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Racial-Ethnic Disparities in Self-Reported Health Status Among US Adults Adjusted for Sociodemographics and Multimorbidities, National Health and Nutrition Examination Survey 2011-2014

Krupa Gandhi, MPH, Eunjung Lim, PhD, James Davis, PhD, John J. Chen, PhD

Office of Biostatistics and Quantitative Health Sciences, John A. Burns School of Medicine, University of Hawaii, Honolulu, United States

Abstract

Objective: To investigate racial-ethnic disparities in self-reported health status adjusting for sociodemographic factors and multimorbidities.

Design: A total of 9,499 adult participants aged 20 years and older from the United States (US); reported by the National Health and Nutrition Examination Survey (NHANES), a cross-sectional survey—for years 2011–2014. The main outcome measure was self-reported health status categorized as excellent/very good, good (moderate), and fair/poor.

Results: Of the NHANES participants, 40.7% reported excellent/very good health, 37.2% moderate health and 22.1% fair/poor health. There were 42.8% who were non-Hispanic whites, 20.2% were Hispanic, 23.8% were non-Hispanic blacks, and 13.2% were non-Hispanic Asians. Compared to non-Hispanic whites, Hispanics [Odds Ratio (OR)=2.91, 95% Confidence Interval (CI)=2.28–3.71] and non-Hispanic blacks [OR=1.51, 95% CI=1.26–1.83] were more likely to report fair/poor health, whereas, non-Hispanic Asians [OR=1.42, 95% CI=1.14–1.76] were more likely to report moderate health than excellent/very good health. Compared to those with no chronic conditions, participants with two or three chronic conditions [OR=9.35, 95% CI=7.26–12.00] and with four or more chronic conditions [OR=38.10, 95% CI=26.50–54.90] were more likely to report fair/poor health than excellent/very good health status.

Conclusion: The racial-ethnic differences in self-reported health persisted even after adjusting for sociodemographics and number of multimorbidities. The findings highlight the potential importance of self-reported health status and the need to increase health awareness through health assessment and health-promotional programs among the vulnerable minority US adults.

Keywords

NHANES; multimorbidities; racial-ethnic disparities; self-reported health status

Corresponding Author: Krupa Gandhi, MPH, 651 Ilalo Street, Biosciences Building Suite 211 Honolulu, HI 96813, Phone: (808) 692-1812, kgandhi@hawaii.edu. Eunjung Lim, PhD, MS, 651 Ilalo Street, Biosciences Building Suite 211, Honolulu, HI 96813, Phone: (808) 692-1817, lime@hawaii.edu. James Davis, PhD, 651 Ilalo Street, Biosciences Building Suite 211, Honolulu, HI 96813, Phone: (808) 692-1806 jamesdav@hawaii.edu. John J. Chen, PhD, 651 Ilalo Street, Biosciences Building Suite 211, Honolulu, HI 96813, Phone: (808) 692-1814, jjchen@hawaii.edu.

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Introduction

Self-reported health has been widely utilized as an indicator of an individual's health status. There has been evidence of self-reported health being a good predictor of future disability, morbidity and mortality (Burstrom & Fredlund, 2001; Idler & Angel, 1990; S. J. Lee et al., 2007; McGee, Liao, Cao, & Cooper, 1999; Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997). Self-reported health measure is considered to be an important determinant of health (Wu et al., 2013) and its usefulness has been discussed in terms of clinical practice (Jylha, 2009; Loprinzi, 2015), and public health research and policy (Jylha, 2009). Several studies documented the association of self-reported health with socioeconomic and demographic factors (Franks, Gold, & Fiscella, 2003; Martinez, Mannino, Curtis, Han, & Diaz, 2015), physical and mental health status (Smith, Glazier, & Sibley, 2010; Wu et al., 2013), health behaviors (Smith et al., 2010), health literacy (Bennett, Chen, Soroui, & White, 2009), and health service utilization (George et al., 2012).

Previous studies reported the effect of chronic conditions on self-reported health status and often found worse self-reported health status among those with multimorbidities, commonly defined as two or more chronic conditions (Boume & McGrowder, 2009; Frei et al., 2014; McDaid et al., 2013; Putcha, Puhan, Hansel, Drummond, & Boyd, 2013). As age increases, the risk of multimorbidity increases (St Sauver et al., 2015). The treatment burden of multimorbidities is responsible for two-thirds of health care costs and is rapidly increasing in the United States (US) and multimorbidity is the leading cause of frailty and mortality (Centers for Disease Control and Prevention, 2016; Ornstein, Nietert, Jenkins, & Litvin, 2013; Wallace et al., 2015). Studies show worse self-rated health with increase in the number of chronic conditions (Mavaddat, Valderas, van Der Linde, Khaw, & Kinmonth, 2014; Palladino, Tayu Lee, Ashworth, Triassi, & Millett, 2016), especially among disadvantaged populations (Efrat, 2013). Differences in self-rated health have also been reported across minorities even after adjusting for intra- and interpersonal factors (for e.g., intrapersonal variables such as role of nativity, nature of self-reported diseases and several socio-demographic factors, and interpersonal variables such as differences in age- and race-specific multimorbidity) (Perruccio, Katz, & Losina, 2012; Quiñones, Liang, Bennett, Xu, & Ye, 2011).

Co-morbidities also have an impact on racial-ethnic disparities (e.g., on the prevalence of hypertension and obesity (Balasubramanian et al., 2017; Opara et al., 2013)). Racial-ethnic disparities could possibly be due to under-diagnosis of health problems among minority populations as a result of being uninsured or underinsured, cultural barriers, language proficiency, racial segregation, immigrant status or lower access and rates of health care utilization (Carreon & Baumeister, 2015; Kim & Keefe, 2010; Ryu, Young, & Kwak, 2002). Studies have encouraged more research on the burden of multimorbidity across racial-ethnic groups for better quality of life, productivity and well-being for non-elderly adults (Johnson-Lawrence, Zajacova, & Sneed, 2017). Our study is also aligned with one of the objectives of Department of Health and Human Services in addressing racial-ethnic disparities in multiple chronic condition populations (Parekh, Goodman, Gordon, Koh, & The, 2011). Racial-ethnic disparities in self-reported health status have been studied primarily focusing on non-

Hispanic whites, non-Hispanic blacks and Hispanics (Brewer et al., 2013; Martinez et al., 2015; Shi, Green, & Kazakova, 2004; Wolf, S., & Campbell, 2008). Persistent disparities in self-rated health have also been identified for non-Hispanic blacks, Hispanics and American Indian/Alaska Natives (Mead H, Cartwright-Smith L, Jones K, Ramos C, & Siegel, March 2008). To our knowledge there has not been many studies comparing the self-reported health of Asians to other racial-ethnic groups accounting for multimorbidities using nationally representative data. Due to smaller population size, Asians are often ignored or grouped in the “other” racial group. For instance, National Health and Nutrition Examination Survey (NHANES), a national population-based survey, collapsed Asians into “other” race category before 2011; since 2011 Asians have been oversampled and included as a separate racial group in NHANES surveys, facilitating comparisons with non-Hispanic whites, non-Hispanic blacks and Hispanics. In addition, very few studies focus on racial-ethnic disparities among adults with or without multimorbidities (Reichmann, Katz, Kessler, Jordan, & Losina, 2009).

To address this gap and to provide insights into factors associated with self-reported health status, this study aims to evaluate racial-ethnic disparities in self-reported health status adjusting for sociodemographic factors and the number of multimorbidities. The findings of this study could be helpful in the development of strategies to increase health awareness and improve health assessment and health-promotional programs among the vulnerable minority adults in the United States.

Methods

Data Source

Two cross-sectional datasets from NHANES between years 2011–2014 were utilized for the secondary analysis of all participants aged 20 years and older. Survey data was obtained via personal household interviews of a stratified, multistage probability sample of the civilian, non-institutionalized population of the United States. Data from the NHANES are de-identified, downloadable public-use data files.

Variables

Outcome—The outcome variable for this study was the overall self-reported health status collected during a household interview of the participants. Participants were asked, “Would you say your health in general is ...?” Responses included a range of five categories: excellent, very good, good, fair, and poor. For this study, the responses were re-categorized as excellent/very good (reference category), good (moderate), and fair/poor based on other studies (Brett O’Hara & Kyle Caswell, 2010; White, Philogene, Fine, & Sinha, 2009).

Covariates—Race-ethnicity was the primary independent variable and was categorized as non-Hispanic whites (whites), non-Hispanic blacks (blacks), non-Hispanic Asians (Asians) and Mexican American or Hispanics (Hispanics). Participants who did not identify their race-ethnicity or identified themselves as other were excluded from the analysis. Multimorbidities were defined based on the count of self-reported chronic medical conditions including, respiratory conditions (asthma, emphysema, chronic bronchitis and

chronic obstructive pulmonary disease), joint conditions (arthritis and gout), cardiovascular diseases (congestive heart failure, coronary heart disease, angina and heart attack), stroke, thyroid problem, liver condition, cancer and diabetes. We also accounted for confounding by age (categorized as 20–44, 45–64, and 65 and above), gender, and marital status (married or living with a partner, widowed or divorced or separated and never married), education, family income to poverty ratio, and nativity status or length of time in US. Education level was categorized as less than high school, high-school graduate, some college or associate degree and college graduate or above. Family income to poverty ratio was categorized based on tertiles (<1.07, 1.07–2.83, 2.83). For instance, a ratio of <1.07 indicated the family's income being 107 percent below the appropriate poverty threshold, which is calculated based on the size of the family and ages of the members. Nativity status or years in US was categorized as born in US, lived in US for less than 10 years and more than 10 years (Commodore-Mensah et al., 2016; Yi, Elfassy, Gupta, Myers, & Kerker, 2014).

Statistical Analysis

The survey data were summarized by descriptive statistics, followed by bivariate analyses to assess associations between self-reported health status and other factors. Multinomial logistic regression analysis was performed with race-ethnicity as the primary independent variable of interest, adjusting for age, gender, marital status, education level, family income to poverty ratio, nativity status or years in US and the number of multimorbidities. Missing data (about 9%) were excluded from the analyses and the results did not change substantially. All analyses accounted for NHANES' complex multistage sampling design and $p < 0.05$ were considered statistically significant. Statistical analyses were conducted using SAS software, version 9.4 (SAS Institute Inc., Cary, NC).

Results

Table 1 presents NHANES participants' characteristics. Of 9,499 participants, 40.7% reported 'excellent/very good' health status, 37.2% 'moderate' and 22.1% 'fair/poor.' Among the study population, 42.8% were whites, 20.2% were Hispanic, 23.8% were blacks and 13.2% were Asians. For the age groups, 43.6% were 20–44 years, 34% 45–64 years and 22.4% 65 years and older. Men (48.1%) and women (51.9%) were about equal in proportion, 57.7% were either married or living with a partner, 21.4% had education less than high school and 26.2% had family income to poverty ratio less than 1.07. Almost half of whites (47.2%) reported excellent/very good health compared to only 26.8% of Hispanics; while about 34% Hispanics and 12% Asians reported fair/poor health. The distribution of racial-ethnic groups who reported moderate health status was fairly similar.

Table 2 summarizes the prevalence of self-reported chronic conditions. A total of 18.6% of the participants had at least one respiratory condition, 26.7% had at least one joint condition, 7.7% had at least one cardiovascular condition, 35.8% had high blood pressure, about 13% had diabetes, 9.7% had thyroid problems, and 9% had cancer. Overall, 38.4% had no chronic conditions, 26% had one chronic condition, 26.4% had two or three conditions, and 9.1% had four or more chronic conditions.

Based on the multinomial logistic regression analysis (Table 3), whites were more likely to report excellent/very good health status than any of the other racial groups. Compared to whites, Hispanics had the highest odds, followed by blacks and Asians, of reporting either fair/poor or moderate health, relative to “excellent/very good” health. For example, compared to whites, Hispanics [Odds Ratio (OR)=2.91, 95% Confidence Interval (CI)=2.28–3.71] and blacks [OR=1.51, 95% CI=1.26–1.83] were more likely to report fair/poor health status, whereas Asians [OR=1.42, 95% CI=1.14–1.76] were more likely to report moderate health than excellent/very good health status. Participants who lived more than 10 years in the US were more likely to report fair/poor as well as moderate health compared to those who were born in the US [fair/poor health OR=1.46, 95% CI=1.12–1.90; moderate health OR=1.43, 95% CI=1.18–1.75]. Participants with two or three chronic conditions [OR=9.35, 95% CI=7.26–12.00] or with four or more chronic conditions [OR=38.10, 95% CI=26.50–54.90] were more likely to report fair/poor health status compared to those with no chronic conditions.

Participants 65 years and older were less likely to report fair/poor health and moderate health than excellent/very good health, compared to the 20–44 year age group. Women were less likely to report moderate health than excellent/very good health, compared to men. Participants with less than a high-school education were more likely to report fair/poor health and moderate health compared to college educated participants; and those with a family income to poverty ratio less than 1.07 were more likely to report fair/poor health than those with a family income to poverty ratio of 2.83 or above. The interaction between race-ethnicity and multiple chronic conditions was also tested with no statistically significant differences found ($p=0.20$).

Discussion

This study found racial-ethnic disparities in self-reported health status adjusting for sociodemographic factors and the number of multimorbidities. The disparities have national implications, since the study used NHANES, nationally representative data of non-institutionalized US population. The results, with Asians as a separate racial group, add to the limited literature on self-reported health among Asians in the United States.

A notable finding that came from this study was that even after adjusting for sociodemographic factors and the presence of multimorbidities, compared to whites, Asians, Hispanics and blacks were more likely to report moderate or fair/poor health rather than excellent/very good health. Asians exhibited the second highest odds of reporting moderate health among the minority groups, which is consistent with previous studies. For example, a California-based study on Vietnamese older adults showed higher odds for mental health problems compared to whites, and therefore, reported significantly worse health (Sorkin, Tan, Hays, Mangione, & Ngo-Metzger, 2008). Another California-based study found Asians (with limited English proficiency) to have the worse self-reported health and the differences could possibly be mediated by socioeconomic status and different perceptions of health connected to their specific culture and language (Kandula, Lauderdale, & Baker, 2007). A community-based participatory research study in Portland, Oregon found acculturation to be a strong predictor of fair/poor health (Maty, Leung, Lau, & Kim, 2011). Lee and colleagues

argue the use of the English language proficiency and length of stay as proxies of acculturation, may not be predominantly affecting health among Asians. However, the results from this study show that those who lived more than 10 years in the US were more likely to report fair/poor health compared to excellent/very good health. Prior studies also report that immigrant status has a powerful influence in the health of minority populations like Asians and Hispanics. The immigrants experience better health prior to their arrival in US and gradually their health deteriorates over time (Antecol & Bedard, 2006; Parker Frisbie, Cho, & Hummer, 2001). In fact, an increased length of stay in the United States may lead to adopting an unhealthy lifestyle and behaviors, exposure to psychological stress and racial discrimination (S. Lee, O'Neill, Ihara, & Chae, 2013).

The strongest associations with moderate and fair/poor health was found among Hispanics and were similar to previous studies (Reichmann et al., 2009). Brewer and colleagues reported increased odds of self-reported fair/poor health among immigrants who were interviewed in Spanish than those interviewed in English; and therefore, emphasized the importance of language of the interview in assessment of self-reported health among Hispanics (Brewer et al., 2013). Interviews conducted by NHANES are in Spanish as well as in English; therefore, the Spanish version may alter participants' understanding of the questions and response categories. Low education level, poor primary care experience and limited access to healthcare could be other major factors contributing to a perception of fair/poor health among Hispanics and Asians (Martinez et al., 2015; Shi et al., 2004). Healthcare utilization was not analyzed in this study; however, future studies are needed to investigate other factors affecting self-reported health status among Hispanics and Asians.

Expectedly, blacks were more likely to report fair/poor health status. A CDC report showed blacks reporting worse health status more frequently than whites (Reichmann et al., 2009; Wolf et al., 2008) and have a lower quality of life (Zhang, Ferguson, Simonsen, Chen, & Tseng, 2014). Worse health outcomes among blacks may indicate poor self-management of chronic diseases and non-participation in community-based activities placing them at a higher risk for social isolation (Banerjee, Perry, Tran, & Arafat, 2010). A low childhood socioeconomic status, parental homeownership and parental education has also been shown to affect self-reported health among blacks (Baldassari et al., 2016).

Interestingly, those aged 65 years and older were less likely to report fair/poor health status compared to 20–44 year old participants. Adequate emotional and social support among older adults could be one of the possible reasons for better self-reported health (White et al., 2009). A recent study found reduced odds of discrepancy between reported health status and actual health with an increase in age (Loprinzi, 2015) and stability in health-related quality of life among older adults (Modig, Virtanen, Ahlbom, & Agahi, 2016). Previous studies reported women to fare worse than men in self-reported health (Banerjee et al., 2010; Barry Hultquist, Laux Kaiser, & Rajaram, 2015; Hosseinpoor et al., 2012), however, in our study, after adjusting for other factors, women were less likely to perceive moderate health status than excellent/very good health status. Improvements in functional problems (daily activities) among women have been recently studied (Modig et al., 2016), however, it is not clear which factors are related to improved self-perception of health among women in our

study. These findings underscore the need for future research among women and older participants.

In concordance with prior studies (Dickerson, Smith, Ahn, & Ory, 2011; Frei et al., 2014; McDaid et al., 2013; Putcha et al., 2013; Wu et al., 2013), our study demonstrates that increasing numbers of chronic conditions were associated with fair/poor self-reported health. As the number of chronic conditions increased, the odds of reporting fair/poor health status dramatically increased. These findings highlight the need to take further action in identifying and managing multimorbidities which can potentially improve one's health status.

Consistent with prior studies, socioeconomic factors such as having less than a high- school education or low family income to poverty ratio increased the odds of reporting moderate or fair/poor health than excellent/very good health (Franks et al., 2003; Martinez et al., 2015). This effect may be due to different biological risk profiles by education levels (e.g., healthier levels of high-density lipoprotein cholesterol among those with more education) (Dowd & Zajacova, 2010), differences in social class (Maheswaran, Kupek, & Petrou, 2015) or higher physical and mental health problems, lower health care utilization and unhealthy behaviors among lower socioeconomic positions (Smith et al., 2010).

Our study was subjected to several limitations. First, the data used for this study was cross-sectional in nature which did not allow for assessing the temporal relationship between chronic conditions and self-reported health. Second, our study included the presence of only those medical conditions that were inquired about in the NHANES survey. In addition, the NHANES survey did not inquire about the severity of these conditions; therefore, the analysis could not consider the severity of multimorbidity. Third, since treatment information for the majority of the conditions were not available in the survey, the current data cannot address how the treatment of different chronic conditions could impact self-reported health. Fourth, all the data used in the study were self-reported by the participants. Therefore, the participants' responses may be affected by biases such as a social desirability bias that describes the tendency of the participants to respond to choices in a way that will be viewed more favorable by others.

Regardless of its limitations, the study provides evidence that persistent racial-ethnic disparities in a self-reported health status exists. Hispanics have the highest odds of fair/poor health followed by Asians and blacks. The worse health status was also associated with low education level and increased number of multimorbidities. According to Bennett et al., health literacy could be a possible mediator contributing to racial-ethnic disparities where individuals lack the ability to use health information to make appropriate health-related decisions (Bennett et al., 2009). For example, improvement in health awareness such as medical advice on disease management from clinicians could help improve self-assessment of health in the vulnerable minority groups.

In conclusion, these findings highlight the potential importance of self-reported health status and the need to consider self-reported health status in developing health assessment and health-promotional programs for US adults. Further studies are needed to explore the role of

health status and to provide a comprehensive understanding of self-perception of health and the factors influencing the health status among these minority groups.

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Table 1. Participants' characteristics and bivariate association with self-reported health status

Variable	Self-Reported Health Status										Weighted P-value
	Total (n=9,499)		Excellent/Very Good (n=3,864)		Good (Moderate) (n=3,534)		Fair/Poor (n=2,101)				
	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	
Age Group (years)											<0.001
20–44	4,212 (44.3)	46.2	2,012 (47.7)	51.3	1,596 (37.9)	36.5	604 (14.3)	12.1			
45–64	3,139 (33.6)	36.2	1,152 (36.1)	46.6	1,176 (36.9)	33.5	861 (27.0)	19.9			
65	2,098 (22.1)	17.6	700 (33.4)	42.7	762 (36.3)	34.0	636 (30.3)	23.3			
Gender											0.087
Male	4,565 (48.1)	47.8	1,879 (41.1)	48.1	1,739 (38.1)	36.0	947 (20.7)	15.9			
Female	4,934 (51.9)	52.2	1,985 (40.2)	48.0	1,795 (36.4)	34.1	1,154 (23.4)	17.9			
Race-Ethnicity											<0.001
Non-Hispanic Whites	4,065 (42.8)	69.3	1,918 (47.2)	53.1	1,371 (33.7)	32.7	776 (19.1)	14.2			
Mexican American or Hispanics	1,915 (20.2)	13.8	513 (26.8)	29.4	752 (39.3)	41.0	650 (33.9)	29.5			
Non-Hispanic Blacks	2,266 (23.8)	11.6	827 (36.5)	39.4	912 (40.3)	39.9	527 (23.3)	20.8			
Non-Hispanic Asians	1,253 (13.2)	5.3	606 (48.4)	49.7	499 (39.8)	39.2	148 (11.8)	11.1			
Marital Status											<0.001
Married or Living with a partner	5,477 (57.7)	62.1	2,312 (42.2)	50.0	2,045 (37.3)	34.2	1,120 (20.5)	15.7			
Widowed or Divorced or Separated	2,092 (22.0)	18.5	663 (31.7)	38.4	775 (37.1)	37.3	654 (31.3)	24.2			
Never Married	1,930 (20.3)	19.4	889 (46.1)	51.1	714 (37.0)	35.1	327 (16.9)	13.8			
Education Level											<0.001
Less than High School	2,030 (21.4)	14.8	401 (19.8)	23.2	778 (38.3)	38.2	851 (41.9)	38.6			
High School graduate or GED or equivalent	2,067 (21.8)	20.7	702 (34.0)	39.6	850 (41.1)	40.0	515 (24.9)	20.2			
Some college or AA degree	2,917 (30.7)	32.5	1,256 (43.0)	47.4	1,139 (39.1)	37.8	522 (17.9)	14.8			
College graduate or above	2,485 (26.1)	32.0	1,505 (60.6)	65.7	767 (30.9)	27.5	213 (8.6)	6.8			
Family Income to Poverty Ratio											<0.001
<1.07	2,484 (26.2)	18.2	697 (28.1)	31.4	923 (37.2)	37.6	864 (34.8)	30.9			
1.07 – 2.83	3,327 (35.0)	31.2	1,142 (34.3)	38.2	1,339 (40.3)	39.2	846 (25.4)	22.7			

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Variable	Self-Reported Health Status								Weighted P-value
	Total (n=9,499)	Excellent/Very Good (n=3,864)		Good (Moderate) (n=3,534)		Fair/Poor (n=2,101)			
	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	n (Unweighted %)	Weighted %	
2.83	3,688 (38.8)	50.6	2,025 (54.9)	60.2	1,272 (34.5)	31.5	391 (10.6)	8.3	
Nativity or Length of time in US									<0.001
Born in US	6,803 (71.6)	83.5	2,921 (42.9)	50.4	2,437 (35.8)	33.9	1,445 (21.2)	15.7	
Lived less than 10 years	605 (6.4)	4.0	250 (41.3)	42.4	248 (41.0)	39.8	107 (17.7)	17.7	
Lived more than 10 years	2,091 (22.0)	12.5	693 (33.1)	34.5	849 (40.6)	41.1	549 (26.3)	24.4	

* Row percentage. Bivariate association was performed using Rao-Scott Chi-square test accounting for complex sampling design.

Table 2.

Chronic conditions and bivariate association with self-reported health status

Variable	Total (n=9,499)		Self-Reported Health Status				Weighted P-value
	n (Unweighted %)	Weighted %	Excellent/Very Good (n=3,864)	Good (Moderate) (n=3,534)	Fair/Poor (n=2,101)	Weighted %	
Respiratory Conditions	1,769 (18.6)	19.3	518 (13.4)	661 (18.7)	590 (28.1)	30.3	<0.001
Asthma	1,407 (14.8)	15.2	449 (11.6)	529 (15.)	429 (20.4)	21.3	<0.001
Emphysema	152 (1.6)	1.7	17 (0.4)	39 (1.1)	96 (4.6)	5.9	<0.001
Chronic Bronchitis	508 (5.4)	5.6	99 (2.6)	184 (5.2)	225 (10.7)	12.2	<0.001
COPD	167 (3.4)	3.4	15 (0.8)	52 (2.9)	100 (9.3)	10.9	<0.001
Joint conditions	2,535 (26.7)	25.9	690 (17.9)	882 (25.0)	963 (45.8)	46.4	<0.001
Arthritis	2,381 (25.1)	24.3	641 (16.6)	815 (23.1)	925 (44.0)	45.0	<0.001
Gout	392 (4.1)	3.9	93 (2.4)	158 (4.5)	141 (6.7)	5.9	<0.001
Cardiovascular Conditions	718 (7.7)	6.4	108 (2.8)	239 (6.8)	371 (17.7)	15.8	<0.001
Congestive Heart Failure	305 (3.2)	2.6	25 (0.7)	80 (2.3)	200 (9.5)	8.2	<0.001
Coronary Heart Disease	342 (3.6)	3.1	64 (1.7)	106 (3.0)	172 (8.2)	7.4	<0.001
Angina	222 (2.3)	2.2	28 (0.7)	76 (2.2)	118 (5.6)	5.9	<0.001
Heart Attack	339 (3.6)	2.9	55 (1.4)	106 (3.0)	178 (8.5)	8.0	<0.001
Stroke	336 (3.5)	2.7	54 (1.4)	94 (2.7)	188 (9.0)	7.9	<0.001
Thyroid Problem	924 (9.7)	10.6	298 (7.7)	344 (9.7)	282 (13.4)	14.9	<0.001
Liver Conditions	369 (3.9)	3.2	78 (2.0)	134 (3.8)	157 (7.5)	6.8	<0.001
Cancer	857 (9.0)	10.2	278 (7.2)	327 (9.3)	252 (12.0)	12.5	<0.001
High Blood Pressure	3,397 (35.8)	32.4	899 (23.3)	1,330 (37.6)	1,168 (55.6)	52.1	<0.001
Diabetes	1,204 (12.7)	9.6	156 (4.0)	446 (12.6)	602 (28.7)	25.0	<0.001
Number of chronic conditions							
0	3,647 (38.4)	39.9	2,010 (52.0)	1,258 (35.6)	379 (18.0)	18.9	
1	2,473 (26.0)	26.5	1,035 (26.8)	1,011 (28.6)	427 (20.3)	21.2	
2-3	2,512 (26.4)	25.4	702 (18.2)	991 (28.0)	819 (39.0)	38.0	
4	867 (9.1)	8.1	117 (3.0)	274 (7.8)	476 (22.7)	21.9	

Column percentage. Bivariate association was performed using Rao-Scott Chi-square test accounting for complex sampling design.

Table 3.

Odds ratios and 95% confidence intervals of self-reported health status

Variable	Self-Reported Health Status		
	Fair/Poor vs. Excellent/Very Good	Good (Moderate) vs. Excellent/Very Good	Weighted P-value
Age Group (years)			
45–64 vs. 20–44	1.25 (1.01–1.55)	0.82 (0.70–0.96)	0.038
65 vs. 20–44	0.63 (0.48–0.81)	0.54 (0.44–0.67)	<0.001
Gender			
Female vs. Male	0.87 (0.73–1.03)	0.86 (0.75–0.97)	0.097
Race			
Mexican American or Hispanics vs. Non-Hispanic Whites	2.91 (2.28–3.71)	1.71 (1.42–2.06)	<0.001
Non-Hispanic Blacks vs. Non-Hispanic Whites	1.51 (1.26–1.83)	1.40 (1.22–1.62)	<0.001
Non-Hispanic Asians vs. Non-Hispanic Whites	1.31 (0.95–1.80)	1.42 (1.14–1.76)	0.102
Marital Status			
Widowed or Divorced or Separated vs. Married or Living with a partner	1.01 (0.82–1.26)	1.14 (0.96–1.36)	0.894
Never Married vs. Married or Living with a partner	0.87 (0.69–1.10)	0.91 (0.77–1.08)	0.245
Education			
Less than High School vs. College graduate or above	6.93 (5.20–9.24)	2.78 (2.23–3.45)	<0.001
High School graduate or GED or equivalent vs. College graduate or above	2.95 (2.26–3.86)	2.02 (1.67–2.45)	<0.001
Some college or AA degree vs. College graduate or above	2.12 (1.63–2.75)	1.68 (1.42–1.99)	<0.001
Family Income to Poverty Ratio			
<1.07 vs. 2.83	3.84 (3.06–4.81)	1.49 (1.25–1.78)	<0.001
1.07 – 2.83 vs. 2.83	2.67 (2.16–3.30)	1.44 (1.23–1.67)	<0.001
Nativity or Length of time in US			
Lived less than 10 years vs. Born in US	1.20 (0.85–1.70)	1.26 (0.95–1.64)	0.293
Lived more than 10 years vs. Born in US	1.46 (1.12–1.90)	1.43 (1.18–1.75)	0.005
Number of chronic conditions			
1 vs. 0	2.95 (2.34–3.70)	1.88 (1.61–2.20)	<0.001
2–3 vs. 0	9.35 (7.26–12.00)	3.31 (2.74–4.01)	<0.001

Variable	Self-Reported Health Status			
	Fair/Poor vs. Excellent/Very Good	Good (Moderate) vs. Excellent/Very Good	OR (95% CI)	Weighted P-value
	OR (95% CI)	OR (95% CI)	OR (95% CI)	Weighted P-value
4 vs. 0	38.10 (26.50–54.90)	<0.001	6.85 (4.95–9.49)	<0.001

OR = Odds Ratio; CI = Confidence Interval.

Odds Ratios and 95% confidence intervals were obtained based on a multinomial logistic regression model adjusting for sociodemographics and multimorbidities, accounting for complex sampling design.