PATTERNS OF RACIAL DIFFERENCES IN HEALTHY DAYS MEASURES AMONG ADULTS AGE 60 AND OVER IN PENNSYLVANIA

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ABSTRACT

PUBLIC HEALTH SIGNIFICANCE. Older African Americans are more likely to report poorer self-rated health (SRH) than Caucasians even when individual-level characteristics, such as number of chronic conditions or education, are controlled. One explanation is health pessimism, which posits that African Americans are more pessimistic about their health because of non-health factors, such as perceived discrimination. We examined whether health pessimism or other factors explain the SRH differential between African Americans and Caucasians.

METHOD. Research participants were members of the Community Research Registry of the Claude D. Pepper Center at the University of Pittsburgh. The cohort, recruited between 2005 and 2013 (n=2,483), is a convenience sample of residents aged 60+ living in western Pennsylvania. Participants completed the CDC Healthy Days module, which includes questions on SRH. We estimated hierarchical logistic regression models to examine demographic characteristics (race, age, gender, income, and education level), health characteristics (number of diseases), life style

characteristics (current tobacco use, alcohol consumption, and physical activity), and perceived number of physically and mentally unhealthy days on reports of poor or fair health.

RESULTS. African Americans were 1.6 times (95% CI=1.04, 2.45) more likely to report fair or poor SRH after controlling for demographic and health characteristics. Including lifestyle characteristics, especially physical activity and alcohol consumption attenuated the association, so that African Americans no longer differed from Caucasians in fair-poor SRH. Significant correlates of poorer SRH included male gender, less education, a greater number of diseases, number of reported unhealthy days, less physical activity, and no alcohol consumption.

CONCLUSIONS. Health pessimism but also actual poorer health and greater number of behavioral risk factors may be responsible for greater likelihood of fair or poor SRH in older African Americans. Racial differences may partially be addressed through public health effects to improve prevention of disease and reduction of poor life style behaviors.

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PREFACE

This master thesis was carried out at the Department of Behavioral and Community Health Sciences, Graduate School of Public Health at University of Pittsburgh, over the period from July 2013 to April 2014. This thesis is the result of my work and includes constructive comments from my thesis committee: Dr. Steven M. Albert, Dr. Elsa S. Strotmeyer, and Dr. Edmund Ricci.

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Sometimes I feel lonely and frustrated to study alone with non-native language in the

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1.0   INTRODUCTION

In 1947, the World Health Organization (WHO) defined "health" as a state of complete physical, mental, and social well-being, not merely the absence of illness. Once the WHO published this definition, many researchers began to focus on identifying the relationships between potentially distant factors — such as education, social environment, age, gender, role function, level of happiness, and degree of independence — and health outcomes (Deeks, Lombard, Michelmore, & Teede, 2009; Oshio & Kobayashi, 2010; Ross & Wu, 1995). Researchers pointed out that these factors may affect health along a broad spectrum, from a mild influence to a substantial, adverse impact. In order to assess overall human experience related to health, researchers and academics in related fields developed the term "health-related quality of life" (HRQOL), which encompasses multi-dimensional concepts. Although the explicit definition of HRQOL varies slightly, depending on a researcher's purpose, in general, HRQOL not only focuses on objective clinical data but also analyzes information with respect to subjective measurements of a particular individual (Costanza et al., 2007).

In recent decades, the older population (people over the age of 65), is increasing in the United States. According to the U.S. Census Bureau, there approximately 13.7% of the entire population fell into this demographic in 2012, and they projected that this percentage will grow to 19% of the population by 2030. Thus, the population is aging at an accelerated rate. The WHO's "Active Aging" framework posits that active aging is a process of optimizing

opportunities for health, participation, and security in order to enhance quality of life as people age. As a result, the Healthy People 2020 initiative aims to increase HRQOL among older adults (World Health Organization, 2002). By garnering more precise measurements of HRQOL, health professionals may better analyze the roots of HRQOL in older adults and to understand the HRQOL trend. In doing so, they can facilitate the decision-making and policy creation on a personal, community, and governmental level to account for the aging population, achieving healthy aging.

1.1 CDC HEALTHY DAYS MEASURES

In the last three decades, researchers have constructed a wide variety of assessment instruments for HRQOL, which have received considerable attention. The SF-36, for example, is a multiple-purpose, patient-reported, short form survey that includes 36 items that measure eight dimensions related to health (Hickey, Barker, McGee, & O'Boyle, 2005). In order to manage the complexity of SF-36, researchers simplified the process to shorter questionnaires, such as SF-12 or SF-8, while still maintaining the validity and reliability of the instruments (Ware, Kosinski, & Keller, 1996). In 1993, the Centers for Disease Control (CDC) developed the Healthy Days Measure, which was recognized as a simple method to measure, calculate, interpret, and add to other assessments about individual health. The scale was called as CDC Healthy Days Measures or Healthy Days Measures, which determines HRQOL by assessing a person's perceived sense of well-being. Overall, Healthy Days Measure asks 1) general self-rated health (SRH); 2) number of physically unhealthy days, which asks people to report number of days of the past 30 days that they feel their physical health is not health; 3) number of mentally unhealthy days

which refers to number of days of the past 30 days that people feel they do not have good mentally health; and 4) number of days with activities limitation because of poor physical and mental health. The self-reported perceived physically and mentally unhealthy days and number of activity limitation days are as summarized as Healthy Days Index (HDI). Healthy Days Measures were reported to have good content, construct, and criterion validity, and test-retest reliability (Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003); therefore, since 1993, the Healthy Days Measure is widely used in each state-based Behavioral Risk Factor Surveillance System (BRFSS), which allows the government to monitor HRQOL in general populations over time by using a simple instrument (Centers for Disease Control, 2000).

Previous studies indicated that SRH may predict future health outcomes. According to previous research results, poor SRH was associated with higher mortality (Halford et al., 2012; Majernikova et al., 2012; Razzaque, Mustafa, & Streatfield, 2013), morbidity (Chen, Baumgardner, & Rice, 2011), and higher health care utilization, which was measured by the number of doctors' visits in the past 12 months (Denkinger, Lukas, Herbolsheimer, Peter, & Nikolaus, 2012). The factors which affect how people rate their health were also well documented. Studies showed that SRH declined as age advanced after adjusting for race and socioeconomic status, (Razzaque, Nahar, Akter Khanam, & Kim Streatfield, 2010). Beyond the individual level, some researchers highlighted that a person's social environment also had an impact on SRH. Lehning, Smith, and Dunkle (2014) found that an age-friendly environment, which includes access to health care, social support, and community engagement, resulted in a better SRH. On the other hand, self-perceived neighborhood problems correlated to poor SRH. The neighborhood factors such as noise, and traffic and dilapidated housing also contributed the poorer SRH (Krause, 1996).

In terms of risk factors of HDI, studies found that people with low socioeconomic status and lower education levels reported greater numbers of overall unhealthy days (Alvarez-Galvez et al., 2013; Campbell, Crews, Moriarty, Zack, & Blackman, 1999). Furthermore, survey data from BRFSS 1993-2002 showed that factors such as being female, unemployed, separated marital status, or being an American Indian or Alaskan Native lead to more physically and/or mentally unhealthy days (Zahran et al., 2005). The research also delineated a few factors that were even more specific, and that were also linked to unhealthy days. Chen, Gelaye, and Williams (2014) indicated that an improvement to sleep quantity and quality can also decrease the risk of poor SRH and fewer mentally unhealthy days. Although the relationship between the SRH and the number of unhealthy days is still developing, Guyatt, Feeny, and Patrick (1993) found that people with more physically or mentally unhealthy days within the past 30 days were more likely to report poor SRH, although about 24 percent of people with poor SRH reported no impaired days.

1.2 RACIAL DIFFERENCES

Significant racial differences were documented to exist in health and poor health outcomes in older adults (age 65 or older). Several researchers indicated that older African Americans have a significantly higher association with higher disability levels (Mendes de Leon, Barnes, Bienias, Skarupski, & Evans, 2005), a lower life expectancy (Crimmins, Hayward, & Saito, 1996), and a poor functional status such as ambulation (Brega, Goodrich, Powell, & Grigsby, 2005).

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1.2.1   African American-Caucasian Differences in SRH

Although Sarkin et al. (2013) suggested that the racial disparities in the SRH were reduced from 1972 to 2008, people still report racial differences among the SRH among people 18 and over. African Americans consistently tend to report poor health, in general, more frequently than non-African American (Borrell & Crawford, 2006; Franks, Gold, & Fiscella, 2003). National Health Interview Survey conducted at 2012 also illustrated this phenomenon, 12.1% of White adults reported fair or poor SRH compared with 19.3 of Black adults after being age-sex adjusted (U.S. Department of Health and Human Services, 2014). Several studies further explore the racial differences in SRH among older adults (aged 65 and over). One result showed that over 44% of African Americans aged 75 and older reported fair or poor health as compared with 31% of Whites (Kington & Nicken, 2001). Bennett, Chen, Soroui, and White (2009) also conducted a survey among 2,668 U.S. adults aged 65 years and older. The result showed that 49% of African Americans reported fair or poor SRH; in contrast, only 27% of Caucasians reported fair or poor SRH. Ferraro (1993) first described health pessimism by elaborating on the potential reasons for racial differences. According to their study, they observed that African Americans do not have significant different number of chronic illnesses; however, when African American are asked to rate their health, they tend to report significantly poorer health compared to Caucasian. This explanation process seems to posit that African Americans are more pessimistic about health than Caucasians; therefore, they tend to evaluate their health more negatively even when they have similar functional statuses, medical conditions, and socioeconomic statuses. The theory of health pessimism among African American older adults was bolstered by Spencer et al. (2009). The results showed that Caucasians were 3.7 times more likely to report a favorable SRH even after controlling socioeconomic factors, objectively

measured physical function by using physical performance battery scale, and psychosocial health status including depression syndromes, personal mastery, and satisfaction with social support.

In addition to health pessimism, researchers have tried to find the root cause to account for the racial differences in SRH continuously. One study showed us that a neighborhood's affluence and structural resources can account the association between race and SRH. Cagney, Browning, and Wen (2005) measured the neighborhood-level factors include age of population, residential stability (measured by housing tenure and percentage of housing occupied), neighborhood poverty (defined as the proportion of residents with incomes below the 1990 federal poverty threshold), and neighborhood affluence (operationalized as the percentage of households with incomes $50,000 or over). African Americans are 1.6 times more likely to report poorer SRH; however, affluence, a neighborhood structure resource, contributes positively to SRH and attenuates the association between race and SRH. Another study used interpersonal maltreatment to illustrate the racial differences among SRH. Interpersonal Maltreatment is measured by response to the nine questions: "In your day-to-day life, how often have any of the following things happened to you?": (1) "You are treated with less courtesy than other people;" (2) "You are treated with less respect than other people;" (3) "You receive poorer service than other people at restaurants and stores;" (4) "People act as if they think you are not smart;" (5) "People act as if they are afraid of you;" (6) "People act as if they think you are dishonest;" (7) "People act as if they're better than you are;" (8) "You are called names or insulted;" and (9) "You are threatened or harassed." Researches dichotomized the responses into "Very Often" or "Fairly Often" versus "Not Too Often", "Hardly Ever", or "Never". When comparing participants who perceive the same levels of interpersonal maltreatment, the racial differences among SRH were no longer significant (Boardman, 2004). Although there were some factors

could account for racial differences among SRH, researchers, to date, are still working on finding the other potential factors to explain racial differences among SRH.

1.3   AIMS

Racial differences in SRH were documented in numerous studies, and the possible explanations include the health pessimism which posits that African Americans are more pessimistic about their health condition than Caucasians. Therefore, we examine whether health pessimism or other factors help to explain SRH differential between African Americans and Caucasians by using Health Days Measures. This research study had two aims:

Aim 1. Observe the general pattern of Healthy Days Measures among Pennsylvanian adults over 60, and

Aim 2. Determine potential relationship between racial differences among Healthy Days Measures and to find the reasons which can account for racial differences in generally healthy days and SRH.

The hypotheses in this study as follows:

Hypothesis 1. African American and Caucasian older adults will not differ in mean self-reported unhealthy/healthy days.

Hypothesis 2. African American and Caucasian older adults will not differ in proportion of reporting Fair-Poor SRH adjusting for individual-level characteristics

If we reject these above two hypotheses, we can assume that health pessimism can help to account for African American-Caucasian Differences in reported unhealthy days or SRH.

2.0   METHOD

2.1 STUDY POPULATION AND SAMPLING DESIGN

This study was a secondary and cross-sectional data analysis. Data was obtained from Community Registry of Pittsburgh's Claude D. Pepper Older Americans Independence Center (Pepper Center), which was devoted to geriatric research. The Pepper Center collected a representative sample of older adults live in Pittsburgh between 2005 to 2013 via telephone interviews, with the intent of establishing a convenient sampling design. The potential population lived within 50 miles of the University of Pittsburgh. The eligible participants were community-dwelling older adults, ages 55 or older, who would be able to communicate without any restrictions. In terms of recruiting enough samples of each race (namely the Caucasians and the African Americans), Pepper Center chose to interview more people in the areas with many qualified individuals, but that, may be more likely to contain more African Americans. After participants orally agreed to participate in the survey during the telephone interview, Pepper Center recorded their responses to the questionnaire.

2.2 MEASUREMENTS

The questionnaire contained demographic characteristics, health characteristics, and Healthy Days Measures. Pepper Center Registry did not identify or document any personal information such as name and addresses.

2.2.1   Demographic Characteristics

Demographic characteristics included age (continuous variables), gender (male=1 and female=0), race (African American=1, Caucasian=0). Although the individual income was not included in the questionnaire, we would like to add this variable into our statistical analysis since the income plays a major role on socioeconomic factors. As a result, we use the median income in 2010 stratified by zip code and then race which was downloaded from U.S. Census Database and gives each participant an estimate individual income by matching their zip code and race. For example, if participant is Caucasian and lives in zip code: 15213, we will use the median income of every Caucasian that lives in zip code: 15213. We coded the income on $10,000 bases. If a person's income is $35,000, we coded their individual income variable as 3.5. In the questionnaire, we also asked participant educational year. We grouped in terms of education level: less than high school=1, high school but no college=2, and college and beyond as a reference group.

2.2.2   Health Characteristics

Telephone interviews included questions about medical history. Participants were asked "has a doctor ever told you that you have had any of the following?" Participants could report that if they have stroke, diabetes, hypertension, heart attack, macular degeneration, arthritis, osteoporosis, glaucoma, inner ear problem, depression, COPD or asthma, congestive heart failure, peripheral neuropathy, Parkinson's, fractures, and cancer.

2.2.3   Life Style Characteristics

Participants were asked about lifestyle behaviors which include tobacco use, alcohol consumption, and physical activity. For tobacco use, they were asked the former tobacco use and current tobacco use. Former tobacco use was measured by the response of the following question "Have you smoked at least 100 cigarettes in your entire life?" Responses were dichotomized to yes=1 and no=0. In order to explore the current tobacco use, Participants were asked the following questions "Do you smoke cigarettes every day, some days, or not at all?". In addition to tobacco use, the participants were asked that "During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?". The responses ranged from yes=1 and no=0. To explore the physical activity status of participants, Participants were also asked them the following question "During the past 30 days, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?. The responses were coded into yes=1 and no=0.

2.2.4   Healthy Days Measures

Healthy Days Measure included four core questions on individual's general health: 1) Self-rated health: "How would you rate your health in general?" The responses are separated into five categories: poor, fair, good, very good, and excellent. 2) Physically unhealthy days: In terms of physical health, which includes physical illness and injury, for how many days of the past 30 days would you say that your physical health was not good? 3) Mentally unhealthy days: Thinking about mental health, which includes stress, depression, and emotional problems, how many of the past 30 days was your mental health not good? 4) Activity limitation: How many of those past 30 days did your poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

In this study, we also used general healthy days which was an estimate of the overall number of days during the previous 30 days when the participants reported that both his and her physical or mental health was good. In order to obtain general healthy days, we first calculated the unhealthy days which was an estimate of the overall number of days during the previous 30 days when the participants reported that either his or her physical or mental health was not good. We added together a participants' number of physically and mentally unhealthy days based their responses, with a logical maximum of 30 days (Moriarty, Zack, & Kobau, 2003). Next, we subtracted their unhealthy days from 30 to establish general healthy days; we then obtained the general healthy days of the past 30 days for each participant, and constructed a statistical analysis based on the data.

2.3 STATISTICAL ANALYSIS

The statistical analysis was performed by using the IBM SPSS Statistics Data Editor 20.0 software. In this study, 2,670 people were interviewed initially. We excluded 55 respondents who were neither Caucasian nor African American. We also excluded eight respondents who did not live in Pennsylvania any more. After reviewing the data, we found that there were only two respondents who were over age 55 but under the age of 60. We decided to exclude these two respondents and redefined the target population in this research was "people who are over age 60, either Caucasian or African American, and live in Pennsylvania." In addition, we excluded 122 participants who had missing data in any demographic, medical, and Healthy Days Measures variable we interviewed. We analyzed whether the percentage of missing data in SRH, physically unhealthy days, mentally unhealthy days, and activity limitation days were significant by race or not. We found that although the percentage of missing data for each variable was significantly different by race, the percentages of missing data were around or smaller than 5%. After data cleansing, 2,483 participants were included into analysis (93%). In order to examine the hypothesis, we used several statistical methods to analyze the data including descriptive and analytical method. First, in descriptive characteristics of subjects, we tend to explore each individual-level variables are associated with race among participants. The bivariate variables were analyzed by using the Chi-Square test; on the other hand, continuous variables were performed by using the independent sample t-test. Further, in order to describe the relationships among the SRH and number of physically or mentally unhealthy days, we used the cross table and then the Chi-square Test. When the expected values in 80% of cells of a contingency table are below five, we alternatively used Fisher's Exact Test.

After descriptive analysis, we used the multivariable linear regression and hierarchical logistic regression to explore the potential racial differences within Healthy Days Measures in order to adjust for the confounding variables. The multivariable linear regression analysis is to explore the relationship between general healthy days and race; the dependent variable in the multivariable linear regression is general healthy days which will be treated as a continuous variable. The independent variables in multivariable linear regression were demographic characteristics (age, race, gender, education and individual income), health characteristics (morbidity), and life style characteristics (physical activity, current smoker, and alcohol consumption). The statistical significance in the multivariable linear regression was defined as $p < .05$. We drop out the variable of former smoker because this variable was not significant between two races in the descriptive analysis.

In order to explore the relationship between races and SRH, the dependent variable in logistic regression was SRH, dichotomized as poor and fair SRH as a poor SRH and a good SRH as good, very good, and excellent SRH. Similarly, the independent variables in logistic regression included demographic characteristics (age, race, gender, education and individual income), health characteristics (morbidity), and lifestyle characteristics (physical activity, current smoker, and alcohol consumption), and number of physically and mentally unhealthy days. We used hierarchical logistic regression to determine the contribution of specific independent variables. The magnitude of the association was measured by means of the odds ratio (OR), and the statistical significance was determined using the p-value $<.05$.

3.0   RESULTS

Our results consist of several categories: descriptive statistics, stratified by race, for our individual-level variables (Table 1); cross tables between SRH and number of physically unhealthy, mentally unhealthy, and activity limitation days, also stratified by race (Table 2 to Table 4); the distribution of proportions for the number of physically and mentally unhealthy days (Table 5 to Table 6); an multivariable linear regression model predicting general healthy days (Table 7); and a hierarchical logistic regression model predicting SRH (Table 8)

3.1 DESCRIPTIVE ANALYSIS FOR INDIVIDUAL-LEVEL VARIABLES

As the descriptive statistics in Table 1 indicate, there were total 2,483 participants in this study, including 2,214 Caucasians (89.2%) and 269 African Americans (10.8%). The mean age for the entire sample (N=2483) was 75.6 years (SD=7.5). The average age in both groups was not significantly different. Both the African American and Caucasian groups contained more female participants (79.6% and 59.8%) than male participants; however, the proportion of female in African Americans is significantly higher than in Caucasians (p<0.001). Caucasians had higher income and educational levels, reported fewer number of diseases (p<0.001). In our sample, African American are had higher prevalence of stroke, diabetes, hypertension, arthritis,

glaucoma, and congestive heart failure; in contrast, Caucasians had higher prevalence of osteoporosis, fracture, and cancer.

In terms of life style characteristics, African Americans also reported less physical activity (p<0.001), higher percentage in current smoker (p<0.001). The percentages of former smoker between African Americans and Caucasians are not significantly different. In contrast, the alcohol consumption had an significantly inverse relationship; Caucasians were more likely to consume alcohol-related beverage compared to African Americans (p<0.001). However, it is noted that there were some missing data (either did not remember the answers or refused to answer) among life style characteristics. For the current smoker variable, we had 29 missing data: 18 Caucasians (0.8%) and 11 African Americans (4.1%). For the former smoker variable, we had 33 missing data: 21 Caucasians (0.9%) and 12 African Americans (4.5%). For the physical activity variable, we had 24 missing data: 18 Caucasians (0.8%) and 6 African Americans (2.2%). And for the alcohol consumption variable, we had 40 missing data: 28 Caucasians (1.3%) and 12 African Americans). Although the percentage of missing data for each variable were significant by race, the percentages of missing data among African-Americans were < 5% and therefore still low.

In Healthy Days Index (HDI), African Americans reported more physically unhealthy days but fewer mentally unhealthy days compared to Caucasians; however, only the difference in the number of physically unhealthy days was statistically significant (p=0.047). The average of physically unhealthy days in African Americans are 3.5 days (SD=7.7); while Caucasians had average 2.5 physically unhealthy days (SD=6.5). African Americans reported average 1.4 mentally unhealthy days (SD=4.4); while Caucasians reported 1.5 mentally unhealthy days

(SD=4.8). Overall, Caucasians reported more general healthy days compared to African Americans in the past 30 days.

The self-rated health (SRH) stratified by race is also displayed in Table 1. When categorizing SRH, we established three groups: Excellent to Very Good, Good, and Fair to Poor. Overall, Caucasians significantly reported better SRH compared to African Americans (p<0.001). We found that a considerably higher percentage of Caucasians reported themselves as having an "Excellent to Very Good" SRH rating, compared to African Americans (51.4% versus 25.3%). African Americans, in contrast, were more likely to report poorer SRH. In Good SRH group, there were 36.1% Caucasians and 47.6% African Americans. The results of Fair to Poor SRH were similar: 27% of African Americans versus 12% of Caucasians. The percentage of SRH stratified by race are also shown on the Figure 1.
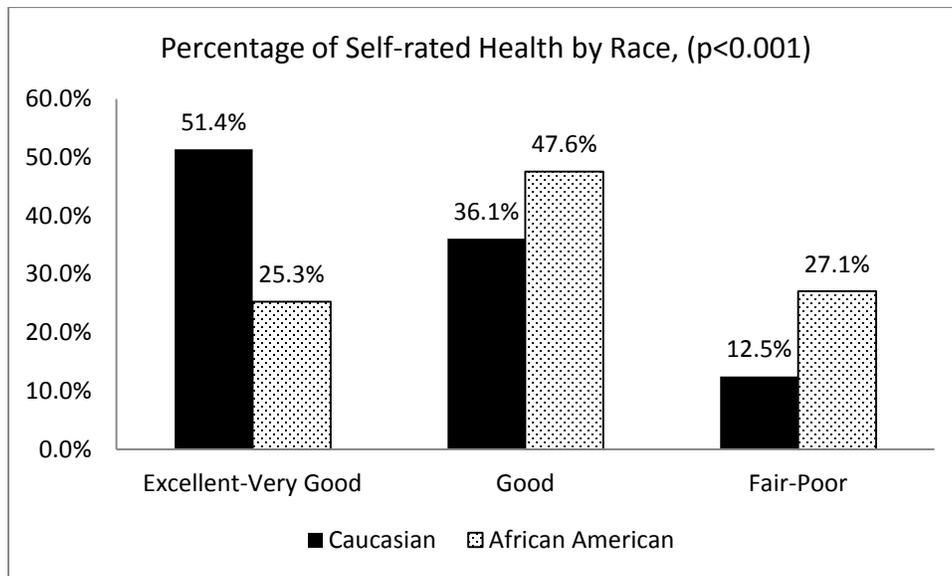
Figure 1: Percentage of SRH by race

Table 1: Descriptive statistics for individual-level variables stratified by race

Variables	Caucasian (n=2,214)	African American (n=269)	P value
	n (%) or M (SD)	n (%) or M (SD)	
Total	2,214 (89.2)	269 (10.8)	
Demographic characteristics			
Age (years)	75.6 (7.5)	75.6 (7.6)	0.897
Gender***			<0.001
Male	889 (40.2)	55 (20.4)	
Female	1,325 (59.8)	214 (79.6)	
Individual Income (*10,000)***	5.83 (1.68)	2.62 (1.13)	<0.001
Education***			<0.001
Less Than High School	25 (1.1)	22 (8.2)	
High School but No College	470 (21.2)	105 (39.0)	
College or Graduate School	1,719 (77.6)	142 (52.8)	
Health characteristics			
Number of diseases***	2.6 (1.9)	3.1 (1.6)	<0.001

Table 1 Continued

Stroke*	127 (5.7)	26 (9.7)	0.015
Diabetes***	302 (13.6)	79 (29.4)	<0.001
High Blood Pressure***	1,171 (52.9)	211 (78.4)	<0.001
Heart Attack	171 (7.7)	29 (10.8)	0.096
Macular Degeneration	183 (8.3)	14 (5.2)	0.093
Arthritis*	1,328 (60.0)	183 (68.0)	0.012
Osteoporosis*	386 (17.4)	39 (14.5)	0.025
Glaucoma***	195 (8.8)	49 (18.2)	<0.001
Inner ear problem	218 (9.8)	31 (11.5)	0.390
Depression	294 (13.3)	41 (15.2)	0.395
COPD or Asthma	281 (12.7)	41 (15.2)	0.249
Congestive heart failure**	88 (4.0)	22 (8.2)	0.004
Peripheral neuropathy	169 (7.6)	22 (8.2)	0.717
Parkinson's disease	23 (1.0)	2 (0.7)	1.000
Fracture***	664 (30.0)	43 (16.0)	<0.001
Cancer***	801 (36.2)	51 (19.0)	<0.001

Table 1 Continued

Life style characteristics

Physical activity ***	1,816 (82.7)	185 (70.3)	<0.001
Former smoker	1,035 (47.2)	124 (48.2)	0.749
Current smoker***	69 (3.1)	24 (9.3)	<0.001
Alcohol consumption***	1,457 (66.7)	89 (34.6)	<0.001

Healthy Days Measures

Physically Unhealthy Days*	2.5 (6.5)	3.5 (7.7)	0.047
Mentally Unhealthy Days	1.5 (4.8)	1.4 (4.4)	0.745
General Healthy Days	26.4 (7.6)	25.5 (8.7)	0.106
Self-rated health***			<0.001
Excellent-Very Good	1,138 (51.4)	68 (25.3)	
Good	800 (36.1)	128 (47.6)	
Fair-Poor	276 (12.5)	73 (27.1)	

Note: N=2483, *p≤0.05; **p≤0.01; ***p ≤ 0.001 (two-tailed test)

Missing: Current smoker for Caucasians: 18; Current smoker for African Americans: 11. Former smoker for Caucasians: 21; Former smoker for African Americans: 12. Physical activity for Caucasians: 18; Physical activity for African Americans: 6. Alcohol consumption for Caucasians: 28; Alcohol consumption for African Americans: 12

3.2   CHI-SQUARE TEST ON RACE AND HEALTHY DAYS MEASURES

3.2.1   Physically Unhealthy Days and SRH by Race

Table 2 illustrates the number of physically unhealthy days, stratified by race. First, we separated the number of physically unhealthy days into four groups: None, 1-2 days, 3-7 days, and 8 or more days within the past 30 days. Then we grouped participants by their SRH into three categories: Excellent to Very Good, Good, and Fair to Poor. We used the number of participants in the each cell (a "cell" being a cross-section of SRH and the number of physically unhealthy days) and divided that number by the total number of participants who reported the same number of unhealthy days in order to establish the percentage of African Americans that fell into each SRH cell across each "category" of number of unhealthy days.

Across both races, people who reported less physically unhealthy days within the past 30 days are more likely to report better health. The difference was most significant within people with no physically unhealthy days (p<0.001). The differences were also significant within people with 3-7 physically unhealthy days (p=0.023) and people with 8 or more physically unhealthy days (p=0.023). Among the Caucasians with no physically unhealthy days within the past 30 days, 56.9% of them reported Excellent to Very Good SRH, and 34.6% reported they had Good SRH, and 8.4% of Caucasians with no physically unhealthy days still reported that they had only Fair to Poor SRH. Similarly, among the African Americans with no physically unhealthy days within the past 30 days, 30.3% of them said that they had Excellent to Very Good SRH, and 34.6% reported they had Good SRH, and 8.4% of Caucasians with no

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physically unhealthy days still reported that they had only Fair to Poor SRH. When we compared two races, the Table 2 and Figure 2 shows that Caucasians no matter they reported none, 1-2, 3-7, 8 or more physically unhealthy days had higher percentage to report Excellent-Very Good SRH compared to African Americans. There were 56.9% of Caucasians with no physically unhealthy days reported they had Excellent-Very Good SRH; in contrast, only 30.3% of African Americans with no physically unhealthy days reported they had Excellent-Very Good SRH. There were 52.8% of Caucasians with 1-2 physically unhealthy days reported they had Excellent-Very Good SRH, while 26.3% of African Americans with 1-2 physically unhealthy days reported they had Excellent-Very Good SRH. There were 40.4% of Caucasians with 3-7 physically unhealthy days reported they had Excellent-Very Good SRH; in contrast, only 14.8% of African Americans with 3-7 physically unhealthy days reported they had Excellent-Very good SRH. In people with 8 or more physically unhealthy days, 19.8% of Caucasians reported Excellent-Very Good SRH; however, only 7.9% African Americans reported Excellent-Very Good SRH.

In every group, African Americans also consistently tended to report poorer SRH. As shown in Table 2, of the people who reported no physically unhealthy days in the past 30 days, 20.0% of African Americans reported they had Fair-Poor SRH, while only 8.4% of Caucasians reported Fair-Poor SRH. In people who had 1-2 physically unhealthy days in the past 30 days, 21.1% of African Americans reported Fair-Poor SRH, but only 11.2% of Caucasians. We found that out of the people with 3-7 physically unhealthy days in the past 30, 29.6% of African Americans categorized their SRH as Fair-Poor, versus 15.9% of Caucasians in the same SRH category. Lastly, among those people who noted 8 or more physically unhealthy days, 63.2% of African Americans reported Fair-Poor SRH in contrast with only 40.1% of Caucasians.
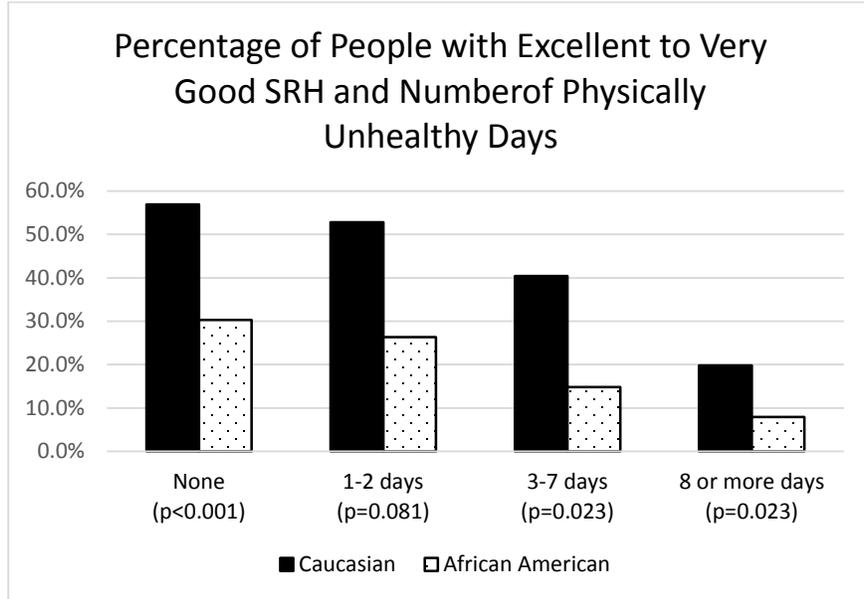
Figure 2: Percentage of People with Excellent to Very Good SRH and Number of

Physically Unhealthy Days by Race

Table 2: Number of physically unhealthy days in the past 30 days and SRH by race

	Excellent-very good		Good		Fair-poor		Total		
	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	
	n (%)		n (%)		n (%)		n (%)		p-value
None***	917	56	558	92	136	37	1611	185	<0.001
	(56.9)	(30.3)	(34.6)	(49.7)	(8.4)	(20.0)	(100.0)	(100.0)	
1-2 days	94	5	64	10	20	4	178	19	0.081
	(52.8)	(26.3)	(36.0)	(52.6)	(11.2)	(21.1)	(100.0)	(100.0)	
3-7 days*	84	4	91	15	33	8	208	27	0.023
	(40.4)	(14.8)	(43.8)	(55.6)	(15.9)	(29.6)	(100.0)	(100.0)	
8 or more days*	43	3	87	11	87	24	217	38	0.023
	(19.8)	(7.9)	(40.1)	(28.9)	(40.1)	(63.2)	(100.0)	(100.0)	
Total	1138	68	800	128	276	73	2214	269	
	(51.4)	(25.3)	(36.1)	(47.6)	(12.5)	(27.1)	(100.0)	(100.0)	

Note: N=2483, *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

### 3.2.2 Mentally Unhealthy Days and SRH by Race

After we explored the relationship between self-reported physically unhealthy days and SRH, we examined the relationship between mentally unhealthy days and SRH in order to see whether racial differences exist between these two variables. In Table 3, Caucasians with less mentally unhealthy days within the past 30 days are more likely to report better health. The difference was significant within people with no mentally unhealthy days ($p<0.001$). Within Caucasians reported no mentally unhealthy days, 53.5% of them reported Excellent to Very Good SRH, 39.5% of them reported Good SRH, and 12.1% of them reported Fair to Poor SRH. In contrast, within African Americans reported no mentally unhealthy days, 27.6% of them reported Excellent to Very Good SRH, 47.5% of them reported Good SRH, and 24.9% of them reported Fair to Poor SRH.

In Table 3, we found that the relationship between mentally unhealthy days and SRH varies slightly from the relationship between physically unhealthy days and SRH. Caucasians with fewer mentally unhealthy days within the past 30 days are more likely to report better health than African Americans. Within the group of Caucasians who reported no mentally unhealthy days, 53.5% of them reported Excellent-Very Good SRH, 39.5% reported Good SRH, and 12.1% reported Fair-Poor SRH. In contrast, within the group of African Americans who reported no mentally unhealthy days, only 27.6% of them reported Excellent-Very Good SRH, while 47.5% of them reported Good SRH, and 24.9% reported Fair-Poor SRH.

Figure 3 and Table 3 also show results similar to Table 2; they illustrate that Caucasians tended to report better SRH than African Americans, regardless of how many mentally unhealthy days they experienced. 53.5% of Caucasians with no mentally unhealthy days reported

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Excellent-Very Good SRH; in contrast, only 27.6% of African Americans with no mentally unhealthy days reported they had Excellent-Very Good SRH. In addition, 56.7% of Caucasians with 1-2 mentally unhealthy days reported Excellent-Very Good SRH, while only 30.8% of African Americans with 1-2 mentally unhealthy days reported Excellent-Very Good SRH. Of the Caucasians with 3-7 mentally unhealthy days, 40.1% labeled their SRH as Excellent-Very Good SRH as opposed to only 15.8% of African Americans. Among people with 8 or more mentally unhealthy days, 26.7% of Caucasians reported Excellent-Very Good SRH. However, none of African Americans with 8 or more mentally unhealthy days reported Excellent-Very Good SRH, which reinforces the observed pattern that African Americans as a whole reported poorer SRH in every group.

This observation holds true on the other end of the SRH spectrum, too. In people who reported no mentally unhealthy days out of the past 30 days, 24.9% of African Americans said they had Fair-Poor SRH, while only 12.1% of Caucasians reported Fair-Poor SRH. In people who had 1-2 mentally unhealthy days, there were 30.8% of African Americans with Fair-Poor SRH, but only 10.8% of Caucasians. Moreover, we found that 31.6% of African Americans with 3-7 mentally unhealthy days reported Fair-Poor SRH, but 15.3% of Caucasians with 3-7 mentally unhealthy days reported Fair-Poor SRH. Although Caucasians and African Americans are both represented in the 8 or more mentally unhealthy days category, 50.0% of African Americans reported Fair-Poor SRH in that grouping opposed to only 37.1% of Caucasians.
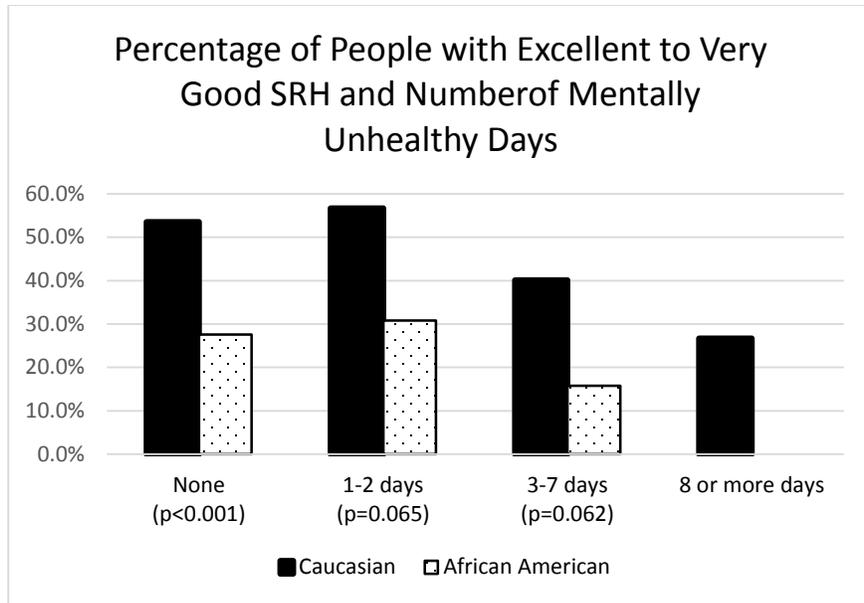
Figure 3: Percentage of People with Excellent to Very Good SRH and Number of

Mentally Unhealthy Days by Race

Table 3: Number of mentally unhealthy days in the past 30 days and SRH by race

|	Excellent-very good		Good		Fair-poor		Total		
	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	
	n (%)		n (%)		n (%)		n (%)		p-value
None***	955	61	637	105	195	55	1611	221	<0.001
	(53.5)	(27.6)	(39.5)	(47.5)	(12.1)	(24.9)	(100.0)	(100.0)	
1-2 days	89	4	51	5	17	4	157	13	0.065
	(56.7)	(30.8)	(32.5)	(38.5)	(10.8)	(30.8)	(100.0)	(100.0)	
3-7 days	63	3	70	10	24	6	157	19	0.062
	(40.1)	(15.8)	(44.6)	(52.6)	(15.3)	(31.6)	(100.0)	(100.0)	
8 or more days	31	0	42	8	43	8	116	16	--- [1]
	(26.7)	(0.0)	(36.2)	(50.0)	(37.1)	(50.0)	(100.0)	(100.0)	
Total	1138	68	800	128	276	73	1138	68	
	(51.4)	(25.3)	(36.1)	(47.6)	(12.5)	(27.1)	(51.4)	(25.3)	

Note: N=2483, *p≤0.05; **p≤0.01; ***p ≤ 0.001

[1]: The cell within the cross-table of people with 8 or more days and SRH contains 0, so it cannot obtain p-value.

3.2.3   Activity Limitation Days and SRH by Race

In addition to physically and mentally unhealthy days, Table 4 expresses the potential racial differences between SRH and activity limitation days which may reflect the severity of physical and mental health. According to Table 4, the observed racial differences is consistent with the one found in the physically and mentally unhealthy days. The differences were significant within people with no activity limitation days ($p<0.001$) and people with 3-7 activity limitation days ($p=0.048$). Across both races, people who reported less activity limitation days within the past 30 days are more likely to report better health. Among the Caucasians with no activity limitation days within the past 30 days, 55.5% of them said that they had Excellent to Very Good SRH, and 35.0% reported they had Good SRH, and 9.0% of Caucasians still reported that they had only Fair to Poor SRH. Among the African Americans with no activity limitation days within the past 30 days, 29.4% of them said that they had Excellent to Very Good SRH, and 48.6% reported Good SRH, and 22.0% of Caucasians reported Fair to Poor SRH.

The percentages of Excellent-Very Good SRH in Caucasians who reported the same number of activity limitation days are much higher than African Americans. Caucasians tended to report better SRH compared to African Americans regardless of how many activity limitation days. Caucasians, 55.5% of them with no activity limitation days reported Excellent-Very Good SRH; in contrast, only 29.4% of African Americans with no activity limitation days reported Excellent-Very Good SRH. In people who had 1-2 activity limitation days, 40.0% of Caucasians reported Excellent-Very Good SRH, but only 10.0% of African Americans. We found that out of people with 3-7 activity limitation days in the past 30 days, 31.7% of Caucasians reported Excellent-Very Good SRH; in contrast, only 5.6% of African Americans categorized their SRH

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as Excellent-Very Good. In people with 8 or more activity limitation days, 21.7% of Caucasians reported Excellent-Very Good SRH; however, only 8.7 of African Americans reported Excellent-Very Good SRH.
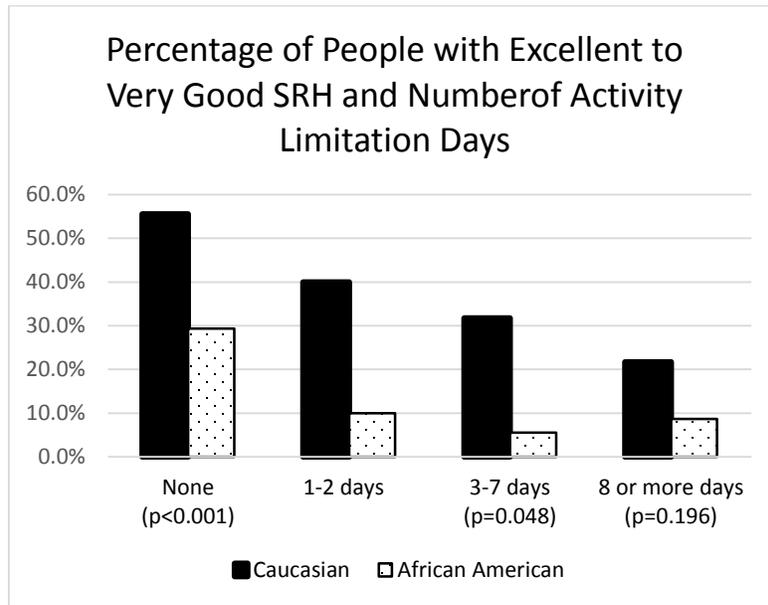
Figure 4: Percentage of People with Excellent to Very Good SRH and Number of

Activity Limitation Days by Race

Table 4: Number of activity limitation days because of poor physical or mental health in the past 30 days by race

	Excellent-very good		Good		Fair-poor		Total		
	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	Caucasians	African Americans	
	n (%)		n (%)		n (%)		n (%)		p-value
None***	1030	64	649	106	176	48	1855	218	<0.001
	(55.5)	(29.4)	(35.0)	(48.6)	(9.5)	(22.0)	(100.0)	(100.0)	
1-2 days	38	1	43	5	14	4	95	10	--- [1]
	(40.0)	(10.0)	(45.3)	(50.0)	(14.7)	(40.0)	(100.0)	(100.0)	
3-7 days*	40	1	59	10	27	7	126	18	0.048
	(31.7)	(5.6)	(46.8)	(55.6)	(21.4)	(38.9)	(100.0)	(100.0)	
8 or more days	30	2	49	7	59	14	138	23	0.196
	(21.7)	(8.7)	(35.5)	(30.4)	(42.8)	(60.9)	(100.0)	(100.0)	
Total	1138	68	800	128	276	73	2214	269	
	(51.4)	(25.3)	(36.1)	(47.6)	(12.5)	(27.1)	(100.0)	(100.0)	

Note: N=2483, *p≤0.05; **p≤0.01; ***p ≤ 0.001

[1]: We could not calculate this p-value since there were over 50% expectation values of cells smaller than 5 in people with 1-2 days group

3.2.4   Dichotomized SRH And Race

Despite the drastically different number of Caucasian and African American participants, strong racial differences from Table 2 through Table 3 when considering physically or mentally unhealthy days and SRH because the proportion of Excellent to Very Good SRH among Caucasians is higher than the African Americans with the same number of physically or mentally unhealthy days. Since the sample sizes of Caucasians or African Americans in the categories are small when we defined SRH into three groups, we then regrouped the SRH into two groups: One was the Good SRH (coded as 0), which included Excellent, Very Good, and Good SRH; the other one was Poor SRH (coded as 1), which included Fair or Poor SRH.

According to Table 5, there were total 1,796 people who reported no physically unhealthy days, including 1,611 Caucasians and 185 African Americans. In Table 6, there were total 2,005 people who reported no mentally unhealthy days, including 1,784 Caucasians and 221 African Americans. Both Tables show that African Americans are more likely to report Poor SRH when they had no physically or mentally unhealthy days as compared to Caucasians (p<0.001). Within those with no physically unhealthy days, the odds ratio shows that African Americans are 2.71 (95% CI=1.82, 4.05) times more likely to report Poor SRH as compared to Caucasians. Within those with no mentally unhealthy days, the odds ratio shows that African Americans are 2.75 (95% CI=1.96, 3.86) times more likely to report Poor SRH as compared to Caucasians.

Table 5: Chi-square test on dichotomized SRH and race within group of no physically unhealthy day

	Good SRH		Poor SRH		Total	
	Caucasian	African American	Caucasian	African American	Caucasian	African American
	n (%)		n (%)		n (%)	
No physically unhealthy day***	1,475 (91.6)	148 (80.0)	136 (8.4)	37 (20.0)	1,611 (100.0)	185 (100.0)
	Odds ratio (African American/Caucasian): 2.71 (95% CI= 1.77, 3.02)					

Note: N=1796, *p≤0.05; **p≤0.01; ***p ≤ 0.001

Table 6: Chi-square test on dichotomized SRH and race within group of no mentally unhealthy day

	Good SRH		Poor SRH		Total	
	Caucasian	African American	Caucasian	African American	Caucasian	African American
	n (%)		n (%)		n (%)	
No mentally unhealthy day***	1,592 (89.2)	166 (75.1)	192 (10.8)	55 (24.9)	1,784 (100.0)	221 (100.0)
	Odds ratio (African American/Caucasian): 2.75 (95% CI=1.96, 3.86)					

Note: N=2005, *p≤0.05; **p≤0.01; ***p ≤ 0.001

3.3 MULTIVARIABLE LINEAR REGRESSION

Table 7 illustrates the multivariable linear regression model results between general healthy days and individual-level characteristics. We first calculated the unhealthy days which was an estimate of the overall number of days during the previous 30 days when the participants reported that either his or her physical or mental health was not good. We added together a participants' number of physically and mentally unhealthy days based their responses to general unhealthy days, with a logical maximum of 30 days. The general healthy days come from 30 days subtracted by the general unhealthy days. The coefficients predicting the number of general healthy days based on basic demographic and health characteristics are shown. For the independent variables, we used demographic, health, and life style characteristics in the model. Since only current smoker, physical activity, and alcohol consumption is significant different stratified by race, we only put these three life style characteristics in multiple linear regression model.

The main result in Table 7 indicates that the African Americans did not significantly reported different perceived general healthy days in the past 30 days as compared to Caucasians after adjusting for other individual-level characteristics (p=0.437). On the other hand, the general healthy days is related to gender, number of diseases, physical activity, tobacco use, and alcohol consumption. Men reported overall 0.92 more number of general healthy days compared to women (95% CI=0.27, 1.56; p=0.006). People who have one more number of disease report 1.04 fewer number of general healthy days (95% CI= -1.22, -0.86; p<0.001). People who report have at least one physical activity reported 2.3 more number of general healthy days (95% CI= 1.49, 3.11; p<0.001). People who are current smoker reported 1.68 fewer number of general healthy days compared to people who do not smoke (95% CI= -3.30, -0.07; p=0.041). People who

consume at least one alcohol-related drinks in the past 30 days reported 1.13 more number of general healthy days compared to people who did not drink alcohol in the past 30 days (95% CI= 0.46, 1.807; p=0.001).

Table 7: Multivariable Linear Regression Model of General Healthy Days on Individual-Level Characteristics

Independent Variables	Beta (se)	95% CI	p Value
Constant***	22.90 (1.74)	(19.48, 26.32)	<0.001
Demographic characteristics			
Race (African American)	0.48 (0.61)	(-0.73, 1.68)	0.437
Age	-0.006 (0.02)	(-0.05, 0.04)	0.791
Gender (Male)**	0.92 (0.33)	(0.27, 1.56)	0.006
Individual Income, 10,000	0.18 (0.10)	(-0.01, 0.40)	0.064
Education			
Less than high school	-0.95 (1.19)	(-3.28, 1.38)	0.424
High school but no college	-0.84 (0.37)	(-1.56, -0.12)	0.059
Health characteristics			
Number of Diseases***	-1.04 (0.09)	(-1.22, -0.86)	<0.001
Life style characteristics			
Physical activity***	2.30 (0.41)	(1.49, 3.11)	<0.001
Current smoker*	-1.68 (0.82)	(-3.30, -0.07)	0.041
Alcohol consumption**	1.13 (0.34)	(0.46, 1.80)	0.001

Adjusted R² :0.033; F: 10.02; P-value: <0.001

Note: N=2483, *p≤0.05; **p≤0.01; ***p ≤ 0.001 (two-tailed test)

Missing: Current smoker for Caucasians: 18; Current smoker for African Americans: 11; Former smoker for African Americans: 12. Physical activity for Caucasians: 18; Physical activity for African Americans: 6. Alcohol consumption for Caucasians: 28; Alcohol consumption for African Americans: 12

Dependent variable is number of general healthy days

Reference groups: female, Caucasians, and people who have college degree and beyond

3.4   HIERARCHICAL LOGISTIC REGRESSION MODEL

The Table 8 examines whether the racial differences exist within SRH. In order to examine the specific contribution of life style characteristics in the explanation of SRH, a hierarchical logistic regression was performed. The dependent variable is the same—SRH—in two Models. Model 1 in Table 11 shows the coefficients of a model predicting poorer SRH based on demographic characteristics, health characteristics, and Healthy Days Measures. The main finding in Model 1 shows that racial differences exist—African Americans are 1.6 times more likely to report poorer SRH compared to Caucasians (95% CI= 1.04, 2.45; p=0.032). In addition to race, the SRH is also associated to gender, individual income, education, number of diseases, and number of physically and mentally unhealthy days. Men is 1.48 times more likely to report poor SRH compared to women (95% CI= 1.13, 1.94; p=0.004). More income and education are both associated with better SRH. A person who has $10,000 more in annual income is 0.92 times as likely to report poorer health (95% CI= 0.84, 1.00; p=0.045). Compared to people who received college or higher degree, people have a high school but no college diploma were 2.18 times more likely to report Poor SRH (95% CI= 0.66, 2.87 ; p<0.001). People who have one more disease are 1.53 more likely to report poorer SRH (95% CI= 1.42, 1.65; p<0.001). Last, people who have one more number of physically unhealthy days are 1.07 more likely to report poorer SRH (95% CI= 1.05, 1.08; p<0.001); people who have one more number of mentally unhealthy days are 1.04 more likely to report poorer SRH (95% CI= 1.02, 1.06; p=0.001).

In Model 2, we added the life style characteristics; the main result shows that racial differences are attenuated and are no longer significant after adjusting for other variables. In contrast, physical activity and alcohol consumption are related to SRH. People who reported physical activity are 0.49 times more likely to report poorer SRH (95% CI= 0.36, 0.65; p<0.001);

people who reported alcohol consumption are 0.51 times more likely to have poorer SRH (95% CI= 0.39, 0.67; p<0.001). The effects of gender and education are more obvious—women and higher education are report better SRH. As similar as race, individual income is no more significant. Since the R^2 of Model 2 is bigger than Model1, and -2 Log Likelyhood of Model 2 is smaller than Model 1, we concluded that the Model 2 is better to fit our data.

In above analysis, we dichotomized the alcohol consumption as yes=1 and no=0. During the interview, the Pepper Center also asked people who reported they had at least one alcohol-related drink were added to quantify how many days they have alcohol consumption in the past 30 days. As a result, alcohol consumption was classified as four groups: none (None drinker), drink 1-3 days (Slight drinker), drink 4-12 days (Moderate drinker), and drink 13 or more days (Heavy drinker) in the past 30 days. The result showed that heavy drinkers have more general healthy days, and moderate drinkers have the least likely to report poorer SRH compared to none drinkers (data are not shown).

In addition, for multivariable linear regression model (Table 7) and logistic regression (Table 8), since participants were not asked to report their individual income, we used Census data to predict the individual incomes of participants based on their zip codes and race; as a result, the clustered phenomenon may occur. In order to examine whether the cluster phenomenon affect the relationship between SRH and individual-level characteristics, we used robust cluster linear regression and robust cluster logistic regression. The coefficients and p-value of each individual-level characteristics obtained from the robust cluster regression and normal regression were similar. Therefore we decided to publish only the result from normal regression

Table 8: Hierarchical Logistic Regression Model of SRH on Individual-Level Characteristics

Independent Variables	Model 1		Model 2	
	OR (95%CI)	p-value	OR (95%CI)	p-value
Constant	0.04	<0.001	0.08	0.001
Demographic characteristics				
Race				
African American	1.60 (1.04, 2.45)	0.032*	1.282 (0.81, 2.03)	0.287
Caucasian	1		1	
Age	0.998 (0.98, 1.02)	0.837	1.00 (0.98, 1.10)	0.989
Gender				
Male	1.48 (1.13, 1.94)	0.004**	1.77 (1.33, 2.36)	<0.001***
Female	1		1	
Individual Income, 10,000	0.92 (0.84, 1.00)	0.045*	0.92 (0.84, 1.00)	0.065
Education				
Less than high school	2.00 (0.94, 4.28)	0.074	2.28 (1.05, 4.98)	0.038*
High school but no college	2.18 (0.66, 2.87)	<0.001***	2.05 (1.54, 2.74)	<0.001***

Table 8 Continued

College or graduate school	1		1	
Health characteristics				
Number of Diseases	1.53 (1.42, 1.65)	<0.001***	1.49 (1.38, 1.62)	<0.001***
Life style characteristics				
Physical activity			0.49 (0.36, 0.65)	<0.001***
Current smoker			1.25 (0.66, 1.37)	0.488
Alcohol consumption			0.51 (0.39, 0.67)	<0.001***
Healthy Days Measures				
Physically unhealthy days	1.07 (1.05, 1.08)	<0.001***	1.07 (1.05, 1.08)	<0.001***
Mentally unhealthy days	1.04 (1.02, 1.06)	0.001**	1.03 (1.01, 1.06)	0.003**
Cox & Snell R^2	0.144		0.166	
Nagelkerke R^2	0.259		0.302	
-2 Log Likelyhood	1629.892		1483.247	

Note: N=2483, *p≤0.05; **p≤0.01; ***p ≤ 0.001 (two-tailed test)

Missing: Current smoker for Caucasians: 18; Current smoker for African Americans: 11; Former smoker for African Americans: 12. Physical activity for Caucasians: 18; Physical activity for African Americans: 6. Alcohol consumption for Caucasians: 28; Alcohol consumption for African Americans: 12

Dependent variable is SRH (1=Poor SRH, 0=Good SRH)

Reference groups: female, Caucasians, and people who have college degree and beyond

3.5 INTERACTION EFFECT

Previous studies show that the major underlying causes of physical disability are chronic diseases, including both acute events, such as hip fracture and stroke and slowly progressive diseases such as arthritis and heart disease, which means that the severity of disease may affect the possibility of being physically active (Fried & Guralnik, 1997). As a result, we examined whether interaction effect exist within number of diseases and physical activity in Figure 5. People were grouped into 0-2 diseases and 3 or more diseases, and then stratified by physical activity. Next, people with activity were stratified again by race; we like to see whether the range of percentages of reporting poor SRH among African Americans and Caucasians are different within four groups: people with 0-2 diseases and physical activity, people with 0-2 diseases and physical inactivity, people with 3 or more diseases and physical activity, and people with 3 or more diseases and physical inactivity.

The Figure 5 shows that the percentage of African Americans who report poor SRH is generally higher in every category, which means that the racial differences in SRH is mostly consistent across categories of physical activity and disease; therefore, the interaction effect is not informative. As a result, we did not involve the interaction term (physical activity*number of diseases) in the regression model.
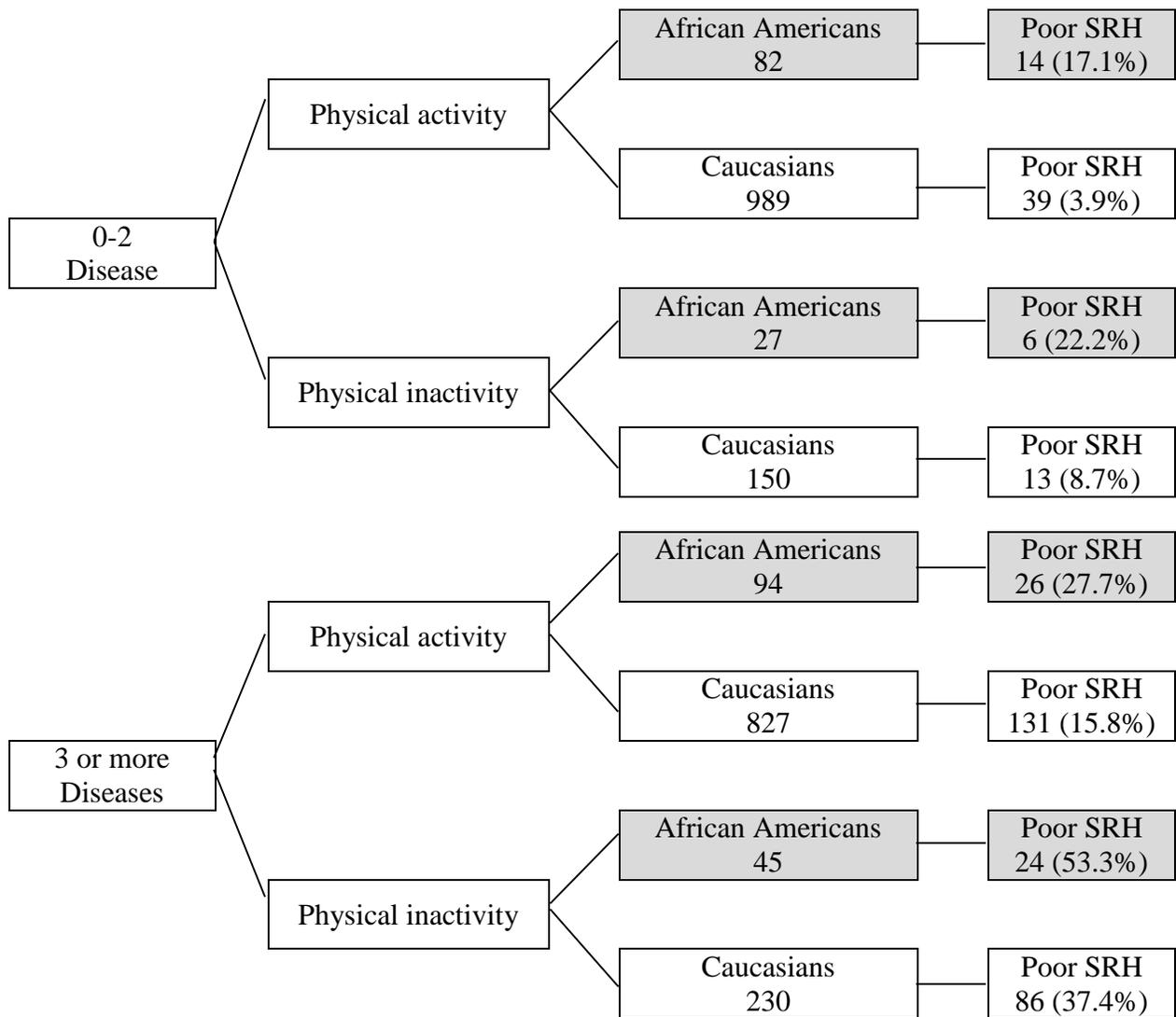
Figure 5: Interaction effect examination between number of diseases and physical activity

Missing: Physical activity for Caucasians: 18; Physical activity for African Americans: 6. N=2,459

4.0   DISCUSSION

In our descriptive analysis for African Americans and Caucasians, we concluded that African Americans received less education and individual income, which indicates that they have lower SES conditions. The low SES such as less education and lower income may also contribute to the racial differences in health (Farmer & Ferraro, 2005; Williams & Collins, 1995). As a result, African Americans have substantially higher likelihood of experiencing negative health outcomes and reporting lower levels of health when compared with Caucasians. In our study, we also found to consistent with previous findings that African Americans were more likely to have stroke, diabetes, hypertension, and arthritis as compared to Caucasians, while Caucasians have higher cancer prevalence rate (Desai, Zhang, & Hennessy, 1999; Dunlop, Manheim, Song, & Chang, 2002). Although BRFSS survey conducted from 2000-2002 indicated that African Americans reported 6.39 unhealthy days in the past 30 days, whereas Caucasians reported 5.80 unhealthy days per month, after standardized by age and sex (Jia, Lubetkin, Moriarty, & Zack, 2007), we found that African Americans do not have significantly different general unhealthy days compared to Caucasians in our study after adjusting for demographic, health, and life style characteristics.

In examining the relationship between number of self-reported unhealthy days and SRH, we found that both in Caucasians and African Americans reported more unhealthy days when poorer SRH was rated by participants. It is consistent with findings from Guyatt et al. (1993)

found that people with more physically or mentally unhealthy days within the past 30 days were more likely to report poor SRH. However, the interesting situation is that the proportion of excellent or very good SRH among Caucasians are generally higher than the proportion among African Americans even they both reported they had the same status of unhealthy days. Moreover, when we use dichotomized SRH (Good SRH and Poor SRH), the results also show that African Americans are 2.71 (95% CI=1.82, 4.05) times more likely to report Poor SRH as compared to Caucasians. Within those with no mentally unhealthy days, the odds ratio shows that African Americans are 2.75 (95% CI=1.96, 3.86) times more likely to report Poor SRH as compared to Caucasians. Therefore, potentially health pessimism is a truth possibly, although we did not directly assess health pessimism.

Another potential explanation is lifetime experiences. As WHO's definition, health is as a state of complete physical, mental, and social well-being. HDI measure the physical and mental status but cannot measure the perceived social well-being in each race. People may experience lifetime experiences differently because of their race and other demographic characteristics. For example, some African Americans may more likely to feel they receive discrimination or other unfair life experiences. These perceived feelings may contribute to racial differences among SRH; however, we did not measure this kind of indicators in our study. Or African Americans have some specific culture of life style which leads to different perspectives and interpretations toward health. Phenomenon that diverse populations may decide what constitutes good or poor health in dissimilar ways, based on past lifetime experiences (Damron-Rodriguez, Frank, Enriquez-Haass, & Reuben, 2005). African Americans may go through some kind of specific life experience that we did not capture and that accounts for the racial differences among SRH.

In order to examine the hypothesis 1, we further added individual-level characteristics into multiple linear regression models. The result of multiple linear regression fails to reject the null hypothesis 1. The result indicates that when adjusting for demographic, health, and life style characteristics, the relationship between race and generally healthy days is not significant anymore. Instead, being male, higher number of diseases, and being current smoker were associated with poorer SRH. Physical activity and moderate alcohol consumption were associated with better SRH. We summarize that people may report their perceived number of generally healthy days in the past 30 days based on their disease status and risk behavior presence. Next, by using hierarchical logistic regression model, we found that African American are 1.6 times (95% CI= 1.04, 2.45) more likely to report poor SRH after controlled demographic and health characteristics; however, life style characteristics include physical activity, tobacco use, and alcohol consumption attenuate the association between race and SRH. Being a male, less educational level, higher number of diseases, and more number of perceived unhealthy days contributes negatively to SRH. In addition, more physical activity and moderate alcohol consumption are associated with better SRH. These findings fail to reject the hypothesis 2 and indicate that racial differences do not exist among SRH after adjusting for these factors.

Based on above findings from regression model, we conclude that the reason why African Americans report fewer generally unhealthy days due to a poor health status and more number of poor life style behaviors. Compared with previous studies, number of diseases was documented to be related to poorer SRH (Idler & Benyamini, 1997). In addition, several studies reiterated that the health-related behaviors such as physical inactivity and current tobacco use are associated with poorer SRH (Manderbacka, Lundberg, & Martikainen, 1999). In our study, we found that alcohol consumption is related to better SRH, and moderate drinker report the best SRH

compared non-drinkers, slight drinkers, and heavy drinkers. The relationship also found in Saarni et al. (2008). The research showed that positive associations between moderate alcohol use and well-being were observed on SRH. Also, there are many studies suggesting a J-shaped relationship between alcohol consumption and different measures of health and well-being including SRH (Grønbæk, 2004). Physical activity is another important predict of SRH (Parkai, Deeg, Bosscher, & Launer, 1998). The prevalence of poor self-rated health was significantly lower as at a higher level of physical activity increased, and odds ratios for poor self-rated health were significantly lower for higher levels of physical activity after adjusting for age, marital status, educational status, smoking, alcohol consumption, and the number of physical impairments and chronic medical conditions (Han, Kim, Park, Kang, & Ryu, 2009). Gallant and Dorn (2001) also found that Caucasians who reported better SRH had greater levels of physical activity. To sum up, we can conclude that poorer health accounted for greater likelihood of fair or poor SRH in older African Americans. Health may involve multiple elements and we suggest researchers can use finer measurement to measure participants' life style behaviors, which may help us to better explain African Americans-Caucasians differences in SRH in future studies.

These results must be interpreted in light of study limitations. One of the limitations of this study is that it was a cross-sectional survey so the causality may not be clear. The second limitation is that there was a smaller sample size of African Americans compared to Caucasians in our study. Only one African American per group existed in some categories. The discrepancy between the sample size of Caucasians and African Americans might make for a slightly larger margin of error in our results. Therefore, we grouped SRH into two categories — Excellent, Very good, and Good versus Fair and Poor — so that sufficient sample sizes of Caucasians and African Americans within these two categories. The third limitation is that whole participants

came from convenience sampling design and participants only lived in the Western Pennsylvania; as a result, the generalizability to other regions may be limited.

According to previous studies, we know that SRH is a good indicator to predict future negative outcomes, so it is crucial to understand what factors can affect older adults to rate their health. In our study, we learned that older adults may rate their health based on how many number of diseases they have and presence of poor life style behaviors; as a result, this result suggests the racial differences may partially be addressed through public health effects to improve prevention of disease and reduction of poor life style behaviors.

5.0   CONCLUSION

Older African Americans are more likely to report poorer self-rated health (SRH) than Caucasian even when individual-level characteristics, such as number of chronic conditions or education, are controlled. Health pessimism which refers to African Americans are more pessimistic about their health because of non-health factors, such as perceived discrimination provide a possible explanation this racial differences. The aim of this study is to find whether health pessimism or other factors explain the SRH differential between African Americans and Caucasians. Community Research Registry of the Claude D. Pepper Center at the University of Pittsburgh recruited between 2005 and 2013 (n=2483), is a convenience sample of residents aged 60+ living in western Pennsylvania. Participants completed the CDC Healthy Days module, which includes questions on SRH, perceived number of physically unhealthy days, perceived number of mentally unhealthy days, and perceived number of activity limitation days. We use multiple linear regression models to examine demographic characteristics (race, age, gender, income, and education level), health characteristics (number of diseases), life style characteristics (current tobacco use, alcohol consumption, and physical activity) on reports of generally healthy days; moreover, we estimated hierarchical logistic regression models to examine demographic characteristics (race, age, gender, income, and education level), health characteristics (number of diseases), life style characteristics (current tobacco use, alcohol consumption, and physical activity), number of physically and mentally unhealthy days on reports of poor or fair health.

Our findings show there is no significant African American-Caucasian differences in generally healthy days after adjusting for demographic, health, and life style characteristics. On the other hand, African Americans were 1.6 times (95% CI=1.04, 2.45) more likely to report fair or poor SRH after controlling for demographic and health characteristics. Including lifestyle characteristics, especially physical activity and alcohol consumption attenuated the association, so that African Americans no longer differed from Caucasians in fair-poor SRH. Significant correlates of poorer SRH included male gender, less education, a greater number of diseases, number of reported unhealthy days, less physical activity, and no alcohol consumption. As a result, we conclude that health pessimism but also actual poorer health may be responsible for greater likelihood of fair or poor SRH in older African Americans.

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