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Self-Rated Health, Healthcare Satisfaction, Healthcare Adherence, and Medical Mistrust: The Moderating Role of Rurality

Stephanie Alu
East Tennessee State University

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by

Stephanie Alu

TABLE OF CONTENTS

Page

ABSTRACT

The current study is part of a broader study called the Women's Reproductive Health Survey (WRHS) which aimed to examine various aspects of women's life experiences. This study examined the moderating effect of rurality on several factors of healthcare in a sample of women between the ages of 18 and 50. Self-rated health (SRH) was hypothesized to predict healthcare satisfaction, healthcare adherence, and medical mistrust. Furthermore, rurality was hypothesized to weaken the relationships between SRH and healthcare satisfaction and adherence; it was further hypothesized to exacerbate the relationship between SRH and medical mistrust. A survey containing a single-item measure of SRH and rurality, a seven-item measure of medical mistrust, and an exploratory measure of both healthcare satisfaction and adherence, was uploaded to the Internet forum Redditt. Participants received informed consent and monetary compensation for their time. Bivariate correlations and moderation analysis was conducted on the resulting data. Self-rated health was found to be a significant predictor of healthcare satisfaction, healthcare adherence, and medical mistrust. Rurality was a nonsignificant moderator. Healthcare systems may consider enhancing patient portfolios with a measure of SRH. This may have implications for improved quality of care and health outcomes. Limitations within the study included the participant demographics, which were mostly White and of a high socioeconomic status, as well as the broader survey from which this study originated. Future studies may consider comparing populations from a high socioeconomic status to populations from a low socioeconomic status.

Self-Rated Health, Healthcare Satisfaction, Healthcare Adherence, and Medical Mistrust: The Moderating Role of Rurality

INTRODUCTION

Previous research has shown that there are many disparities in health care access and service between rural and urban areas within the United States (López-Cevallos, Harvey, & Warren, 2014; Vanderboom & Madigan, 2008). The Federal Office of Rural Health Policy defines rurality as living in a non-metropolitan county, i.e. living in an area of less than 50,000 people (Health Resources and Services Administration, 2017). Rural residents also tend to be older and of lower socioeconomic status than the general population (Rural Health Information Hub, 2017). This income inequality is oftentimes associated with higher rates of mortality caused by health-related problems such as coronary heart disease, malignant neoplasms, cancer, or diabetes (Kawachi & Kennedy, 1999; Vanderboom & Madigan, 2008). Individuals residing in rural areas are also more likely to be chronically ill or have a disability (Vanderboom & Madigan, 2008). According to Spleen, Lengerich, Camacho, and Vanderpool (2014), health care systems in rural areas are often uncoordinated and consist of county health departments and small hospitals with a relatively low presence of specialty care providers. This limited access to specialized care can have a significantly adverse impact on the health of a rural individual and may leave them with unmet health needs. Access to care is in part limited by the availability of services as well as the distance needed to travel in order to receive adequate care. Rural adults oftentimes find travel distance and a lack of quality care as significant barriers to their own health (Vanderboom & Madigan, 2008).

In a study examining health care avoidance among rural populations, Spleen, Lengerich, Camacho, and Vanderpool (2014), found that patients who resided in rural areas are more likely

to delay or avoid emergency care. More specifically, non-Latino black women and women with lower education and income levels, both of which are significantly associated with rurality, are more likely to delay healthcare for breast cancer symptoms (Spleen, Lengerich, Camacho, & Vanderpool, 2014). Another study of rural veterans found that travel distance, lack of quality care, and limited services to be significant barriers to health care with many patients also delaying or avoiding emergency care (Buzza, et al. 2011). Compared to their urban counterparts, rural veterans indicated having a lower health-related quality of life. A study conducted with rural African Americans found that they were more likely to experience circumstances associated with depression and psychological distress such as a high poverty rate, low education, and poor health when compared to their non-Hispanic White and urban peers (Weaver, Taylor, Chatters, & Himle, 2018).

In short, the literature indicates that rurality may be associated with and influence health disparities. Rural residents tend to "smoke more, exercise less, have less nutritional diets, and are more likely to be obese than suburban residents" ("Unite For Sight", n.d., para 6). They also tend to live in neighborhoods that make it less likely to maintain healthy habits like exercise ("Unite For Sight", n.d.). Some rural areas are also more likely to have uninsured residents than urban areas ("Unite For Sight", n.d.). All these factors can adversely impact individual health outcomes. While there is much literature regarding the associations between rurality and health disparities, there is little research indicating the mechanisms through which rurality may also influence other factors related to health and the healthcare system. This study aims to identify the relationship between these factors and the ways in which rurality may influence or moderate this relationship.

Self-Rated Health

Research has shown that an individual's subjective self-perception of their own health is a strong predictor of morbidity and mortality as well as a valid indicator of overall health (Schnittker & Bacak, 2014; Sokol, Ennett, Gottfredson, & Halpern, 2017). Self-rated health reflects an integrated perception of personal health including biological, psychological, and social factors that may not be immediately accounted for during a clinic visit or checkup (Moradi-Lakeh, et al, 2015). Schneider and his co-authors (2004) examined the ways in which one's subjective evaluation of their own health correlated with subjective well-being within an elderly population. They found that the subjective evaluation of one's own health accounted for more factors than just physical health; it also considered overall life satisfaction, anxiety, and even depression. (Schneider, et al, 2004). In a study on healthy elderly adults, Blazer and Houpt (1979) found that those who perceived their health to be poor were more likely to be depressed and dissatisfied with their life. Furthermore, their daily living activities decreased, making them more likely to seek out care (Blazer II & Houpt, 1979). As such, self-rated health (SRH) is the most widely used measure of health across a wide range of studies (Garbarski, 2016).

SRH has been linked to mental health, BMI, preventative health behaviors, suicide ideation, and a twofold higher risk of mortality (Schnittker & Bacak, 2014; Lachytova, Katreniakova, Mikula, Jendrichovsky, & Nagyova, 2017; Schneider, at al, 2004). Other factors that influence one's self-perception of their own health include old age, education, employment, physical activity level, and smoking (Kaleta, Polańska, Dziankowska-Zaborszcyk, Hanke, & Drygas, 2009). In a study conducted with elderly Canadians, SRH was found to be positively related to the number of physician visits but negatively correlated to hospitalization with those rating their health as poor or fair being more likely to be hospitalized or readmitted than those who rated their health as good or excellent (Menec & Chipperfield, 2001). Another study found

that SRH may "influence the frequency of medical consultations and healthcare utilization" (Schneider, et al, 2004, p.228). A study looking at the relationship between SRH and functional ability found SRH to be associated with changes in functional ability over a span of six years with implication for the loss of functional ability in day to day activities (Idler & Kasl, 1995).

Self-Rated Health and Rurality. As evidenced by the literature, SRH is a comprehensive measure of overall health (Schnittker & Bacak, 2014). It captures different aspects of an individual's life and is indicative of numerous health outcomes (Moradi-Lakeh, et al, 2015). This study also aims to examine the influence of rurality as a moderating factor between self-rated health and other health-related factors. Some literature suggests that rurality may exacerbate the already existing connections between SRH and health outcomes. In a rural population of African Americans, SRH was a predictor of increasing mortality (Weaver, Taylor, Chatters, & Himle, 2018). Self-perceptions of one's own health were also significantly associated with depressive symptoms in a rural population of African Americans with poor self-rated physical health correlating with more depressive symptoms (Weaver, Taylor, Chatters, & Himle, 2018). Additionally, over 55% of people living in high-income inequality states who self-reported their household income as below $25,000, a factor which is related to the low-socioeconomic status of rural populations, reported their SRH as being fair or poor (Kawachi & Kennedy, 1999). Despite this, SRH is not always so conclusive. In a study done in rural Appalachia, Griffith and his coauthors (2011) found that respondents tended to report being healthy even when they lived a more sedentary life style, were overweight, or suffered from hypertension. In this instance, they found SRH to be distorted and not correlated with physical or medical health. This runs counter to other studies that have been conducted with rural populations and may indicate that there are other factors related to rurality that may also influence one's self perceptions of their own health.

Healthcare Satisfaction

Satisfaction in healthcare refers to the extent to which patients are happy with the services received and their overall encounter with the health care system, including but not limited, to clinic visits. Factors that influence satisfaction in healthcare range from health outcomes and patient/doctor relationships to the quality of interactions with the healthcare system (Raposo, Alves, & Duarte, 2009). Generally, patient satisfaction encompasses the patients' fulfillment and experience with cost, quality of services, accessibility to services, and the overall wellbeing of the patient (Faezipour & Ferreira, 2013). However, satisfaction in the healthcare system is subjective to the patient's perceptions and expectations of the healthcare system (Urden, 2002). Therefore, when expectations are not met or fulfilled, patient satisfaction is likely to decrease (Urden, 2002).

In recent years, satisfaction has been posited as a quality of care indicator and has been linked to patients' health status, quality of life, and adherence to treatment (Tambuyzer & Van Audenhove, 2015; Molina, Kim, Berrios, & Calhoun, 2015). Among a sample of women, those who reported higher satisfaction in the healthcare system were more likely to have had a recent mammogram than those who reported lower satisfaction (Sheppard, Want, Yi, Harrison, Feng, Huerta, & Mandelblatt, 2008). While higher satisfaction has also been linked to lower instances of emergency room visits, Fenton and his coauthors (2012) also found that greater satisfaction is associated with greater healthcare cost and a statistically significant higher rate of mortality. They posited that patients who had high satisfaction with their care were more likely to request specialized diagnostics and treatment which incurs greater expenses and increases the risks for adverse effects (Fenton, Jerant, Bertakis, & Franks, 2012). Satisfaction in healthcare is also linked to self-rated health. Jang, Giyeon, and Chiriboga (2005) found that the subjective

perception of one's own health is a significant indicator for satisfaction with service from the healthcare system. Likewise, the more satisfied the patient, the more likely they are to rate their own health as excellent (Fenton, Jerant, Bertakis, & Franks, 2012).

There are also many studies in support of a relationship between healthcare satisfaction and healthcare adherence (Thames, et al, 2012; Chang, Uman, Linn, Ware, & Kane, 1985; Taylor, La Greca, Valenzuela, Hsin, & Delamater, 2016). Oftentimes, the two go hand in hand. Patient satisfaction has been found to be the strongest predictor of follow-up medication adherence for African Americans (Thames, et al, 2012). In a group of elderly women, those who had preexisting satisfaction with the health care system were more likely to report their strong intent to adhere to a care plan (Chang, Uman, Linn, Ware, & Kane, 1985). Patient-provider relationship satisfaction has also been associated with increased adherence to treatment (Taylor, La Greca, Valenzuela, Hsin, & Delamater, 2016). Likewise, dissatisfaction is also associated with nonadherence. In a study conducted with people diagnosed with systemic arterial hypertension, it was found that those who were dissatisfied with health care services were nearly two times more likely to not adhere to drug therapy (Barreto, Reiners, & Marcon, 2014).

Healthcare Satisfaction and Rurality. One study did find that overall satisfaction with care was not associated with non-adherence of primary medications indicating that lower levels of satisfaction may not be indicative of lower levels of adherence in a rural population (Wroth & Pathman, 2006). In a study comparing rural and urban patient populations in an Australian emergency department, urban patients were more likely to be satisfied with the care they received than their rural counterparts (Davis & Duffy, 2002). In a study comparing satisfaction levels between rural and urban populations in China, Yan and coauthors (2011) found that age was a significant predictor of satisfaction in rural participants. In both rural and urban

populations, convenience of access to care was also significantly associated with level of satisfaction (Yan, Wan, & Li, 2011). In a population of rural African Americans, those who reported being in good to excellent health were more likely to perceive racial barriers to their healthcare which was, in turn, associated with decreased satisfaction in the care that they received (Fowler-Brown, Ashkin, Corbie-Smith,Thaker, & Pathman, 2006).

Healthcare Adherence

Adherence refers to the ways in which a patient's behavior aligns with the recommendations provided by their physicians (Wroth & Pathman, 2006). Adherence to treatment plans have been positively correlated with effective communication between providers and patients and continuity of care (Safran, Taira, Rogers, Kosinski, Ware, & Tarlov, 1998). Maintaining high levels of adherence to a prescribed treatment plan has also been associated with decreased health costs for patients with hypercholesterolemia and hypertension (Iuga & McGuire, 2014). Furthermore, in patients with diabetes and hyperlipidemia, adherence was shown to decrease medical costs by 15% (Iuga & McGuire, 2014).

Despite this, the literature suggests that nearly half of all treatment plans are not followed by patients (Safran, Taira, Rogers, Kosinski, Ware, & Tarlov, 1998). Nonadherence serves to undermine care, thereby leading to increased morbidity and mortality (Wroth & Pathman, 2006; Thompson & McCabe, 2012). This pattern could lead to potentially avoidable hospitalization which can, in turn, incur clinical and economic burdens (Wroth & Pathman, 2006; Thompson & McCabe, 2012). In fact, 50% of patients suffering from cardiovascular disease are likely to have poor adherence to their medications which could exacerbate their poor health and lead to adverse health outcomes (Iuga & McGuire, 2014). In a study examining the treatment plan adherence of patients with gout, Reach (2011) found that nonadherence or low adherence to the treatment plan

causes a failure to maintain adequate serum urate levels and may increase the number of inflammatory attacks that are characteristic of gout. Moreover, poor adherence to a treatment plan has been found to have adverse effects on the success rate of treatment and can exacerbate the disease progression (Reach, 2011).

Just as healthcare satisfaction plays a role on patient adherence, adherence also influences satisfaction in a reciprocal manner. African Americans who reported better adherence to physician recommendations for treatment also tended to be more satisfied with their healthcare and were therefore more likely to seek care when needed (Bogart, Bird, Walt, Delahanty, & Figler, 2004). Another study found that increasing patient satisfaction mediated the effects of physician communication on adherence (Bartlett, Grayson, Barker, Levine, Golden, & Libber, 1984). In a study focused on HIV care, Dang and coauthors (2013) found that patient satisfaction was influential in adherence to HIV treatment which, in turn, significantly correlated with HIV suppression. The current study was unable to find any literature pertaining to potential associations between SRH and adherence. Therefore, this study would contribute to the literature by determining if SRH is correlated with adherence. A significant finding could potentially have implications for a more wholesome and holistic approach to patient care during interactions between the healthcare system and the patient population.

Healthcare Adherence and Rurality. In a study examining medication adherence among a rural population, Wroth and Pathman (2006) found that the inconvenience of transportation challenges and travel distance associated with rurality had a strong impact on medication adherence with 1 in 5 individuals residing in the rural South reporting delayed or unfilled prescriptions. In another study on HIV positive women in the rural southeast United States, Kempf and coauthors (2010) found that low adherence to HIV medical care, including clinic

visits, were associated with patient/provider relationships, access to transportation, and more. It is interesting to note that one study found the opposite effect. When comparing the levels of antiretroviral adherence between rural and urban veterans with HIV who received their healthcare from the Veterans Affairs (VA), Ohl and coauthors (2012) found that increased adherence was predicted by residence in a rural or remote setting. The authors did note that these results may not be generalizable to rural populations outside of the VA healthcare system (Ohl, Perencevich, McInnes, Kim, Rimland, Akgun,…, & Justice, 2012).

Medical Mistrust

Medical trust refers to the trust that forms based on partnership between the patient and physician, shared goals, and mutual respect (Chow & Ismail, 2017). Consequently, mistrust in the health care system indicates a lack of willingness to seek care and take medical advice, adhere to treatment regimens, or remain with a physician (Hall, et al, 2001; Laveist, Isaac, & Williams, 2009). Medical mistrust in the health care system has often been associated with perceived lower quality of care (Molina, et al, 2015). A large portion of the literature on medical mistrust focuses on its intersection with racial minorities and other underrepresented populations. This is, in part, due to the negative historical experiences of racial minorities in the medical systems (Williamson & Bigman, 2018). Perhaps the most notable historical example of these negative experiences is the Tuskegee Syphilis study, which is often cited as a reason for medical mistrust among African Americans (Brandon, Isaac, & LaVeist, 2005). Brandon, Isaac, and LaVeist (2005) sought to examine the impact of the Tuskegee Syphilis study on racially-based differences in medical mistrust. They found that only two-fifths of both black and white respondents had heard of the Tuskegee study (Brandon, et al, 2005). Of these respondents, even fewer were knowledgeable about the details of the study, including but not limited to, when the

study began and ended, the number of participants, and how the subjects were infected with syphilis (Brandon, et al, 2005). Furthermore, there were significant differences between reports of medical mistrust among blacks and whites with black respondents reporting higher levels of mistrust in the medical system than white respondents, even when controlling for other demographic factors (Brandon, et al, 2005). In another study examining mistrust of the healthcare system in a population of Native Americans with cancer, Native Americans exhibited significantly higher levels of mistrust compared to their white counterparts, even after adjusting for other demographic variables (Guadagnolo, Cina, Helbig, Molloy, Reiner, Cook, & Petereit, 2009). Another study found that racial concordance between the patient and the healthcare system was associated with lower mistrust in the overall system, but not with the specific healthcare provider (Sohler, Fitzpatrick, Lindsay, Anastos, & Cunningham, 2007).

Medical mistrust has also been linked to satisfaction with the healthcare system. One study found that individuals who reported less satisfaction with the healthcare system and who held more negative attitudes were more likely to report greater mistrust (Bogart, et al, 2004). In fact, satisfaction was negatively related to suspicion of the health care system indicating that lower levels of medical mistrust are associated with higher levels of satisfaction (Benkert, Hollie, Nordstrom, Wickson, & Bins-Emerick, 2009). Safran and coauthors (1998) found a nearly fivefold increase in the likelihood of satisfaction with care received among patients who reported high levels of trust as compared to patients who reported median to low levels of trust. In non-Latina groups, trust has often been an important factor that affects satisfaction and health behaviors (Sheppard, Wang, Yi, Harrison, Feng, Huerta, & Mandelblatt, 2008). Women who had high levels of trust in their physicians were more satisfied with their health care experience and, in turn, more likely to adhere to mammograms (Sheppard, et al, 2008). In a population of African

American males with HIV, general medical mistrust was found to predict lower levels of medication adherence over time which, in turn, contributed to poor health outcomes (Dale, Bogart, Wagner, Galvan, & Klein, 2014). In another study examining hypertension control among African American men from the South, Elder and coauthors (2012) found that those who reported higher trust in the medical system were more likely to adhere to their medication.

In the examination of the phenomena of medical mistrust, there have been few studies linking SRH to medical mistrust. One study found that improvements in SRH can lead to increases in generalized trust (Mewes & Giordano, 2017), while another found that the reciprocal relationship of trust between the patient and the provider correlates to improved SRH (Hall, Dugan, Zheng, & Mishra, 2001). The lack of literature looking at the relationship between medical mistrust and SRH highlights a gap in the research. The current study, which aims to examine the relationship between SRH and medical mistrust, aims to bridge this gap and highlight the way in which an individual's self-perception of their own health may affect the levels of trust that they place in the healthcare system which may, in turn, affect their health outcomes.

Medical Mistrust and Rurality. Rural residents have reported poor patient-provider relationships due to mistrust in the health care system (Spleen, Lengerich, Camacho, & Vanderpool, 2014). Spleen and colleagues (2014) found that among a population of rural residents, medical mistrust is oftentimes one of the primary reasons why an individual may delay health care services even when those services are needed. Those who trusted information from their doctors, believed their health information was protected, and were involved in their own health care decisions were less likely to avoid care (Spleen, et al, 2014). Furthermore, those who report lower levels of mistrust were more likely to utilize health care services and be satisfied

with the services that they received (Spleen, et al, 2014). In a rural population of Latinos, medical mistrust was negatively associated with healthcare satisfaction (López-Cevallos, Harvey, & Warren, 2014). Moreover, mistrust was found to have more of an impact on satisfaction than the health visit itself (López-Cevallos, Harvey, & Warren, 2014). Some literature suggests that the effects of mistrust in a rural population can also be seen in urban populations. One study found that for both rural and urban respondents, mistrust in physicians was significantly associated with nonadherence to the physicians' orders (Harju, Wuensch, Kuhl, & Cross, 2006). Moreover, lower levels of mistrust is often correlated with higher levels of treatment adherence even among rural populations (Gabay, 2016; Hall, et al, 2001; Wroth & Pathman, 2006).

Current Study

Currently, the existent literature contains a multitude of studies on SRH, healthcare satisfaction, healthcare adherence, medical mistrust, and the role of rurality in healthcare. However, to date there are no studies that have examined the relationship between SRH, healthcare satisfaction, healthcare adherence, and medical mistrust. Additionally, no existing studies have examined the effects of rurality on this relationship. Therefore, the purpose of this study is to examine the relationship between SRH and healthcare satisfaction, SRH and healthcare adherence, and SRH and medical mistrust. Lastly, rurality will be examined for its potentially moderating effects on each of these relationships. This study, which utilizes a sample of only women, is an important addition to the literature as it may speak to certain challenges that stand in the way of quality care provided to women within a rural population and may indicate a need for more holistic measures to be implemented within the care plan in order to ensure better patient outcomes.

Hypotheses

The current study aims to utilize three separate moderation models (see Figure 1) to examine the relationship between the following factors: SRH and healthcare satisfaction, SRH and healthcare adherence, SRH and medical mistrust, and the moderating role of rurality on each relationship. The following hypotheses will be examined.

Hypothesis 1. It is hypothesized that SRH will be significantly correlated to healthcare satisfaction such that as SRH increases, healthcare satisfaction also increases. Those who view their perception of their own health as good or excellent are likely to also be satisfied with the care that they receive. It is further predicted that rurality will have a moderating effect on the relationship between SRH and healthcare satisfaction by weakening this relationship.

Hypothesis 2. It is similarly hypothesized that SRH will be significantly correlated to healthcare adherence such that as SRH increases, healthcare nonadherence decreases. Those who view their self-rated health as good or excellent will be more likely to adhere to treatment regimens. It is further predicted that rurality will also weaken the relationship between SRH and healthcare adherence.

Hypothesis 3. Lastly, it is hypothesized that SRH will be significantly correlated to medical mistrust with higher levels of SRH correlating to lower levels of medical mistrust. Those who rate themselves as having good to excellent health will be likely to place greater trust in the medical system and, therefore, exhibit lower levels of mistrust. It is predicted that rurality will further exacerbate the relationship between SRH and medical mistrust.

METHODS

Study Design & Participants

This study includes specific data from a broader survey called the Women's Reproductive Health Survey (WRHS) which addresses a large variety of health-related factors including reproductive health outcomes, mental health issues, and stressful life experiences. Participants included women between the ages of 18 and 50 (M = 30.3, SD = 4.8) from a variety of demographic backgrounds including both urban and rural populations. 203 participants lived in a very rural, moderately rural, or slightly rural area. The estimated household income of participants ranged from less than $15,000 to greater than $200,000, with 41% of participants reporting an income of $100,000 to $200,000. Most of the participants (87.7%) were White.

Participants were recruited from a litany of subreddits on the popular Internet forum, Reddit, a website where users can share content and discuss the contents related to a subreddit. Subreddits are online communities dedicated to specific topics such as life experiences, politics, special interests, and health. For example, the WRHS recruited participants from the following subreddits: Breastfeeding, WomensHealth, and FemmeThought (see Appendix for a full list of all subreddits). Because the WRHS utilized social media for recruitment, participants were not limited to U.S. residents. Therefore, responses to the survey were collected from women of several different nationalities. Due to differences in healthcare laws, cultural health stigmas, and health perceptions, only participants who reside in the USA were included in analysis as participant responses from other countries may introduce extraneous variables to the results. The WRHS also included participants who reported their current pregnancy status and if they have ever or are currently experiencing infertility. Infertility may have the potential to influence one's self-perception of their own health; therefore, it may also confound the results of the relationship between SRH and the factors that the current study aims to examine. Consequently, the current study will not include women who reported having experienced infertility. Participants were also

asked to provide information regarding their demographics including age, ethnicity, sexual orientation, household income, and education level.

Procedure. Moderators of each subreddit were contacted, notified of the study, and permission was requested to post and repost the study. Once permission was obtained, a link to the WRHS was posted on the subreddit. Because of the nature of Reddit, the link was subject to removal at the discretion of the moderators who ensure that the content within each subreddit is within topic and unoffensive to the members in its community. Women who were active within the subreddit were able to voluntarily access the link on their own personal devices and complete the survey. The survey was untimed and allowed participants to leave the survey and later return to it while ensuring that all responses were saved. The survey was linked to the online system REDCap. REDCap is an online software that uses a secure web connection with authentication and SSL encryption to collect data and ensure privacy protection. It is compliant with HIPAA, 21 CFR Part 11, FISMA, and international standards. In order to ensure privacy and anonymity of participant response, no participant can be linked to their survey responses.

At the start of the survey, participants provided their informed consent as well as verified that they were female between the ages of 18 and 50. Participants were able to leave the survey and return without losing any responses. REDCap provided participants with a return code and link to the survey with their personal responses. The survey in its entirety ranged from 30 minutes to 75 minutes due to the branching of survey questions. The branching method of the survey ensured that participants only answered questions related to their experiences. For example, a participant who indicated they had never been pregnant or had children would not receive questions pertaining to breastfeeding or pregnancy. Participants were always given an option to decline to answer any question within the survey.

Once participants completed and submitted the survey, participants could choose to be entered into a drawing to win a $75 Amazon electronic gift card. A link was provided at the end of the survey which directed participants to another page. They could then choose to share their email address. Due to the encrypted nature of REDCap, email addresses cannot be linked to any of the answers from the survey. At the end of the overarching Women's Reproductive Health Survey study, one random email was chosen to win the gift card. The winning individual was emailed the $75 Amazon electronic gift card.

Some of the questions asked within the overarching study were sensitive in nature. At the end of the survey, the following resources were provided should any participant be upset or distressed by the survey: Crisis Hotline, The National Infertility Association, Postpartum Support International, National Center for Posttraumatic Stress Disorder, National Sexual Assault Hotline, National Alliance on Mental Illness, and Solace for Mothers.

Measures

Self-Rated Health (SRH). In the current study, participants' self-rated health (SRH) was captured by a single-question item that asked, "How would you rate your health in general?" Responses were presented on a five-point Likert scale in the following response order: Poor, Fair, Good, Very Good, Excellent, Decline to Answer. Garbarski, Schaeffer, and Dykema (2018) examined the influence on respondent's answers and overall quality of this single-item question by manipulating the response option order and the scale orientation. There were no effects of the response scale orientation (vertical, horizontal, or banked) on the quality of the SRH questionnaire and no association between scale orientation and response option order. Effects on response option were observed. The mean SRH and the proportion of respondents who rated their health as "excellent" or "very good" were higher and the proportion of respondents who

rated their health as “fair” or “poor” were lower when the response options were ordered from “excellent” to “poor” compared to “poor” to “excellent”. Therefore, our survey utilized a response order from poor to excellent. SRH remains a valid indicator for overall health not only because of its strong predictor of mortality but also because individuals are likely to consider more inclusive and holistic factors than are able to be captured on a survey instrument or in a routine clinical examination (Schnittker & Bacak, 2014).

***Healthcare Satisfaction and Adherence*.** Johns Hopkins Bloomberg School of Public Health (2003) conducted a survey measuring medical mistrust. In the survey, they also looked at 17 items measuring health care utilization. For this study, nine of the 17 items were utilized and further distinguished between health care satisfaction and healthcare adherence (Table 1 and Table 2). Four of the nine items were coded as health care satisfaction, and four of the nine items were coded as health care adherence. The four health care satisfaction items and the four healthcare adherence items were each summed separately for an overall score of healthcare satisfaction and an overall score of healthcare adherence. Healthcare adherence items were reverse scored so that lower scores corresponded with increased adherence and higher scores corresponded to increased nonadherence. Healthcare satisfaction items were scored such that lower scores corresponded to increased satisfaction and higher scores corresponded to increased dissatisfaction. Johns Hopkins used this scale as an exploratory self-report measure, and because it is not yet a psychometrically validated questionnaire, this study will also be utilizing it as an exploratory self-report measure. Furthermore, Gill and White (2007) found that there is little standardization, reliability, and validity for current theoretical or conceptual development of the satisfaction construct.

Medical Mistrust. The Medical Mistrust Index (MMI) is used to measure participants' mistrust in the healthcare system and healthcare organizations. Previous scales such as the Trust in Physicians Scale (TIPS) fail to apply to patients with whom a physician is not their primary source of care as is often the case in rural populations who tend to rely primarily on clinics and emergency rooms (LaVeist, Isaac, & Williams, 2009). LaVeist, Isaac, and Williams (2009) aimed to validate an instrument to measure general mistrust in health care organizations. They conducted a telephone survey with 401 respondents who completed a baseline interview and 327 who completed a follow-up interview. The sample was predominantly African American. A 17-item Medical Mistrust Index (MMI) was used to measure mistrust in the sample. The questionnaire consists of a four-point Likert scale with the codes "strongly disagree", "disagree", "agree", and "strongly agree". Validity of the MMI was measured using Pearson correlation against the TIPS and the Generalized Trust Scale (GTS). MMI was significantly correlated with both TIPS (r = -0.232, $p < 0.0001$) and the GTS (r = -0.151, p= 0.006). Though these correlations were not strong, the correlations suggest that the MMI measures a related but distinctly different aspect of mistrust. MMI was correlated with race (r = -0.183, p = 0.01) and education (r = 0.115, p = 0.02). Internal consistency of the 17-item MMI was analyzed and resulted in a two-factor solution with seven of the 17 items loading on a factor above 0.5. The seven items had a reliability coefficient (Cronbach-alpha) of 0.76. Test-retest reliability had a correlation of 0.697 for all seven items with all correlations being significant at $p < 0.0001$.

This study will utilize the seven-item MMI (Table 3) and maintain the original Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Items will be summed with scores ranging from 7 to 28. Higher scores indicate higher levels of medical mistrust while lower scores indicate low levels of medical mistrust.

Rurality. Rurality was measured by a self-report of the area in which participants were raised. Participants had the option to choose between "very rural", "moderately rural", "slightly rural", "suburban", "moderately urban", and "very urban". Responses indicating a rural background were used in the current study as a moderator.

Statistical Analysis

This study seeks to analyze three different moderation models (Figure 1). In order to examine these three moderation models, three different statistical analyses are required. However, to ensure that the appropriate number of participants were recruited and included within the current study, a G-Power analysis was conducted. A total of 68 participants were needed to detect a medium effect size (0.15) at an alpha error probability of 0.05 and a power of 0.8. As the Medical Mistrust Index was the only formalized measure used in this study, Cronbach's alpha was only calculated for the Medical Mistrust Index to ensure reliability. Cronbach's alphas were not calculated for SRH or rurality because both are single-item factors, nor was it calculated for healthcare satisfaction or healthcare adherence due to a lack of formalized and vetted psychometrics (as well as the short, four-item nature of both scales). Bivariate correlations will be conducted to determine the strength of the correlations using Pearson's coefficient, *r*. Correlations in which *r* is greater than 0.8 will be further analyzed and potentially combined as one measure or discarded from the study as this likely indicates multicollinearity.

Covariates which could influence the results of these models will be controlled for. These include age, race, and socioeconomic status. Age will be controlled for since health issues are likely to increase with age. Race will be controlled for due to historically race-based negligence and maleficence in healthcare towards racial minorities (Brandon, Isaac, & LaVeist, 2013).

Lastly, socioeconomic status will be controlled for as lower socioeconomic status has been suggested to influence medical mistrust in women (Ahmed, Winter, Albatineh, & Haber, 2012). Covariates that are not significant influencers to the current study will be dropped from the final model for the sake of parsimony. All statistics will be analyzed using SPSS v. 25. Moderation analyses will be conducted using Hayes Process Macro with bootstrapping (5000 iterations) via SPSS v. 25.

RESULTS

Self-rated health scores ranged from 1 to 5, with lower numbers indicating poor SRH and higher numbers indicating excellent SRH (M = 3.42, SD = .914). Healthcare adherence scores ranged from 0 to 4, with lower scores indicating higher adherence and higher scores indicating higher nonadherence (M = 1.38, SD = 1.3). Healthcare satisfaction scores ranged from 4 to 16 with lower scores indicating higher satisfaction and higher scores indicating dissatisfaction (M = 6.26, SD = 2.44). Medical mistrust scores ranged from 7 to 28 with lower scores indicating less medical mistrust and higher scores indicating more medical mistrust (M = 18, SD = 3.95).

Bivariate correlations revealed several significant correlations at an alpha-level of .05 and .01. Rurality was significantly correlated with healthcare dissatisfaction ($r(388) = -.101$, $p < .05$). SRH was significantly correlated with nonadherence ($r(480) = -.263$, $p < .01$), dissatisfaction ($r(388) = -.145$, $p < .01$), and medical mistrust ($r(494) = -.119$, $p < .01$). Nonadherence was also significantly correlated with dissatisfaction ($r(367) = .290$, $p < .01$) and medical mistrust ($r(464) = .219$, $p < .01$). Dissatisfaction was significantly correlated with medical mistrust ($r(372) = .258$, $p < .01$).

In order to examine the potential moderating effect of rurality on the relationship between SRH and healthcare satisfaction, SRH and healthcare adherence, and SRH and medical mistrust,

Hayes PROCESS Macro with bootstrapping (5000 iterations) via SPSS v. 25 was used to conduct moderation analysis.

Hypothesis 1. Moderation analysis was conducted to examine the potential moderating effect of rurality on the relationship between SRH and healthcare satisfaction. As none of the included covariates were significant, all were dropped from analysis. Results showed that SRH significantly predicted dissatisfaction, (b = -0.345, t(383) = -2.15, $p < 0.05$), though rurality did not (b = 0.155, t(383) = 0.155, p = 0.88). The interaction of rurality and SRH was also found to be nonsignificant, (b = -9.215, t(383) = -0.75, p = 0.45); therefore, rurality failed to moderate the relationship between SRH and dissatisfaction (F(3,383) = 4.74, R^2 = 0.036).

Hypothesis 2 Moderation analysis was conducted to examine the potential moderating effect of rurality on the relationship between SRH and healthcare adherence. In this model, income remained a significant covariate ($p < .01$) and remained in the analysis while all other covariates were dropped. Results showed that SRH significantly predicted nonadherence (b = -0.36, t(460) = -4.68, $p < .01$). Results also demonstrated that rurality did not significantly predict nonadherence (b = -0.33, t(460) = -0.69, p = 0.49). The interaction between rurality and SRH was also found to nonsignificant (b = .049, t(469) = .359, p = .72); therefore, rurality failed to moderate the relationship between SRH and nonadherence (F(4,460) = 13.5, R^2 = .11).

Hypothesis 3 Moderation analysis was conducted to examine the potential moderating effect of rurality on the relationship between SRH and medical mistrust. As none of the included covariates were significant, all were dropped from analysis. Results showed that SRH significantly predicted medical mistrust, (b = -.518, t(489) = -2.22, p = .026). Results also demonstrated that rurality did not significantly predict medical mistrust (b = -.024, t(489) = -.016, p = .99). The interaction between rurality and SRH was also found to be insignificant (b = -

.014, $t(489) = -.034$, $p = .97$), therefore rurality failed to moderate the relationship between SRH and medical mistrust, ($F(3,489) = 2.4$, $R^2 = 0.015$).

DISCUSSION

Previous literature has found self-rated health to be a significant indicator of satisfaction in the healthcare system (Jang, Giyeon, & Chiriboga, 2005). This study hypothesized that as SRH increased, dissatisfaction would decrease. Analyses found that SRH did significantly predict dissatisfaction, thereby supporting the original hypothesis and adding to the existing literature. Other studies have found self-rated health and healthcare satisfaction to have a reciprocal relationship with both factors being linked to a patient's overall health status and quality of life (Schnittker & Bacak, 2014; Sokol, Ennett, Gottfredson, & Halpern, 2017; Tambuyzer & Van Audenhove, 2015; Molina, Kim, Berrios, & Calhoun, 2015). Healthcare professionals may want to consider enhancing patient portfolios to include questions related to their self-rated health which may help make an evaluation of their overall satisfaction with the healthcare system more robust. Because SRH reflects an integrated perception of personal health including biological, psychological, and social factors, including SRH may provide a more accurate understanding of patient's satisfaction (Moradi-Lakeh, et al, 2015). Healthcare professionals would have a better understanding of the a patient's overall health status and use this information to guide the way in which physicians interact with their patients. This may give physicians a unique opportunity to directly influence patient satisfaction based on their understanding of the patient's SRH. Increasing patient satisfaction may increase the likelihood of patient's adhering to care plans and working with the healthcare system rather than against it. This has implications for patient's health outcomes and may improve their overall health and quality of life.

Furthermore, this study found SRH to be predictive of nonadherence, such that as SRH increases, nonadherence decreases. Previous studies have only indirectly linked SRH to adherence through its association with satisfaction. This finding bridges this gap in the literature by indicating SRH as an indicator of patient adherence. Because adherence captures the ways in which patient's behaviors align with physician recommendations, including but not limited to treatment plans and medication adherence, it is often also associated with morbidity and mortality, just as SRH is (Wroth & Pathman, 2006; Thompson & McCabe, 2012). This association has clear indications for patient outcomes and highlights the way in which a patient's self-perception of their own health may influence their willingness or ability to adhere to physician recommendations. By evaluating a patient's SRH, physicians may be better equipped to understand their patients in order to better determine how to approach conversations and establish a relationship with their patient in order to provide quality care and ensure better health outcomes.

Mistrust in the health care system indicates a lack of willingness to seek care and take medical advice, adhere to treatment regimens, or remain with a physician (Hall, et al, 2001; Laveist, Isaac, & Williams, 2009). SRH was also found to be predictive of medical mistrust such that as SRH increases, medical mistrust decreases, thereby supporting the original hypothesis and adding to the gaps in the literature. It is important to note that analysis of the data also found correlations between adherence and satisfaction with medical mistrust. In the current study, SRH predicted both satisfaction and adherence. This indicates that all four factors are intrinsically linked. It is likely that those who indicate having high SRH, may be less likely to mistrust the healthcare system. This may also have implications for the patient's satisfaction with the healthcare system and willingness to adhere to a care plan. Therefore, improving healthcare

system to patient trust may, in turn, lead to better health outcomes. This indicates that an evaluation of patient's SRH may be beneficial information for healthcare systems.

For all models, rurality was not found to be a significant moderator, indicating that other factors may play a larger role in these relationships. It is important to note that while rural populations are often associated with health disparities that may influence their access to specialized or quality care, rurality itself may not exacerbate the relationships between SRH and satisfaction, adherence, and mistrust. Instead, it is likely that specific factors related to, but not unique to, rural populations may have more of an influence on these relationships. These specific factors associated with rurality that may impact these relationships includes convenience of access and distance to a healthcare setting (Yan, Wan, Li, 2011).

LIMITATIONS

Limitations within the study may play a role in the rurality's lack of significance as a moderator. As aforementioned, most participants in this survey identified as being White. Minority individuals of rural background are more likely to experience circumstances, such as a high poverty rate which is associated with poor health when compared to their White and urban counterparts (Weaver, Taylor, Chatters, & Himle, 2018). Therefore, the lack of diversity participant population may have limited the effects of race on the data which limits its generalizability to a larger population. Furthermore, White individuals tends to be less likely to mistrust the medical system than their minority counterparts, which may in turn have had implications for the participants samples satisfaction, adherence, and SRH.

Most participants reported being from a high socioeconomic class, indicating that they may have the means to access specialized and quality care, pay for the cost of medications, and maintain an overall healthier lifestyle. In fact, income was found to be a significant covariate in

the relationship between SRH and adherence. This finding indicates that despite coming from a rural background, participants within this survey were likely to still be able to access necessary care as a result of their household income.

This study originated from a larger study called the Women's Reproductive Health Survey (WRHS). The WRHS was limited to a population of women and aimed to capture life experience including but not limited to pregnancy, infertility, breastfeeding, adverse life experiences, and sexual trauma. Due to the self-report nature of the survey, it is possible that participants may have reported responses that do not accurately reflect their experiences and beliefs because of the sensitive nature of the questions. Furthermore, the WRSH utilized a branching method for the survey. For example, respondents who indicated being infertile received questions about fertility treatments, but not about pregnancy and breastfeeding. Likewise, respondents who reported being pregnant where asked questions related to pregnancy. Because of this, it is possible that some respondents may have received questions about one factor related to the current study, but not another factor. This is also reflected in the number of responses for each factor used in the current study. The number of responses were not consistent for each item. This makes it possible that participants either declined to answer the question or failed to receive the question entirely.

FUTURE STUDIES

Despite the limitations of the study, the results of these analyses highlight the need for healthcare organizations to evaluate the ways in which patient's self-perceptions of their own health plays a role in both the patient's relationship to the healthcare system as well as their relationship to their physicians. Future studies should consider expanding the population to be more representative of diverse backgrounds, including a larger population of underrepresented

racial groups and those of lower socioeconomic status. It may be beneficial to compare how these results may differ between those of higher socioeconomic status versus those of lower socioeconomic status. Because lower socioeconomic status has often been associated with poorer health outcomes, comparing how SRH differs between the two populations may reveal important information about patient satisfaction, adherence, and mistrust. This may influence the ways in which the healthcare system and healthcare professionals interact with patients in order to increase their quality of care and improve health outcomes.

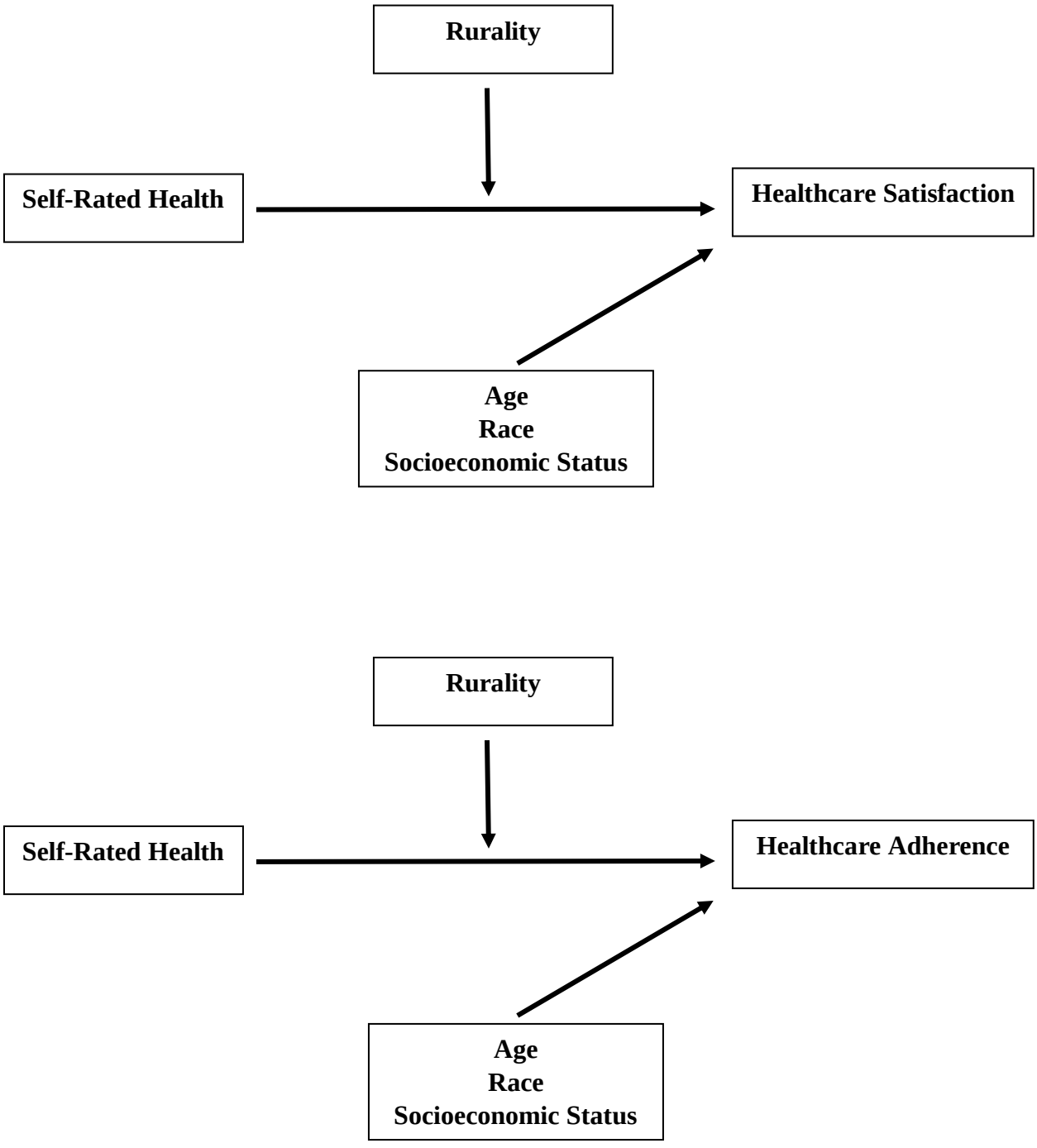
CONCLUSION

The current study highlights the importance of SRH on healthcare satisfaction, healthcare adherence, and medical mistrust. It indicates a need for healthcare systems and healthcare professionals to include SRH on patient portfolios. This may be captured during while taking a patient's medical history. It serves to give physicians a better understanding of their patient's overall health status which may improve patient-provider relationships which may, in turn, improve quality of care and health outcomes. Furthermore, healthcare systems oftentimes give surveys evaluating patient satisfaction with their clinic visits or hospital stays. Including a question on the patient's SRH prior to and after treatment may provide a more robust understanding of patient's satisfaction. It may also highlight the degree to which a patient's innate beliefs about their own health influences these factors of health when compared to the attitudes and actions of the healthcare provider and the healthcare system. While rurality may have failed to have an influence within the current study, factors associated with rural populations, such as low income and travel inconvenience, may also need to be taken into account when assessing a patients SRH. It may be beneficial to evaluate SRH both at the start of patient encounter with the healthcare system and periodically throughout their medical

experience. Tracking the ways in which SRH may fluctuate throughout a patient's life may provide valuable information for healthcare providers.

FIGURES AND TABLES

Figure 1. Illustration of Moderation Models



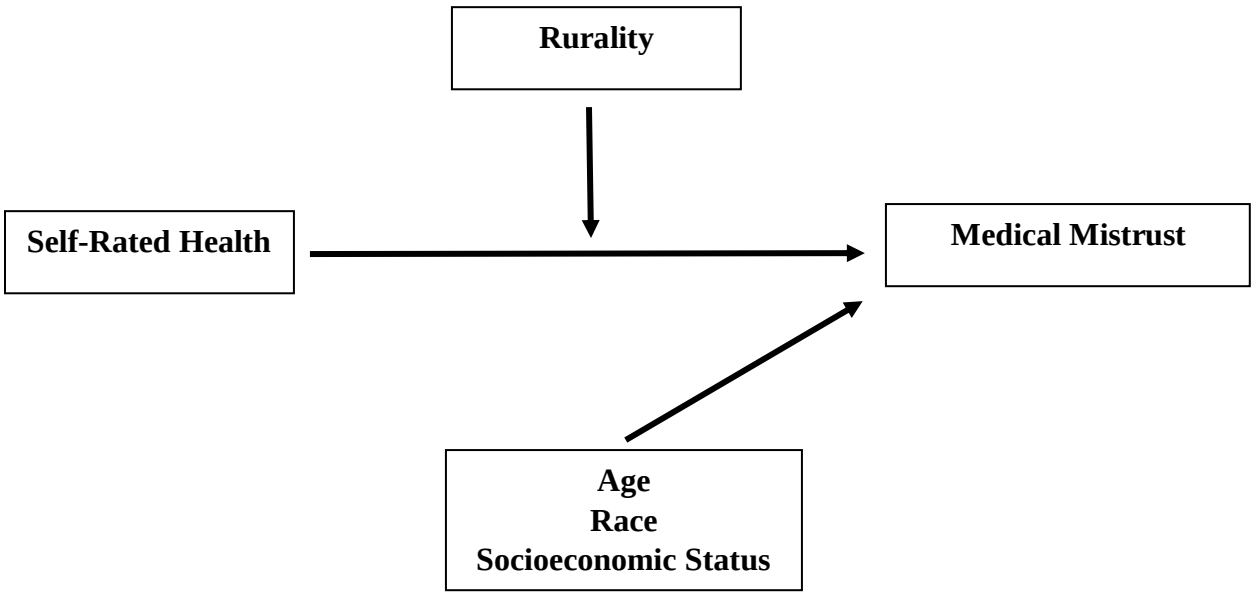

Rurality
Self-Rated Health
Medical Mistrust
Age
Race
Socioeconomic Status

Table 1. Healthcare Satisfaction

(1) Think of your last visit with your regular doctor. Would you say the doctor treated you with a great deal of respect and dignity, a fair amount, not too much, or none at all?
(2) Would you say the doctor spends as much time with you as you wanted, almost as much as you wanted, less than you wanted, or a lot less than you wanted?
(3) Would you say that the doctor involves you in decisions about your care as much as you wanted, almost as much as you wanted, less than you wanted, or a lot less than you wanted?
(4) Overall, how satisfied or dissatisfied are you with the quality of health care you have received? Would you say you are very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?

Table 2. Healthcare Adherence

(1) During the last 12 months, was there any time when you had a medical problem but never sought any medical attention about your condition?
(2) During the last 12 months, was there any time when you did not fill a prescription for medicine?
(3) During the last 12 months, was there any time that you did not come back for a follow up appointment that your doctor gave you?
(4) Has there been a time in the last 12 months when you didn't follow the doctor's advice, or treatment plan, get a recommended test or see a referred doctor?

Table 3. Medical Mistrust

(1) You'd better be cautious when dealing with healthcare organizations
(2) Patients have sometimes been deceived or misled by healthcare organizations
(3) When healthcare organizations make mistakes they usually cover it up
(4) Healthcare organizations have sometimes done harmful experiments on patients without their knowledge
(5) Healthcare organizations don't always keep your information private
(6) Sometimes I wonder if healthcare organization really know what they are doing
(7) Mistakes are common in healthcare organizations

APPENDIX

abuse	EmbryoDonation	InfertilitySucks	PostpartumProgress
AbuseInterrupted	EctopicSupportGroup	KetoBabies	Pregnancy (private group)
actuallesbians	Equality	ladieslounge	Pregnant
adultsurvivors	Feminism	LadiesofScience	ProjectUnbreakable
AttachmentParenting	FemmeThoughts	meToo	Queerception
BabyBumps	femmit	Miscarriage	Rainbow_Babies
BabyLoss	FitPregnancy	moderatelygranolamoms	RaisingKids
BB30	FirstTimeTTC	Mommit	Rape
BeyondtheBump	GetFeminine	mrkh	SaferSex
beyondbaby	getting_over_it	MyPPDSupport	SAHP
birthparents	GirlTalk	NaturalPregnancy	SampleSize
BirthStories	health	newparents	science
BreakingBumps	Ifadoption	NICUParents	ScienceParents
breastfeeding	IFchildfree	Parenting	SecondaryInfertility
breakingmom	IFParents	parentsofmultiples	sexualassault
CautiousBB	Infertility	PCOSandPregnant	SexPositive
CSectionCentral	InfertilityBabies	Postpartum_Anxiety	survivorsofabuse
domesticviolence	infertilityandfaith	Postpartum_Depression	tryingforanother
Trying for a baby	Trollingafterloss	TTCAfterLoss	Waiting_to_try
TFABChartStalkers	TrollingforaBaby	TTCHealthy	whatworkedforme
TFABGrads	TTC30	Twins	Women
TFABLinePorn	TTC_PCOS	TwoXChromosomes	WomensHealth
WTTGraduates			

REFERENCES

Aguilar-Palacio, I., Gil-Lacruz, A. I., Sánchez-Recio, R., & Rabanaque, M. J. (2018). Self-rated health in Europe and its determinants: Does generation matter? *International Journal of Public Health*, *63*(2), 223–232. https://doi.org/10.1007/s00038-018-1079-5

Ahmed, N. U., Winter, K., Albatineh, A. N., & Haber, G. (2012). Clustering very low-income, insured women's mammography screening barriers into potentially functional subgroups. *Women's Health Issues*, *22*(3), e259–e266. https://doi-org.iris.etsu.edu:3443/10.1016/j.whi.2012.02.001

Barreto, M. da S., Reiners, A. A. O., & Marcon, S. S. (2014). Knowledge about hypertension and factors associated with the non-adherence to drug therapy. *Revista Latino-Americana de Enfermagem*, *22*(3), 491–498. https://doi.org/10.1590/0104-1169.3447.2442

Bartlett, E., Grayson, M., Barker, R., Levine, D., Golden, A., & Libber, S. (1984). The effects of physician communications skills on patient satisfaction, recall, and adherence. *Journal of Clinical Epidemiology*, *37*(9-10), 755-764.

Benkert, R., Hollie, B., Nordstrom, C. K., Wickson, B., & Bins-Emerick, L. (2009). Trust, mistrust, racial identity and patient satisfaction in Urban African American primary care patients of nurse practitioners. *Journal of Nursing Scholarship*, *41*(2), 211–219. https://doi.org/10.1111/j.1547-5069.2009.01273.x

Blazer II, D.G., Houpt, J.L. (1979). Perception of poor health in the healthy older adult. *Journal of American Geriatrics Society*, *27*(7), 330-334.

Bogart, L. M., Bird, S. T., Walt, L. C., Delahanty, D. L., & Figler, J. L. (2004). Association of stereotypes about physicians to health care satisfaction, help-seeking behavior, and

adherence to treatment. *Social Science and Medicine*, *58*(6), 1049–1058. https://doi.org/10.1016/S0277-9536(03)00277-6

Boyas, J. F., Negi, N. J., & Valera, P. (2017). Factors associated to health care service use among Latino day laborers. *American Journal of Men's Health*, *11*(4), 1028–1038. https://doi.org/10.1177/1557988317694297

Brandon, D. T., Isaac, L. A., & LaVeist, T. A. (2013). The legacy of Tuskegee and trust in medical care: Is Tuskegee responsible for race differences in mistrust of medical care? In T. A. LaVeist & L. A. Isaac (Eds.), *Race, ethnicity, and health: A public health reader., 2nd ed.* (pp. 557–568). San Francisco, CA: Jossey-Bass. Retrieved from https://search-ebscohostcom.iris.etsu.edu:3443/login.aspx?direct=true&AuthType=cookie,ip,url,uid,athens&db=psyh&AN=2012-28090-026&site=ehost-live

Buzza, C., Ono, S. S., Turvey, C., Wittrock, S., Noble, M., Reddy, G., … Reisinger, H. S. (2011). Distance is relative: Unpacking a principal barrier in rural healthcare. *Journal of General Internal Medicine*, *26 Suppl 2*, 648–654. https://doi.org/10.1007/s11606-011-1762-1

Chang, B.L., Uman, G.C., Linn, L.S., Ware, J.E., & Kane, R.L. (1985). Adherence to health care regimens among elderly women. *Nursing Research*, *34*(1), 27???31. https://doi.org/10.1097/00006199-198501000-00006

Chow, H. & Ismail, A. (2017). Indicators for medical mistrust in healthcare – A review and standpoint from Southeast Asia. *The Malaysian Journal of Medical Sciences, 24*(6), 5-20.

Dale, S., Bogart, L., Wagner, G., Galvan, F., & Klein, D. (2014). Medical mistrust is related to lower longitudinal medication adherence among African-American males with HIV. *Journal of Health Psychology*, *21*(7), 1311-1321.

Dang, B., Westbrook, R., Black, W., Rodriguez-Barradas, M., Giordano, T. (2013). Examining the link between patient satisfaction and adherence to HIV care: A structural equation model. *PLoS One 8*(1), e54729.

Davis, B., & Duffy, E. (2002). Patient satisfaction with nursing care in a rural and an urban emergency department. *Australian Journal of Rural Health, 7*(2), 97-103.

DeCola, P.R. (2012). Gender effects on health and healthcare. In Schenck-Gustafsson, K., DeCola, P.R., Pfaff, D.W., Pisetsky, D.S. (Eds.), *Social and Biological Determinants in Health and Disease* (p. 10-17). New York, NY: Pfizer Inc.

Elder, K., Ramamonjiarivelo, Z., Wiltshire, J., Piper, C., Horn, W., Gilbert, K., …, & Allison, J. (2012). Trust, medication adherence, and hypertension control in Southern African American men. *American Journal of Public Health, 102*(12), 2242-2245.

Faezipour, M., & Ferreira, S. (2013). A system dynamics perspective of patient satisfaction in healthcare. *Procedia Computer Science, 16*, 148-156. https://doi.org/10.1016/j.procs.2013.01.016

Fenton, J., Jerant, A., Bertakis, K., & Franks, P. (2012). The cost of satisfaction: A national study of patient satisfaction, healthcare utilization, expenditures, and mortality. *Archives of Internal Medicine, 172*(5), 405-411. https://doi.org/10.10001/archinternmed.2011.1662

Fowler-Brown, A., Ashkin, E., Corbie-Smith, G., Thaker, S., & Pathman, D. (2006). Perception of racial barriers to health care in the rural South. *Journal of Health Care for the Poor and Underserved, 17*(1), 86-100.

Gabay, G. (2016). Exploring perceived control and self-rated health in re-admissions among younger adults: A retrospective study. *Patient Education and Counseling, 99*(5), 800–806. https://doi.org/10.1016/j.pec.2015.11.011

Garbarski, D. (2016). Research synthesis research in and prospects for the measurement of health using self-rated health. *Public Opinion Quarterly*. Oxford University Press. https://doi.org/10.1093/poq/nfw033

Gill, L., & White, L. (2007). A critical review of patient satisfaction. *Leadership in Health Services, 22*(1), 8-19. https://doi.org/10.1108/17511870910927994

Guadagnolo, A., Cina, K., Helbig, P., Molloy, K., Reiner, M., Cook, F., & Petereit, D. (2009). Medical mistrust and less satisfaction with healthcare among Native Americans presenting for cancer treatment. *Journal of Healthcare for the Poor and Underserved, 20*(1), 210-226.

Hall, M. A., Dugan, E., Zheng, B., & Mishra, A. K. (2001). Trust in physicians and medical institutions: What is it, can it be measured, and does it matter? *Milbank Quarterly*, *79*(4), 613–639. https://doi.org/10.1111/1468-0009.00223

Hamberg, K. (2008). Gender bias in medicine. *Women's Health, 4*(3), 237-43. doi:http://dx.doi.org/10.2217/17455057.4.3.237

Hamberg, K., Risberg, G., Johansson, E., & Westman, G. (2002). Gender bias in physician's management of neck pain: A stud of the answers in a Swedish national examination. *Journal of Women's Health & Gender-Based Medicine, 11*(7), 653-66. doi.org/10.1089/152460902760360595

Harju, B., Wuensch, K., Kuhl, E., & Cross, N. (2006). Comparison of rural and urban residents' implicit and explicit attitudes related to seeking medical care. *The Journal of Rural Health, 22*(4), 359-363.

Health Resources and Services Administration. (2017). Defining rural population. Retrieved from https://www.hrsa.gov/rural-health/about-us/definition/index.html

Hamberg, K. (2008). Gender bias in medicine. *Women's Health, 4*(3), 237-43. doi:http://dx.doi.org/10.2217/17455057.4.3.237

Hamberg, K., Risberg, G., Johansson, E., & Westman, G. (2002). Gender bias in physician's management of neck pain: A stud of the answers in a Swedish national examination. *Journal of Women's Health & Gender-Based Medicine, 11*(7), 653-66. doi.org/10.1089/152460902760360595

Idler, E. & Kasl, S. (1995). Self-ratings of health: Do they also predict change in functional ability? *The Journal of Gerontology, 50B*(6), S344-S353.

Iuga, A., & McGuire, M. (2014). Adherence and health care costs. *Risk Management and Health Policy, 2014*(7), 35-44. https://doi.org/10.2147/RMHP.S19801

Jang, Y., Kim, G., & Chiriboga, D. (2005). Health, healthcare utilization, and satisfaction with service: Barriers and facilitators for older Korean Americans. *Journal of the American Geriactrics Society, 53*(9), 1613-1617. https://doi.org/10.1111/j.1532-5415.2005.53518.x

Kaleta, D., Polańska, K., Dziankowska-Zaborszcyk, E., Hanke, W., & Drygas, W. (2009). Factors influencing self-perception of health status. *Central European Journal of Public Health, 17*(3), 122-127

Kawachi, I., & Kennedy, B. P. (1999). Income inequality and health: pathways and mechanisms. Health Services Research, 34(1 Pt 2), 215–227.

Kempf, M.C., McLeod, J., Boehme, A., Walcott, M., Wright, L., Seal, P., …, & Moneyham, L. (2010). A qualitative study of the barriers and facilitators to retention-in-care among HIV-positive women in the rural southeastern United States: Implications for targeted interventions. *AIDS Patient Care and STDS, 24*(8), n.p. https://doi.org/10/1089/apc.2010.0065

Lachytova, M., Katreniakova, Z., Mikula, P., Jendrichovsky, M., & Nagyova, I. (2017). Associations between self-rated health, mental health problems and physical inactivity among urban adolescents. *European Journal of Public Health*, *27*(6), 984–989. https://doi.org/10.1093/eurpub/ckx051

Laveist, T. A., Isaac, L. A., & Williams, K. P. (2009). Mistrust of health care organizations is associated with underutilization of health services. *Health Services Research*, *44*(6), 2093–2105. https://doi.org/10.1111/j.1475-6773.2009.01017.x

López-Cevallos, D. F., Harvey, S. M., & Warren, J. T. (2014). Medical mistrust, perceived discrimination, and satisfaction with health care among young-adult rural Latinos. *Journal of Rural Health*, *30*(4), 344–351. https://doi.org/10.1111/jrh.12063

Molina, Y., Kim, S., Berrios, N., & Calhoun, E. A. (2015). Medical mistrust and patient satisfaction with mammography: The mediating effects of perceived self-efficacy among navigated African American women. *Health Expectations*, *18*(6), 2941–2950. https://doi.org/10.1111/hex.12278

Menec, V., & Chipperfield, J. (2001). A prospective analysis of the relation between self-rated health and health care use among elderly canadians. *Canadian Journal on Aging / La Revue Canadienne Du Vieillissement*,*20*(3), 293-306. doi:10.1017/S0714980800012794p

Mewes, J., & Giordano, G.N. (2017). Self-rated health, generalized trust, and the Affordable Care Act: A U.S. panel study, 2006-2014. *Social Science and Medicine*, *190,* 48-56.

Moradi-Lakeh, M., El Bcheraoui, C., Tuffaha, M., Daoud, F., Al Saeedi, M., Basulaiman, M., … Mokdad, A. H. (2015). Self-rated health among Saudi adults: Findings from a national survey, 2013. *Journal of Community Health*, *40*(5), 920–926. https://doi.org/10.1007/s10900-015-0014-4

Ohl, M., Perencevich, E., McInnes, K., Kim, N., Rimland, D., Akgun, K., …& Justice, A. (2012). Antiretroviral adherence among rural compared to urban veterans with HIV infection in the United States. *Aids and Behavior, 17*(1), 174-180.

Raposo, M., Alves, H/, Duarte, P. (2009). Dimensions of service quality and satisfaction in healthcare: A patient's satisfaction index. *Service Business, 3*(1), 85-100.

Reach, G. (2011). Treatment adherence in patients with gout. *Joint Bone Spine, 78*(5), 456-459.

Rural Health Information Hub. 2017. Retrieved from https://www.ruralhealthinfo.org/topics/rural-health-disparities

Safran, D., Taira, D., Rogers, W., Kosinski, M., Ware, J., & Tarlov, A. (1998). Linking primary care performance to outcomes of care. *Journal of Family Practice, 47*(3), 213

Schneider, G., Driesch, G., Kruse, A., Wachtner, M., Nehan, H.G., & Heuft, G. (2004). What influences self-perception of health in the elderly? The role of objective health condition, subjective well-being and sense of coherence. *Archives of Gerontology and Geriatics, 29*(3), 227-237.

Schnittker, J., & Bacak, V. (2014). The increasing predictive validity of self-rated health. *PLoS ONE*, *9*(1). https://doi.org/10.1371/journal.pone.0084933

Sheppard, V. B., Wang, J., Yi, B., Harrison, T. M., Feng, S., Huerta, E. E., & Mandelblatt, J. S. (2008). Are health-care relationships important for mammography adherence in Latinas? *Journal of General Internal Medicine*, *23*(12), 2024–2030. https://doi.org/10.1007/s11606-008-0815-6

Sohler, N., Fitzpatrick, L., Lindsay, R., Anastos, K., & Cunningham, C. (2007). Does patient-provider racial/ethnic concordance influence ratings of trust in people with HIV infection? *AIDS and Behavior, 11*(6), 884-896.

Sokol, R., Ennett, S., Gottfredson, N, & Halpern, C. (2017) Variability in self-rated health trajectories from adolescence to young adulthood by demographic factors. *Preventative Medicine, 105*, 73-76.

Spleen, A. M., Lengerich, E. J., Camacho, F. T., & Vanderpool, R. C. (2014). Health care avoidance among rural populations: Results from a nationally representative survey. *Journal of Rural Health*, *30*(1), 79–88. https://doi.org/10.1111/jrh.12032

Tambuyzer, E., & Van Audenhove, C. (2015). Is perceived patient involvement in mental health care associated with satisfaction and empowerment? *Health Expectations*, *18*(4), 516–526. https://doi.org/10.1111/hex.12052

Taylor, C. J., La Greca, A., Valenzuela, J. M., Hsin, O., & Delamater, A. M. (2016). Satisfaction with the health care provider and regimen adherence in minority youth with type 1 diabetes. *Journal of Clinical Psychology in Medical Settings*, *23*(3), 257–268. https://doi.org/10.1007/s10880-016-9460-0

Thames, A. D., Moizel, J., Panos, S. E., Patel, S. M., Byrd, D. A., Myers, H. F., … Hinkin, C. H. (2012). Differential predictors of medication adherence in HIV: Findings from a sample of African American and Caucasian HIV-positive drug-using adults. *AIDS Patient Care and STDs*, *26*(10), 621–630. https://doi.org/10.1089/apc.2012.0157

Thompson, H. S., Valdimarsdottir, H. B., Winkel, G., Jandorf, L., & Redd, W. (2004). The group-based medical mistrust scale: Psychometric properties and association with breast cancer screening. *Preventive Medicine*, *38*(2), 209–218. https://doi.org/10.1016/j.ypmed.2003.09.041

Thompson, L., & McCabe, R. (2012). The effect of clinician-patient alliance and communication on treatment adherence in mental health care: A systematic review. *BMC Psychiatry*, *12*.

Turan, B., Rogers, A. J., Rice, W. S., Atkins, G. C., Cohen, M. H., Wilson, T. E., … Weiser, S. D. (2017). Association between perceived discrimination in healthcare settings and HIV medication adherence: Mediating psychosocial mechanisms. *AIDS and Behavior*, *21*(12), 3431–3439. https://doi.org/10.1007/s10461-017-1957-5

Unite for Sight. (n.d.). Urban versus rural health. Retrieved from https://www.uniteforsight.org/global-health-university/urban-rural-health

Urden, L. 2002. Patient satisfaction measurement: Current issues and implications. *Lippincott's Case Management, 7*(5), 194-200.

Vanderboom, C. P., & Madigan, E. A. (2008). Relationships of rurality, home health care use, and outcomes. *Western Journal of Nursing Research*, *30*(3), 365–378. https://doi.org/10.1177/0193945907303107

Weaver, A., Taylor, R. J., Chatters, L. M., & Himle, J. A. (2018). Depressive symptoms and psychological distress among rural African Americans: The role of material hardship and self-rated health. *Journal of Affective Disorders*, *236*, 207–210. https://doi.org/10.1016/j.jad.2018.04.117

Williamson, L., & Bigman, C. (2018). A systematic review of medical mistrust measures. *Patient Education and Counseling, 101*(10), 1786-1794.

Wroth, T. H., & Pathman, D. E. (2006). Primary medication adherence in a rural population: the role of the patient-physician relationship and satisfaction with care. *Journal of the American Board of Family Medicine: JABFM.*, *19*(5), 478–86. https://doi.org/10.3122/JABFM.19.5.478

Yan, Z., Wan, D., & Li, L. (2011). Patient satisfaction in two Chinese provinces: Rural and urban differences. *International Journal for Quality in Health Care, 23*(4), 384-389.