high-risk behaviors in middle-aged Hispanic women may inform health policy makers at the local, state and federal levels about the multiple health

challenges confronting this targeted group. The development of metabolic syndrome and high-risk health behaviors in the Hispanic population becomes also a burden to the public health care system. However, in some underserved communities, health equity remains a challenge. The quality of care received by racial and ethnic minorities continues to be suboptimal, as demonstrated by some federal wide core indicators of quality care in preventive care, acute treatment and chronic disease management (Tanjala et al, 2016). A number of federal, state and local policies have begun to examine the complex factors that affect the relationships between high-risk behaviors such as obesity, unhealthy eating, lack of healthy food access, limited physical activity and the development of metabolic syndrome among this underserved group. Federal, state, local initiatives and community partners can approach this matter by dedicating their efforts to improve health care outcomes and living conditions among Hispanic women. Ultimately, research will drive health care policy discussion, formulation and implementation as it provides needed scientific evidence that becomes critical in eliminating health disparities and inequalities among this disadvantaged population. Last of all, researchers, advanced practice nurses, policymakers, community leaders and health care administrators should focus on all these contributing health factors and take actions to address the mentioned health care challenges facing Hispanic women.

Implications for Future Research

Study findings suggested that more scientific research is needed in describing the relationships of chronic stress, adaptive coping behaviors for perceived stressors and how they relate to their cultural health care practices among women from the largest minority group. Further research describing the role of ethnicity as a moderator of the associations

between chronic stress and cardiovascular health will be beneficial among this targeted group. The present metabolic syndrome epidemic among Hispanic women will not improve unless there is first, more available scientific research evidence on the factors and health care behaviors contributing to the development of metabolic syndrome among this growing minority population.

In addition, further research on the development of culturally appropriate health promotion and chronic disease prevention programs are needed, paying particular attention to the specific health care needs in Mexican/American women living along the U.S./Mexican border. Every single of these strategies might support and improve health promoting behaviors among this high-risk population. Moreover, subsequent research will assist to formulate and to better understand how Hispanic women promote their wellbeing within their own socio-cultural context and the health barriers they encounter. Research-based interventions need to be innovative and collaborative to promote community engagement. Health care leaders, scientists, researchers, health care administrators and community members bring an essential understanding, expertise and trust to scientific population research. It is imperative to involve community members at all levels from research development toward research dissemination. It is also of critical importance that this underrepresented population recognizes the value of participating in population research. Therefore, this collaboration will contribute to the avoidance of research bias and towards the advancement of scientific research in Hispanics.

Conclusion

In some instances, cardio-metabolic syndrome risk factors and high-risk behaviors could be inadequately recognized by health care providers. For this reason, the theoretical

and conceptual model used in this retrospective study may guide health care professionals about how Hispanic women view their own health promoting behaviors.

To conclude, longitudinal interventional health outcome research studies with a large and representative sample are needed to provide a more extensive analysis of the complex contributing factors affecting the health of Hispanic women. Innovative research will provide evidence of effective disease specific interventions and the integration into clinical practice guidelines among this understudied population. Early recognition of cardio-metabolic syndrome risk factors and improving health promoting behaviors become a critical preventive measure to avoid negative health consequences among this high-risk group.

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APPENDIX A

USD IRB

-------- Forwarded message ---------
From: <irb@sandiego.edu>
Date: Tue, May 26, 2020 at 10:57 AM
Subject: IRB-2020-455 - Initial: Initial - Exempt
To: <eesquer@sandiego.edu>, <jgeorges@sandiego.edu>

May 26, 2020 10:57 AM PDT

Edna Esquer
Hahn School of Nursing & Health Science
Re: Exempt - Initial - IRB-2020-455, The Relationship of Metabolic Syndrome and Health Behaviors among Hispanic Women.

Dear Edna Esquer:

The Institutional Review Board has rendered the decision below for IRB-2020-455, The Relationship of Metabolic Syndrome and Health Behaviors among Hispanic Women..

Decision: Exempt

Selected Category: Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:

(i) The identifiable private information or identifiable biospecimens are publicly available;

(ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;

(iii) The research involves only information collection and analysis involving the investigator's use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of "health care operations" or "research" as those terms are defined at 45 CFR 164.501 or for "public health activities and purposes" as described under 45 CFR 164.512(b); or

(iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for non-research activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

Findings: None
Research Notes:
Internal Notes:
Note: We send IRB correspondence regarding student research to the faculty advisor, who bears the ultimate responsibility for the conduct of the research. We request that the faculty advisor share this correspondence with the student researcher.

The next deadline for submitting project proposals to the Provost's Office for full review is N/A. You may submit a project proposal for expedited or exempt review at any time.

Sincerely,
Dr. Thomas R. Herrinton
Administrator, Institutional Review Board
Office of the Vice President and Provost
Hughes Administration Center, Room 214
5998 Alcalá Park, San Diego, CA 92110-2492
Phone (619) 260-4553 • Fax (619) 260-2210 • www.sandiego.edu

APPENDIX B

MEASUREMENTS

(CSBS) CHRONIC STRESS BURDEN SCALE

English version

Many people experience ongoing problems with their everyday lives. Please tell us whether any of the following has been a problem for you. Please circle your answers. Thank you!

1. Have you had a serious ongoing health problem? No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

2. Has someone close to you had a serious ongoing health problem?
No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

3. Have you had ongoing difficulties with your job or ability to work? No(0) Si (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

4. Have you experienced ongoing financial strain? No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

5**. Have you had ongoing difficulties in a relationship with someone close to you?**
No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

6. Has someone close to you had an ongoing problem with alcohol or drug use?
No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

7. Have you been helping someone close to you, who is sick, limited or frail?
No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

8. Have you had another ongoing problem not listed here? No (0) Yes (1)
Has this been a problem for six months or more? No (0) Yes (1)
If yes, please describe: _____
_____
Would you say this problem has been?
Not very stressful (1)
Moderate stressful (2)
Very stressful (3)

(CSBS) EVALUACION DE STRESS CRONICO
Spanish version

Muchas personas tienen algun problema persistente en su vida cotidiana. Por favor diganos si alguna de las situaciones que se indican a continuacion ha representado un problema para usted. Por favor circule su respuesta. Muchas Gracias!

1. Ha tenido usted alguna enfermedad continua ? No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

2. Ha tenido alguien cercano a usted con alguna enfermedad prolongada?
No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

3. Ha tenido recientemente dificultades persistentes en su trabajo o problemas en su capacidad para trabajar?
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado,
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

4. Ha tenido recientemente problemas importantes de dinero? No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

5. Ha tenido recientemente problemas en una relacion personal con alguien cercano a usted? No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

6. Alguien cercano a usted ha tenido un problema continuo con alcohol o uso de drogas? No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

7. Usted ha ayudado al menos a alguien cercano que tiene limitaciones, enfermedades o alguna debilidad, en forma regular?
No (0) Si (1)
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

8. Ha tenido algun otro problema continuo? No (0) Si (1)
Si contesto si, por favor explique: _____
_____
Ha sido un problema durante seis meses o mas? No (0) Si (1)
Diria que este problema le ha causado?
Cierto estres (1)
Bastante estres (2)
Mucho estres (3)

(ESSI) Enriched Social Support Instrument
English version

Please read the following questions and circle the response that most closely describes your current health status and your current social situation.

1. **ESSI-Q1. Is there someone available to you whom you can count on to listen to you when you need to talk?**

None of the time A little of the time Some of the time Most of the time All the time
1 **2** **3** **4** **5**

2. **ESSI-Q2. Is there someone available to give you good advice about a health problem?**

None of the time A little of the time Some of the time Most of the time All the time
1 **2** **3** **4** **5**

3. **ESSI-Q3. Is there someone available to you who shows you love and affection?**

None of the time A little of the time Some of the time Most of the time All the time

1 **2** **3** **4** **5**

4. **ESS1-Q4. Is there someone available to help you with daily chores?**

None of the time A little of the time Some of the time Most of the time All the time
1 **2** **3** **4** **5**

5. **ESSI-Q5. Can you count on anyone to provide you with emotional support (taking over problems or helping you make a difficult decision)?**

None of the time A little of the time Some of the time Most of the time All the time

1 **2** **3** **4** **5**

6. **ESSI-Q6. Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide?**

None of the time A little of the time Some of the time Most of the time All the time

1 2 3 4

5

7. **ESSI-Q7 Are you currently married or living with a partner? Yes No**

(ESSI) Questionario de Apoyo Social
Spanish version

Lea las siguientes preguntas y encierre en un círculo la respuesta que mejor describa su salud y situación actual.

1. ¿Hay alguien cerca de usted que lo pueda escuchar cuando usted necesite a alguien con quien pueda hablar?
Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

2. ¿Hay alguien cerca de usted para darle buenos consejos sobre un problema de salud? Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

3. ¿Hay alguien cerca de usted disponible para ti que te muestre amor y afecto?
Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

4. ¿Hay alguien cerca de usted para ayudarlo con los quehaceres diarios?
Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

5. ¿Puede contar con alguien para que le brinde apoyo emocional (hacerse cargo de los problemas o ayudarlo a tomar una decisión difícil)?
Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

6. ¿Tiene tanto contacto como quisiera con alguien con quien se siente cercano, alguien en quien puede confiar y confiar?
Ninguna de las veces A veces Algunas de las veces La mayoría de las veces Todo el tiempo
1 2 3 4 5

7. ¿Actualmente esta Casado o vive con una pareja? Si No

The Associations of Chronic Stress, Social Support, Health Behaviors & Metabolic Syndrome Among Hispanic Women

Code Book – Study Variables (revised May 29, 2020)
***All dichotomous responses should be coded as 1= yes, 0=No & missing data code 999**

DEMOGRAPHIC DATA

1. **DEMO-Q1** Age: _____
2. **DEMO-Q2**Type of insurance: Medicaid (1) Medicare (2) Private Insurance (3)
3. **DEMO-Q3** Country of origin: Mexico (1) US (2) other (3)
4. **DEMO-Q4** Preferred language: English (1) Spanish (2)
5. **DEMO-Q5** Parity: 0 (0), 1 (1), 2 (2), 3 (3), 4 (4), (5) 5 or more

CLASSIFICATION OF WEIGHT STATUS BY BODY MASS INDEX (BMI).

1. **BMI-Q1**
   (1) <24 Normal Weight
   (2) 25-29.9 Overweight
   (3) 30-34.9 Obesity Class 1
   (4) 35-39.9 Obesity Class 2
   (5) >40 Extreme Obesity Class 3

METABOLIC SYNDROME CRITERIA DATA (ATP III, NCEP, 2009)

1. **MET-Q1** Waist circumference: _____
2. **MET-Q2** Fasting blood glucose: _____
3. **MET-Q3** Triglycerides level: _____
4. **MET-Q4** HDL cholesterol level: _____
5. **MET-Q5** Systolic blood pressure reading: _____
6. **MET-Q6** Diastolic blood pressure reading: _____

STAYING HEALTHY ASSESSMENT (SHA)

(DHCS) Individual Health Education Behavioral Assessment/Medi-Cal Managed Care, 2013.

Healthy Eating

1. **SHA-Q1** Drinks or eats 3 servings of calcium-rich foods daily? Yes (1) No (0)
2. **SHA-Q2** Eats fruits and vegetables every day? Yes (1) No (0)
3. **SHA-Q3** Limits the amount of fried food or fast food eaten? Yes (1) No (0)
4. **SHA-Q4** Drinks a soda, juice, sports, energy drink most days of the week?

   Yes (1) No (0)

Weight Perception

1. **SHA-Q5** Concerned about your weight? Yes (1) No (0)

Physical Activity

1. **SHA-Q6** Exercises or spends time doing moderate activities for at least ½ hour a day? Yes (1) No (0)

Food Access/Food Insecurity

1. **SHA-Q7** Easily able to get enough healthy food? Yes (1) No (0)
2. **SHA-Q8** Often eats too much or too little food? Yes (1) No (0)

Family Safety

1. **SHE-Q9** Feels safe where she lives? Yes (1) No (0)

Tobacco Use

1. **TOB-Q1** History of Tobacco use? Yes (1) No (0)

Family History

1. **FH-Q1** Family History of Heart Disease/Stroke: Yes (1) No (0)
2. **FH-Q2** Family History of Diabetes: Yes (1) No (0)
3. **FH-Q3** Family History of Cancer: Yes (1) No (0)

APPENDIX C

LICENSE TO USE "ALLOSTATIC LOAD RESEARCH THEORETICAL FRAMEWORK" FIGURE

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