The Role of the Social Determinants of Health in Rural Health Equity

By:

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A Dissertation

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Abstract

Background: Health equity is a complex phenomenon that embodies both the social determinants of health (structural and intermediary) and external factors, such as the health system. As a well-researched phenomenon, it is known that certain populations are more vulnerable than others to experiencing health inequities; specifically, those of low socioeconomic status, racial/ethnic minorities, older adults, and rural residents. However, gaps in knowledge exist in understanding *why* certain populations remain at higher risk of experiencing health inequities during a time of improved health insurance coverage and technological advances in health care. The purpose of this manuscript dissertation was to identify and address influential factors that serve as road blocks in achieving health equity, guided by the World Health Organization's *Conceptual Framework on the Social Determinants of Health*.

Methods: First, an integrative review was performed in order to determine current scope of practice restrictions and patient outcomes across the continuum of licensure for advanced practice registered nurses (APRNs), especially certified registered nurse anesthetists (CRNAs). Next, a secondary analysis of large national data set was done to identify the social determinants and risk factors for poor health effect among a national sample at high risk for poor health. And finally, a survey methodology study was completed to determine the roles that satisfaction with health care and physical function have on the perceived health status for rural, older adults in Massachusetts, and to explore the willingness of rural, older adults to use non-physicians for their health care needs.

Results: The integrative review revealed the inconsistent use of APRNs at their full licensure. Nationally, APRNs had better geographic distribution in rural areas compared to physicians; yet many states continue to restrict APRN SOP. Second, across the U.S., older adults at the highest risk for poor health live in rural areas, are of lower socioeconomic status, and identify as racial/ethnic minorities. Third, both satisfaction with health care and the physical function of a small sample of older rural adults were significantly associated with physical health. And finally this body of work found that among a small sample of older rural adults, most were willing to use APRNs to meet their health care needs.

Conclusions: With the ultimate goal of health equity it is necessary to empower those experiencing health inequities to be both aware of the problems as well as informed enough to push for change. Understanding why the experience of health differs among some individuals more than others helps to target change. The fusion of findings from this body of research has revealed a gap in health care that can be easily filled with simple policy change. APRNs at full SOP can generate means for high quality preventative, cost-saving care, and can better access the most vulnerable populations at a lower cost than physician counterparts.

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Chapter I

Introduction to the Dissertation

Introduction

Achieving health equity is a global health goal (WHO, 2019) and a complex phenomenon (WHO, 2010). Health equity is grounded in social justice (Willis, Grace, & Roy, 2008; WHO, 2010) and even considered a human right (Braveman & Guskin, 2003; WHO, 2010). Thus, the concepts of health equity, social justice, and human rights are closely intertwined. Nursing research is appropriately positioned to focus on promoting health equity (i.e. eliminating health inequities) through the profession's conscious consideration of "human beings as they are" (Willis, Grace, & Roy, 2008, p. E34).

The unique ability of the nurse to consider the unity of the whole person, health, and the environment is a fundamental quality of the discipline (Manhart Barret, 2017). Nurse researchers must identify and understand why certain populations are more vulnerable to experiencing health inequities in the United States (U.S.) in order to implement policy change and improve health care that could bridge the gaps between various populations. For example, according to the Center for Disease Control and Prevention (CDC), there is an association between being a person with social, economic, and environmental disadvantages and certain health inequities (e.g. disease risk factors, lack of access to health care, and poor health status) (Meyer, Yoon & Kaufman, & CDC, 2013). While the associations have been determined, understanding the complexity around the combination of factors involved has yet to be clear.

As a well-studied research priority in many disciplines (e.g. nursing, medicine, public health, social work), it is known that achieving health equity remains a complicated problem that must be targeted from more than one facet. For example, improving the number of people with health insurance (i.e. following the implementation of the Affordable Care Act (ACA) (2010)), was not enough to eradicate health inequities in the U.S. The last decade has seen initiatives that prioritize improving health equity across the population. This push has been evident in campaigns such as *Healthy People 2020* (and a proposed priority for *Healthy People 2030*), the Institute of Medicine's (IOM) (2011) *The Future of Nursing, The Campaign for Consensus* by the National Council of State Boards of Nursing (NCSBN) (2008), and the 2016-2018 strategic plan for the Health Resources and Services Administration (HRSA) (2017). Each initiative has put forth recommendations to eliminate health inequities. For example, *Healthy People 2020* (and proposed in *Healthy People 2030*), emphasized that access to "comprehensive, quality health care services" (U.S. Department of Health and Human Services, 2011) is necessary to promote health for Americans and serve as an example for other countries. Furthermore, the IOM (2011) and NCBSN (2008) pushed for advanced practice registered nurses (APRNs) to have full scope of practice (SOP) to improve access to quality health care for more individuals. While considering the recommendations and the previous approaches to improve health equity, it has become clear that in order to eliminate health inequities, it must be broached from multiple facets.

The voice of those experiencing health inequities is often unheard in health equity research. As a result, it is not understood if the most vulnerable population for experiencing health inequities are even aware they are at the highest risk, and if they know of specific strategies to promote health equity. With ever-reforming health care policy that is affected by economics, politics, and ethical considerations (Roberts, Hsaio, Berman, & Reich, 2008), it is more important than ever to shed light on what the most vulnerable populations experience to be able to appropriately guide policy change to eradicate health inequities.

Conceptual Framework

The WHO (2010) established the Commission on Social Determinants of Health (CSDH) to develop a conceptual framework around action on the social determinants of health. Social determinants of health are defined as the combined effects of the structural determinants of health (i.e. income, education, occupation, social class, gender, race/ethnicity) and the conditions of daily life (Marmot, Friel, Bell, Houweling, & Taylor, 2008). With health equity as the ultimate goal, the conceptual framework was developed from a social justice perspective, focusing on human rights to achieve health and well-being among all social groups (WHO, 2010). The model for the framework (Figure 1) involves a bi-directional loop linking political and economic mechanisms with socioeconomic position/status (i.e. income, education, occupation, gender, race/ethnicity); the socioeconomic position gives rise to intermediary determinants of health (e.g. behavioral factors and conditions of living) that ultimately lead to health status, while considering the influence of the health system (WHO, 2010). The framework accounts for psychosocial stressors, relationships, living and working conditions, social support, and health behaviors (e.g. smoking, nutrition, exercise) (WHO, 2010) and is, therefore, comprehensive in its approach to understanding and addressing health inequity. Thus, it was selected to guide the work of this dissertation.

Figure 1.



Commission on Social Determinants of Health (CSDH) Conceptual Framework

Note. CSDH conceptual framework model

The CSDH conceptual framework (WHO, 2010) serves as a road map for the dissertation, as it cohesively illustrates the interconnectedness of the factors that play a role in achieving health equity. As the basis of the dissertation, the intended use of the model is to pinpoint areas of vulnerability to implement policy, clinical, and cultural change necessary to eliminate health inequities.

Background and Significance

Social justice. Social justice is broadly, and at times, vaguely defined across disciplines (Matwick & Woodgate, 2016). The American Association of Colleges of Nursing (2008) defines social justice in nursing as "acting in accordance with fair treatment regardless of economic status, race, ethnicity, age, citizenship, disability, or sexual orientation" (p. 28). In the nursing

profession, social justice is deemed a "prerequisite to health" (Falk-Rafael & Betker, 2012, p.99) and is therefore necessary to live a life of meaning and health (Falk-Rafael & Betker, 2012; Grace & Willis, 2012).

Postmodernist philosophers Foucault and Habermas gave life to the notion that injustices result from power imbalances in society (Grace & Willis, 2012). Indeed, the opposite of nursing has been referred to as negligence (Kagan, Smith, & Chin, 2014); thus, social justice is considered an obligation of the nursing profession (Grace & Willis, 2012). In the context of Critical Social Theory, as applied to nursing, negligence could include anything that does not empower the patient (e.g. inadequate communication, lack of knowledge of the patient, ignorance of the patient's social norms and cultures, ineffective patient education). Assumptions of the social justice paradigm include an emphasis on power imbalances in society that lead to oppression that can negatively impact health (Rogers, 2005). It is emancipation of the oppressed (i.e. empowerment of all oppressed and neglected individuals) that will lead to improved quality of life (Rogers, 2005).

Health equity. The concept of health equity is based in social justice. The World Health Organization (WHO) (2019) defines health equity as all individuals having "a fair opportunity to attain their full health potential" (para 1), regardless of their economic, demographic, or geographic backgrounds. Braveman and Guskin (2003) presented the concept of "equal opportunities to be healthy" (p. 255) when linking health equity with human rights. Matwick and Woodgate (2016) sought to clarify the meaning of social justice in the nursing profession in their concept analysis and determined that health equity (a defined nursing goal) can achieve social justice (Canadian Nurses Association, 2010; Matwick & Woodgate, 2016). In order to achieve health equity across the population, the WHO (2008) recommends "the empowerment of individuals to challenge and change the unfair and steeply graded distribution of social resources to which everyone has equal claims and rights" (para 8). Empowerment is a way to recognize the individuals within the central unifying focus of the nursing profession: "facilitating humanization, meaning, choice, quality of life, and healing in living and dying" (Willis, Grace, & Roy, 2008, p. E32 – E33).

Health inequities. Where health equity gives individuals equal opportunity to achieve health, health inequities get in the way of achieving health. Health inequities are defined as "avoidable inequalities in health between groups of people within countries and between countries" (WHO, 2008, para 1). Moreover, social, demographic, economic, and geographic factors can affect an individual's ability to achieve health (WHO, 2008). Unequal distribution of resources necessary to maintain health (e.g. clean air, fresh food, education, health insurance, health services) results in health inequities (Klein & Huang, 2010).). Health inequities are therefore deemed unjust (Braveman & Guskin, 2003).

Health inequities in the U.S. As unjust phenomena, health inequities tend to be more prevalent in certain, more vulnerable sub-populations. Singh et al. (2017) studied life expectancy in the U.S. and found that while overall life expectancy has improved (from 69.7 years in 1950 to 78.8 years in 2015) (CDC, 2017), the life expectancy for racial/ethnic minorities and rural residents was significantly lower (Singh et al., 2017). Similarly, infant and child mortality rates have greatly improved for the overall U.S. population; yet, black infants remain at much higher risk for mortality than white infants, especially those in rural areas and with higher poverty rates (Ely & Hoyert, 2018; Singh et al., 2017). Racial, geographic, and socioeconomic disparities also exist in the mortality rates for the leading causes of death in the U.S. (e.g. heart disease, cancer, unintentional injuries/accidents, chronic lower respiratory disease, stroke, Alzheimer's disease,

diabetes, influenza and pneumonia, kidney disease, and suicide) (CDC, 2016a; Singh et al., 2017), where being of a racial/ethnic minority and/or having lower SES (lower income and education) posed the highest risk for mortality (Singh et al., 2017). Since the incidence of teenage pregnancies peaked in 1991, it has decreased among all sub-populations. (CDC, 2013); however, the same rate of improvements has not been seen across racial/ethnic groups with the least improvements observed for those identifying with a racial/ethnic minority group (CDC, 2013), Finally, in rural areas of the U.S. the most frequently identified health inequity is lack of access to quality health care (Bolin et al., 2015).

Vulnerable population. As previously mentioned, within the U.S. population there are certain factors and qualities that make some individuals and sub-populations more susceptible to experiencing health inequities than others. The combination of these factors further potentiates the risk for health inequities (WHO, 2008).

Socioeconomic status (SES). SES can be measured by either level of education attainment or income, or a combination of both (WHO, 2008). The World Health Organization (WHO) has identified a social gradient in health inequities, where the poorest and lowest SES experience overall worse health (WHO, 2008; Marmot et al., 2008). Those individuals at the greatest risk of experiencing health inequities are of lower SES, lower education attainment (Bolin et al., 2015; Hartley, 2004; WHO, 2008), racial/ethnic minorities (James et al., 2017; Kozhimannil & Henning-Smith, 2018), and living in rural areas (Bolin et al., 2015; Singh et al., 2017). For example, individuals who are educated at less than high school level *and* have a low income are at the most risk for negative health (Hartley, 2004; WHO, 2008).

Racial/ethnic minorities. Racial/ethnic minorities experience overall worse health in the U.S., especially those with low income (i.e. less than \$25,000) (James et al., 2017; Kozhimannil

& Henning-Smith, 2018). For example, regions with \geq 20% poverty level have three times the rate of infant mortality for black infants and children compared to areas with <5% poverty level (Singh et al., 2017). Furthermore, African Americans tend to rate their health as worse than the white population (Bell, Thorpe, & LaVeist, 2018); self-rated health is a known predictor of morbidity and mortality and health-seeking behaviors (Bowling, 2005). Additionally, racial/ethnic minorities (e.g. Hispanics and African Americans) in rural areas had overall worse quality of life (Baernholdt et al., 2012), and African Americans have greater unmet needs in mental health compared to whites (Alang, 2019). The fact that minority populations in the U.S. regard their overall health and quality of life as worse could indicate a gap in health care services and utilization and needs further exploration.

The WHO (2001) recognizes the risk for poor health and health inequities among racial/ethnic minorities and attributes it to racism and racial discrimination. Freedom from discrimination is considered necessary to achieve health equity (WHO, 2001, p. 6). Furthermore, Goodman (2000) argues that race cannot be considered a biological factor; rather, it must account for social and political influence. For example, in a recent study looking at the mental health care that black people receive in the U.S., Alang (2019) found that black people were more likely to have unmet needs regarding their mental health, avoid care out of fear of oppression and "double discrimination" (p. 351) from being black and having a stigmatized mental illness, and mistrust in the effectiveness of treatment. The CDC regards racism as a social determinant of health, responsible for both increased disease risk and higher mortality rates (CDC, 2016b). Racism as the root of unmet health care needs among minorities (Alang, 2019) is concerning and needs to be understood and addressed in more depth to implement change in the health care system.

Age. Older adults (65+ years) experience a higher risk of chronic disease, increasing their risk of mortality from the most common causes of death in the U.S. (ODPHS, 2019). Furthermore, compared to urban and suburban areas, there is a higher percentage of older adults in rural areas of the U.S. (Bolin et al., 2015; New England Rural Health Roundtable, 2014; Singh et al., 2017). Baernholdt, Yan, Hinton, Rose, and Mattos (2012) studied the quality of life of older adults in rural areas and discovered overall worse quality of life secondary to isolation for rural older adults. Interestingly, those with higher education attainment, African Americans, and women all had higher social functioning (a known predictor of quality of life), despite having overall worse quality of life (Baernholdt et al., 2012). The authors suggested that the reason for these results could be related to the measure (combined physical and mental quality of life score) being too broad (Baernholdt et al., 2012). Understanding the function that race/ethnicity, gender, and education have on social functioning, and how they influence physical and mental health, is an important concept for future research.

Geographic location. The U.S. Census Bureau broadly defines rurality as "all population, housing, and territory not included in an urban area" (US Department of Commerce, 2018); where urban encompasses both urbanized areas (population > 50,000) or urban clusters (population between 2,500 - 49,999) (Ratcliffe, Burd, Holder, & Fields, 2016). The U.S. Census Bureau uses population density and the urban areas' "footprint" (Ratcliffe, Burd, Holder, & Fields, 2016, p. 2) to determine the urban territories; rural territory becomes "what is left" (Ratcliffe, Burd, Holder, & Fields, 2016, p. 2) to determine the urban territories; rural territory becomes "what is left"

Compared to urban areas, rural regions of the U.S. have higher poverty rates, increasing age of residents, increasing diversity (racial/ethnic minority population growing), poor infrastructure, lower education attainment, fewer employment opportunities, higher risk of injury

for rural workers (Bolin et al., 2015; Singh et al., 2017), and experience a lack of access to care (Bolin et al., 2015; Hartley, 2004). The WHO (2015) studied urban/rural health inequities regarding access to health care services and found that globally, rural populations experience much worse health care coverage and access to services compared to urban areas. For example, the opioid crisis is a nation-wide epidemic (HHS, 2018); yet, deaths from 2010 – 2015 opioid overdoses increased more steadily in rural areas compared to other areas (Singh et al., 2017). Rural residents are at a disproportionate risk for experiencing health inequities based on socioeconomic, geographic, and racial/ethnic factors (Bolin et al., 2015; Hartley, 2004; Singh et al., 2017).

Rural health researchers, Meit and Knundson (2017), present the argument that the neglect for rural Americans persists, despite knowledge of the ongoing health inequities, because most programs and funding sources intend to have greater impact (i.e. target the more densely populated regions). For example, the New England Rural Health Roundtable (2014) presented detailed demographic and health information among the New England States in their *Rural Data for Action, A Comparative Analysis of Health Data for the New England Region* (2014). The analysis was done in an effort to serve as a planning tool in preparation for the Affordable Care Act (ACA) (2010) and to measure its impact (New England Rural Health Roundtable, 2014). Compared to metropolitan residents, the roundtable executive summary revealed the following significant findings among rural residents in New England: the rural population is older, less likely to have had a routine checkup in the past 5 years, more likely to smoke when pregnant, more prone to certain chronic illnesses, have higher rates of mental illness, higher suicide rates, higher population of military veterans with fewer Veteran Health Administration (VA) services, and are more dependent on the support of federal programs (New England Rural Health

Roundtable, 2014). Primary care physician coverage in rural areas was worse (New England Rural Health Roundtable, 2014); as a result, rural residents were more reliant on non-physician providers compared to metropolitan areas (New England Rural Health Roundtable, 2014). However, the New England Rural Health Roundtable (2014) executive summary only highlighted the role of physician assistants in rural areas and did not include the role of APRNs. While the role of APRNs in rural health care is mentioned in the full report of *Rural Data for Action, A Comparative Analysis of Health Data for the New England Region* (2014), physician assistants were highlighted, as the projected growth of their role is greater than that of APRNs. This is an important insight into the perception of Scope of Practice (SOP) and SOP restrictions for APRNs among an organization striving to improve access to quality health care in rural areas.

Cohen, Cook, Sando, and Sabik (2018) studied the rural-urban differences and associated factors that lead to health disparities in older adults, and found a greater association with socioeconomic status than with geographic factors alone. The authors suggested that health disparities are caused by factors beyond simply rural versus urban status or socioeconomic status that have yet to be determined, as it is a complex problem (Cohen et al., 2018). Discovering the *other* factors that have an impact on health inequities in rural areas can identify the root causes of specific gaps in health care from one rural community or sub-population to the next.

Access to health care. Access to quality health care is necessary to achieve health and health equity. Moreover, access to both preventative services and the management of diseases and health problems is a compulsory need to be healthy (U.S. Department of Health and Human Services, 2011). *Healthy People 2020* (U.S. Department of Health and Human Services, 2011). *Healthy People 2020* (U.S. Department of Health and Human Services, 2011) identifies the three important components that are required to find access to comprehensive health care: insurance coverage, geographically available health services, and a provider each

patient trusts who offers culturally-competent care (para 4). Health inequities stem from a variety of sources; namely, the health system, public policies, SES, geographic location, unequal distribution of resources, and behavioral factors (WHO, 2010).

Health insurance. The enactment of the ACA (2010) hoped to provide all Americans with quality, affordable health care. The ACA (2010) resulted in more than 20 million Americans gaining access to health care (KFF, 2018). For example, Massachusetts, the model state for the ACA (2010), has the lowest state average of uninsured individuals (3% as of 2017) (KFF, 2019). As a relatively small state, Massachusetts is well known for the quality of care in the city hospitals and medical centers (Drew, Cashman, Savageu, & Stenger, 2006). Yet, lack of access to health services remains the primary health inequity even in a highly-insured state like Massachusetts, especially in the rural areas (Drew, Cashman, Savageu, & Stenger, 2006; RHI Hub, 2018).

Lack of access to health services. In rural areas in the U.S., lack of access to health care is the most frequently identified health inequity (Bolin et al., 2015). Distance to health services (New England Rural Health Roundtable, 2014) and very low distribution of health care providers (Massachusetts Department of Public Health, 2014) are the main reasons that lack of access remains an ongoing issue in the state.

Health care utilization. The National Academies of Science, Engineering, and Medicine (NASEM) (2018) developed a committee to study barriers to health care utilization. The committee's book articulates the factors that influence health care utilization; namely, an underlying need for health care, knowledge of that need, desire to seek care, and ability to access care (NASEM, 2018). Furthermore, they elaborate on the disparities in utilization pertaining to certain factors, like race/ethnicity, language barriers, SES, geography, and disabilities (NASEM,

2018). Consistent with most health care inequities in the U.S., racial/ethnic minorities, non-English speaking, poor, rural areas, and people with certain disabilities are at the highest risk for decreased health care utilization (NASEM, 2018).

Health literacy. Poor health literacy is associated with a decreased use of preventative services and increased hospitalizations, and is most prevalent in the less educated, poorer, older, and racial/ethnic minorities (U.S. Department of Health and Human Services, 2019).

APRN scope of practice. The American Nurses Association (ANA) defines scope of practice as "...the services that a qualified health professional is deemed competent to perform, and permitted to undertake – in keeping with the terms of their professional license" (ANA, 2017, para 1). In current practice, APRNs are not utilized at the maximum potential of their license and face restrictions to use their full scope of practice (Englebright, McCurley, & Borum, 2017; Fairman, Rowe, Hassmiller, & Shalala, 2011; Kritz, 2018; Lofgren et al., 2017). APRNs encompass nurse practitioners, nurse midwives, certified registered nurse anesthetists (CRNAs), and clinical nurse specialists (ANA, 2019). Currently, CRNAs face the most resistance of any APRN group (Malina & Izlar, 2014). As a state that restricts the full scope of practice of APRNs, Massachusetts has limited the number of health care providers in rural areas and beyond (MAAC, 2018). In their cross-sectional study analyzing the role and SOP of APRNs in rural health clinics, Ortiz et al. (2018) found that the quality of patient care is maintained as APRNs SOP is expanded.

APRN SOP Recommendations. Following the enactment of the Affordable Care Act (ACA) (2010), the Institute of Medicine (IOM) (2011) collaborated with the Robert Woods Johnson Foundation nurse leaders to establish *The Future of Nursing* to serve as a guide to meet the needs of the millions of newly insured individuals. Part of the proposed solution to meet

these needs was a push for state legislatures to remove restrictions on SOP for APRNs (IOM, 2011). Prior to that, the National Council of State Boards of Nursing issued the *Campaign for Consensus* (NCSBN, 2008) to encourage states to accept their proposed *Consensus Model for APRN Practice*, listing independent practice as a key element, and encouraging state legislation to equally recognize APRN license and practice.

More recently, the Massachusetts Action Coalition (MAAC) (2018) initiated a campaign for full licensure and SOP for nurses and nurse practitioners (NPs) to better meet the needs of underserved/rural areas, given the shortages of physicians and high numbers of insured individuals needing care. This *Campaign for Action* (MAAC, 2018) has resulted in many states lifting restrictions on APRN practice; however, Massachusetts remains a full restriction state. Currently, 22 states and the District of Columbia (D.C.) have passed legislation to allow APRNs to practice at their full licensure and education (MAAC, 2018).

Physician burnout (Shanafelt et al., 2015) has been linked to reduction in health care quality and patient safety (Lyndon, 2016), and physician shortages in rural areas have resulted in decreased access to providers (MAAC, 2018; Massachusetts Department of Public Health, 2014). These factors pose a great risk for individuals most susceptible to experiencing poor health and health inequities.

Purpose and Aims

As a complex phenomenon, health equity is achieved when the social determinants (structural and intermediary) form a cohesive flow to promote health, while considering external factors such as the health system (WHO, 2010). It is necessary to understand why some do not have an equal opportunity to be healthy. The overall goal of this dissertation is to identify and address influential factors that serve as road blocks in achieving health equity along the CSDH

feedback loop (WHO, 2010). Specifically, this work will examine SOP, social determinants and risk factors for patient outcomes (including perceived physical and mental health) among some of the most vulnerable populations.

The following are specific aims the dissertation will address (see Table 1 for details on which chapter will address each aim):

Aim 1: To determine current scope of practice restrictions and associated patient outcomes across continuum of licensure for advanced practice nurses, particularly CRNAs.

Aim 2: To identify the social determinants and risk factors associated with poor health status among a national sample at high risk for poor health.

Aim 3: To examine the role of perceived satisfaction with health care and physical function on the physical and mental health status of rural older adults.

Aim 4: To determine the willingness of rural, older adults to use non-physicians for health care.

Specific Aim	Chapter
Aim 1: To determine current scope of practice	Chapter 2: The state of nurse anesthetist
restrictions and patient outcomes across	practice and policy: An integrated review
continuum of licensure for advanced practice	
nurses, especially CRNAs.	
Aim 2: To identify the social determinants	Chapter 3: Behavioral risk factors and
and risk factors associated with poor health	structural social determinants of health
status among a national sample at high risk	associated with self-reported health of older
for poor health.	Americans.

 Table 1. Chapters and Aims

Chapter 4: The Role of Satisfaction with
Health Care on Perceived Physical and
Mental Health Status of Rural, Older Adults
in Massachusetts.
Chapter 4: The Role of Satisfaction with
Health Care on Perceived Physical and
Mental Health Status of Rural, Older Adults
in Massachusetts.

Chapter II

The State of Nurse Anesthetist Practice and Policy: An Integrative Review

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This manuscript represents a significant contribution to the Dissertation work. It was accepted for publication by the *AANA Journal* on June 23, 2020. The *AANA Journal* has an impact factor of 0.10. Permission obtained from the editor of the *AANA Journal* to include the published article in the dissertation.

Abstract

The enactment of the Affordable Care Act (ACA) in 2010 prompted the Institute of Medicine to release *The Future of Nursing* to help guide the necessary changes in nursing to accommodate the millions of newly insured individuals. A key point of the campaign was for advanced practice registered nurses (APRNs) to practice at the fullest extent of their licensure to meet the needs of the newly insured. Certified registered nurse anesthetists (CRNAs) experience the most restricted scope of practice (SOP) among APRNs. An integrative review was conducted to examine CRNA practice and policy since *The Future of Nursing* was released. Ten research articles were included in the final review. Key findings related to CRNA practice and policy that emerged from the review were: 1) compared to anesthesiologists, patient complications and mortality rates are no different under the care of CRNAs; 2) CRNAs are more accessible to vulnerable populations and rural areas; and 3) state legislators are being influenced by factors other than evidence, such as strong professional group influence, to make policy decisions for CRNAs. Future interdisciplinary research investigating outcomes from the patients' perspectives could help remove bias and strengthen the evidence of the quality of care given by CRNAs.

Keywords: certified registered nurse anesthetist, CRNA, advanced practice registered nurse, APRN, policy, license The Institute of Medicine (IOM) released *The Future of Nursing* as a response to the enactment of the Affordable Care Act (ACA) (IOM, 2011). The goal of this report was to help envision and guide necessary changes in the nursing profession in order to meet the needs of the projected additional 32 million people who would be newly insured (IOM, 2011). To facilitate meeting the needs of patients across the United States (US), one important objective in *The Future of Nursing*'s "blueprint for action" (IOM, 2011, p. 269) was that "advanced practice registered nurses should be able to practice to the full extent of their education and training" (IOM, 2011, p. 9).

Certified Registered Nurse Anesthetists (CRNAs) are Advanced Practice Registered Nurses (APRNs) educated and trained to provide all types of anesthesia in all settings to all types of patients (ANA, 2017). The American Nurses Association (ANA) defines scope of practice (SOP) as "...the services that a qualified health professional is deemed competent to perform, and permitted to undertake – in keeping with the terms of their professional license" (ANA, 2017, para 1). In current practice, APRNs are not utilized at the maximum potential of their license and face restrictions to use their full SOP (Englebright, 2017; Fairman et al., 2011; Lofgren et al., 2017). For instance, restrictions in Medicare reimbursement, as well as a lack of uniformity in SOP across states has posed a great challenge for CRNAs (Malina & Izlar, 2014; NCSBN, 2008). Despite the push from the IOM and the *Campaign for Consensus* among states by the National Council of State Boards of Nursing, APRN SOP remains restricted across the majority of the country (ANA, 2017; NCSBN, 2008).

CRNAs have the potential to improve the access to and quality of patient care. Shortages of physicians and an increased demand for anesthesia services require APRNs to practice at their full certification to meet the needs of patients (Lofgren et al., 2017; Brooten et al., 2012; Russell-

Babin & Wurmser, 2016). As will be explored in this review, research shows no difference in patient outcomes based on the type of anesthesia provider (Dulisse & Cromwell, 2010; Negrusa et al., 2016; Lewis et al., 2014). Previously, a systematic review of six articles from the years 2000 to 2010 was conducted to evaluate differences in patient outcomes based on the type of anesthesia provider (Lewis et al., 2014). Despite finding no patient outcome differences among physician and non-physician anesthesia providers, the authors could not make a definitive statement regarding safety and effectiveness of anesthesia providers (Lewis et al., 2014). More recently, Hoyem et al. (2019) critically reviewed research articles involving safety outcomes and cost-effectiveness in anesthesia. Overall, the authors found that anesthesia in general was quite safe, and did not find differences in safety between providers (Hoyem et al, 2019). Additionally, the authors found political influences to have power over evidence in decisions to maintain anesthesiologists as superior to CRNAs (Hoyem et al, 2019). With a national emphasis to use APRNs at full SOP to meet the demands in health care today, resistance to this creates a road block to meet the needs of all patients (IOM, 2011; NCSBN, 2008).

Purpose

The goal of this integrative review was to examine CRNA practice and SOP policy through evaluating published research since the release of *The Future of Nursing*. The purpose is to highlight research findings that could influence the ways in which CRNAs practice and SOP policy decisions are made.

Methods

A search was conducted using the guidelines presented in the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Statement (Moher et al., 2009). Two nursing and medical databases were searched – the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and PubMed. Key terms used in the search were the following: *nurse anesthetist* OR *CRNA*, AND *policy*. Studies were included if they were conducted on the U.S. CRNA workforce between the years 2010 and 2020, research-based, and captured the current state of CRNA practice and policy following the release of *The Future of Nursing* (IOM, 2011). Other search terms such as *scope of practice* or *SOP* or *practice* did not yield relevant articles. Any article that did not capture the themes of SOP or policy in anesthesia or were not data-based, were omitted from the review.

The primary author conducted a search between January and April, 2018 (with an additional search in July 2019) with the guidance of a university research librarian. The CINAHL search yielded 21 publications and PubMed resulted in 632 articles when the search was limited to the year range 2010-2018, English language, and research studies for a total of 650 non-redundant publications. The PubMed search resulted in 13 articles for full text review and consideration. CINAHL yielded a total of four articles considered for inclusion. (See Figure 1 – Appendix A).

The 17 studies that fit the initial screening criteria were read for consideration and eleven were removed because they did not focus on CRNA policy or practice. Through a legacy search, four additional articles were identified, resulting in a total of ten articles to be included in the review.

Initial Evaluation

The *Johns Hopkins Nursing EBP Models and Guidelines* were used to evaluate the quality of the articles (Newhouse et al., 2017). The scale ranges from level I to level III for type of evidence, where level I is experimental research, level II is quasi-experimental, and level III is non-experimental or qualitative research (Newhouse et al., 2017). The quality of the article is

rated from high to low, where a high quality article is given an "A", good quality is rated a "B", and a flawed/low quality research article is given a "C" (Newhouse et al., 2017). Both authors rated the articles for validation. Of the ten articles that were reviewed, all were rated as level III evidence, or non-experimental. The studies were mostly rated as good quality (n=8), with two rated as high quality (n=2).

Results

The ten studies published between the years 2010 and 2020 included in this review were critically analyzed and subcategorized into themes that evolved from the articles related to either CRNA SOP policy or current practice (e.g. patient outcomes, factors influencing state opt-out policy, prescriptive authority, anesthesia provider supply and distribution, and work environment). The studies consisted of one qualitative, seven quantitative, and two mixed methods design. Table 1 (See Appendix B) displays the article evidence level and quality rating, specific designs, purpose, key findings, and limitations of each study. This review specifically pertains to CRNAs.

Patient Outcomes

Authors of two of the articles examined different databases to determine associations between patient outcomes (such as patient complications and mortality) and independent CRNA practice (Dulisse & Cromwell, 2010; Negrusa et al., 2016). Evaluating Medicare claims data, health economists Dulisse and Cromwell (2010) studied the impact of physician supervision in opt-out states on patient outcomes. Opt-out states are those states that do not require physician supervision of CRNAs (ANA, 2017). The multivariate analyses used the solo anesthesiologist group in non-opt-out states as the reference group for both patient complications and mortality rate outcomes, with alpha set at 0.05 (Dulisse & Cromwell, 2010). The results of the analyses indicated that in opt-out states there was no increase in patient mortality rate and that CRNAs in independent-practice had a significantly (p = .05) lower rate of complications compared to anesthesiologists practicing independently (Dulisse & Cromwell, 2010). In fact, the analyses revealed no significant differences in patient complications in *any* anesthesia model (anesthesiologist alone, CRNA alone, CRNA-anesthesiologist team) in non-opt-out states, but a lower incidence of complications for solo CRNAs in opt-out states compared to solo anesthesiologists (Dulisse & Cromwell, 2010). The Center for Medicare and Medicaid Services (CMS) (2010) still maintains their ruling from 2010 that a state's governor must submit a letter to the CMS to request to remove physician supervision requirements of CRNAs. Based on the findings of their study, Dulisse and Cromwell (2010) recommended that the CMS eliminate this requirement and allow states to remove physician supervision to provide more cost-effective care by independent CRNA practice.

Similarly, Negrusa et al. (2016) found no significant differences in patient complications when comparing CRNAs with both full and restricted SOP classification and the different anesthesia delivery models in the privately insured patient population (p > .10) for alpha set at both .05 and .10. The authors indicated that the type of anesthesia care delivery model does not increase risk for anesthesia-related patient complications, and as a result they recommended that CRNA practice be unrestricted (Negrusa et al., 2016). Both patient characteristics (i.e. comorbidities such as diabetes, hypertension, cancer, arrhythmia) (p < .05) and geographic location (i.e. rural areas) (p = .036) were significantly related to patient complications (Negrusa et al., 2016). These findings indicate that other patient-specific factors have an impact on patient complications, and the anesthesia provider does not significantly affect patient outcomes (Negrusa et al., 2016).

Factors Influencing State Opt-out

Feyereisen, Broschak, and Goodrick (2018) took a different approach to gain insight into what factors influenced states opting out of physician oversight of CRNAs. The authors analyzed several databases, including the AANA, the ASA, the American Association of Nurse Practitioners (AANP), U.S. government files, and others to gain a better understanding of all factors that impact physician supervision opt-out policy change (Feyereisen et al., 2018). Policy change for CRNA autonomy was most significantly influenced by the strong presence of professional group resistance in a state (p < .01), the influence of decisions in bordering states to change policy (p < .05), and the degree of labor market deficiency (or number of rural hospitals in each state) (p < .05) (Feyereisen et al., 2018). The authors suggest that future research could examine outcomes in the opt-out states to see if the policy change met the intended goals (Feyereisen et al., 2018).

Prescriptive Authority

Prescriptive authority is another important aspect of CRNA practice that varies from state to state. Only 19 states offer independent prescriptive authority for CRNAs (Kaplan et al., 2011). Kaplan, Brown, and Simonson (2011) surveyed Washington-based CRNAs to determine prescribing practice in the state after the laws were expanded to include more controlled substances to their autonomous full SOP. Their study revealed that the majority of CRNAs opted not to obtain prescriptive authority (Kaplan et al., 2011). The authors suggest that more research is necessary to understand the reasons why CRNAs do not engage in their full SOP in states that have removed such restrictions (Kaplan et al., 2011).

Anesthesia Provider Supply and Distribution

Liao and colleagues suggested that the ACA's enactment in 2010 would lead to higher healthcare demands to accommodate those who were newly insured and seeking care (Liao et al., 2015). In their correlational analysis of the 2012 U.S. Health Resources Services Administration Area Resource File and 2013 Rural Urban Continuum Codes (RUCC), they found significant differences in the distribution of CRNAs and anesthesiologists across the country (Liao et al., 2015). CRNAs were more likely to be the anesthesia providers for the more vulnerable populations, such as lower-income (p < .01), uninsured (p = .033), unemployed (p = .047), and Medicaid-eligible patients (p = .053) when compared to anesthesiologist-provided care (Liao et al., 2015). As a result, the authors' findings support lifting restrictions on CRNAs and facilitating independent practice to be able to provide necessary care to these vulnerable populations (Liao et al., 2015).

In their mixed methods study, Mills et al. (2020) studied the perceived safety and quality of CRNAs from the perspective of the surgical facility leaders, and how this impacted anesthesia staffing for the facility. The quantitative analysis revealed a stronger presence of predominantly CRNAs in rural settings (46%), with the majority covering ambulatory surgical centers (Mills et al., 2020). In the interviews, most surgical facility leaders indicated an understanding of the cost-effectiveness of CRNAs, but they were reluctant to change staffing models to predominantly CRNAs due to resistance from surgeons and anesthesiologists (Mills et al., 2020). Additionally, surgical facility leaders recognized CRNAs as essential in rural areas, given the inability to recruit an adequate amount of anesthesiologists to rural regions (Mills et al., 2020). The authors suggest focusing future research on cost and patient outcomes associated with specific anesthesia models to drive change at the facility-level (Mills et al., 2020).

Geographic Distribution

Greenwood and Biddle (2015) used survey methodology to obtain an understanding of which factors (e.g. location, state opt-out status) have an effect on CRNA SOP. The authors

found significant differences in the distribution of SOP among rural and non-rural CRNAs (p < .001), as well as broader SOP in opt-out states (p < .001) (Greenwood & Biddle, 2015). From the perspective of CRNAs, they report having a broader SOP in rural areas and opt-out states (Greenwood & Biddle, 2015).

Martsolf and colleagues studied the distribution of anesthesia providers in relation to CRNA SOP policy by state, specifically in the rural counties of each state (Martsolf et al., 2019). The regression analysis revealed that when compared to non-opt-out states with highly restrictive CRNA SOP, other non-opt-out states with medium to lower restrictive SOP policies had significantly higher number of CRNAs (p < .001) and fewer anesthesiologists (p < .001) in rural counties, with an overall significant difference in anesthesia providers in those rural counties (p < .001) (Martsolf et al., 2019). These findings are consistent with Feyereisen et al. (2018) and Mills et al. (2020) that CRNAs are in higher supply in rural areas compared to anesthesiologists. **Work Environment**

Dumouchel et al (2015) used a mixed methods approach to study the differences in CRNA moral distress among those in supervised and independent practice. The results showed less moral distress in independent CRNA practice compared to those in supervised practice (p = .034) (Dumouchel et al., 2015). The themes in the qualitative portion of the study revealed that CRNAs felt moral distress from the following occurrences: feeling pressured to give anesthesia to less-than-optimized patients, believing there is a double standard for CRNAs (physicians not being held accountable for mistakes in the same way CRNAs are), and having to work with incompetent or unethical providers (Dumouchel et al., 2015). While the authors do not suggest that states other than California lift restrictions so more CRNAs can practice independently, the

findings of the study shed light on a positive aspect of less moral distress for CRNAs in independent practice.

Schreiber and MacDonald (2010) used grounded theory to study the ways in which CRNAs "protect and promote their profession". The authors discussed the political influences in anesthesia practice and concluded that CRNAs are committed to maintaining this "vigilance" over the profession through political involvement, growing the next generation of CRNAs, and maintaining credibility within the profession with high quality patient care (Schreiber & MacDonald, 2010).

Discussion and Implications

The NCSBN (2008; 2018) created a *Campaign for Consensus* based on their APRN *Consensus Model for APRN Regulation* to encourage state legislation to equally recognize APRN license and practice. The IOM's (2011) *The Future of Nursing* urged states to do the same in response to the ACA implemented in 2010. Despite these campaigns, and research supporting no difference in patient outcomes with CRNAs practicing independently (Dulisse & Cromwell, 2010; Negrusa et al., 2016), the majority of states (only 17 opt-out states) are still restricting the practice of CRNAs. Furthermore, the *Johns Hopkins Nursing Evidence Based Practice (JHNEBP) Model* was created to guide nursing practice in response to the NASEM's recommendation to have all nursing practice and decisions in health care be evidence-based (Dang & Dearholt, 2017; IOM, 2009). Factors influencing policy change for CRNAs go beyond evidence-based decision making (Feyereisen et al., 2018). It is necessary to ensure that those responsible for policy change are aware of the current evidence regarding CRNAs and patient outcomes. However, Hoyem at al. (2019) made the point that there is not enough evidence on improved patient outcomes and access to care to convince legislators to change the status quo. Despite national recommendations to lift restrictions and evidence that indicates patients are not at higher risk, CRNA SOP policy change remains a challenge in the majority of states.

The compelling campaigns from professional groups, such as the American Society of Anesthesiologists (ASA), have a powerful influence over legislators (Feyereisen et al., 2018). The ASA (2018) strongly opposes states opting out of physician supervision as a "matter of patient safety" and states, "a nurse anesthetist cannot replace a physician" (para 1). As evidenced by Dulisse & Cromwell (2010) and Negrusa et al. (2016), there is no difference in patient outcomes such as mortality rate and anesthesia-related complications when comparing CRNAs and anesthesiologists. Additionally, as the AANA (2019) points out, when a CRNA administers anesthesia it is the practice of nursing, not medicine. On the ASA website page discussing optout states, there is no link or reference to evidence that supports these claims about CRNAs (ASA, 2018). The professional goal of CRNAs rests in the duty to provide high quality care from a nursing perspective to meet the needs of all patients.

One such example of APRNs improving patient care is in the primary care setting. Nurse practitioners (NPs) are now being better used in primary care to bridge the gap in meeting the increased demands for primary care of the newly insured population (following the implementation of the ACA) with the shortage in primary care physicians (Brooten et al., 2012; Russell-Babin & Wurmser, 2016). *The Campaign for Action* by the Massachusetts Action Coalition (MAAC) pushed NP full SOP to improve access to quality care in underserved/rural areas (MAAC, 2018). The campaign resulted in many states lifting restrictions on nurse practitioner practice (MAAC, 2018). The goal of CRNAs practicing at their full SOP is to improve and increase access to quality care, especially in lieu of the projected shortage of anesthesiologists in the U.S., health care policy changes, and the subsequent need for more cost-

effective care (Schubert et al., 2011). There is a significantly better supply of CRNAs in rural areas (Feyereisen et al., 2018; Liao et al., 2015; Mills et al., 2020); as a result, CRNAs improve access to care in rural areas due to their cost-effectiveness and geographical distribution (Liao et al., 2015; Greenwood & Biddle, 2015; Kaplan et al., 2012). The intentions of lifting restrictions on CRNAs practice are not to "invade on professional turf" (Russell-Babin & Wurmser, 2016, p. 27) or "replace a physician" (ASA, 2018, para 1). Simply, CRNAs could be better used at full SOP to meet the needs of the rural and vulnerable populations in the country.

More importantly, the recent Covid-19 pandemic led to the CMS lifting restrictions on physician supervision to allow CRNAs to practice with full SOP to meet the demands of the health crisis (AANA, 2020). The pandemic has resulted in an acute need for clinicians with airway, ventilator management, and critical care skills. This indicates an understanding of the ways in which CRNAs can mitigate burden on physicians during a surge of critically ill patients. The ASA (2020) continues to oppose lifting physician supervision from CRNA practice, citing a superior medical education and training for anesthesiologists. The ASA openly campaigning against CRNA full SOP is hindering the possibilities for growth in a time of great need and change in health care (AANA, 2014). Currently, the AANA and the ASA have a unique opportunity to work together to find the best ways to provide safe anesthesia to all patients. The negative influence of the ASA campaigns may be preventing improvement of access to needed care in rural areas. Whether in collaborative care teams or working independently, CRNAs practicing in their full SOP can reduce the burdens on anesthesiologists in the same way NPs did for primary care physicians and help meet the needs of health care today.

While empirical studies or data-based studies have revealed important findings on patient outcomes when under the care of CRNAs, research examining patient preferences and self-

reported outcomes may contribute an important and compelling voice to influence SOP policy. Objective measures of patient outcomes are helpful to give a strong basis for the evidence; however, at the core of nursing research is the need to examine subjective measures of patient outcomes, such as patient satisfaction, to build upon the existing facts. Specifically, studying patient satisfaction with care in surgical facilities with independent CRNA practice could offer new insight and strengthen empirical evidence. As Feyereisen et al. (2018) suggested, studying patient outcomes and evaluating access to care in the states that have opted out of physician supervision and granted full SOP to CRNAs could strongly influence other states lifting restrictions. With higher numbers of CRNAs in rural regions (Liao et al., 2015; Greenwood & Biddle, 2015; Martsolf et al., 2019) focusing on CRNA practice and patient outcomes in rural areas is a starting point to strengthen evidence favoring full SOP for CRNAs.

In order to promote change in policy, CRNAs need to continue to be leaders on interdisciplinary teams to strengthen the knowledge base of the profession. Gaps in health care, such as lack of access to care, can be mitigated by implementing full SOP for CRNAs. Resistance to this realization is only perpetuating health inequities. Now, more than ever, it is critical for legislators to recognize the changing needs in health care, see beyond political influences, and adjust policy according to patient needs.
Appendix A

Figure 1 PRISMA Flow Diagram



Appendix B

Table 1

1 st Author	Study Design/	Purpose	Sample and Setting	Construct of	Key Findings	Limitations
	Measurement Strategy/			Interest		
Dulisse (2010)	Quantitative, retrospective, comparative; multivariate analyses Level IIIB	Explore if change in CMS policy toward anesthesia supervision had a negative impact on patient outcomes (complications and mortality)	Inpatient Medicare anesthesia claims from 1999-2005; 481,440 hospitalizations analyzed: 412,696 located in non-opt- out states and 68,744 were in opt-out states	Anesthesia supervision; patient outcomes	Proportion of surgeries CRNAs without anesthesiologists increased by 5% Compared to solo anesthesiologists, no increase in adverse outcomes for solo CRNAs in non-opt-out states; lower incidence of complications and mortality for solo CRNAs in opt-out states	Rate of increase in proportion of CRNAs practicing without anesthesiologist supervision higher in non- opt-out states so may be unrelated to CMS policy change
Dumouchel (2015)	Mixed Methods Survey methodology with 63- question Ethics Stress Scale; qualitative – open-ended questions Level IIIB	Understand the differences in moral distress between CRNAs in independent practice and physician-supervised practice in California Determine which situations caused moral distress among CRNAs in the study	Quant: n=157 CRNAs in California Qual: n=65 CRNAs in California (sample obtained from AANA)	Moral distress	Quantitative findings: CRNAs in supervised practice had higher level of moral distress than those in independent practice Both groups of CRNAs had moderate distress range Qualitative findings: Themes derived from responses: lack of optimization, end-of-life care, CRNA/MD dynamics, differential care based on ability to pay, and coworker incompetence	Items and questions and response options can be interpreted differently by individuals Sample taken from California CRNAs, so limits generalizability
Feyereisen (2017)	10-year longitudinal study regression analysis Level IIIB	To further understand jurisdictional disputes between professional groups by examining U.S. states differential adoption of policies to expand CRNA autonomy	All 50 states included State level and anesthesia specific data obtained from 2001-2010: AANA American Society of Anesthesiologists (ASA), and American Association of Nurse Practitioners (AANP), the US government ARF, the American Hospital	Professional jurisdiction changes in anesthesia	CRNA opt-out policy innovation less likely during economic recessions Higher number of anesthesiologists per capita with decreased likelihood for states to adopt CRNA opt-out policy States with a history of granting autonomy to other midlevel	Captured only one dimension of construct (power relied on numerical presence of anesthesiologists and CRNAs) Not all states were included in at-risk set

Assessment and evaluation of CRNA practice and policy studies based on the Johns Hopkins EBP Models and Guidelines (2007)

			Association (AHA), and the Center to Champion Nursing in America		providers more likely to adopt CRNA opt-out policy change Bordering states previously adopting policy increased chance of at-risk state adopting policy The number of rural hospitals in state increased likelihood of opt- out policy Higher ratios of CRNAs in a state increased likelihood of opt-out	
Greenwood (2015) Kaplan (2011)	Survey methodology with SOP- VAS tool Level IIIB Survey methodology with 55- item questionnaire	Investigate the impact of opt- out legislation and the location of practice on CRNA SOP Describe Washington State CRNA prescribing practices and	AANA active CRNAs: 10,000 randomly selected from 42,500 database of active CRNAs; usable surveys n=1202 2006 Washington State CRNAs. n=203:	CRNA SOP Prescriptive authority of	policy Significant difference (p<0.001)	Threats to internal validity: selection bias due to the selection of individuals who chose to respond to survey; lack of control over unidentified variables that could influence SOP Lack of generalizability since only Washington
	Level IIIB	workforce and practice characteristics Analyze factors related to Washington State CRNAs' adoption of prescriptive authority for controlled substances II – IV	questionnaires mailed to all CRNAs in state, follow up emails	CRNAs in Washington	number 13% CRNAs were not aware of the new option for full prescriptive authority 61% CRNAs use the Nurse Practice Act as foundation for practice in administering medications	State CRNAs, low sample size, and varied policies on prescriptive authority for CRNAs in the US
Liao (2015)	Retrospective, descriptive, correlational analysis, descriptive analysis Level IIIB	Identify and assess geographical distribution of CRNAs and anesthesiologists regions based on population density Determine whether economic conditions among populations are associated with the distribution of anesthesia provider type Assess to what extent anesthesia providers differ among	2012 US Health Resources and Services Administration;3,143 counties, 35,570 CRNAs, 41,236 anesthesiologists	Geographical distribution of anesthesia provider	CRNAs and anesthesiologists are not evenly distributed throughout the country, related to income and health insurance of patients CRNAs correlate more among low-income, Medicaid, and uninsured population compared to anesthesiologists	Sample is not patient specific and extends to all populations that have encounters with anesthesia Correlational study cannot attribute causality to CRNA geographical distribution

		populations of varied				
Martsolf (2019)	Retrospective, cross-sectional secondary data analysis Level IIIA	Estimate association between state CRNA policy and anesthesia provider supply	N = 3143 observations	State-level CRNA policy and anesthesia provider supply in rural areas	Average 13.44 total anesthesia providers per 100,000 people (8.73 were CRNAs) Overall rural areas had fewer anesthesia providers, but CRNAs had higher supply in rural areas compared to anesthesiologists in opt out states (medium to low restrictive policy) (p<0.001)	Repeated cross-sectional analysis; unable to control for state characteristics that could be associated with decision to lighten SOP restrictions or opt- out; unable to determine direction of relationships
Mills (2020)	Mixed methods: quantitative analysis and semi-structured interviews Level IIIB	Goal of quantitative analysis was to stratify region of surgical facilities, type of surgical facility, and anesthesia staffing models used in surgical facilities To understand surgical facility leaders' perception of CRNA quality, safety, and cost- effectiveness and rationale for type of anesthesia model for staffing at facility	Quantitative: N = 6440 facilities Qualitative: N = 46 facility leaders	Rationale for choosing anesthesia care model in surgical facilities	Predominantly CRNAs more likely in rural facilities; most of the facilities were in non-opt out states Surgical facility leaders were aware of the cost-effectiveness of predominantly CRNA model, but felt resistance from surgeons and anesthesiologists to change model; not all facility leaders understood the rules of the opt- out policy	The study only looked at anesthesia services covered by Medicare and did not consider services covered by Medicaid, commercial plans or uninsured; small sample size of surgical facility leaders with potential selection bias due to disclosure of funding by the AANA
Negrusa (2016)	Retrospective, descriptive; logit regression models estimated, controlled for patient characteristics, comorbidities, procedure, and local area economic factors Level IIIA	Determine if differences in anesthesia-related complications across delivery models and CRNA Scope of Practice (SOP) in a commercial payor database	5.7 million anesthesia- specific procedures in 2011- 2012 from the Optum Research Database	Anesthesia delivery models and CRNA SOP	No statistically significant difference in the risk of anesthesia complications based on degree of restrictions placed on CRNAs by state SOP laws or delivery model Strong evidence for anesthesia complication risk related to patient characteristics, comorbidities and procedures	Small difference in risk may exist but cannot be detected Only privately insured population Potential bias as funded by AANA
Schreiber (2010)	Grounded theory Participant observation and interviews Level IIIB	Explore how CRNAs protect and promote their profession	N=18 CRNAs active members or employees in AANA; purposive, snowball, and theoretical sampling used	CRNA dedication to providing high quality patient care Vigilance over profession	Two of the three categories in <i>Keeping Vigil over the Profession</i> stood out: political vigilance and tending the flock Observation – the explicit link between establishing personal- professional credibility and collective credibility for the profession at large	Findings cannot be generalized Participants included only active members and employees of the AANA, small sample

Chapter III

Behavioral Risk Factors and Structural Social Determinants of Health Associated with Selfreported Health of Older Americans

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Abstract

Background and Objectives: The impact that structural social determinants of health and behavioral risk factors play on self-reported health (a known predictor of mortality and health seeking behavior) among older adults is not well-known. This study examined recent national data to determine the associations of both intermediary determinants (i.e. behavioral factors) and structural social determinants with self-reported health.

Research Design and Methods: A secondary analysis was conducted using data from the 2018 self-reported national Behavioral Risk Factor Surveillance System (BRFSS). The number of observations (n = 387,039) was weighted to represent a population size of 238,137,160, and limited to adults age 65+. Multivariate ordered logit modeling was used to determine the structural and intermediary factors associated with poor self-reported health rating.

Results: Better self-reported health was associated significantly with female gender and higher income. Poor self-reported health was associated with older age (i.e. 80 + years), non-White and non-Hispanic race and ethnicity, and rural residency. Intermediary determinants associated with a worse self-reported health rating were current smoking, having underweight body mass index, physical inactivity, and chronic conditions (i.e. diabetes, heart attack, stroke, major depressive disorder, chronic kidney disease and chronic obstructive pulmonary disorder).

Discussion and Implications: Structural social determinants of health combined with behavioral risk factors influence the self-reported health rating for older adults. Current interventions and campaigns designed to promote health through modifiable healthy behaviors need to also be more appropriately tailored to account for structural determinants that are not preventable behaviors, but more a health care system problem.

Keywords: socioeconomic status, rural, vulnerable population

Introduction

By the beginning of the 2030 decade, the United States (U.S.) population is expected to have more people over the age of 65 than under the age of 18 for the first time in history (United States Census Bureau, 2018). With the growing population of older adults, it will become more important than ever to promote the concept of successful aging. Successful aging has been defined by Rowe and Kahn (1997) as involving three interconnected components: "low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life" (p. 433). More recently, Rowe and Kahn (2015) acknowledged the current challenge to understand the multifactorial nature of successful aging, given the growth of the aging population. The authors state, "to understand the complex relationship between aging at the societal and individual levels is perhaps the greatest gerontological challenge of our time" (Rowe & Kahn, 2015, p. 595). The concept of health equity is an equal opportunity to be healthy across all populations (Braveman & Guskin, 2003; WHO, 2019), and thus is necessary to achieve successful aging.

With health equity as the ultimate goal, the World Health Organization (WHO) (2010) established the Commission on Social Determinants of Health (CSDH) to develop a conceptual framework to broach the composite nature of health equity and well-being among all social groups. The CSDH conceptual framework model displays areas of action to approach the various social determinants of health (WHO, 2010). Social determinants of health are defined as the combined effects of the structural determinants of health (i.e. income, education, occupation, social class, gender, race/ethnicity) and the intermediary determinants of health (i.e. behavioral factors, psychosocial factors, and conditions of daily life) (WHO, 2010). Health and well-being are affected by the combined impact of the structural and intermediary social determinants of

health (WHO, 2010). For the purpose of this study, the model was adapted to represent the key factors included in the framework – structural determinants of health (income, education, race/ethnicity, gender, age, marital status) and intermediary social determinants of health (behavioral risk factors, BMI and chronic illness) that ultimately have an impact on health equity and well-being (see Figure 1).

The idea of health has shifted from simply the absence of disease to an individual's *functional ability* (WHO, 2020) or ability to engage with life (Rowe & Kahn, 1997; Rowe & Kahn, 2015); yet, individuals can only achieve health when they are given a fair chance to experience it (Braveman & Guskin, 2003; WHO, 2019). Given the aging population, there is an urgent need to refine both an understanding of and ability to promote health and successful aging for the older population to offer an equitable chance to experience health.

National programs have been established to help promote health, especially in high risk populations. For example, the Center for Disease Control and Prevention (CDC) (2017b) employs the REACH program to develop tailored approaches to make health more accessible to racial/ethnic minority populations by addressing behavioral risk factors (e.g. smoking, physical activity, nutrition) associated with chronic disease and mortality (CDC, 2017b). BMI, smoking status, and physical activity are known predictors of cardiovascular health, and are influenced by socioeconomic status (Leigh, Alvarez, & Rodriguez, 2016; Winkleby, Kraemer, & Ahn, 1998). Biologic and behavioral factors can lead to major chronic illnesses that are associated with the highest mortality in the U.S. (CDC, 2016a; Singh et al., 2017). Although certain measurable outcomes, such as reduced tobacco use, safer areas for physical activity, and improved fruit and vegetable consumption resulted from the initiation of the REACH program (CDC, 2019), it is unclear if the program addressed all determinants of health for racial/ethnic minorities.

Moreover, it is not evident if the program helped improve overall self-reported health of these racial/ethnic minority populations. Another example is the *Million Hearts* initiative (HHS, 2012) that set a goal of preventing one million heart attacks and strokes (the second leading cause of death in the U.S.) through targeting the three major risk factors – high blood pressure, high cholesterol, and smoking (CDC, 2017a). While the program resulted in an estimated reduction of half a million cardiovascular events in its first five years (HHS, 2017), the updated initiative, *Million Hearts 2022* (HHS, 2017), shifted the target population to younger adults (ages 35 - 64). Yet, it is known that older adults (65+ years) experience a higher risk of chronic disease, increasing their risk of mortality from the most common causes of death in the U.S. (ODPHS, 2019). It is, therefore, concerning that the older population at higher risk of chronic disease is not included in a health promotion program that successfully reduced disease in the past. Programs such as these target modifiable variables, such as health risk behaviors like smoking and physical activity. However, as presented by the CSDH conceptual framework (WHO, 2008), behavioral health risk factors (a component of intermediary social determinants) cannot be considered alone when the goal is health equity; the combined effect of structural and intermediate social determinants of health must be accounted for.

Self-reported health is a valid measure that naturally incorporates both structural and intermediate social determinants of health, as it is a subjective measure of health (Bowling, 2005). More importantly, self-reported health is a known predictor of morbidity, mortality, and health-seeking behaviors (Bowling, 2005). Programs like REACH and *Million Hearts* targeted modifiable health behaviors. Yet, consideration of both modifiable behaviors (e.g. increased physical activity, improved nutrition) and structural considerations (e.g. geographic location, racism) is necessary to understand the health of older adults. For the purpose of this study, the

CSDH conceptual framework served as a guide to focus on the self-reported health impact of two salient categories: social determinants of health and intermediary determinants of health (i.e. behavioral risk factors).

Social Determinants of Health

Older adults (age 65+ years) are among the highest risk populations for experiencing health inequities, given their susceptibility to chronic disease and risk of mortality from the most common causes of death (ODPHS, 2019). Despite efforts to prevent chronic illness, older adults continue to live with at least one (Beard, Officer, & Cassels, 2016). Other sub-populations at high risk for experiencing health inequities include those of lower socioeconomic status (SES), lower education attainment (Bolin et al., 2015; Hartley, 2004; WHO, 2008), racial/ethnic minorities (James et al., 2017; Kozhimannil & Henning-Smith, 2018), and those living in rural areas (Bolin et al., 2015; Singh et al., 2017). Indeed, racial, geographic, and socioeconomic disparities are also associated with higher mortality rates from the leading causes of death in the U.S. (e.g. heart disease, cancer, unintentional injuries/accidents, chronic lower respiratory disease, stroke, Alzheimer's disease, diabetes, influenza and pneumonia, kidney disease, and suicide) (CDC, 2016; Singh et al., 2017). More importantly, combinations of these factors can increase susceptibility to health inequities (WHO, 2008).

The combined impact social determinants have on health is more dramatically manifested in rural regions of the U.S. Compared to urban areas, rural regions have higher poverty rates, increasing numbers of older residents, a higher percentage of older adults in rural areas of the U.S. (Bolin et al., 2015; New England Rural Health Roundtable, 2014; Singh et al., 2017), a growing racial/ethnic minority population, poorer infrastructure, lower education attainment, fewer employment opportunities, higher risk of injury for rural workers (Bolin et al., 2015; Singh et al., 2017), and less access to care (Bolin et al., 2015; Hartley, 2004). The WHO (2016) studied urban/rural health inequities regarding access to health care services and found that globally, rural populations experience much worse health care coverage and access to services compared to urban areas. Rural residents, especially older adults in rural areas, are at a disproportionate risk of experiencing health inequities based on socioeconomic, geographic, and racial/ethnic factors (Bolin et al., 2015; Hartley, 2004; Singh et al., 2017). Thus, it is vital that we include rural older adults when examining health equity, knowing they do not experience health and access care the same way as the general population.

The disproportionate risk of experiencing health inequities among racial/ethnic minority populations is a national concern. In fact, the WHO (2001) recognizes the risk for poor health and health inequities among racial/ethnic minorities to be attributed to racism and racial discrimination, rather than as a biologic or demographic factor. Furthermore, the CDC regards racism as a social determinant of health, responsible for both increased disease risk and higher mortality rates (CDC, 2016b). Tailoring interventions and accompanying measures to prevent chronic disease and mortality requires an understanding of the multifactorial nature and combinations of factors that have the greatest influence on health. While programs such as REACH successfully improved modifiable healthy behaviors (CDC, 2017), a lack of attention exists in understanding structural factors that have a big impact on health inequities among a population with a critical combination of risk factors (e.g. older, rural, racism among racial/ethnic minorities). Research on health inequities requires a shift in perspective to both appreciate and accept the role that racism plays in health care. There is a gap in the literature as to how both modifiable behavioral and structural social determinants of health affect the selfreported health of older adults. Accordingly, the purpose of this secondary analysis was to

determine how self-reported health of older adults is affected by both intermediary determinants (i.e. behavioral factors) and structural social determinants of health using the most recent national data.

Design and Methods

Dataset

The Behavioral Risk Factor Surveillance System (BRFSS) is a survey developed by the Centers for Disease Control and Prevention (CDC) that assesses health risk behaviors, chronic disease, and utilization of health care in the United States (U.S.) (CDC, 2018). The survey is administered to a random selection of adults (aged 18 and older) and all the responses are selfreported (CDC, 2018). Following data collection, the CDC provides an edited, weighted data file to each participating state (currently all 50 states take part) (CDC, 2018). Pierannunzi, Hu and Balluz (2013) published a systematic review on the reliability and validity of the prevalence estimates for each category resulting from the BRFSS between the years 2004 and 2011. The authors concluded that the prevalence rates matched those of other national surveys and the selfreported questions from the BRFSS data were deemed reliable information for health-related issues. Many improvements since the original survey administered in 1984 maintain the BRFSS as a reliable, valid measure of health risk factors and health status, and provide accurate national estimates (CDC, 2018). For the purpose of this study, the 2018 BRFSS national dataset was used. IRB approval was not required because the data is public and identifying information from respondents are removed by the CDC.

Sample

The CDC prepares the public data files as weighted data to provide population estimates (CDC, 2018). The sample was described by running population proportions on the various

variables to present a nationally representative sample. The current sample included adults age 65 and older, using five year age increments as the comparison groups, with 80+ as the oldest age group. The study sample consisted of 387,039 observations, which represented a population estimate of 238,137,160 as weighted data.

Measures

The outcome variable for this study was the respondents' self-reported general health status. The survey asked respondents to rate their health on a scale of one to five, where a score of one is excellent, two is very good, three is good, four is fair, and five is poor. The variable was reverse coded prior to running the analysis to make the interpretation more logical, so that a health rating of excellent was coded as five and poor was coded as one. All respondents that either did not know, refused to answer, or missing responses were removed from the analysis. The reference category was poor self-reported health; the likelihood of having a better than poor health status was tested.

Structural Social Determinants of Health

The predictor variables included any demographic and socioeconomic status questions that fit the WHO (2010) categories of structural determinants of health. These represent variables that are not modified with behavioral changes; rather, only policy and systematic changes could alter the impact of these determinants on health status. All variables were categorical. Any missing answers or refused to answer/don't know responses were coded differently and removed from the analysis. There were seven variables that fell under structural social determinants of health: sex, age, race/ethnicity, income, education, geographic territory, and marital status. The reference category for all the variables was the category coded as one. Sex was coded one for male or two for female. Since the study was only looking at older adults (65+) the age category variable only included the five year age groups from 65 up to 80+, with 65 – 69 years as the reference group. White served as the reference for the race/ethnicity, compared to other racial/ethnic minorities. Socioeconomic status was measured with both yearly income and highest completed education level, with the lowest category of each as the reference groups (less than \$15,000 a year and completed kindergarten only). Geographic territory was coded a one for urban counties and a two for rural counties. Marital status, which served as a proxy for social support and isolation, used married individuals as the reference group.

Intermediary Social Determinants of Health

The CSDH conceptual framework (WHO, 2008) fits behavioral, biological, and daily living factors in the intermediary social determinants of health. These variables represent modifiable behaviors or circumstances. There were six variables that fit under intermediary social determinants of health in the current study: BMI, physical activity, smoking, chronic illness - diabetes, heart attack, stroke, chronic kidney disease, major depressive disorder, and chronic obstructive pulmonary disease. Both BMI (as calculated by weight in kilograms / height in meters squared) and physical activity status served as a proxy for nutritional status and overall physical health. The CDC created BMI categories of underweight (BMI < 18.5), normal weight (BMI 18.5 – < 25), overweight (BMI 25 – < 30), and obese (BMI 30+), with underweight as the reference group. Physical activity status was represented as either physically active in last 30 days (reference group) or not physically active in the last 30 days. The variable for smoking used current every day smokers as the reference group. Based on the information provided by the BRFSS 2018 survey, the chronic illnesses included were diabetes, cardiovascular disease - had heart attack or stroke, major depressive disorder, kidney disease, or chronic obstructive pulmonary disease. The chronic illness variables were all coded the same – a zero for those who

have been diagnosed with the disease (which served as the reference groups), and a one for those who have not been diagnosed with the disease.

Analysis

Weighted proportions were used to characterize the sample. Multivariate ordered logit modeling was used to determine which variables significantly influenced self-reported health. Self-reported health was reverse coded so that the lowest rated category (poor health) served as the reference group. An odds ratio of less than one indicated less of a possibility of better than poor health rating compared to the reference group; whereas, an odds ratio of greater than one indicated a greater possibility of a better health rating compared to the reference group. Each predictor variable was categorical, and the reference group was automatically assigned to the lowest coded category. Males, age 65 - 69, urban counties, White/non-Hispanics, yearly income <\$15,000, kindergarten as the highest education level completed, married, underweight BMI, current every day smokers, had physical activity in the last 30 days, those who have been diagnosed with diabetes, heart attack, stroke, major depressive disorder, chronic kidney disease, or COPD all served as the reference groups to be compared to. All analyses were performed using Stata v16 (College Station, TX); sampling weights were applied to all analyses.

Results

The current sample (see **Table 1**) was evenly split between males (49%) and females (51%), with the majority between 65 and 74 (approximately 60%), living in a designated urban area (92%), and White (79%). More than half of the sample was married, but important to note that roughly a quarter of the sample was widowed. A gradient existed in income and education, with the lowest population percentage reporting making <\$15,000 per year (9.6%) and completing less than a high school education (12%), and the highest percentage making a

reported \$50,000 or more a year (42%) and completing high school or higher (88%). From a health risk behavior standpoint, the study population estimates were mostly former smokers or non-smokers (90%), overweight or obese (69%), and reported engaging in physical activity in the last 30 days (70%). The majority of the sample had not been diagnosed with a chronic illness. Approximately 23% reported having diabetes, 12% had a heart attack, 8% had a stroke, 15% had a depressive disorder, 7% had chronic kidney disease, and 13% had COPD.

An ordered logit modeling revealed that gender, age, geographic location, race, income, BMI, physical activity, smoking, and chronic illness diagnoses were all significantly associated with self-reported health (see **Table 2**).

Structural Social Determinants of Health

Women were 18% more likely than men to rate their health as better than poor. Adults in the oldest age category (80+) were 19% less likely to rate their health as better than poor compared to the 65-70 year old age category. Adults living in rural counties were 9% less likely to rate their health as better than poor compared with those living in urban counties. In the racial/ethnic categories, all other racial/ethnic minority groups were significantly less likely to rate their health as better than poor compared with White non-Hispanics. All yearly income categories above the lowest (<\$15,000) were more likely to report better than poor health, with a gradient that ranged from 22% more likely (\$15,000 – \$25,000) to 144% more likely (over \$50,000). Education and marital status categories did not have a significant influence on self-reported health status for older adults when adjusting for other factors.

Intermediary Social Determinants of Health

Behavioral Factors

Compared with underweight older adults, those who were normal weight (78%) and those who were overweight (62%) were more likely to report their health as being better than poor. Obese older adults were equally likely to report better than poor health compared with those who were underweight. Older adults who reported not being physically active in the last 30 days were half as likely to report their health as being better than poor. Compared to those who smoke every day, former smokers were 12% more likely, and those who never smoked were 22% more likely to report better than poor health status.

Chronic Illness

Overall, older adults who have not been diagnosed with chronic illnesses were more likely to have a better health rating. Those who have not been diagnosed with diabetes or have only had diabetes during pregnancy were twice as likely to rate their health as better than poor; whereas, those who have only been diagnosed as pre-diabetic/diet-controlled diabetes were 60% more likely to report better than poor health status compared to those who have been diagnosed with diabetes. Older adults who have had a history of heart attack, stroke, or depressive disorder were half as likely, and chronic kidney disease or COPD 63% less likely to have a better than poor health rating.

Discussion

The findings of this study reveal that when controlling for all other factors, older adults in the U.S. at the highest risk of having a poor health rating were male, rural residents, over 80 years old, those of racial/ethnic minorities, of the lowest socioeconomic status, underweight, daily smokers, physically inactive, and diagnosed with a chronic illness. Thus, the current study demonstrates that both intermediary and structural social determinants of health are significantly associated with poor health effect among a nationally representative recent sample of older adults.

Political and social factors influence health just as behavioral and biologic factors do (WHO, 2010). As a result, "health is a complex phenomenon" (WHO, 2010, p. 10) and needs to be approached from each factor. It is clear that multiple factors play a role in how older residents rate their own health. As a known predictor of morbidity and mortality and health-seeking behavior (Bowling, 2005), it is important to understand what factors lead to a poor self-reported health rating, especially given the health risks for older adults. Health care costs for chronic disease in the U.S. are extremely high. For example, heart disease and stroke cost a reported \$199 billion a year, diabetes \$237 billion a year, and obesity \$147 billion a year (CDC, 2019). According to the CDC (2019) smoking is the leading cause of preventable death in the U.S., and costs the health care system \$170 billion a year. Among contributing factors to health, social connectedness has been an important predictor of resilience and quality of life for the oldest old (age 88 – 99 years old) (Browne-Yung, Walker, & Luszcz, 2017). In order to prevent chronic illness and subsequently cut health care costs, it is necessary to understand who is at the highest risk, and which combination of behavioral, social, and geographic factors are most associated with poor health to be able to develop targeted interventions. Our results emphasize the complex nature of health for older adults, highlighting how both structural and intermediary social determinants of health can lead to a poor health rating among this population.

The BRFSS 2018 survey data offers the most recent reflection of the national health status of adults. Consistent with previous research, older adults, rural residents, and racial/ethnic minorities are all more likely to report poor health. The findings of the current study confirm that among older adults, those at greatest risk of poor health are racial/ethnic minorities (James et al.,

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2017; Kozhimannil & Henning-Smith, 2018), and those of lower socioeconomic status (Bolin et al., 2015; Hartley, 2004; WHO, 2008). However, unique to this study is a snapshot of the health experience of older adults. As previously mentioned, programs to improve health focus on modification of behaviors, and tend to target younger adults. This study supports that factors beyond modifiable behaviors are responsible for poor health among older adults. In this population, behavioral risk factors, such as smoking, nutritional status (as represented by BMI) and physical health status, predictors of cardiac health (Leigh, Alvarez, & Rodriguez, 2016; Winkleby, Kraemer, & Ahn, 1998), have an impact on self-reported health rating. Being physically active, a non-smoker, and having a normal (18.5 - < 25) or overweight (25 - < 30)BMI were associated with a higher health rating. Interestingly, having an underweight BMI was associated with a worse health rating. Weight loss contributes to frailty in older adults (Lally & Crome, 2007). Therefore, it is important to appreciate the affect that an underweight BMI has on poor subjective health, and worth exploring in future research. For instance, modifying behaviors to increase physical activity for older adults can only work when they have a safe place and strength to be physically active. Not surprisingly, those diagnosed with a chronic disease (e.g. diabetes, cardiovascular disease, depressive disorder, chronic kidney disease, COPD) are more likely to have a poor health rating compared to those not diagnosed with a chronic disease.

The findings imply a gap in health promotion for the most vulnerable population. Despite efforts to improve health equity and prevent chronic disease, the most vulnerable populations continue to be at the highest risk for poor health. While this study did not test interactions among the variables, it highlights the concerning health impact of factors beyond modifiable behaviors among the structural social determinants of health. Greater consideration of the combined effect of factors such as rurality, racism, oldest age groups, and socioeconomic status when tailoring approaches to promote health is needed. Those living in rural regions of the U.S. tend to experience the social gradient in health inequities at a higher degree (WHO, 2008; Marmot, Friel, Bell, Houweling, & Taylor, 2008). The disproportionate experience of health could be due to the fact that compared to urban regions, rural areas have higher poverty rates, more elderly residents, increasing diversity (minority population growing), poor infrastructure, lower education attainment, fewer employment opportunities, higher risk of injury for rural workers (Bolin et al., 2015; Singh et al., 2017), and experience a lack of access to care (Bolin et al., 2015; Hartley, 2004). Moreover, it is interesting that age only became a risk factor for the oldest age category (80+) reminding us that with older adult populations other risk factors may be more salient for the focus of interventions and policy to support successful aging and optimal perceived health.

Racial discrimination is embedded in health policy and the health care system, and is often referred to as *structural racism* (Bailey et al., 2017). For example, access to quality health care is a challenge for Black-only communities, with poor distribution of providers and services, resulting in poor health outcomes (Bailey et al., 2017). Like the CSDH conceptual framework (WHO, 2008), Bailey et al. (2017) see structural racism as a determinant of health and believe that in order to promote health equity, more research needs to focus on how structural racism interferes with health and health equity to inform policy change. The current study reiterated that racial/ethnic minorities are more likely to have a worse self-reported health, which could be the result of a lack of culturally-competent care and needs to be explored more. Furthermore, older adults of racial/ethnic minority populations living in rural areas are at even greater risk of poor health. A lack of access to culturally-competent care in rural areas (Bolin et al., 2015; Hartley, 2004) in a health care system with underlying racism present (WHO, 2001; CDC, 2016b) can

have a negative impact on the health and well-being of the already vulnerable older adults in this specific population.

Both improvement of life expectancy and the fact that the baby boomer generation will all be 65+ by the year 2030 will bring a surge of higher risk, older adults in the U.S. (United States Census Bureau, 2018). In their narrative study on the oldest old (88 – 99 years), Browne-Yung, Walker, and Lucszcz (2017) captured how this population can use resilience and other coping strategies to maintain a healthy quality of life. The authors suggest the use of intervention models tailored for individuals, fostering social-connectedness and helping to develop coping skills to promote mental health and quality of life (Browne-Yung, Walker, & Luszcz, 2017). Baernholdt, Yan, Hinton, Rose, and Mattos (2012) studied the quality of life of older adults in rural areas and discovered overall worse quality of life secondary to isolation for rural older adults. Successful aging involves societal and individual components that influence quality of life and well-being (Rowe & Kahn, 2015); the concept of social-connectedness is an important one and should be considered in future research on health equity in this population.

The current study was limited in examining cross-sectional data, and therefore not able to describe social isolation in a meaningful way. Marital status served as a broad, if crude, measure of social support and potential isolation. Given recent research demonstrating the powerful impact social isolation and loneliness can play on mortality (Alcaraz et al., 2018), future research would benefit greatly from the inclusion of these concepts as additional risk factors. However, a strength of the study was the use of a large national data set that offered a nationally representative sample from the most recently available data to study health equity from a social justice perspective.

Health is a complex problem; however, approaching health and well-being using the social determinants conceptual framework (WHO, 2010) guides necessary action to approach the multifactorial phenomenon. Health equity and improved health status can be achieved by focusing policy change on the social gradients and closing health gaps (WHO, 2008). The current study was able to show the importance of considering the combined effect that the structural and behavioral factors have on self-reported health. For instance, older adults in rural areas with chronic disease have many factors associated with a poor health rating. Without access to proper preventative care and disease management, the disease process is perpetuated. Consideration beyond modifiable behaviors (e.g. smoking, physical activity, nutrition) is needed to address health care policy change and guide the necessary individually-tailored, culturally-appropriate health care.

Implications

With a basis in social justice and a goal of health equity, this study has informed two future objectives in gerontological research. First, this study has once again highlighted the vulnerability of rural adults, and future research needs to explore the degree to which this population is experiencing social isolation and lack of access to health care providers. Second, the findings of this study reinforce the need for not only more research on this vulnerable population, but also a push for individual and policy level intervention and change in the health care system.

Identifying the contributing factors to poor health status can provide evidence to inform future campaigns on preventative health strategies to combat chronic disease and ultimately decrease mortality. Health care costs can be lowered by simply preventing chronic disease through modifiable behaviors, improved access to care for rural regions, and culturally

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compatible care for racial/ethnic minorities. Through the use of evidence highlighting the populations that are at the highest risk of expensive chronic illnesses, morbidity, and mortality, perhaps policymakers can recognize the critical need for funding interventions that target the most vulnerable.

Appendix C

Figure 1

Structural and Intermediary Social Determinants of Health Affecting Self-reported Health – Adapted Model from the Commission on Social Determinants of Health Conceptual Framework



Note. Adapted CSDH social determinants of health model.

Table 1

Population Proportions of the Sample

Variables	Population Proportion (%)		
Outcome Variable			
Self-reported health rating			
Poor	6.8		
Fair	17.2		
Good	33.5		
Very Good	30.2		
Excellent	12.3		
Structural Social Determinants of Health			
Sex			
Male	48.8		
Female	51.2		
Age (years)			
65-69	32.9		
70-74	26.8		
75-79	17.9		
80+	19.6		
Geographic location			
Urban counties	91.9		
Rural counties	8.1		
Race/ethnicity			
White only, non-Hispanic	78.9		
Black only, non-Hispanic	8.6		
Other race only, non-Hispanic	4.8		
Multiracial, non-Hispanic	0.85		
Hispanic	6.8		
Marital Status			
Married	55.8		
Divorced	13.5		
Widowed	23.2		
Separated	1.4		
Never married	4.99		
Part of an unmarried couple	1.02		
Yearly income (dollars)			
<15,000	9.6		
15-25,000	18.6		
25-35,000	13.4		
35-50,000	16.0		
50,000+	42.4		
Completed education level			
Never attended school/only K	0.25		
Grades 1 through 8	4.3		

Grades 9 through 11	7.8
Grade 12 or GED	27.8
College 1 year to 3 years	31.2
College 4 years or more	28.6
Intermediary Social Determinants of	
Health	
BMI	
Underweight	17
Normal weight	29.5
Overweight	39.3
Obese	29.6
Physical activity	_,
Engaged in physical activity in	69.7
last 30 days	
Did not engage in physical	30.3
activity in last 30 days	
Smoking status	
Current every day smoker	6.6
Current some day smoker	2.6
Former smoker	40.7
Never smoked	50.0
Chronic health conditions (diagnosed by	
health care professional)	
Diabetes	
Yes – has diabetes	23.2
No – only during pregnancy	0.39
No – does not have	73.7
No – pre-diabetes/borderline	2.8
Heart attack/MI	11.7
Stroke	7.8
Major depressive disorder	14.5
Kidney disease	6.9
COPD	13.1

Table 2

Factors Affecting the Self-assessed Health of Older Adults

Variable	OR	95% CI		
Standard Conigl Determinants of Hould				
Siruciural Social Determinants of Health				
Sex (comparison group: males)	1 10***	[1 12 1 25]		
$A = (y_0, y_0, y_0, y_0, y_0, y_0, y_0, y_0, $	1.18	[1.12, 1.23]		
Age (years) (<i>comparison group</i> : 05-09)	1.01			
/0-/4	1.01			
/3-/9	1.03	[0,74, 0,90]		
80+ Casemania la sotian (source suison success)	0.81	[0.74,0.89]		
Geographic location (<i>comparison group</i> :				
Dural counties	0.01**	[0.95 0.07]		
Rural counties	0.91	[0.85, 0.97]		
Race/elimicity (comparison group: while only,				
non-Hispanic)	0 71***	[0 64 0 79]		
Diack only, non-Hispanic	0.71***	[0.04, 0.78]		
Other race only, non-Hispanic	0.03****	[0.30, 0.78]		
Multifacial, non-Hispanic	0.73^{++}	[0.03, 0.88]		
Hispanic Monital Status (communication and Manual A	0.01	[0.33, 0.71]		
Marital Status (comparison group: Marriea)				
Divorced	1.03	[0.96, 1.11]		
Widowed	1.07	[0.99, 1.15]		
Separated	1.05	[0.84 , 1.31]		
Never married	1.01	[0.90, 1.14]		
Part of an unmarried couple	1.19	[0.99, 1.44]		
Yearly income (dollars) (comparison group:				
<15,000)				
15-25,000	1.22**	[1.07, 1.38]		
25-35,000	1.62***	[1.40 , 1.87]		
35-50,000	1.72***	[1.50, 1.96]		
50,000+	2.44***	[2.14, 2.78]		
Completed education level (comparison				
group: Never attended school/only				
Kindergarten)				
Grades 1 through 8	0.73	[0.32, 1.66]		
Grades 9 through 11	0.85	[0.38, 1.91]		
Grade 12 or GED	1.09	[0.49, 2.42]		
College 1 year to 3 years	1.28	[0.58 , 2.84]		
College 4 years or more	1.55	[0.70 , 3.45]		

Intermediary Social Determinants of Health

BMI (comparison group: Underweight)		
Normal weight	1.78***	[1.36, 2.33]
Overweight	1.62***	[1.24 , 2.12]
Obese	1.17	[0.89 , 1.52]
Physical activity (comparison group: Had		
physical activity in last 30 days)		
Did not have physical activity in last 30	0.49***	[0.46, 0.53]
days		
Smoking status (comparison group: Current		
every day smoker)		
Current some day smoker	0.96	[0.82 , 1.13]
Former smoker	1.12*	[1.01 , 1.25]
Never smoked	1.22***	[1.10, 1.36]
Diabetes (<i>comparison group: yes – has been</i>		
diagnosed with diabetes)		
No – only during pregnancy	2.13***	[1.65, 2.75]
No – does not have	2.14***	[2.00, 2.28]
No – pre-diabetes/borderline	1.60***	[1.36 , 1.88]
Heart attack/MI (<i>comparison group: yes – has</i>		
been diagnosed with an MI)		F
No	0.52***	[0.47, 0.57]
Stroke (<i>comparison group: yes – has been</i>		
diagnosed with a stroke)		
No	0.50***	[0.45, 0.56]
Major depressive disorder (<i>comparison group</i> :		
yes – has been diagnosed with a depressive		
disorder)	0.52***	
	0.53***	[0.50, 0.58]
Kidney disease (<i>comparison group: yes – has</i>		
been diagnosed with kidney disease)		
No	0 42***	[0.38 0.48]
COPD (comparison group: ves - has been	0.12	
diagnosed with COPD)		
No	0 37***	[0 34 0 41]
110	0.07	[0.51, 0.71]

Note: The regression evaluated the likelihood of having a better than poor self-reported health rating when keeping all other variables constant. An odds ratio of less than 1 indicated that group was less likely to report a better than poor general health rating; an odds ratio of greater than 1 indicated that group was more likely to report a better than poor general health rating. *Abbreviations: OR* = odds ratio; CI = confidence interval; COPD = chronic obstructive pulmonary disease.

p < .05. p < .01. p < .001

Chapter IV

The Role of Satisfaction with Health Care on the Perceived Physical and Mental Health of Rural,

Older Adults

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Abstract

Background: Older (65+) rural Americans are at high risk for experiencing health inequities. Lack of access to health care is the most common health inequity in rural areas. Satisfaction is an important component of access to health care. Moreover, few studies have examined the role of satisfaction with health care on self-reported health in rural, older adults.

Objectives: To examine the role of perceived satisfaction with health care on the physical and mental health status of rural older adults and to determine the willingness of rural older adults to use non-physicians for health care.

Methods: This cross-sectional, pilot study examined perceived satisfaction with health care in a sample of 53 older adults aged 65-98 years (M=74.1; SD=7.7), controlling for age, education and physical function. Descriptive statistics and hierarchical linear regressions were used to analyze the data.

Results: Hierarchical linear regressions revealed that satisfaction with health care access (p = <.05) was significantly associated with physical global health, but not mental global health, controlling for age and education. The majority of the sample reported already receiving care from a non-physician (62.5%) or were willing to if made available (12.5%).

Discussion: A larger, more diverse sample is necessary to validate the findings of this pilot study. However, satisfaction with access to care is a novel and important finding that warrants further investigation in greater detail to untangle its role in the health status of older, rural adults over time. The physical function of older rural adults continues to affect both physical and mental health; interventions to promote age-friendly, safe environments to support physical function should be prioritized to promote health.

Key Words: rural, older adults, health inequities, access to care

Perception of both physical and mental health is important, as self-reported health status is a known predictor of morbidity and mortality and health-seeking behaviors (Bowling, 2005). However, most research on the determinants of health is conducted in urban areas. As a result, we know little about the factors associated with the self-reported physical and mental health of the rural population. For example, the Behavioral Risk Factor Surveillance System (BRFSS) is a survey developed by the Centers for Disease Control and Prevention (CDC) that assesses health risk behaviors, chronic disease, and utilization of health care in the United States (U.S.) (CDC, 2018). A goal of the BRFSS (CDC, 2018) is to assess comparisons among sub-populations to determine risks for poor health; however, the respondents in Massachusetts for the 2017 survey tended to be White, non-rural adults with higher education, and higher socioeconomic status (SES). The most vulnerable population for health inequities was not captured in Massachusetts, leaving an enormous gap in our understanding of this population.

Moreover, access to health care is often touted as a barrier to necessary preventative care and illness management (U.S. Department of Health and Human Services, 2010), and lack of access to health care is the most common health inequity for rural Americans (Bolin et al., 2015; Hartley, 2004). Insurance coverage, geographically available health services, and ability to find a provider each patient trusts who offers culturally-competent care all contribute to the concept of access to health care (U.S. Department of Health and Human Services, 2010, para 4). In addition, satisfaction with health care has been linked to access, as those who were not satisfied with the health care they received were more likely to lack necessary insurance coverage to get the proper care they needed (Okoro et al., 2017). It is also known that factors beyond patient experience account for satisfaction in health care (Bleich, Ozaltin & Murray, 2009); however, it is unclear if satisfaction with health care affects the perceived health of rural older adults. In order to empower the rural population to achieve health equity, it is first necessary to understand how satisfaction with health care affects self-reported health. This is the first known study to examine how satisfaction with health care influences perceived physical and mental health among older rural adults.

Additionally, geographic distance (New England Rural Health Roundtable, 2014) and shortages of health care providers (Massachusetts Department of Public Health, 2014) in rural areas can make it challenging to seek health care. Prevention of chronic illness and symptom management are health priorities for the older population; yet, it is unclear if that population can access the care needed to prevent and treat illness. Advanced practice registered nurses (APRNs) are being utilized to bridge gaps in health care, in the setting of physician shortages and a highly insured population (Brooten, Youngblut, Hannan, & Guido-Sanz, 2012; Russell-Babin & Wurmser, 2016). Regardless of the reason why rural residents are not accessing health care at the same level of the urban population, there seems to be an ongoing neglect for rural Americans that perpetuates health problems (Meit & Knudson, 2017).

The purpose of this pilot study was to explore if older rural adults' satisfaction with health care is associated with self-reported physical and mental health status, when controlling for known social determinants of health (age, education and physical function). Specifically, the study will attempt to answer three research questions: What is the current health status of older rural adults? Does satisfaction with health care access significantly predict physical and mental health, when accounting for the effects of age, education level, and physical function? What is the older rural adult's perception of receiving health care from a non-physician?

Methods

A cross-sectional online REDCap survey design was used. Respondents had the option of virtual consent via REDCap, or a hard copy written consent form. The pilot study received approval from Boston College's Institutional Review Board (IRB) prior to recruitment and collection of data.

Sample

Eligibility criteria included being an older adult (age 65 and older), English-speaking, and being resident of a rural-designated town in Massachusetts. Rural designation was determined by the State Office of Rural Health (SORH) (2017) parameters: towns with a population <10,000 people or 500 people per square mile, or contains a small rural hospital or critical access hospital. Recruitment strategies employed community outreach for participation. Local churches, community leaders, and home health centers were contacted to gain access to the people of the different communities. Recruitment resulted in 65 respondents, but 12 were removed because they did not meet inclusion criteria, or were missing eligibility information, resulting in 53 survey responses (N = 53).

Measures

Physical and Mental Health

There are two categories of outcome variables for the study. The first category is the respondents' perception of their physical global health status, and the second is their perception of their mental global health status. The PROMIS Global Health (Short Form v1.1) measure was used to operationalize both physical and mental health. PROMIS Global Health (Short Form v1.1) is a highly reliable (Cronbach's alpha > .95) and validated measure (Cella et al., 2010). Global physical health and global mental health were scored using the *Global Health* scoring instrument. Raw scores were converted to T scores, then the sum of T scores for questions

relating to either physical or mental health were totaled to represent the physical global health score or mental global health score. The national average for the PROMIS Global Health measure is 50 (SD=10).

Physical Function

Physical function was measured using the PROMIS Physical Function Short Form 12a. Total raw scores were converted to T scores. The national average for the physical function measure is a standardized score of 50 (SD = 10).

Access to Health Care

Perception of access to health care specific to this study was measured by the following questions contained on the national survey *Behavioral Risk Factor Surveillance System* (BRFSS) (CDC, 2018): In general, how satisfied are you with the health care you received? (responses: very satisfied, somewhat satisfied, not at all satisfied, don't know/unsure, not applicable, refuse to answer). Have you delayed getting needed medical care for any of the following reasons in the past 12 months? (responses: could not get through on telephone, couldn't get an appointment soon enough, long wait for doctor, clinic/doctor's office not open, other, not sure, did not delay). Satisfaction with health care was the main focus for this study. The sample was either very satisfied or somewhat satisfied, with only one participant who responded "not applicable" (and two missing responses); as a result, the item was recoded to two categories for the regression – very satisfied or somewhat satisfied. A single item asked participants if they have ever received care from a non-physician (e.g. NP, PA), and if not, would they be willing to (i.e. yes or no).

Demographic

Basic demographic (e.g. income, education, occupation, gender, race/ethnicity, and marital status), health behaviors (e.g. smoking status, daily fruit and vegetable consumption), and chronic health issues were measured with single item questions.

Data Analysis

IBM SPSS Version 26 was used to conduct all the analyses. Descriptive statistics were used to describe the sample and address the first research question. To determine the role of satisfaction with access to healthcare, two hierarchical linear regressions were run (alpha set at <.05) (physical global health and mental global health) over two steps. At step one, social determinants of health - age, education (representing unmodifiable biological and socioeconomic factors), and physical function (modifiable) - were entered. At step two, satisfaction with health care was entered. Physical and mental global health scores were obtained from 53 participants, in addition to age and education variables; however, only 51 participants had summary scores for physical function and satisfaction with access to health. Therefore, the sample size for the regressions was 51.

Results

Sample

The sample consisted of 53 older rural adults (see Table 1), between the ages of 65 and 98, with a mean age of 74.1 (SD 7.7). The majority of the sample was female (71.7%), White (92.5%), married (58.5%) and retired (84.9%). More than half of the sample graduated from college or technical school (67.9%), and 41.5% reported a yearly income of over \$50,000. More than half the sample reported being very satisfied with the health care they received (54.7%), and 39.6% of the population was somewhat satisfied, and more than half of the sample did not experience a delay getting medical care (69.8%). Of the (30.2%) respondents who did report

experiencing delayed health care, the most common reason was due to lack of transportation (7.5%), followed by long wait time once arrived at an appointment (5.7%). The sample had an average global physical health score of 50 (\pm 6.5) and global mental health score of 53.5 (\pm 8.1).

Research Question 1: What are the health behaviors of older rural adults?

The sample consumed an average of 4.79 (\pm 13.97) vegetables and 4.23 (\pm 14.25) servings of fruit a day. Only three respondents were current smokers (5.7%), whereas 50.9% were former smokers, and 37.7% never smoked. From the most prevalent chronic health condition to the least, the sample was diagnosed with the following: high blood pressure (49.1%), high cholesterol (43.4%), cancer (26.4%), flu or pneumonia (20.8%), diabetes (15.1%), COPD (11.3%), heart disease (9.4%), and stroke (3.8%). The sample scored an average of 45.3 (SD 7.1) on the PROMIS physical function scale (which is half a standard deviation below the average of 50 for the general U.S. population).

Research Question 2: Does satisfaction with health care significantly predict physical and mental health, when accounting for the effects of age, education level, and physical function?

The first hierarchical linear regression (see Table 2) revealed that both physical function (p < .001) and satisfaction with health care (p < .05) were significantly associated with global physical health, controlling for age and education. As physical function and satisfaction with health care increased, physical global health improved. Physical function accounted for the majority of the variance in global physical health scores (42.4%); satisfaction with health explained an additional 5.5% of the variance. In the second regression (see Table 2) physical function (p < .05) was the only significant factor associated with global mental health, and accounted for 10.7% of variance in global mental health scores. As physical function scores
increased, mental global health improved. Satisfaction with health care was not significantly associated with global mental health, but did account for an additional 2.5% of variance.

Research Question 3: What is the older rural adult's perception of receiving health care from a non-physician?

The majority of the sample (62.5%) reported already receiving care from a non-physician (e.g. nurse practitioner or physician assistant), and an additional 12.5% would be willing to receive care from a non-physician if available. Only 14.3% of the sample preferred not to receive care from a non-physician. Of that small group (n = 8), all were under the age of 80 (mostly between the ages of 65 – 68), most were female (n = 5), married (n = 6), and college or technical school graduates (n=6). Additionally, almost all of the respondents who did not prefer to receive care from a non-physician had been diagnosed with a chronic health condition.

An open-ended question about the respondents' willingness to see a non-physician (e.g. NP, CRNA, PA) for their health care needs shed more light on the older rural adult's perception of non-physician providers. Of the respondents who did not prefer seeing a non-physician for their health care needs, one did comment positively about non-physician providers: "They are friendly and patient." No further information was provided beyond "prefer the physician" from the other respondents who did not want to receive care from non-physician providers. On the other hand, those who do currently receive care from non-physician providers had a lot of positive comments about the care they receive: "I have total confidence in the nurse practitioner"; "Saw an NP last year who was wonderful and had read my chart!"; "My primary care/GP is a nurse practitioner and I could not feel more pleased. She give a patient her time, attention and wisdom." However, some respondents said their willingness to see a non-physician

depended on the health problem; others admitted to being fine with care from a non-physician, as long as a physician was available if needed.

Discussion

In the United States (U.S.), the associations between individuals of lower socioeconomic status (SES) (Bolin et al., 2015; WHO, 2008), racial/ethnic minorities (James et al., 2017; Kozhimannil & Henning-Smith, 2018), rural residents (Bolin et al., 2015; Singh et al., 2017), older adults (65 and older) (ODPHS, 2019) and health inequities are known. The complexity behind *why* these associations persist in the setting of improved health insurance coverage and technological advances in health care remains an issue. As with most pilot studies, the study was limited with a small sample size that lacked diversity in race/ethnicity and socioeconomic status; thus, the findings cannot be generalized to the broader rural population. However, this pilot study was able to accomplish two important things: first, it provided evidence that satisfaction with health care is an important concept to measure, as it has a positive impact on perceived physical health; second, it provided direct evidence from older rural adults (a population often missed in studies) that they are willing to use APRNs for their health care needs.

Satisfaction with health care captures many influential factors involved with access to care. Future studies need to tease apart the nuance of satisfaction in older rural adults to determine what has the most influence on satisfaction (e.g. is it access to providers or the actual care provided, ease of access, or culturally-competent care, etc.). Perhaps the willingness of older rural adults to use non-physicians for their care is a starting point to tackle one aspect of access to care. This population could greatly benefit from access to APRNs who are trained experts in health promotion and chronic disease prevention/management. APRN scope of practice is restricted in Massachusetts (Lofgren et al., 2017); however, the recent Covid-19 pandemic led

the governor to lift restrictions on APRN practice to alleviate the burden on physicians during the influx of critically ill patients in the state. This indicates an understanding of the need to better use APRNs in the health system, and could perpetuate an increase use of APRNs in rural areas with critical shortages of providers.

APRNs are professionally positioned to offer patient education on the physical and mental health benefits of physical function. The influence that physical function has on physical health is consistent with what is already known. Because physical function also has an impact on mental health is a strong indication to ensure age-friendly environments in rural areas to promote health and prevent chronic illness for the older population.

Appendix D

(N = 53)	M (SD) or n (%)	%
Physical Health*	50.0 ± 6.5	
Mental Health*	53.5 ± 8.1	
Demographics		
Age	74.1 ± 7.7	
Gender		
Female	38	71.7
Male	15	28.3
Ethnicity		
Hispanic or Latino	7	13.2
NOT Hispanic or Latino	41	77.4
Other	5	9.4
Race		
Black or African American	1	1.9
White	49	92.5
Other	3	5.6
Employment Status		
Employed – full time (30+ hours a week)	4	7.5
Employed – part time (< 30 hours a week)	3	5.7
Retired	45	84.9
Other	1	1.9
Yearly Income		
\$0 - 14,999	4	7.5
\$15,000 - 24,999	1	1.9
\$25,000 - 34,999	8	15.1
\$35,000 - 49,999	9	17.0
\$50,000+	22	41.5
Other	9	17
Highest Level of Education Completed		
Graduated high school	10	18.9
Attended college or technical school	7	13.2
Graduated from college or technical school	36	67.9
Marital Status		
Married/Partnered	32	60.4
Divorced	5	9.4
Widowed	14	26.4
Never married	1	1.9
Physical Health		
Physical Function	45.3 ± 7.1	
Vegetable Consumption	4.79 <u>+</u> 13.97	
Fruit Consumption	4.23 <u>+</u> 14.25	
Smoking Status		

Table 1: Descriptive Statistics of Sample

Smoke every day	1	1.9
Smoke some days	2	3.8
Former smoker	27	50.9
Never smoked	20	37.7
Other	3	5.7
Chronic Health Conditions		
COPD	6	11.3
Flu or pneumonia	11	20.8
Diabetes		
Yes have been diagnosed with diabetes	8	15.1
Only during pregnancy	1	1.9
Pre-diabetes or borderline diabetes	2	3.8
High cholesterol	23	43.4
High blood pressure	26	49.1
Angina or coronary heart disease	5	9.4
Stroke	2	3.8
Cancer	14	26.4
Access to Health Care		
Delayed Medical Care		
Couldn't get through on telephone	1	1.9
Couldn't get an appointment soon enough	1	1.9
Long wait time once arrived	3	5.7
No transportation	4	7.5
Don't know/unsure	1	1.9
Did not delay getting medical care/did not need medical care	37	69.8
Other	6	11.3
Access to Health Care – Satisfaction with health care		
received		
Very satisfied	29	54.7
Somewhat satisfied	21	39.6
Not applicable	1	1.9
Other	2	3.8
Do you ever receive care from a non-physician (NP or PA)		
Yes	35	62.5
No, and do not wish to see a non-physician	8	14.3
No, but would be willing to if available	7	12.5
Don't know/unsure	1	1.8
Other	2	8.9

Note. M = mean, SD = standard deviation *Measured with PROMIS Global Health Short Form (v.1.1)

Table 2: Factors Predicting Physical Global Health

Variable	Physical Health			Mental Health					
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	
Age	0.15 (0.10)	0.17	0.06 (0.11)	0.07	0.09 (0.16)	0.08	0.02 (0.17)	0.02	
Education	-2.28 (1.68)	-0.16	-2.94 (1.65)	-0.20	-2.14 (2.56)	-0.12	-2.69 (2.60)	-0.15	
Physical function	0.66 (0.11)**	0.70	0.65 (0.11)*	0.69	0.40 (0.17)*	0.35	0.39 (0.17)*	0.34	
Satisfaction			3.41 (1.57)*	0.26			2.80 (2.47)	0.17	
Note. SE = standard error									

p* <.05 *p* <.001

Chapter V

Discussion

In an age of great scientific and technological advances, improved health insurance coverage, and greater knowledge development around health equity, health inequities persist (WHO, 2019). Achieving health equity is a global health goal (WHO, 2019). The World Health Organization's (WHO) (2010) Commission on Social Determinants of Health (CSDH) conceptual framework served as the road map for this dissertation, as it sets the course for action on the many social determinants of health that interfere with health equity. While a comprehensive test of the framework was beyond the scope of this dissertation, the framework was used to guide this body of research. In particular, the framework's model clearly illustrates the spectrum of factors that influence the achieving of health equity with its inclusion of multiple social determinants of health (e.g. intermediary and structural) as well as the acknowledgement of the health system and access to health care. As the CSDH framework presents, multiple social determinants of health (e.g. intermediary and structural) and the health system itself influence the ultimate goal of achieving health equity (WHO, 2010); as a result, the framework guided this body of research to focus on multiple determinants of health.

Along the CSDH conceptual framework loop, access to health care is a social determinant of health incorporated in both political mechanisms (e.g. state APRN scope of practice policies) and the health system (e.g. shortages of doctors, geographic imbalances of specialists and health care centers, racism in the health system). *Healthy People 2030* continued the health goal from *Healthy People 2020* to improve access to "comprehensive, quality health care services" (U.S. Department of Health and Human Services, 2011), as it remains an ongoing issue. The overall purpose of this dissertation was to identify and address influential factors that serve as road blocks in achieving health equity along the CSDH feedback loop (WHO, 2010).

The dissertation included four aims. The first aim of the dissertation was to determine current SOP restrictions and patient outcomes across the continuum of licensure for APRNs, especially CRNAs. The second aim was to identify the social determinants and risk factors for poor health effect among a national sample at high risk for poor health. The third aim was to determine the roles that satisfaction with health care and physical function have on the perceived health status for rural, older adults in Massachusetts. Finally, the fourth aim was to explore the willingness of rural, older adults to use non-physicians for their health care needs.

Principle Findings Aim 1: SOP Restrictions for APRNs

As the first step in approaching the health inequity of *lack of access to health care*, an integrated review of the literature regarding SOP policy for APRNs was done (Chapter II). Research articles published over the last decade (from 2010) since the release of the IOM's (2010) recommendations to lift restrictions on APRN practice were included. Currently, APRNs are not utilized at the maximum potential of their license and face restrictions to use their full SOP, varying from state to state (Englebright, McCurley, & Borum, 2017; Fairman, Rowe, Hassmiller, & Shalala, 2011; Kritz, 2018; Lofgren et al., 2017). Among the different APRNs (midwives, nurse practitioners, CRNAs), CRNAs tend to have the most restricted practice (Malina & Izlar, 2014). The integrated review specifically concentrated on CRNA SOP to understand the biggest challenges in loosening restrictions on the SOP of one of the most challenged groups of APRNs. Ultimately, the governor of each state has the authority to allow APRNs to practice at their full licensure, or under a restricted practice. While the quality of patient care is maintained as APRN SOP is maximized (Ortiz et al., 2018), it is evident that factors beyond patient outcomes have the strongest influence over SOP policy in each state.

There were three key findings that emerged from the integrated review on CRNA practice and policy. First, compared to anesthesiologists, patient complications and mortality rates were no different under the care of CRNAs. Second, CRNAs are more accessible (i.e. better geographic distribution compared to anesthesiologists) to vulnerable populations and rural areas. And third, state legislators are being influenced by factors other than evidence, such as strong professional group influence, to make policy decisions for CRNAs.

Principle Findings Aim 2: Impact of the Social Determinants of Health on Self-reported Health of Older Americans

In order to address the second aim of the dissertation, a secondary analysis of a large national sample of older Americans was done (Chapter III). The study used data from the 2018 self-reported national Behavioral Risk Factor Surveillance System (BRFSS). The purpose of the secondary analysis was to determine how the self-reported health of older adults was affected by both intermediary determinants (i.e. behavioral factors) and structural social determinants of health using recent national data. Key findings of the study showed that better self-reported health was associated significantly with female gender and higher income. Poor self-reported health was associated with older age (i.e. 80 + years), non-White and non-Hispanic race and ethnicity, and rural residency. Those with a worse self-reported health rating were current smokers, had underweight body mass index, were physically inactive, and had chronic health conditions (i.e. diabetes, heart attack, stroke, major depressive disorder, chronic kidney disease and chronic obstructive pulmonary disorder).

Importantly, the findings confirm that among older adults, the most vulnerable for poor health remain racial/ethnic minorities (James et al., 2017; Kozhimannil & Henning-Smith, 2018), and those of lower socioeconomic status (Bolin et al., 2015; Hartley, 2004; WHO, 2008). Also, the findings imply a gap in health promotion for the rural population.

Principles Findings Aim 3: The roles that structural and intermediary social determinants of health have on perceived health status of older rural adults in Massachusetts.

A primary data collection on a small sample of older, rural Massachusetts residents addressed the third aim of the dissertation (Chapter IV). Among the sample of older, rural adults, both physical function and satisfaction with health care played a significant role in their perceived physical health status, controlling for age and highest education level completed. Physical function also played a significant role in the perceived mental health status of this population. Furthermore, the experience of health care for older, rural Massachusetts residents was mostly positive, but a third of the sample reported delayed health care. Notably, the majority of the sample reported being willing to use non-physicians for their health care needs.

Summary and Implications

Summary

As a complex phenomenon (WHO, 2010), health equity must be broached from many angles. The CSDH framework was used as a road map, guiding three connected lines of inquiry to gain an understanding of factors that are associated with health inequities among a vulnerable population. Both gaps in the health care system (APRN SOP restrictions) and the fact that within older adults (a known at-risk group) some were at an increased chance of poor health outcomes, identified a disproportionate experience of health equity within the older population. The first major finding of this dissertation is the inconsistent use of APRNs at their full licensure. Nationally, APRNs had better geographic distribution in rural areas compared to physicians; yet many states continue to restrict APRN SOP, thus preventing patients from accessing this option for health care in rural areas. Second, across the U.S., older adults at the highest risk for poor health live in rural areas, are of lower socioeconomic status, and identify as racial/ethnic minorities. Third, both satisfaction with health care and the physical function of a small sample of older rural adults were significantly associated with physical health. And finally this body of work found that among a small sample of older rural adults, most were willing to use APRNs to meet their health care needs.

Implications

Research Implications

APRN SOP. In the first study (Chapter II), evidence of patient outcomes showed no differences when patients were under the care of CRNAs compared to physician anesthesiologists. In the third study (Chapter IV) on an older rural population, the respondents reported being willing to use APRNs for their health care needs. In fact, many provided direct quotes reporting positive experiences with APRNs. To strengthen the argument that patients are willing to use APRNs for their health care needs, future research needs to involve a larger, national sample under the care of all types of APRNs to determine if the willingness to use APRNs stretches across a more generalizable population. Additionally, patient outcome research should begin to examine satisfaction with care under APRNs with full SOP.

Satisfaction with Care. Satisfaction with health care is a nuanced way to engage the patient voice and has a positive influence on health. In the small sample of older rural adults, high ("very satisfied") satisfaction with health care had a positive impact on global physical health. Self-reported health is a known predictor of morbidity, mortality and health-seeking behaviors (Bowling, 2005); thus, the connection to satisfaction with health care should not be overlooked. As mentioned above, satisfaction with care should be explored further for patients

under the care of APRNs at full SOP. More evidence among a larger sample of adults (especially those in rural areas who are at highest risk of experiencing a lack of access to health care) is needed to determine if patient satisfaction under APRNs can lead to a positive self-reported health. Next, research needs to be done to determine if this positive self-reported health leads to improved health-seeking behaviors and reduced morbidity and mortality.

Furthermore, more needs to be known about what aspects of health care patients are satisfied, or unsatisfied with. In order to improve the health care experience for patients, future research can be done to delve deeper into specific aspects of care that are associated with overall satisfaction rating. Specifically, future research could compare age groups to determine the overall satisfaction with care rating among the different age groups (e.g. young adults compared to older adults). Future research could also separately examine the satisfaction rating of adults who are healthy and adults with comorbidities who require chronic health condition management.

In the second study (Chapter III), those at highest risk of having poor health effect had a chronic health condition, were current smokers, and physically inactive. Measuring satisfaction with health care among those at greatest risk of having poor health is an important next step in research. Chronic health symptom management and health promotion interventions (e.g. smoking cessation, improved physical activity) are basic health care needs in this sub-group. Satisfaction with health care was associated with high self-reported physical health in the study presented in Chapter IV. Longitudinal research is needed to determine the directionality of association as it is also possible that the reverse association is true – that is, those reporting poor health are not satisfied with their health care.

Social Determinants of Health. Across the three studies, various social determinants of health were identified. Namely, public policies (affecting APRN SOP, shortages of health care providers in rural regions, allocation of federal spending to non-rural regions), socioeconomic status, health behaviors and biologic factors. Across all three studies, it was evident that any one social determinant of health alone has an impact on health equity. Yet, the predominant interest of this dissertation was the cumulative impact on health that multiple social determinants of health have on a vulnerable population (i.e. older, rural adults). For example, in Chapter II, review of literature revealed that APRN SOP restrictions perpetuated lack of access to care in rural regions. Also, Chapter III results indicated that rurality put older adults at greater risk of poor health effect.

National surveys like the BRFSS have successfully provided population-level health information. Telephone surveys are limited to who is randomly selected from a landline and cellphone database, but are limited to who answers and responds to such a survey. According to the American Association of Retired Persons (AARP), households without both landline and cell phone service has increased to 3.7% in 2017 (Gibson & AARP, 2018). Often, vulnerable populations can be missed. For this reason, probability weighting (currently using the raking technique) and stratifying of the data is necessary (CDC, 2020); however, there remains the risk of not actually representing the voices of those who did not respond. Generalizations on a particular vulnerable population might prevent proper policy change to improve health equity, particularly on the marginalized populations (e.g. immigrants). This supports the need to directly target the disenfranchised populations in empirical studies with culturally sensitive methods. While the BRFSS has proved successful in capturing the general health of the nation, perhaps a more targeted approach to capture the most vulnerable populations (e.g. older rural adults, racial/ethnic minorities) could give more insight into the health challenges of those at most risk for poor health. Recently, the CDC (2020) has been piloting different methods to use for future use in the BRFSS to enable capturing a broader population.

Theoretical Implications

Approaching health equity from multiple perspectives (i.e. political and health system factors, intermediary and structural determinants of health and their impact on health equity), the findings of this dissertation provides support for the CSDH conceptual framework presented by the WHO (2010). Health equity, as defined by the CSDH, is "the absence of unfair and avoidable or remediable differences in health among social groups" (WHO, 2010, p. 4). As stated in the CSDH executive summary, the framework is intended to "guide empirical work to enhance our understanding of determinants and mechanisms and guide policy-making to illuminate entry points for interventions and policies" (WHO, 2010, p. 3). The comprehensive framework was chosen to guide this dissertation because it is all-encompassing of factors that can influence achieving health equity, and is therefore a great framework for this program of research. Additionally, the model was chosen for its unique ability to approach health equity from both a macro and a micro outlook to guide action. The model for the framework (Figure 1) involves a bi-directional loop linking political and economic mechanisms with socioeconomic position/status (i.e. income, education, occupation, gender, race/ethnicity); the socioeconomic position gives rise to intermediary determinants of health (e.g. behavioral factors and conditions of living) that ultimately lead to health status, while considering the influence of the health system (WHO, 2010). The framework also accounts for psychosocial stressors, relationships, living and working conditions, social support, and health behaviors (e.g. smoking, nutrition, exercise) (WHO, 2010). The ultimate goal of the framework is empowerment of the individual to be able to achieve health equity. (WHO, 2010). While the framework model flows in both directions depicting the social determinants of health affecting health equity, and the reverse of health inequity affecting socioeconomic position, health behaviors, etc., this current body of work was limited to examining cross-sectional associations hypothesized in one direction. Clearly going forward longitudinal models that can examine these bi-directional and recursive associations are needed.

Each specific aim of the dissertation was guided by the CSDH framework to pinpoint how implicit or explicit vulnerabilities interfere with health equity. The first aim focused on APRN SOP policy. Health policies, such as SOP restrictions, fall on the left side of the model under the "socioeconomic and political context" section. The implementation of restrictions on full SOP for APRNs in many states limits the number of health care providers people can use for their health care needs, especially in areas where severe shortages of physicians occur (e.g. rural areas). The CSDH framework identifies government as holding the highest responsibility for protecting health equity (WHO, 2010). APRN SOP restrictions are avoidable, and restrictive policy by the state governments is only perpetuating health inequities among vulnerable populations.

The second aim was guided by the framework to focus on socioeconomic position, health behaviors, and biologic conditions to determine what social determinants of health were associated with poor health from a macro level (i.e. recent large national sample). Whereas, the third aim used the framework to approach the social determinants of health from a more individualized understanding (i.e. small local sample of older, rural adults at high risk for health inequities). In the construction of the CSDH framework, it was understood that implementing action on social determinants of health from an individual level was not enough to have a greater impact on a vulnerable population (WHO, 2010). Instead, a fusion of individual desire for health equity and commitment to structural change from governing bodies is necessary to facilitate health equity: "action on the social determinants of health inequities is a political process that engages both the agency of disadvantaged communities and the responsibility of the state" (WHO, 2010, p. 22).

The impact that social determinants of health have on health status and health equity is a well-known and well-studied topic. Yet, the health system and public policies continue to put vulnerable populations at a disadvantage. Future use of the CSDH framework could focus more on the reverse effect of health inequity, through targeting those experiencing poor health and studying the impact that poor health has on both socioeconomic position, health behaviors, and psychosocial factors. The nursing metaparadigm (i.e. person, health, environment, nursing) broadly encompasses the components within the CSDH framework, but adds the concept of nursing as a component of *action*. Although every nursing theorist defines nursing differently, the commonality among the definitions is the action of empowering people to achieve health. The use of the CSDH framework from a nursing perspective can help incorporate the action piece into implementing change to prevent barriers to health.

Clinical Implications

APRN SOP Restrictions. This program of research supports three important clinical implications. First, lifting APRN SOP restrictions is necessary to promote health and health equity, especially among vulnerable rural populations. Continuing to restrict APRNs from using their full SOP in the clinical setting is perpetuating health inequities.

Nationally, state restriction of APRN practice has been deemed an interference with innovation, access to patients, and limits the number of providers who can give safe, cost-

effective health care (Lugo, O'Grady, Hodnicki, & Hanson, 2007). Recently, during the Covid-19 pandemic, APRN practice restrictions were suspended in many states to help offset the surge of patients burdening the health care system (AANP, 2020). APRNs quickly stepped up to the front lines to help the influx of patients suffering from Covid-19. The pandemic has resulted in an acute need for clinicians with airway, ventilator management, and critical care skills. This indicates an understanding of the ways in which CRNAs can mitigate burden on physicians during a surge of critically ill patients. The global pandemic has revealed extreme gaps in the country's health care system, leaving racial/ethnic minorities and those of lower socioeconomic status at greater risk of contracting, spreading, and having complications from Covid-19. Despite this example that proved both an urgent need for autonomous APRNs and their value in managing a very challenging time in health care, many states are choosing to relinquish the temporary lifting of restrictions on SOP now that the surge of the pandemic has begun to subside. As shown in Chapter II, state health care policy decisions continue to be based on reasons beyond evidence and patient outcomes. This is a very critical time to act and change health care policies to fill the gaping voids. Specifically, implicit and explicit racism among health care providers and health policy makers has put racial/ethnic minorities at a dangerous disadvantage for poor health and health inequities (Williams, Lawrence, & Davis, 2019). Rural areas have growing populations of racial/ethnic minorities, with fewer resources available, as well as physician shortages; these factors put the rural population at particularly high risk for contracting, spreading, and having complications from the Covid-19 pandemic. Additionally, the Covid-19 virus has been shown to disproportionally affect older adults, those living in nursing homes, and racial/ethnic minorities.

The Massachusetts Health Policy Commission (HPC) (2019) was established in 2012 to analyze health care costs and spending, and make recommendations to enable an "efficient, high-quality health care delivery system" (p. 5). While Massachusetts health care spending is below the national average, it continues to steadily climb (Massachusetts HPC, 2019). There are many areas to reduce health care costs; for example, low value care (tests, services, screenings deemed unnecessary and wasteful) accounted for \$80 million dollars over two years (Massachusetts HPC, 2019). Furthermore, Massachusetts experienced an increase in the 30 day readmission rate in 2017, even with Medicare patients (while the national rates decreased for Medicare patients) (Massachusetts HPC, 2019). While increased hospital admissions can be considered a negative finding, the fact that community-based hospitals saw an increase in admissions to treat conditions appropriate for community setting could indicate an improved use of the system (Massachusetts HPC, 2019). The HPC (2019) recommends addressing the social determinants of health with flexible funding to improve access and health outcomes, as well as strengthening the health care workforce by allowing APRNs to practice at their top-of-license.

The IOM (2011) urges nurses to be leaders in transforming health care; telehealth is a prime example of innovation in health care where nurses can lead change. Telehealth services can provide quality care at a lower cost to those who cannot access services safely (e.g. during a pandemic) or in a timely fashion (e.g. rural areas) (Massachusetts Health & Hospital Association, 2017). The Health Resource and Service Administration (2019) defines telehealth as "the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health and health administration" (para 1). In their article on the role of nurses in health care reform, Fathi, Modin, and Scott (2017) discuss the reasons why nurses are professionally positioned to advance

telehealth: "As clinicians, educators, researchers, advocates of policy, and as transformational leaders, nurses need to practice at the fullest extent of their education and training in order to derive their professional potential for all involved. Nursing practice, at its full scope, must include continued reform to develop and deliver telehealth services" (para 30). With policy change to remove restrictions on APRN practice, NPs could be more accessible to their patients with telehealth services, without having to rely on physician oversight by physicians who do not know the patients. In the study on a small sample of older rural adults in Massachusetts (Chapter IV), the majority of the respondents were open to using APRNs for their health care needs to some extent. Furthermore, a third of the sample experienced delayed health care, mostly due to lack of transportation to appointment or long wait times. Telehealth services conducted by APRNs could quickly eliminate these delays in care received, especially in a population who is willing to use APRNs for their health care needs.

Promoting Physical Function of Older Rural Adults. The second clinical implication of this program of research is how the preventative health in the older rural population can be broached from a focus on physical function. In the second study on the large national sample, those at highest risk for poor health were older, rural, physically inactive, and had a low body mass index. The idea of health has shifted from simply the absence of disease to an individual's *functional ability* (WHO, 2020) or ability to engage with life (Rowe & Kahn, 1997; Rowe & Kahn, 2015); yet, individuals can only achieve health when they are given a fair chance to experience it (Braveman & Guskin, 2003; WHO, 2019). Given the aging population and the apparent association of risk for poor health (e.g. rurality, chronic health conditions, oldest age groups, reduced physical function, etc.), there is an urgent need to refine both an understanding

of and ability to promote health and successful aging for the older population to offer an equitable chance to experience health.

The CDC launched an initiative, *The Health Impact in 5 Years* (HI-5) to foster improvements in health within communities by targeting specific health outcomes that are affected by the social determinants of health (CDC, 2018). Additionally, the CDC has reprioritized preventative strategies due to concerns the death rates will rise again (HHS, 2017). While mortality rates from the leading causes of death in the U.S. have steadily declined since 1969 (Weir et al., 2016), individuals are now living longer with chronic disease symptoms, such as depression and anxiety, which can be predictors of poor health outcome (Palacios, Khondokerb, Manne, Tyleec, & Hotop, 2018). The findings of the study on an older, rural population (Chapter IV) introduced an opportunity to better use APRNs for those at highest risk for poor health and decreased access to health care. APRNs can institute preventative health measures, such as health screening tools (e.g. blood pressure, blood sugar, BMI), education on age-appropriate healthy diet and exercise plans, and provide services needed to diagnose and treat chronic health conditions.

Satisfaction with Health Care. Finally, satisfaction with health care directly impacts self-reported health and needs to be explored in greater detail to determine which aspects of care individuals prioritize. For instance, in the third study presented in this dissertation, more than half of the sample of older, rural adults in Massachusetts were very satisfied with their health care and the rest somewhat satisfied. However, about a third of the sample experienced delays in receiving health care due to lack of transportation to the appointment or long wait times. While the sample lacked diversity in both racial/ethnic backgrounds, education, and socioeconomic status, this finding could imply that delayed care is not enough of a reason to lead to

dissatisfaction with health care. Further inquiry is needed to determine an association. Moreover, the sample of older, rural adults emphasized *trust* and *confidence* in their health care providers, which may have a stronger influence on how satisfied they are with their care. This supports what is already known – factors beyond patient experience account for satisfaction in health care access (Bleich, Ozaltin & Murray, 2009).

Strengths. This program of research has a number of strengths. Tackling health equity requires strategies from multiple approaches and multiple levels of inquiry. This dissertation includes a thorough review of the literature, an examination of large national data, and an examination of a small targeted population of older adults. Through careful consideration of multiple factors along the CSDH framework, the cumulative findings of this body of work accounted for the impact that many different social determinants of health, including the health system, have on health equity.

Lack of access to health care is the most frequently cited health inequity among the rural population (Bolin et al., 2015). Both physician shortages in rural areas (MAAC, 2018; Massachusetts Department of Public Health, 2014) and physician burnout (Shanafelt et al., 2015) has been linked to reduction in access to health care, health care quality, and patient safety (Lyndon, 2016). The burden on physicians in rural areas could be alleviated by allowing APRNS to provide high quality, safe care to patients. The thorough review of the literature on CRNA practice and SOP policy provided clarity and support for policy makers to put patients before antiquated policies that favor physician group lobbying and remove restrictions on APRN SOP.

Using a large national sample first helped determine the populations at greatest risk of experiencing health inequities through the use of a nationally representative sample from the most recently available data to study health equity from a social justice perspective. This guided

the next study and sample selection, providing a template for future research on the older, rural population. Additionally, the tools used to measure both predictor and outcome variables (e.g. self-reported mental and physical health, satisfaction with health care, physical function, etc.) are robust, validated measures. The pilot study (Chapter IV) was one of the first known studies to allow older, rural adults to tell their health story through both quantitative survey questions, as well as open-ended questions to hear directly from those at high risk for health inequities. Furthermore, the study indicated the novel approach to understanding the patient experience through measuring patient satisfaction. The findings of this body of work were presented in a way that should clarify the need to change antiquated policy that directly interferes with the most vulnerable populations achieving health equity.

Limitations. Despite the many strengths of this body of work, it is important to note several limitations. The secondary analysis on a nationally representative sample was limited as it examined cross-sectional data, thus hindering the ability to make conclusions or deduct causality on the relationships of the variables across time. Additionally, the analysis was restricted to the data available, which required weighting and stratifying due to low representation of sub-groups, such as rural residents. Furthermore, as with all secondary analyses, the analysis was limited to the variables measured, so the nuance of the data was previously set. For instance, the BRFSS 2018 survey lacked questions on cardiac health markers, such as hypertension and high cholesterol. In the final primary data collection study, the study was limited by a small sample size that lacked diversity in race/ethnicity and socioeconomic status; thus, the findings cannot be generalized. Furthermore, rural populations and challenges are unique across the different states. This supports the need for future research studies on a spectrum of rural populations across the United States. In order to maximize representation

among the rural populations, non-probability, targeted sampling strategies (e.g. snowball sampling) could be implemented to have more diversity among participants.

Conclusion

Health equity is a complex issue. As a result, a step by step approach is needed to achieve the ultimate goal: to empower those experiencing health inequities to be both aware of the problems as well as informed enough to push for change. Thus, each aim of the dissertation served as a cumulative step towards understanding an aspect of the composite goal of health equity. A basic human right is being violated when one experiences inequities in health. Understanding why the experience of health differs among some individuals more than others helps to target change. In this crucial time during a global pandemic that has had a negative impact on the country's economy, it is now more important than ever to find ways to improve the health care system while saving money. The fusion of findings from this body of research has revealed a gap in health care that can be easily filled with simple policy change. APRNs at full SOP can generate means for high quality preventative, cost-saving care, and can better access the most vulnerable populations at a lower cost than physician counterparts.

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