# Racial/Ethnic Disparities in Disability Prevalence

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## Abstract

**Purpose**—Worldwide, the number of disabled individuals is used as a marker for population health status because of high morbidity and mortality burden associated with disability. The primary objective of the current study is to use the 2012 NHIS disability supplement and examine racial/ethnic disparities in disability after controlling for a comprehensive list of factors, using the World Health Organization's International Classification of Functioning, Disability, and Health (WHO-ICF).

**Methods**—A retrospective cross-sectional study design with data from 7993 individuals aged above 21 years from the 2012 National Health Interview Survey (NHIS) was adopted. Disability was defined based on a standard set of questions related to mobility, self-care, and cognition from the "Functioning and Disability" supplement of 2012 NHIS. Chi-squared tests and multinomial logistic regressions were conducted to examine the association between race/ethnicity and disability.

**Results**—There were statistically significant racial/ethnic differences in disability status; 10.2 % non-Hispanic whites, 14.8 % non-Hispanic African Americans, 8.1 % Latino, and 6.7 % other racial minorities had severe disability. Non-Hispanic African Americans were more likely to have severe disability than were non-Hispanic whites (OR = 1.56, 95 % CI = 1.24, 1.95), and Latinos were less likely to have severe disability (OR = 0.70, 95 % CI = 0.55, 0.90) in the unadjusted model. There was no difference in disability status among non-Hispanic African Americans and non-Hispanic whites after adjusting for socio-economic status.

**Conclusion**—The study findings highlighted the role of socioeconomic characteristics in reducing disparities in disability between non-Hispanic African Americans and non-Hispanic whites. As SES can affect health through a complex interaction of biological, psychological, lifestyle, environmental, social, and neighborhood factors, a multipronged approach that focuses on primary, secondary, and territory prevention of disability is needed.

## Keywords

Disability; Race/ethnicity; Disparity

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## Introduction

Worldwide, the number of individuals with disability is used as a marker for population health status because of high morbidity and mortality burden associated with disability [1]. According to the census, as of 2010, in the USA, across all ages, 18.7 % of the civilian, non-institutionalized population had some disability and 12.6 % had severe disability based on difficulty in performing functions and participation in activities [2].

Disability is associated with various factors such as age, race, obesity, lifestyle, chronic condition, environment, socioeconomic status, and immigration status [3–7]. It is important to identify subgroup differences in disability for health promotion and prevention efforts [8]. In USA, of particular importance are the racial/ethnic disparities in health [9–11]. Age-adjusted rates of disability varied by racial/ethnic groups, which ranged from 17.4% in non-Hispanic Whites, 17.8% in Hispanics, and 22.2 % in non-Hispanic African Americans [2].

While some studies have examined racial/ethnic disparities in disability in the general population [4, 6, 12, 13], other studies have been subgroup-specific—for example: elderly individuals and women [14–19] or disease-specific—for example: women with metastatic breast cancer, brain injury, heart disease, diabetes, and others [14, 15, 20, 21]. However, many of these studies did not include a comprehensive list of factors that may be associated with disability (for example: number of chronic conditions, lifestyle practices, and obesity).

These studies have made significant contributions to the literature and highlighted the existence of racial/ethnic disparities. According to the Department of Health and Human Services, there are at least 40 federally sponsored nationwide surveys that contain disability-related content, and these surveys contain diverse measures of disability [22]. A report by Oreskovich et al. compared some of the national surveys and found that disability estimates varied by the definition used [23]. In light of the difficulties in measuring disability, efforts have been made to include the same set of questions on disability across surveys that can be used for to understand the different aspects of disability [22].

In this context, the 2012 National Health Interview Survey (NHIS) disability supplement asked a set of questions on disability based on the Washington Group on Disability Statistics (WG) and the Budapest Initiative on the Measurement of Health State (BI) [24]. The questions on the disability supplement of NHIS enable researchers to combine various items according to a conceptual framework. The primary objective of the current study is to use the 2012 NHIS disability supplement and examine racial/ethnic disparities in disability after controlling for a comprehensive list of factors, using the World Health Organization's International Classification of Functioning, Disability, and Health (WHO ICF).

## Methods

### Conceptual Framework

The conceptual framework used in this study is based on WHO's ICF [25]. The WHO ICF is a biopsychosocial model that provides a coherent view about the individual, social, and physical elements of health [26]. The WHO ICF organizes factors associated with disability

in two categories: (1) functioning and disability which comprises of body functions and body structures and activities and participation and (2) contextual factors which are an individual's personal factors and environment in which the individual performs activities [26]. In the present research, we have estimated racial differences in disability rates among all adults. In addition, we examined whether personal factors which include demographic and lifestyle factors (such as age, gender, marital status, smoking, and alcohol use), external environment (region of residence), body structure and function (body mass index), and health status (presence of chronic conditions) contributed to racial differences in disability status.

### Study Design

For the purposes of the present study, we used a cross-sectional study design using data from the 2012 NHIS.

### Data Source

The NHIS is a nationally representative sample of civilian, non-institutionalized population of the USA. The NHIS consists of four components—household, family, person, and sample adult. The household component of the survey is administered to all the households. A random sample of adults from the household component was chosen to ask the sample adult questions, and from these sample adults, individuals were selected to respond to the functioning and disability component. The disability component is not available for all the years. The latest data release on functioning and disability is for the year 2012.

The NHIS is a household interview survey and has been conducted annually since 1957. The contents of the survey are updated periodically. Trained interviewers collect data using computer-assisted personal interviews of the civilian non-institutionalized population living in USA according to procedures specified by the National Center for Health Statistics (NCHS). The intent of the surveys was to monitor the general health information for the resident civilian non-institutionalized population [27]. The NHIS sample design involves multistage clustering, stratification, and oversampling of specific groups. Data from the surveys are released with sample weights adjusted for non-response so that the results can be generalized to the civilian, non-institutionalized population of the USA.

### Study Sample

The NHIS interviewed 8781adults on functioning and disability module. Our study sample consisted of all the adults aged 21 years and older and who responded to the sample adult and disability components of the survey and who did not have any missing value on disability. The final sample size was 7993 individuals.

### Measures

**Dependent Variable: Disability Categories**—Disability categories were derived from questions related to mobility limitations, difficulties in cognition, and self-care. Mobility limitations were derived from three items—difficulties in walking 100 yards on level ground without any aid, difficulties in walking one-third of a mile on level ground without any aid, and difficulties in climbing the stairs. Cognition was determined by single item, i.e.,

difficulty in remembering or concentrating. Self-care was also assessed with single item based on difficulty in performing activities such as bathing, dressing, or washing. The NHIS used a four-point scale to ascertain difficulty performing the abovementioned tasks (mobility, cognition, and self-care). The responses included no difficulty, some difficulty, a lot of difficulty, cannot do at all, refused, not ascertained, and do not know. Individuals who refused or did not answer the questions were considered to have missing data and were not included.

Based on these responses, adults were grouped into three categories: (1) no disability; (2) moderate; and (3) severe disability. Adults who responded "no difficulty" to all items were considered to have no disability. Adults who reported "lot of difficulty" and "cannot do at all" to any of the items were classified as having severe disability. Adults who reported "some difficulty" to any of the items and did not report "lot of difficulty" and "cannot do at all" to any of the items were considered to have moderate disability.

**Key Independent Variable**—Race/ethnicity was classified as non-Hispanic Whites, non-Hispanic African American, Latino, and other racial groups. Other racial group included American Indians/Alaskan Natives, Asian Indians, Chinese, Filipino, and other Asians.

**Other Independent Variables**—To identify factors associated with racial/ethnic differences in disability, the WHO ICF conceptual framework was used. Based on this conceptual framework, the independent variables were grouped into personal factors, external environment, body structure and function, and health condition. Additionally, the effect of socio-economic status was analyzed because it has been shown to be associated with disability.

The personal factors were measured as demographic and lifestyle characteristics. Demographic factors included age in years (22–39, 40–49, 50–64, >65), sex (men or women), and marital status (married or other). Lifestyle characteristics included smoking status (never smoked, past smoker, or current smoker) and alcohol use (lifetime abstainer, former drinker, or current drinker). External environment was measured with region variable in NHIS. The region was identified as northeast, south, midwest, and western states. Body structure and function included body mass index (BMI) categories (underweight/normal (0–25 kg/m$^2$), overweight (25–30 kg/m$^2$), and obese ( 30 kg/m$^2$)). Health condition was measured as chronic condition status (yes or no).

Although socioeconomic status variables are not included in WHO's ICF framework, we also include education and income of adults because prior literature has documented differences in disability status by education and income [14, 28–30]. The socioeconomic status variables were income (less than 100 % Federal Poverty Line (FPL), 100–200 % FPL, greater than or equal to 200 % FPL) and education level (less than high school, high school, greater than high school).

### Statistical Analyses

Unadjusted subgroup differences in disability status across all the independent variables were examined with chi-square statistics. The association between race/ethnicity and

disability status within a multivariable format was examined using multinomial logistic regressions where the variables were added into the model in sequential blocks. The first model was an unadjusted model with only race/ethnicity as the independent variable. In model 2, we added personal factors (demographic characteristics and lifestyle characteristics). In model 3, socioeconomic status was added in addition to the variables specified in model 2. In model 4, presence of health condition was added along with all other variables (demographic, lifestyle, and socioeconomic characteristics). In all these regressions, no disability was used as the reference group for the dependent variable. From multinomial regression, the parameter estimates were transformed to odds ratios, and their corresponding 95 % confidence intervals were determined. All the findings that were significant, with $p$ values less than 0.01 levels, were discussed. All the analyses used the strata and weights provided in the NHIS data to control for clustering and unequal probability design. All the analyses were conducted in survey procedures using SAS 9.3 (SAS Institute Inc. 2011).

## Results

### Sample Characteristics

Table 1 describes the sample characteristics. Majority of individuals in the sample were non-Hispanic White (69 %), followed by Latino (14 %), and non-Hispanic African American (11 %), while "others" were only 6 %. Majority of the sample were women (52 %). About one-third of the sample was younger adults in the age group 22–39 years. Majority of adults in the sample were married (64.4 %). More than half of the sample had never smoked (57.6 %); however, about half of the sample adults were current alcohol drinkers (53.7 %). More than one-third of the sample was from the southern region of the USA, and 27.8 % of the sample was obese. Majority of the sample had some chronic condition (55.7 %). Majority of the sample had greater than high school education (60.9 %) and had income 200 % above the Federal Poverty Line (61 %).

### Description of Sample by Race/Ethnicity

Table 2 describes differences in demographic, lifestyle, socioeconomic status, and health status by race/ethnicity. *Personal characteristics*: There were no racial/ethnic differences by gender. Among non-Hispanic Whites, 29.6 % adults were in the older age group (50–64 years), among non-Hispanic African Americans, 26.3 % were in the older age group, 21 and 20.3 % of the Latinos and others were in the older age group, respectively. Therefore, majority of non-Hispanic Whites were older adults. Non-Hispanic African Americans had lowest rates of married adults (46.6 %). Majority of non-Hispanic Whites were current smoker (21.5 %) and current alcohol drinkers (58.4 %). *External environment*: Majority of non-Hispanic Whites (35.1 %) and non-Hispanic African Americans (56.7 %) live in the south, whereas majority of Latinos (40.1 %) and others live in the west (47.4 %). *Body structure and functioning*: Among non-Hispanic African Americans, rates of obesity were very high (39 %) compared to non-Hispanic Whites (22.8 %). *Health condition*: Latinos had the lowest prevalence of any chronic condition (41 %), and non-Hispanic African Americans had the highest prevalence of any chronic condition (61.3 %). Therefore, a majority of non-Hispanic African Americans had some chronic condition. Latinos had the lowest rates of

greater than high school education (37.6 %), while other racial groups had the highest rates of (73.7 %) above high school education. Among non-Hispanic Whites, 65.6 % had greater than high school education, and among non-Hispanic African Americans, 54.6 % had greater than high school education. Among non-Hispanic Whites, majority of individuals had income 200 % above the FPL (67.3 %), whereas among non-Hispanic African Americans, 47.8 % had income 200 % above the FPL, and only 41.4 % of Latinos had income 200 % above the FPL.

## Description of Sample by Disability Categories

Overall, 26.6 % of the adults in our study sample had some disability (either moderate or severe) (all the sample characteristics by disability status are described in appendix). Prevalence of severe disability was 10.2 %. Adults (16.4 %) in our study sample had moderate disability, and 73.4 % adults did not have any disability. There were statistically significant differences in disability status by racial/ethnic groups, age, gender, marital status, smoking status, alcohol use, region, BMI, chronic condition status, poverty status, education, perceived health status, and immigration status. A significantly higher percentage of non-Hispanic African Americans (14.8 %) than non-Hispanic Whites (10.2 %) had severe disability; the rates for Latinos were 8.1 %. Lowest rates of severe disability were observed among other racial groups (6.2 %).

*Personal characteristics*:Women had higher prevalence of disability, severe (12.6 %) as well as moderate, (19.1) compared to men (7.7 and 13.4 %, respectively). About half of the elderly adults ( 65 years) in our sample had either severe or moderate disability (23.7%severe disability and 24.3%moderate disability), whereas people in younger age group (22–39) had very low prevalence of disability (2.8 % severe disability and 11.7 % moderate disability). Married adults (8.5 %) had lower rates of severe disability compared to adults with other marital status (13.4 %). In terms of smoking status, adults who never smoked (7.9 %) had lowest rates of severe disability compared to those who smoked in the past (15.2 %). However, current alcohol drinkers had the lowest rates of severe disability (4.8 %) followed by lifetime abstainers (14.8 %) and former alcohol drinkers (17.8 %). *External environment*: Severe disability was most prevalent in the southern region (12 %) followed by midwest (10.3 %), northeast (9.4 %), and west (8 %). *Body structure and functioning*: A significantly higher percentage of adults with morbid obesity had severe disability (25.4 %) or moderate disability (29.6 %) compared to those with normal BMI (6.9 and 12.5 % respectively). *Health condition*: Adults with any chronic condition had higher rates of both severe disability (16.5 %) and moderate disability (22.1 %) compared those without any chronic condition (2.3 and 9.2 % respectively). *Socioeconomic characteristics*: Highest rates of severe (20.8 %) and moderate disability (19 %) were observed in adults with low education (less than high school), whereas adults with higher education (greater than high school) had lowest rates of severe disability (6 %) and moderate disability (14.8 %). Similar patterns were observed for family income as well.

## Multinomial Logistic Regressions on Disability Categories

The odds ratios (OR) and adjusted odds ratios (AOR) from multinomial logistic regression on disability status are shown in Table 3. In the unadjusted model (Model 1), non-Hispanic

African Americans were more likely to have severe disability compared to non-Hispanic Whites (OR = 1.56, 95 % CI 1.24, 1.95), Latinos were less likely to have severe disability compared to non-Hispanic Whites (OR = 0.70, 95 % CI 0.55, 0.90), and other racial groups were also less likely to have severe disability compared to non-Hispanic Whites (OR = 0.58, 95 % CI 0.37, 0.92). Latinos were also significantly less likely to have moderate disability compared to non-Hispanic Whites (OR = 0.74, 95 % CI 0.59, 0.94) in the unadjusted model.

After controlling for personal characteristics, external environment and body structure and function (Model 2), non-Hispanic African Americans were more likely to have severe disability compared to non-Hispanic Whites (AOR = 1.44, 95 % CI 1.11, 1.89). However, Latinos were as likely to have disability as non-Hispanic Whites (AOR = 1.12, 95 % CI 0.84, 1.50). In model 3, when socioeconomic characteristics were additionally controlled, non-Hispanic African Americans were as likely to have severe disability as non-Hispanic Whites (AOR = 1.15, 95 % CI 0.87, 1.52). In this model, Latinos were less likely to have severe disability (AOR = 0.63, 95 % CI 0.46, 0.87) and moderate disability (AOR = 0.72, 95 % CI 0.55, 0.95) compared to non-Hispanic Whites. In model 4, after controlling for health status, the Latinos were as likely to have severe disability (AOR = 0.73, 95 % CI 0.53, 1.01) and moderate disability (AOR = 0.83, 95 % CI 0.83, 1.63) as non-Hispanic Whites.

## Discussion

In this study, we examined the racial/ethnic differences in prevalence of disability among adults in the USA. In our study sample, the prevalence of severe disability was 10.2 % for adults older than 21 years, which is similar to the 12.6 % estimate for all ages from the 2010 Census [2]. We compared the disability estimates of our study to the US census and found that 21.6% of adults in the age group 22–64 had severe or moderate disability, and 48 % adults in the older age group (65 years and older) had severe or moderate disability. Our estimates are consistent with the census estimates of 16.6 % (age group 21–64 years) and 49.8 % (age group 65 years and older) [2].

Prevalence of severe disability varied between different racial/ethnic groups. Non-Hispanic African Americans had the highest prevalence of severe disability among all the racial groups included in the study, which is consistent with the available literature [1, 13, 14]. Previous studies have found that non-Hispanic African Americans are more likely to have disability due to low socioeconomic status, higher obesity, and higher rates of chronic condition compared to non-Hispanic Whites [1, 13, 14]. In our study, without adjustments for socioeconomic characteristics, non-Hispanic African Americans were 1.5 times as likely as non-Hispanic Whites to have severe disability. However, once we controlled for socioeconomic status, the difference in severe disability among non-Hispanic African Americans and non-Hispanic Whites was no longer significant. As stated in the results, non-Hispanic African Americans had lower socioeconomic status in terms of education and family income compared to non-Hispanic Whites. Taken together, these findings suggest that the difference in prevalence of disability between non-Hispanic African Americans and non-Hispanic Whites may be partially explained by lower Socioeconomic status (SES) of non-Hispanic African Americans. SES can affect health through a complex interaction of biological, psychological, lifestyle, environmental, social, and neighborhood factors [31,

32]. Eliminating health disparities will require a multipronged approach with strategies to improve upstream factors for primary prevention, midstream, and downstream factors for secondary and tertiary prevention of disability [32].

We also observed that Latinos were less likely to have severe disability compared to non-Hispanic Whites in unadjusted model. However, once we controlled for health status, Latinos were as likely as non-Hispanic Whites to have severe disability. A plausible explanation can be derived from what is known as "Latino paradox." Latino paradox is generally explained as better health status of Latinos compared to non-Hispanic Whites, despite the low socioeconomic status of Latinos [33]. For example, Latinos are more likely to have lower mortality rates and lower number of chronic conditions [34–36]. It is believed that this is mainly due to migration of healthier Latinos into the USA. Although data are not presented, we found that more than half of Latinos in our study were immigrants. In addition, Latinos may be, in general, healthier because they are less likely to smoke and use alcohol compared to non-Hispanic Whites [37]. In our study sample, it can be seen that Latinos had lower rates of smoking and alcohol use compared to non-Hispanic Whites.

Our study findings have to be interpreted in the context of its advantages and limitations. Major strengths of the study are the use of nationally representative data and inclusion of a comprehensive list of independent variables based on the WHO ICF framework. Unlike previous studies, we did not limit the estimates to a particular population (women, older adults, or individuals with cancer, brain injury, or any other chronic condition). The limitations are that the study is cross-sectional and cannot determine causality. All the variables were self-reported and subject to recall bias. Although we distinguished between severe and moderate disability, we could not objectively measure severity of disability as defined by WHO. It has to be noted that the NHIS 2012 disability questions went through rigorous conceptualization and testing (CDC, 2014).

## Conclusion

Despite the limitations, our study contributed to the existing literature on racial/ethnic disparities in disability prevalence by using a nationally representative recent data that can be generalized to all adults aged 21 and older. Our study findings highlighted the role of socioeconomic characteristics in reducing disparities in disability between non-Hispanic African Americans and non-Hispanic Whites.

As SES can affect health through a complex interaction of biological, psychological, lifestyle, environmental, social, and neighborhood factors, a multipronged approach that focuses on primary, secondary, and territory prevention of disability is needed.

## Acknowledgments

# Appendix

## Table 4

Description of study sample characteristics by disability categories National Health Interview Survey, 2012

| | Severe disability | | Moderate disability | | No disability | | |
|---|---|---|---|---|---|---|---|
| All | N | Wt.% | N | Wt.% | N | Wt.% | Sig |
| Race/ethnicity | | | | | | | *** |
| Non- Hispanic white | 577 | 10.2 | 898 | 16.9 | 3483 | 72.8 | |
| Non-Hispanic AA | 219 | 14.8 | 214 | 17.5 | 737 | 67.8 | |
| Latino | 143 | 8.1 | 188 | 13.4 | 978 | 78.5 | |
| Other | 35 | 6.2 | 65 | 12.9 | 378 | 81.0 | |
| Personal characteristics | | | | | | | |
| Gender | | | | | | | *** |
| Women | 640 | 12.6 | 862 | 19.1 | 2916 | 68.3 | |
| Men | 344 | 7.7 | 526 | 13.4 | 2705 | 78.8 | |
| Age in years | | | | | | | *** |
| 22–39 | 77 | 2.8 | 301 | 11.7 | 2188 | 85.5 | |
| 40–49 | 115 | 7.9 | 203 | 13.1 | 1135 | 79.0 | |
| 50–64 | 309 | 11.7 | 444 | 18.9 | 1439 | 69.4 | |
| 65,+ | 483 | 23.7 | 440 | 24.3 | 859 | 52.1 | |
| Marital status | | | | | | | *** |
| Married | 368 | 8.5 | 647 | 15.6 | 3123 | 75.9 | |
| Other | 616 | 13.4 | 737 | 17.8 | 2485 | 68.8 | |
| Smoking status | | | | | | | *** |
| Never smoked | 456 | 7.9 | 697 | 14.4 | 3432 | 77.7 | |
| Past smoker | 316 | 15.2 | 370 | 19.3 | 1114 | 65.4 | |
| Current smoker | 210 | 11.3 | 317 | 18.6 | 1068 | 70.1 | |
| Alcohol use | | | | | | | *** |
| Lifetime abstainer | 285 | 14.8 | 288 | 17.0 | 1039 | 68.2 | |
| Former drinker | 470 | 17.8 | 488 | 19.5 | 1341 | 62.6 | |
| Current drinker | 221 | 4.8 | 596 | 14.4 | 3189 | 80.8 | |
| External environment | | | | | | | |
| Region | | | | | | | ** |
| Northeast | 138 | 9.4 | 227 | 15.4 | 947 | 75.2 | |
| Midwest | 197 | 10.3 | 288 | 17.2 | 1170 | 72.5 | |
| South | 432 | 12.0 | 520 | 16.9 | 1993 | 71.2 | |
| West | 217 | 8.0 | 353 | 15.4 | 1511 | 76.6 | |
| Body structure and functioning | | | | | | | |
| Body mass index | | | | | | | *** |
| Under weight | 30 | 18.6 | 18 | 15.3 | 73 | 66.1 | |
| Normal | 238 | 6.9 | 370 | 12.5 | 1991 | 80.5 | |
| Overweight | 273 | 7.5 | 457 | 16.0 | 2073 | 76.4 | |
| Obese | 325 | 15.1 | 390 | 18.8 | 1189 | 66.1 | |

| | Severe disability | | Moderate disability | | No disability | |
|---|---|---|---|---|---|---|
| Morbid obese | 79 | 25.4 | 99 | 29.6 | 150 | 44.9 |
| Missing | 39 | 14.5 | 54 | 24.1 | 145 | 61.5 |
| Health condition | | | | | | |
| Any chronic condition | | | | | *** | |
| Yes | 898 | 16.5 | 1071 | 22.1 | 2661 | 61.4 |
| No | 86 | 2.3 | 317 | 9.2 | 2959 | 88.5 |
| Socioeconomic characteristics | | | | | | |
| Education | | | | | *** | |
| LT HS | 310 | 20.8 | 270 | 19.0 | 697 | 60.2 |
| HS | 310 | 14.2 | 382 | 18.5 | 1320 | 67.4 |
| GT HS | 350 | 6.0 | 729 | 14.8 | 3590 | 79.1 |
| Poverty status | | | | | *** | |
| LT 100 % FPL | 278 | 18.5 | 270 | 22.1 | 726 | 59.4 |
| 100 - LT 200 % FPL | 242 | 14.8 | 307 | 20.7 | 893 | 64.5 |
| 200 % and above FPL | 315 | 6.4 | 650 | 13.8 | 3452 | 79.8 |
| Missing | 149 | 15.9 | 161 | 17.8 | 550 | 66.3 |

Note: Based on 7993 adults, 21 years or older, responded to adult sample and disability questionnaires and did not have missing data on disability status

*FPL* Federal Poverty Line, *GT* greater than, *LT* less than, *Wt* weighted, *HS* high School

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0.001  $p < .01$;

***
$p < 0.001$

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**Table 1**

Description of adult study sample National Health Interview Survey, 2012

| All | Number 7993 | Wt.% |
|---|---|---|
| Race | | |
| Non-Hispanic white | 4958 | 68.6 |
| Non-Hispanic AA | 1170 | 11.4 |
| Latino | 1309 | 14.2 |
| Other | 556 | 5.8 |
| Personal characteristics | | |
| Gender | | |
| Women | 4418 | 51.7 |
| Men | 3575 | 48.3 |
| Age | | |
| 22–39 | 2566 | 33.3 |
| 40–49 | 1453 | 20.2 |
| 50–64 | 2192 | 27.5 |
| 65+ | 1782 | 19.1 |
| Marital status | | |
| Married | 4138 | 64.4 |
| Other | 3838 | 35.6 |
| Smoking status | | |
| Never smoked | 4585 | 57.6 |
| Past smoker | 1800 | 22.7 |
| Current smoker | 1595 | 19.6 |
| Alcohol use | | |
| Lifetime abstainer | 1612 | 18.4 |
| Former drinker | 2299 | 27.9 |
| Current drinker | 4006 | 53.7 |
| External environment | | |
| Region | | |
| Northeast | 1312 | 17.1 |
| Midwest | 1655 | 23.4 |
| South | 2945 | 37.2 |
| West | 2081 | 22.4 |
| Body structure and functioning | | |
| Body mass index | | |
| Underweight | 121 | 1.5 |
| Normal | 2599 | 31.8 |
| Overweight | 2803 | 35.9 |
| Obese | 1904 | 23.7 |
| Morbid obese | 328 | 4.1 |
| Health condition | | |

| All | Number 7993 | Wt.% |
|---|---|---|
| Any chronic condition | | |
| Yes | 4630 | 55.7 |
| No | 3362 | 44.3 |
| Socioeconomic characteristics | | |
| Education | | |
| LT HS | 1277 | 14.3 |
| HS | 2012 | 24.8 |
| GT HS | 4669 | 60.9 |
| Poverty status | | |
| LT 100 % FPL | 1274 | 12 |
| 100–LT 200 % FPL | 1442 | 16 |
| 200 % and above FPL | 4417 | 61 |

Note: Based on 7993 adults, 21 years or older, responded to adult sample and disability questionnaires and did not have missing data on disability status

*FPL* Federal Poverty Line, *GT* greater than, *LT* less than, *Wt* weighted, *HS* high school; *AA* African American

**Table 2**

Description of study sample characteristics by race/ethnicity National Health Interview Survey, 2012

| | Non-Hispanic whites | | Non-Hispanic African Americans | | Latinos | | Others | | |
|---|---|---|---|---|---|---|---|---|---|
| All | N | Wt.% | N | Wt.% | N | Wt.% | N | Wt.% | Sig |
| Personal characteristics | | | | | | | | | |
| Gender | | | | | | | | | |
| Women | 2693 | 51.4 | 699 | 54.7 | 719 | 51.0 | 307 | 52.2 | |
| Men | 2265 | 48.6 | 471 | 45.3 | 590 | 49.0 | 249 | 47.8 | |
| Age in years | | | | | | | | | *** |
| 22–39 | 1374 | 29.4 | 371 | 35.1 | 581 | 46.8 | 240 | 42.0 | |
| 40–49 | 812 | 18.7 | 230 | 23.8 | 303 | 22.6 | 108 | 24.8 | |
| 50–64 | 1489 | 29.6 | 340 | 26.3 | 259 | 21.0 | 104 | 20.3 | |
| 65,+ | 1283 | 22.3 | 229 | 14.8 | 166 | 9.6 | 104 | 12.9 | |
| Marital status | | | | | | | | | *** |
| Married | 2726 | 66.8 | 388 | 46.6 | 719 | 65.9 | 305 | 66.2 | |
| Other | 2222 | 33.2 | 779 | 53.4 | 589 | 34.1 | 248 | 33.8 | |
| Smoking status | | | | | | | | | *** |
| Never smoked | 2521 | 51.7 | 741 | 66.9 | 929 | 72.5 | 394 | 72.6 | |
| Past smoker | 1342 | 26.8 | 184 | 14.7 | 201 | 14.6 | 73 | 10.6 | |
| Current smoker | 1083 | 21.5 | 245 | 18.4 | 179 | 12.9 | 88 | 16.8 | |
| Alcohol use | | | | | | | | | *** |
| Lifetime abstainer | 720 | 13.6 | 311 | 26.9 | 373 | 27.7 | 208 | 35.9 | |
| Former drinker | 1410 | 28.0 | 388 | 31.2 | 365 | 26.7 | 136 | 23.3 | |
| Current drinker | 2787 | 58.4 | 458 | 41.9 | 554 | 45.6 | 207 | 40.8 | |
| External environment | | | | | | | | | |
| Region | | | | | | | | | *** |
| Northeast | 872 | 17.6 | 193 | 19.2 | 166 | 13.4 | 81 | 15.5 | |
| Midwest | 1302 | 28.6 | 180 | 14.8 | 98 | 8.2 | 75 | 16.0 | |
| South | 1678 | 35.1 | 677 | 56.7 | 482 | 38.3 | 108 | 21.1 | |
| West | 1106 | 18.7 | 120 | 9.3 | 563 | 40.1 | 292 | 47.4 | |
| Body structure and functioning | | | | | | | | | |

| | Non-Hispanic whites | | Non-Hispanic African Americans | | Latinos | | Others | | |
|---|---|---|---|---|---|---|---|---|---|
| Body mass index | | | | | | | | | *** |
| Under weight | 73 | 1.5 | 11 | 1.1 | 11 | 0.8 | 26 | 3.8 | |
| Normal | 1677 | 32.6 | 287 | 23.1 | 341 | 25.9 | 294 | 53.7 | |
| Overweight | 1740 | 36.2 | 392 | 34.0 | 512 | 38.0 | 159 | 30.0 | |
| Obese | 1131 | 22.8 | 367 | 32.1 | 354 | 27.7 | 52 | 8.3 | |
| Morbid obese | 197 | 4.1 | 77 | 6.9 | 43 | 3.3 | 11 | 1.4 | |
| Missing | 140 | 2.8 | 36 | 2.8 | 48 | 4.4 | 14 | 2.9 | |
| Health condition | | | | | | | | | |
| Any chronic condition | | | | | | | | | *** |
| Yes | 3057 | 58.9 | 765 | 61.3 | 562 | 41.0 | 246 | 42.4 | |
| No | 1900 | 41.1 | 405 | 38.7 | 747 | 59.0 | 310 | 57.6 | |
| Socioeconomic characteristics | | | | | | | | | |
| Education | | | | | | | | | *** |
| LT HS | 505 | 9.8 | 231 | 17.0 | 486 | 36.5 | 55 | 8.4 | |
| HS | 1239 | 24.6 | 335 | 28.3 | 330 | 26.0 | 108 | 17.9 | |
| GT HS | 3204 | 65.6 | 592 | 54.6 | 485 | 37.6 | 388 | 73.7 | |
| Poverty status | | | | | | | | | *** |
| LT 100 % FPL | 509 | 8.4 | 306 | 20.3 | 369 | 23.3 | 90 | 11.6 | |
| 100–LT 200 % FPL | 751 | 13.0 | 252 | 21.1 | 345 | 26.7 | 94 | 15.0 | |
| 200 % and above FPL | 3153 | 67.3 | 477 | 47.8 | 480 | 41.4 | 307 | 61.0 | |
| Missing | 545 | 11.3 | 135 | 10.9 | 115 | 8.6 | 65 | 12.4 | |

Note: Based on 7993 adults, 21 years or older, responded to adult sample and disability questionnaires and did not have missing data on disability status

*FPL* Federal Poverty Line, *GT* greater than, *LT* less than, *Wt* weighted, *HS* high school

***
$p < .001$

**Table 3**

Unadjusted and adjusted odds ratios (AOR) and 95 % confidence intervals of race/ethnicity from multinomial logistic regressions on disability status National Health Interview Survey, 2012

**Model 1**

| | Severe disability | | | Moderate disability | | |
|---|---|---|---|---|---|---|
| | OR | 95 % CI | Sig | OR | 95 % CI | Sig |
| Race/ethnicity | | | | | | |
| Non-Hispanic AA | 1.56 | [1.24, 1.95] | *** | 1.13 | [0.90, 1.42] | |
| Latino | 0.70 | [0.55, 0.90] | ** | 0.74 | [0.59, 0.94] | * |
| Other | 0.58 | [0.37, 0.92] | * | 0.80 | [0.58, 1.10] | |
| Non-Hispanic white (reference group) | | | | | | |

**Model 2**

Controlling personal characteristics, external environment, and body structure and functioning

| | Severe disability | | | Moderate disability | | |
|---|---|---|---|---|---|---|
| | AOR | 95 % CI | Sig | AOR | 95 % CI | Sig |
| Race/ethnicity | | | | | | |
| Non-Hispanic AA | 1.44 | [1.11, 1.89] | ** | 1.13 | [0.87, 1.46] | |
| Latino | 1.12 | [0.84, 1.50] | | 0.94 | [0.73, 1.21] | |
| Other | 1.08 | [0.66, 1.76] | | 1.17 | [0.84, 1.63] | |
| Non-Hispanic white (reference group) | | | | | | |

**Model 3**

Controlling personal characteristics, external environment, body structure and functioning, and socioeconomic characteristics

| | AOR | 95 % CI | Sig | AOR | 95 % CI | Sig |
|---|---|---|---|---|---|---|
| Race/ethnicity | | | | | | |
| Non-Hispanic AA | 1.15 | [0.87, 1.52] | | 0.99 | [0.76, 1.28] | |
| Latino | 0.63 | [0.46, 0.87] | ** | 0.72 | [0.55, 0.95] | * |
| Other | 0.97 | [0.56, 1.67] | | 1.13 | [0.81, 1.57] | |
| Non-Hispanic white (reference group) | | | | | | |

**Model 4**

Controlling personal characteristics, external environment, body structure and functioning, socioeconomic characteristics, and health condition

| | AOR | 95 % CI | Sig | AOR | 95 % CI | Sig |
|---|---|---|---|---|---|---|

| Race/ethnicity | | | | |
| --- | --- | --- | --- | --- |
| Non-Hispanic AA | 1.09 | [0.82, 1.46] | 0.94 | [0.73, 1.23] |
| Latino | 0.73 | [0.53, 1.01] | 0.78 | [0.59, 1.03] |
| Other | 1.05 | [0.61, 1.82] | 1.16 | [0.83, 1.63] |
| Non-Hispanic white (reference group) | | | | |

Note: Based on 7993 adults, 21 years or older, responded to adult sample and disability questionnaires and did not have missing data on disability status. Asterisks indicate significant differences in disability status compared to the reference group. The reference group for the dependent variable was "No disability"

*OR* odds ratio, *CI* confidence interval, *AOR* adjusted odds ratio, *AA* African American

*
0.01 $p < .05$;

**
0.001 $p < 0.01$;

***
$p < 0.001$