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Health Behaviors and All-Cause Mortality in African American Men

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Abstract

Because of the excess burden of preventable chronic diseases and premature death among African American men, identifying health behaviors to enhance longevity is needed. We used data from the Third National Health and Nutrition Examination Survey 1988-1994 (NHANES III) and the NHANES III Linked Mortality Public-use File to determine the association between health behaviors and all-cause mortality and if these behaviors varied by age in 2029 African American men. Health behaviors included smoking, drinking, physical inactivity, obesity, and a healthy eating index score. Age was categorized as 25-44 years ($n = 1,045$), 45-64 years ($n = 544$), and 65 years and older ($n = 440$). Cox regression analyses were used to estimate the relationship between health behaviors and mortality within each age-group. All models were adjusted for marital status, education, poverty-to-income ratio, insurance status, and number of health conditions. Being a current smoker was associated with an increased risk of mortality in the 25- to 44-year age-group, whereas being physically inactive was associated with an increased risk of mortality in the 45- to 64-year age-group. For the 65 years and older age-group, being overweight or obese was associated with decreased mortality risk. Efforts to improve longevity should focus on developing age-tailored health promoting strategies and interventions aimed at smoking cessation and increasing physical activity in young and middle-aged African American men.

Keywords

men's health; health behaviors; men; African Americans; mortality; health disparities

Although there have been improvements in mortality rates over the past five decades, African American men continue to have the highest mortality rate among all racial/ethnic and gender groups in the United States (National Center for Health Statistics, 2004, 2008,

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2009). In 1960, the age-adjusted mortality rate for African American men was 1811.1 per 100,000 population, whereas in 2009, the age-adjusted mortality rate was 1147.3 per 100,000 population (Kochanek, Xu, Murphy, Minino, & Kung, 2011). The magnitude and consistency of the mortality rate among African American men have led scientists to focus their efforts on better understanding of determinants of death in this high-risk group. Some predictors of mortality among African American men include low socioeconomic status, access to and quality of care, health behaviors, and social and environmental conditions where African American men live and work. Among these predictors, health behaviors have been shown to be a major determinant of mortality (Danaei et al., 2009; Ferrucci et al., 1999; McGinnis & Foege, 1993; Mokdad, Marks, Stroup, & Gerberding, 2004; Yates, Djoussé, Kurth, Buring, & Gaziano, 2008).

Although there has been a considerable amount work examining the association between health behaviors and mortality (Danaei et al., 2009; Davis et al., 1994; Ferrucci et al., 1999; Lantz, Bolberstein, House, & Morenoff, 2010; Millen et al., 2005), few studies have focused on understanding how health behaviors or the lack thereof influences mortality among African American men. Warner and Hayward (2006) demonstrated that the race gap in mortality between older African American and White men can be improved by greater engagement in health promoting behaviors by African American males. In a sample of urban, middle-aged African American men, Griffith, Gunter, and Allen (2011) found that physical activity and healthy eating were rooted in the broader context of these men's lives and priorities. Thus, aspects of health behavior are interactive and dynamic across the life course and understanding these variations is essential to understanding why African American men have the highest death rate of any race or gender group. Moreover, behaviors, such as physical inactivity, tobacco use, excessive alcohol use, and inadequate nutrition are increasingly prevalent among African American men (Centers for Disease Control and Prevention, 2004; Haapanen, Miilunpalo, Vuori, Oja, & Pasanen, 1996; Kumanyika et al., 2008; Sampson, Morenoff, & Raudenbush, 2005; Warner & Hayward, 2006). Moreover, these negative health behaviors have also been associated with both premature and excess mortality in this group (Arias, 2006; Griffith, 2012; LaVeist, Bowie, & Cooley-Quille, 2000; Plowden & Young, 2003; Rich, 2000; Williams, 2003; Williams & Collins, 1995). A better understanding of the health behaviors associated with mortality in African American men is needed to identify the health behaviors that should be addressed in interventions seeking to promote health and increasing life expectancy and quality of life for African American men. Furthermore, we are unaware of any study that has examined this relationship exclusively in a national sample of African American men.

We are particularly interested in exploring the relationship between health behaviors and mortality within age-groups. Danaei et al. (2009) have demonstrated that the association between mortality and behavioral risk factors varies by age. For example, these investigators found that younger individuals more likely to die from alcohol-related injuries, middle-aged individuals are more likely to die from smoking and obesity, and older age individuals are more likely to die from chronic conditions such as high blood pressure. Moreover, a study using data from the National Health and Nutrition Examination Survey I Follow-up Study data found that smoking and nonrecreational physical activity were associated with shorter survival time in both older and middle-aged men, but drinking and low body mass index

(BMI) were associated with shorter survival in older men only (Davis et al., 1994). Although these studies examined the relationship between health behaviors and mortality by age, neither of these studies focused on African American men. Thus, the objective of this study is to determine which health behaviors are associated with mortality within age-groups in a national sample of African American men.

Method

The Third National Health and Nutrition Examination Survey (NHANES III) was designed to assess the health, functional, and nutritional status and their interrelationships in the U.S. population between 1988 and 1994. This cross-sectional survey is a nationally representative sample of the civilian noninstitutionalized population with an oversample of African Americans and Mexican Americans, children younger than 5 years, and adults aged 60 years and older. Using a stratified, multistage probability sampling design, NHANES III was conducted in two stages. First, information regarding the participant's health history, health behaviors, risk factors, health conditions is obtained during the face-to-face home interview. Second, at the conclusion of the in-home interview, the participants are invited to participate in the medical examination where they received a detailed physical examination at a mobile examination center. Additional details regarding the sample design, survey, and examination protocols are reported elsewhere (National Center for Health Statistics, 1994).

In addition to the NHANES III publicly available data, we used data from the NHANES III Linked Mortality Public-Use File. This file contains limited death certificate data that provides the opportunity for mortality follow-up on the NHANES III participants through December 31, 2006 (National Center for Health Statistics, Office of Analysis and Epidemiology, 2009). To link these two data sets, the National Center for Health Statistics used a probabilistic matching algorithm based on the following items of identification: social security number, first name, middle initial, last name or surname, date of birth, gender, state of birth, race, state of residence, and marital status. Complete information on the linked dataset can be found at the Centers for Disease Control and Prevention's website (National Center for Health Statistics—Matching Methodology; National Center for Health Statistics, Office of Analysis and Epidemiology, 2009). The linkage of these datasets resulted in a sample size of 33,994. Our analysis excluded participants who were 17 years old and younger ($n = 13,944$), lacked sufficient data for the National Death Index match ($n = 26$), women ($n = 8,976$), men who were 18 to 24 years old ($n = 3,165$), Hispanic men who were 25 years and older ($n = 2,064$), non-Hispanic White men who were 25 years and older ($n = 3,516$) and individuals missing data on race/ethnicity ($n = 274$). These exclusions yielded a final sample of 2,029 non-Hispanic Black (referred to hereafter as African American) men aged 25 years and older.

Measures

The outcome variable, all-cause mortality, was derived from the underlying cause of death according to the International Classification of Diseases Ninth and Tenth Revisions (Data Linkage Team, 2010). Time to death was based on person-months of follow-up and calculated for each participant as the difference between month and year of death and

NHANES III interview month and year for those who died, and the difference between December 2006 and the NHANES III interview month for participants who were alive and did not drop out of the study (Data Linkage Team, 2010). The follow-up time was transformed to person-years by dividing person-months by 12. The median follow-up time was 14.3 years (interquartile range = 12.8-15.9 years).

The independent variables included the following health behaviors: smoking, drinking, physical inactivity, obesity, and healthy eating. Men who consumed at least 100 cigarettes during their lifetime and currently smoked were considered to be a current smoker. Alcohol consumption was based on the number of drinks a man consumed per week (Dawson, Grant, & Li, 2005; National Institute on Alcoholism and Alcohol Abuse, 2005, 2010). Based on the recommended cut-point of 14 drinks per week, the weekly frequency and quantity of alcohol was created. Men who have not had a drink in the past 12 months were classified as “non drinkers,” those who consumed 14 drinks per week per month or less were classified as moderate drinkers, and those who consumed more than 14 drinks per month were classified as heavy drinkers. Men who did not engage in any low, moderate, or vigorous physical activity were considered to be physically inactive. Weight status was based on BMI (in kg/m²) and categorized as underweight (BMI <18.5), normal (18.5 BMI <25), overweight (25 BMI <30), and obese (BMI ≥ 30). Healthy eating was based on the Healthy Eating Index (HEI). This is a measure of diet quality that assesses conformance to federal dietary guidance (Kennedy, Ohls, Carlson, & Fleming, 1995; Koster et al., 2012; U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, 1995). Each component was scored from 0 to 10 with higher scores indicating better compliance with recommended intake. Total HEI score ranged from 0 to 100 and was grouped into three categories for analysis: good (>80), fair (51-80), and poor (<51; U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, 1995). A binary variable was created to identify those men who had a fair/poor HEI score. Additional information regarding the HEI is described elsewhere (U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, 1995).

Covariates

Demographic variables included the following: age, marital status, education, poverty, and insurance status. Age was categorized into the following categories: 25 to 44 years old (hereafter referred to as younger men), 45 to 64 years old (hereafter referred to as middle-aged men), and 65 years and older (hereafter referred to as older men). Marital status was coded as a binary variable indicating those who were married. Education, measured as a continuous variable, was based on the men's report of the number of years of education completed. Poverty to income ratio (PIR), reported as a continuous variable, was used to characterize poverty. The PIR represents the ratio of income to the poverty threshold set by the U.S. Census Bureau in a given calendar year. For example, ratios less than 1.00 represent incomes that are below the official definition of poverty whereas ratios of 1.75 correspond to incomes 75% above the poverty threshold (U.S. Census Bureau, 2012). Insurance status was based on whether a participant reported having any kind of health insurance coverage or not.

Health status was based on self-rated health and chronic conditions. Men rated their health as excellent, very good, good, fair, or poor. We created a binary variable to identify those men who reported fair or poor health compared with those who reported excellent, very good, or good health. Chronic conditions were based on physician diagnoses of the following conditions: diabetes, arthritis, congestive heart failure, stroke, asthma, chronic obstructive pulmonary disease (emphysema or bronchitis), and hypertension. Each of these conditions was coded as binary variables (1 = present; 0 = absent) and summed to create a variable representing the number of chronic conditions.

Analysis

Weighted frequencies and means were used to summarize the demographic and health-related characteristics by age category. Cox proportional hazard regression models were fitted to study the association between health behaviors and mortality in African American men by age categories. In the unadjusted models, each health behavior was modeled as a function of time to all-cause mortality. Two adjusted models were fitted—the first included all of the health behaviors and the second model also included the demographic and health status characteristics. The proportional hazards assumption was investigated by testing the constancy of the log hazard ratio over time by means of log-minus-log survival plots and interactions with time (log transformed). Based on the results of these tests, the proportional hazard assumption was not violated. To account for NHANES III complex, multistage, stratified, sampling design, a Taylor linearization procedure used primary sampling units and strata to calculate standard errors and associated 95% confidence intervals. Sampling weights were used to account for the nonresponse bias and the oversampling of blacks, Mexican Americans, and older adults. Additionally, the probability sample weight applied corresponded to individuals who participated in both the in-home interview and the physical examination at the mobile examination center. All analyses were conducted using STATA 11 (StataCorp, 2009). *P* values <.05 were considered statistically significant and all tests were two-sided.

Results

The distribution of demographic characteristics and health status for African American men within age-groups is shown in Table 1. Among the younger men, the majority was married, had health insurance, and reported a fair/poor HEI score. On average, the number of years of education completed was 12.4 ± 3.5 years and the PIR was 2.4 ± 2.3 . However, less than half of these younger men were physically inactive, a current smoker or heavy drinker, obese, or reported fair/poor health. The average number of chronic conditions for the total sample was 0.3 ± 0.9 . Six percent of the younger men died over the study period.

Among middle-aged men, the majority was married, had health insurance, and reported fair/poor HEI. The average number of years of education completed was 10.6 ± 5.6 years and the average PIR was 2.4 ± 2.7 . More than one third of middle-age men reported being physically inactive, nearly one half were current smokers, whereas slightly less than one fifth were heavy drinkers. The average number of chronic conditions for the total sample was 1.0 ± 1.6 . Slightly less than 8% of middle-aged men died during the study period.

Among older men, the majority was married, had health insurance, and reported fair/poor HEI. The average number of years of education completed was 8.3 ± 8.3 years, and the average PIR was 1.9 ± 3.0 . More than one third of these men were physically inactive, whereas nearly one quarter were current smokers, and less than 10% were heavy drinkers. The average number of chronic conditions for the total sample was 1.4 ± 2.1 . Slightly more than 10% of the older men died during the study period.

The association between each health behavior and all-cause mortality by age-group is shown in Table 2. When examining these associations by age-groups, we observe that men who were current smokers were at an increased risk of mortality compared with those who did not smoke irrespective of age. Young and middle-aged men who heavily drank alcohol had an increased risk of mortality compared with those who did not drink alcohol. Older men who moderately or heavily drank alcohol had a decreased risk of mortality compared with those who did not consume alcohol. Middle-aged and older men who were physically inactive were at an increased risk of mortality compared with those who were physically active. Middle and old age men who were overweight were at a decreased risk of mortality compared with those who were normal weight. Older men who were obese had a decreased risk of mortality than those who were underweight. No associations were observed between fair/poor HEI score and mortality risk.

The association between health behaviors and all-cause mortality by age-group are displayed in Table 3. After adjusting for potential confounders among the younger men, those who were current smokers (odds ratio [OR] = 2.14, 95% confidence interval [CI] = [1.14, 4.03]) had an increased risk of mortality compared with those who did not smoke. Among the middle-aged men, those who were physically inactive (OR = 1.53, 95% CI = [1.08, 2.17]) had an increased risk of mortality compared with those who were physically active. Among the older men, those who were overweight (OR = 0.63, 95% CI = [0.44, 0.92] or obese (OR = 0.69, 95% CI = [0.47, 0.99] had a decrease risk of mortality compared with those who were normal weight adjusting for the potential confounders.

Discussion

One of the approaches to reducing health disparities and improving overall population health is to examine those most affected by mortality. African American men are a high-risk, yet understudied, population (Griffith, 2012; Thorpe, Bowie, Wilson-Frederick, Coa, & LaVeist, 2013; Thrasher, Clay, Ford, & Stewart, 2012; Williams, 2003; Xanthos, Treadwell, & Holden, 2010). However, a clear picture of the contributing factors and the confluence of these factors that place African American men at greatest risk have not been clearly demonstrated. One of the reasons is because those discussions are typically imbedded in research that focused on differences rather than sources of variability within this at-risk population (Whitfield, Allaire, Belue, & Edwards, 2008; Whitfield, Thorpe, & Szanton, 2011). In this nationally representative sample of African American men, we sought to determine the relationship between health behaviors and all-cause mortality and whether these health behaviors varied by age. Findings indicate that modifiable health behaviors such as smoking, physical inactivity, and weight status were associated with mortality and varied by age-group. These results underscore the importance of developing age-tailored health

promoting strategies and interventions that focus on smoking prevention and/or cessation and increasing physical activity that may improve longevity in this population. Additionally, the use of formative research approaches to inform the development and use of appropriate evidence-based strategies may be a powerful tool in creating effective interventions for African American males.

Among younger African American men, smoking was associated with an increased risk of mortality. African Americans tend to delay smoking initiation and generally smoke at lower rates compared with Whites (Substance Abuse and Mental Health Services Administration, 2011). Nonetheless, African Americans are more likely to attempt cessation, with a lower rate of success compared with Whites (Okuyemi et al., 2007). African Americans tend to not only use tobacco in response to perceived ethnic and racial harassment (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005; Jackson & Knight, 2006; Jackson, Knight, & Rafferty, 2010) but also as a coping strategy during stressful situations (Borrell et al., 2010; Jackson et al., 2010). These experiences result in greater smoking-related health consequences in African Americans than in Whites and other racial/ethnic groups (U.S. Department of Health and Human Services, 1998). Future research should consider the social and environmental determinants that contribute to persistent smoking when developing smoking cessation interventions.

This study provided evidence that in middle-aged men physical inactivity was associated with an increased mortality risk. This finding is consistent with previous work examining African American men (Griffith, Gunter, et al., 2011; Warner & Hayward, 2006). Because of the health benefits associated with physical activity, it is important to encourage African American men to engage in the Department of Health and Human Services– recommended level of physical activity. Scholars have identified barriers that should be targeted to attempt to motivate African American men to engage in regular physical activity (Diemer, 2002; Griffith, Gunter, et al., 2011). Research focusing on the social context of the lives of African American men is needed to achieve the goal of incorporating and sustaining physical activity in middle-aged African American men (Whitt-Glover & Kumanyika, 2009). In addition, it should be noted that at this stage in life there are several competing responsibilities and roles that these men have that take priority over physical activity (Griffith, Gunter, et al., 2011).

Consistent with previous work (Dahl et al., 2013; Heiat, Vaccarino, & Krumholz, 2001; Janssen & Mark, 2007) and extending to older African American men, BMI status, namely overweight and obesity, were associated with a decreased risk of mortality. There are two likely explanations for our findings. First, these findings may be a result of selective survival. It is possible that the men who are susceptible to the unfavorable effects of high BMI died before reaching old age. Thus, the remaining sample of older African American men may represent a group of men who are much healthier. In our study, there was a smaller proportion of older men who reported being current smokers, heavy drinkers, and the average number of chronic conditions for older men was 1.4 ± 2.1 . Second, these findings may be affected by the confounding of weight loss on the association between overweight and obese with mortality (Janssen & Mark, 2007). Specifically, older men may be at a lower weight because of illness thereby resulting in a lower association between

mortality and overweight or obese men compared to normal weight men. Some scholars have explored the relationship between BMI, BMI change, and mortality in the elderly (Dahl et al., 2013). However research examining this relationship among older African American men is needed.

These findings identify health behaviors that appear to emphasize personal choice. And, although it is the men's responsibility to maximize their health, there are a number of social and environmental factors that play an important role in shaping these African American men's health behaviors. For example, African American men are often considered as a high-risk group of men because of their greater likelihood of being low socioeconomic status and experiencing racial discrimination, both of which influence the ability to engage in health behaviors (Jackson et al., 1996; Ravenell, Johnson, & Whitaker, 2006; Williams, 2003). A low socioeconomic status environment is characterized by lack of access to resources that can promote health behaviors (e.g., stores that sell healthy foods, gyms, or safe places in the neighborhood to exercise) and increased access to unhealthy resources (e.g., high density of liquor stores, increased tobacco advertising; Pampel, Krueger, & Denney, 2010; Williams, 2003). Low socioeconomic status and experiencing racial discrimination are life stressors that may increase engagement in unhealthy behaviors (e.g., overeating, smoking, drinking) as a coping mechanism (Krueger & Chang, 2008; Ravenell et al., 2006; Williams, 2003). For example, these stressors can lead to unemployment or an inability to fulfill the financial provider role that might affect men more intensely than their female counterparts because being a good provider is symbolic of traditional masculinity (Bonhomme & Young, 2009; Courtenay, 2003; Griffith, Gunter, & Watkins, 2012). Prioritizing the role of provider may reduce the amount of time African American men have to commit to health behaviors, such as physical activity, as well as promote cigarette smoking or alcohol use as a stress reliever if they are unable to successfully fulfill this role (Griffith, Gunter, et al., 2011; Hammond & Mattis, 2005; Peyser, 1993; Ravenell et al., 2006). Approaches to ameliorate African American men's health behaviors require solutions at multiple levels (LaVeist, Pollack, Thorpe, Fesahazion, & Gaskin, 2011).

One viable strategy to improve health behaviors of African American men is to better understand the role of masculinity plays in health behaviors. Men who endorse traditional masculinity beliefs, exemplified by qualities such as being independent, powerful, stoic, and risk seeking, are less likely to engage in health promoting behaviors and more likely to engage in health damaging behaviors than those who do not (Griffith, 2012; Courtenay, 2000b, 2003; Mahalik, Levi-Minzi, & Walker, 2007). Intervention research targeting African American males should assess gender-specific barriers to engaging in health promoting behaviors, and be designed in a manner that is both appealing to and addresses the specific needs of African American males (Griffith, Metzl, & Gunter, 2011). It is worth noting that the challenge of any potential intervention in this high-risk group are the life course factors that complicate the time and change in behavior necessary for the adoption of healthier behaviors. Thus, the impact of social determinants of health should be carefully considered when designing interventions or health promoting strategies. Further interventions targeting African American men should be tailored to address barriers that may prevent them from meeting behavioral recommendations. For example, African American males are more likely to endorse traditional masculinity beliefs than men of other

racess and ethnicities (Courtenay, 2000a). Men who hold traditional masculinity beliefs are less likely than other men to engage in healthy behaviors. An understanding on how masculinity affects health behavior and behavior change is warranted in research on African American men.

This study has some aspects that warrant comment. First, the health behaviors were based on self-report. These reports are considered valid because previous work has demonstrated that people report honestly on health behaviors that are not considered illegal (Lantz et al., 2010). Furthermore, it is known that some underreporting of behaviors that could result in an underestimation of their association with mortality (Cohen & Vinson, 1995; Durante & Ainsworth, 1996; Lantz et al., 2010). Second, the chronic health conditions were also based on self-report of whether the participant has been diagnosed with the illness. It has been established that self-reports of health status are a precise indicator of disease status (Ferraro & Farmer, 1999; Ferraro & Su, 1999; Kriegsman, Penninx, van Eijk, Boeke, & Deeg, 1996; Skinner, Miller, Lincoln, Lee, & Kazis, 2005). Third, in this study we only considered all-cause mortality. Because causes of death vary by age-group among African American men, it is possible that the association between health behaviors and mortality may vary by cause of death. Fourth, our study is prone to omitted variable bias. There may be some unobserved variables that may account some of the associations that are apparent in our results. For example, where one lives has been shown to affect a person's screening behaviors, health, and longevity (Thorpe, Brandon, & LaVeist, 2008; Thorpe et al., 2013; LaVeist, 1993, 2003; LaVeist et al., 2011; Williams & Collins 2001). Additional research on African American men and mortality should consider the social and environmental conditions in which men live.

Nevertheless, this study had the following strengths. This is a nationally representative sample of African American men with more than a decade of mortality follow-up on men across a broad age range. These data also provide a wider array of covariates that we were able to account for in our analyses. Furthermore, we are unaware of any study that has focused the relationship between health behaviors and all-cause mortality exclusively focusing on African American men. This article advances our knowledge about the health and behavioral factors that represent risk and resilience factors in the health of African American men.

As the United States looks forward to the implementation of the Affordable Care Act, there will be preventive health care services at important benchmarks during childhood, adolescence and young adulthood that can encourage the adoption of healthier lifestyle choices earlier in life that may prevent premature mortality. Life expectancy, premature morbidity and mortality affect African American men more than any other group (National Center for Health Statistics, 2004, 2008, 2009). Having employment, type of occupation, financial stewardship, daily hassles, racism and discrimination, stress, family structure, and the ability to fulfill the role as provider, all contribute to men's health (Bonhomme & Young, 2009; Griffith, Metzl, et al., 2011; Xanthos et al., 2010). Similar to the weathering hypothesis put forth by Geronimus (1992; Geronimus, Hicken, Keene, & Bound, 2006), among African American males, the synergistic effects of these oppressors are exacerbated over the life course but become particularly salient and abundant in middle age and later

years. It is for these reasons that men's health has become a priority research area in minority health and health disparities. Among African American men in a nationally representative sample, unhealthy behaviors that are associated with mortality seem to vary by age. Efforts to improve longevity should focus on developing age-tailored health promoting strategies and interventions aimed at smoking cessation and increasing physical activity in African American men. Current evidence-based interventions may require adaptation given limited programming for males in general and African American males in particular. Further intervention research may also facilitate in the development of new evidence-based interventions that may be more appropriate and acceptable for this population.

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References

- Arias, E. National Vital Statistics Reports. Vol. 54. Hyattsville, MD: National Center for Health Statistics; 2006. United States life tables, 2003.
- Bennett GG, Wolin KY, Robinson E, Fowler S, Edwards CL. Perceived racial/ethnic harassment and tobacco use among African American young adults. *American Journal of Public Health*. 2005; 95:238–240. [PubMed: 15671457]
- Bonhomme, JJE.; Young, AMW. The health status of black men. In: Braithwaite, RL.; Taylor, SE.; Treadwell, HM., editors. *Health issues in the black community*. San Francisco, CA: Jossey-Bass; 2009. p. 73-94.
- Borrell LN, Diez Roux AV, Jacobs DR, Shea S, Jackson SA, Shrager S, Blumenthal RS. Perceived racial/ethnic discrimination, smoking and alcohol consumption in the Multi-Ethnic Study of Atherosclerosis (MESA). *Preventive Medicine*. 2010; 51:307–312. [PubMed: 20609433]
- Centers for Disease Control and Prevention. Cases of HIV infection and AIDS in the United States, by race/ethnicity, 1998-2002. HIV/AIDS Surveillance Supplemental Report. 2004; 10(1):1–38. Retrieved from http://www.cdc.gov/hiv/surveillance/resources/reports/2004supp_vol10no1/pdf/HIVAIDS_SSR_Vol10_No1.pdf.
- Cohen BB, Vinson DC. Retrospective self-report of alcohol consumption: Test-retest reliability by telephone. *Alcoholism, Clinical and Experimental Research*. 1995; 19:1156–1161.
- Courtenay WH. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine*. 2000a; 50:1385–1402. [PubMed: 10741575]
- Courtenay WH. Engendering health: A social constructionist examination of men's health beliefs and behaviors. *Psychology of Men & Masculinity*. 2000b; 1(1):4.
- Courtenay WH. Key determinants of the health and well-being of men and boys. *International Journal of Men's Health*. 2003; 2:1–30.
- Danaei G, Ding EL, Mozaffarian D, Taylor B, Rehm J, Murray CJL, Ezzati M. The preventable causes of death in the United States: Comparative risk assessment of dietary, lifestyle, and metabolic risk factors. *PLoS Medicine*. 2009; 6(4):e1000058. [PubMed: 19399161]
- Data Linkage Team. Hyattsville, MD: National Center for Health Statistics; 2010. Comparative analysis of the NHANES III public-use and restricted-use linked mortality Files: 2010 Public-use data release. Retrieved from http://www.cdc.gov/nchs/data/datalinkage/nhanes3_mort_compare_2010_final.pdf
- Dahl AK, Fauth EB, Ernsth-Bravell M, Hassing LB, Ram N, Gerstorf D. Body mass index, change in body mass index, and survival in old and very old persons. *Journal of the American Geriatric Society*. 2013; 61:512–518.10.1111/jgs.12158

- Davis MA, Neuhaus JM, Moritz DJ, Lein D, Barclay JD, Murphy SP. Health behaviors and survival among middle-aged and older men and women in the NHANES I Epidemiologic Follow-up Study. *Preventive Medicine*. 1994; 23:369–376. [PubMed: 8078859]
- Dawson D, Grant B, Li T. Quantifying the risks associated with exceeding recommended drinking limits. *Alcoholism Clinical and Experimental Research*. 2005; 29:902–908.
- Diemer MA. Constructions of provider role identity among African American men: An exploratory study. *Cultural Diversity and Ethnic Minority Psychology*. 2002; 8:30–40. [PubMed: 12092427]
- Durante R, Ainsworth BE. The recall of physical activity: Using a cognitive model of the question-answering process. *Medicine and Science in Sports and Exercise*. 1996; 28:1282–1291. [PubMed: 8897386]
- Ferraro K, Farmer M. Utility of health data from social surveys: Is there a gold standard for measuring morbidity? *American Sociological Review*. 1999; 64:303–315.
- Ferraro K, Su YP. Physician-evaluated and self-reported morbidity for predicting disability. *American Journal of Public Health*. 1999; 90:103–108. [PubMed: 10630145]
- Ferrucci L, Izmirlian G, Leveille S, Phillips CL, Corti MC, Brock DB, Guralnik JM. Smoking, physical activity, and active life expectancy. *American Journal of Epidemiology*. 1999; 149:645–653. [PubMed: 10192312]
- Geronimus AT. The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity & Disease*. 1992; 2:207–221. [PubMed: 1467758]
- Geronimus AT, Hicken M, Keene D, Bound J. “Weathering” and age patterns of allostatic load scores among blacks and whites in the United States. *American Journal of Public Health*. 2006; 96:826–833. [PubMed: 16380565]
- Griffith DM. An intersectional approach to men's health. *Journal of Men's Health*. 2012; 9:106–112.
- Griffith DM, Gunter K, Allen JO. Male gender role strain as a barrier to African American men's physical activity. *Health Education & Behavior*. 2011; 38:482–491. [PubMed: 21632436]
- Griffith DM, Gunter K, Watkins DC. Measuring masculinity in research on men of color: Findings and future directions. *American Journal of Public Health*. 2012; 102(Suppl. 2):S187–S194. [PubMed: 22401519]
- Griffith DM, Metzl JM, Gunter K. Considering intersections of race and gender in interventions that address U.S. men's health disparities. *Public Health*. 2011; 125:417–423. [PubMed: 21724208]
- Haapanen N, Miilunpalo S, Vuori I, Oja P, Pasanen M. Characteristics of leisure time physical activity associated with decreased risk of premature all-cause and cardiovascular disease mortality in middle-aged men. *American Journal of Epidemiology*. 1996; 143:870–880. [PubMed: 8610700]
- Hammond WP, Mattis JS. Being a man about it: Manhood meaning among African American men. *Psychology of Men & Masculinity*. 2005; 6:114–126.
- Heiat A, Vaccarino V, Krumholz HM. An evidence based assessment of federal guidelines for overweight and obesity as they apply to elderly persons. *Archives of Internal Medicine*. 2001; 161:1194–1203. [PubMed: 11343442]
- Jackson JS, Brown TN, Williams DR, Torres M, Sellers SL, Brown K. Racism and the physical and mental health status of African Americans: A thirteen year national panel study. *Ethnicity & Disease*. 1996; 6:132–147. [PubMed: 8882842]
- Jackson, JS.; Knight, KM. Race and self-regulatory health behaviors: The role of the stress response and the HPA axis. In: Schaie, KW.; Carstensten, LL., editors. *Social structure, aging and self-regulation in the elderly*. New York, NY: Springer; 2006. p. 189–240.
- Jackson JS, Knight KM, Rafferty JA. Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health*. 2010; 100:933–939. [PubMed: 19846689]
- Janssen I, Mark AE. Elevated body mass index and mortality risk in the elderly. *Obesity Reviews*. 2007; 8:41–59. [PubMed: 17212795]
- Kennedy ET, Ohls J, Carlson S, Fleming K. The Healthy Eating Index: Design and applications. *Journal of the American Dietetic Association*. 1995; 95:1103–1108. [PubMed: 7560680]
- Kochanek, K.; Xu, J.; Murphy, S.; Minino, A.; Kung, H. *National Vital Statistics Reports*. Vol. 60. Hyattsville, MD: National Center for Health Statistics; 2011. Deaths: Final data for 2009.

- Koster A, Penninx BW, Newman AB, Visser M, van Gool CH, Harris TB, Kritchevsky SB. Lifestyle factors and incident mobility limitation in obese and non-obese older adults. *Obesity*. 2012; 15:3122–3132. [PubMed: 18198323]
- Kriegsman DM, Penninx BW, van Eijk JT, Boeke AJ, Deeg DJ. Self-reports and general practitioner information on the presence of chronic diseases in community dwelling elderly: A study on the accuracy of patient self-reports and on determinants of inaccuracy. *Journal of Clinical Epidemiology*. 1996; 49:1407–1417. [PubMed: 8970491]
- Krueger PM, Chang VW. Being poor and coping with stress: Health behaviors and the risk of death. *American Journal of Public Health*. 2008; 98:889–896. [PubMed: 18382003]
- Kumanyika SK, Obarzanek E, Stettler N, Bell R, Field AE, Fortmann SP, Hong Y. Population-based prevention of obesity: The need for comprehensive promotion of healthful eating, physical activity, and energy balance: A scientific statement from American Heart Association Council on Epidemiology and Prevention, Interdisciplinary Committee for Prevention (formerly the Expert Panel on Population and Prevention Science). *Circulation*. 2008; 118:428–464. [PubMed: 18591433]
- Lantz PM, Bolberstein E, House JS, Morenoff J. Socioeconomic and behavioral risk factors for mortality in a national 19-year prospective study of U.S. adults. *Social Science & Medicine*. 2010; 70:1558–1566. [PubMed: 20226579]
- LaVeist TA. Segregation, poverty, and empowerment: health consequences for African Americans. *Milbank Quarterly*. 1993; 71:41–64. [PubMed: 8450822]
- LaVeist TA. Racial segregation and longevity among African Americans: An individual-level analysis. *Health Services Research*. 2003; 38(6 Pt. 2):1719–1734. [PubMed: 14727794]
- LaVeist TA, Bowie JV, Cooley-Quille M. Minority health status in adulthood: The middle years. *Health Care Financing Review*. 2000; 21(4):9–21. [PubMed: 11481747]
- LaVeist TA, Pollack K, Thorpe R Jr, Fesahazion R, Gaskin D. Place, not race: Disparities dissipate in southwest Baltimore when blacks and whites live under similar conditions. *Health Affairs (Project Hope)*. 2011; 30:1880–1887.10.1377/hlthaff.2011.0640 [PubMed: 21976330]
- Mahalik JR, Levi-Minzi M, Walker G. Masculinity and health behaviors in Australian men. *Psychology of Men & Masculinity*. 2007; 8:240–249.
- McGinnis JM, Foege WH. Actual causes of death in the United States. *Journal of the American Medical Association*. 1993; 270:2207–2212. [PubMed: 8411605]
- Millen BE, Quatromoni PA, Pencina M, Kimokoti R, Nam BH, Cobain S, D'Agostino RB. Unique dietary patterns and chronic disease risk profiles of adult men: The Framingham Nutrition Studies. *Journal of the American Dietetic Association*. 2005; 105:1723–1734. [PubMed: 16256756]
- Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *Journal of the American Medical Association*. 2004; 291:1238–1245. [PubMed: 15010446]
- National Center for Health Statistics. Plan and operation of the Third National Health and Nutrition Examination Survey, 1988–1994. *Vital Health Statistics*. 1994; 32:1–407. [PubMed: 7975354]
- National Center for Health Statistics. Health, United States, 2004 with chartbook on trends in the health of Americans. Hyattsville, MD: Author; 2004.
- National Center for Health Statistics. Health, United States, 2008 with chartbook on trends in the health of Americans. Hyattsville, MD: Author; 2008.
- National Center for Health Statistics. Health, United States, 2009 with chartbook on trends in the health of Americans. Hyattsville, MD: Author; 2009.
- National Center for Health Statistics. Office of Analysis and Epidemiology. The Third National Health and Nutrition Examination Survey (NHANES III) linked mortality file, mortality follow-up through 2006: Matching methodology. Hyattsville, MD: Author; 2009.
- National Institute on Alcoholism and Alcohol Abuse. Helping patients who drink too much: A clinician's guide. Rockville, MD: Author; 2005. NIH Pub. No. 05-3769
- National Institute on Alcoholism and Alcohol Abuse. Rethinking drinking: Alcohol and your health. Rockville, MD: Author; 2010. NIH Pub. No. 10-3770
- Okuyemi KS, Pulvers KM, Cox LS, Thomas JL, Kaur H, Mayo MS, Ahluwalia JS. Nicotine dependence among African American light smokers: A comparison of three scales. *Addictive Behaviors*. 2007; 32:1989–2002.10.1016/j.addbeh.2007.01.002 [PubMed: 17307303]

- Pampel FC, Krueger PM, Denney JT. Socioeconomic disparities in health behaviors. *Annual Review of Sociology*. 2010; 36:349–370.
- Peyser, HS. Stress, ethyl alcohol, and alcoholism. In: Goldberger, L.; Breznitz, S., editors. *Handbook of stress: Theoretical and clinical aspects*. 2nd. New York, NY: Free Press; 1993. p. 532-549.
- Plowden K, Young A. Sociostructural factors influencing health behaviors of urban African-American men. *Journal of National Black Nurses' Association*. 2003; 14:45–51.
- Ravenell JE, Johnson WE Jr, Whitaker EE. African-American men's perceptions of health: A focus group study. *Journal of the National Medical Association*. 2006; 98:544–550. [PubMed: 16623067]
- Rich JA. The health of African American men. *Annals of the American Academy of Political and Social Science*. 2000; 569:149–159.
- Sampson RJ, Morenoff JD, Raudenbush S. Social anatomy of racial and ethnic disparities in violence. *American Journal of Public Health*. 2005; 95:224–232. [PubMed: 15671454]
- Skinner K, Miller D, Lincoln E, Lee A, Kazis L. Concordance between respondent self-reports and medical records for chronic conditions: Experience from the Veterans Health Study. *Journal of Ambulatory Care Management*. 2005; 28:102–110. [PubMed: 15923944]
- StataCorp. Stata statistical software: Release 11. College Station, TX: Author; 2009. Computer software
- Substance Abuse and Mental Health Services Administration. Rockville, MD: Author; 2011. Results from the 2010 National Survey on Drug Use and Health: Summary of national findings. DHHS Pub. No. SMA 11-46582011. Retrieved from <http://www.samhsa.gov/data/NSDUH/2k10NSDUH/2k10Results.htm>
- Thorpe RJ Jr, Bowie JV, Wilson-Frederick SM, Coa KI, LaVeist TA. Association between race, place, and preventive health screenings among men: Findings from the Exploring Health Disparities in Integrated Communities study. *American Journal of Men's Health*. 2013; 7:220–227. 10.1177/1557988312466910
- Thorpe RJ Jr, Brandon DT, LaVeist TA. Social context as an explanation for race disparities in hypertension: Findings from the Exploring Health Disparities in Integrated Communities (EHDIC) study. *Social Science & Medicine*. 2008; 67:1604–1611. [PubMed: 18701200]
- Thrasher AD, Clay OJ, Ford CL, Stewart AL. Theory-guided selection of discrimination measures for racial/ethnic health disparities research among older adults. *Journal of Aging and Health*. 2012; 24:1018–1043. [PubMed: 22451527]
- U.S. Census Bureau. Current population survey: Definitions. Retrieved from <http://www.census.gov/cps/about/cpsdef.html>
- U.S. Department of Agriculture Center for Nutrition Policy and Promotion. The healthy eating index. Washington, DC: Author; 1995.
- U.S. Department of Health and Human Services. Tobacco use among U.S. racial/ethnic minority groups— African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, Hispanics: A report of the Surgeon General. *MMWR Recommendations and Reports*. 1998; 47(RR-18):1–16.
- Warner DF, Hayward MD. Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior*. 2006; 47:209–226. [PubMed: 17066773]
- Whitfield KE, Allaire J, Belue R, Edwards CL. Are comparisons the answer to understanding behavioral aspects of aging in racial and ethnic groups? *Journals of Gerontology Series B Psychological Sciences and Social Sciences*. 2008; 63:P301–P308.
- Whitfield, KE.; Thorpe, R.; Szanton, S. Health disparities, social class, and aging. In: Schaie, KW.; Willis, SL., editors. *Handbook of the psychology of aging*. 7th. San Diego, CA: Academic Press; 2011. p. 207-218.
- Whitt-Glover MC, Kumanyika SK. Systematic review of interventions to increase physical activity and physical fitness in African-Americans. *American Journal of Health Promotion*. 2009; 23(6):S33–S56. [PubMed: 19601486]
- Williams DR. The health of men: Structured inequalities and opportunities. *American Journal of Public Health*. 2003; 93:724–731. [PubMed: 12721133]

- Williams DR, Collins C. U.S. socioeconomic and racial differences in health: Patterns and explanations. *Annual Review of Sociology*. 1995; 21:349–386.
- Williams DR, Collins C. Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports*. 2001; 116:404–416. [PubMed: 12042604]
- Xanthos C, Treadwell HM, Holden KB. Social determinants of health among African-American men. *Journal of Men's Health*. 2010; 7:11–19.
- Yates LB, Djoussé L, Kurth T, Buring JE, Gaziano JM. Exceptional longevity in men: Modifiable factors associated with survival and function to age 90 years. *Archives of Internal Medicine*. 2008; 168:284–290. [PubMed: 18268169]

Table 1

Distribution of Select Characteristics for African American Men Using Linked Data From NHANES III and the NHANES III Public-Use Mortality File^a by Age-Group.

	NHANES III		
	25-44 years (n = 1,045)	45-64 years (n = 544)	65 years (n = 440)
Demographic characteristics			
Age (mean $\pm$ SD)	34.3 $\pm$ 8.9	53.9 $\pm$ 9.4	72.6 $\pm$ 9.2
Years of education completed (mean $\pm$ SD)	12.4 $\pm$ 3.5	10.6 $\pm$ 5.6	8.3 $\pm$ 8.3
Poverty income ratio (mean $\pm$ SD)	2.4 $\pm$ 2.3	2.4 $\pm$ 2.7	1.9 $\pm$ 3.0
Married (%)	53.9	64.1	60.4
Health insurance (%)	80.6	89.2	99.0
Health behaviors			
Physical inactivity (%)	15.3	37.8	44.1
Current smoker (%)	44.3	47.6	24.0
Alcohol consumption per week (%)			
None drinker (0 drinks)	30.2	41.0	65.5
Moderate drinker (1-14 drinks)	55.1	43.2	26.8
Heavy drinker (15+ drinks)	14.7	15.8	7.7
Weight status (%)			
Underweight	1.2	2.3	4.4
Normal	41.8	35.5	37.6
Overweight	35.5	40.9	36.2
Obese	21.5	21.3	21.8
Fair/poor HEI score (%)	97.5	95.4	92.4
Health status			
Diabetes (%)	2.8	10.7	15.4
Arthritis (%)	3.7	23.6	40.5
Congestive heart failure (%)	1.5	5.0	9.6
Stroke (%)	0.3	2.4	10.5
Asthma (%)	6.7	6.9	6.9
COPD ^b (%)	2.5	5.3	7.9
Hypertension (%)	18.0	42.9	53.1
Number of chronic conditions (mean $\pm$ SD)	0.3 $\pm$ 0.9	1.0 $\pm$ 1.6	1.4 $\pm$ 2.1
Fair/poor health (%)	12.7	28.0	45.6
Dead (%)	6.0	7.9	10.3

Note. NHANES III = Third National Health and Nutrition Examination Survey; HEI = Healthy Eating Index; COPD, chronic obstructive pulmonary index.

^aThis mortality file includes death certificate data up through December 31, 2006

^bCOPD was based on a diagnosis of emphysema or bronchitis.

Table 2

The Association Between Each Health Behavior and All-Cause Mortality Among 2,029 African American Men by Age-Group Using Linked Data From NHANES III and the NHANES III Public-Use Mortality File^a.

Health behavior	Hazard ratio [95% confidence interval]		
	25-44 years (n = 1,045)	45-64 years (n = 544)	65 years (n = 440)
Current smoker	2.83 [1.91, 4.21]	2.30 [1.62, 3.27]	1.27 [1.02, 1.58]
Alcohol consumption per week (%)			
None drinker (0 drinks)	1.00	1.00	1.00
Moderate drinker (1-14 drinks)	0.74 [0.43, 1.25]	0.80 [0.55, 1.18]	0.65 [0.49, 0.84]
Heavy drinker (≥ 15 drinks)	1.70 [1.01, 2.87]	1.51 [1.05, 2.17]	0.57 [0.34, 0.97]
Physically inactive	1.41 [0.85, 2.35]	1.67 [1.10, 2.52]	1.62 [1.27, 2.06]
Weight status			
Underweight	2.33 [0.72, 7.55]	1.20 [0.42, 3.46]	1.42 [0.68, 2.98]
Normal	1.00	1.00	1.00
Overweight	0.81 [0.49, 1.35]	0.59 [0.39, 0.88]	0.69 [0.50, 0.94]
Obese	1.27 [0.80, 2.04]	0.71 [0.42, 1.20]	0.72 [0.56, 0.92]
Fair/poor HEI score	0.54 [0.18, 1.61]	1.92 [0.69, 5.38]	1.33 [0.67, 2.63]

Note. NHANES III = Third National Health and Nutrition Examination Survey; HEI = Healthy Eating Index.

^aThis mortality file includes death certificate data up through December 31, 2006.

Table 3

The Association Between Health Behaviors and All-Cause Mortality in African American Men by Age Using Linked Data From NHANES III and the NHANES III Public-Use Mortality File^a.

Health behavior	Hazard ratio [95% confidence interval]					
	25-44 years (n = 1,045)		45-64 years (n = 544)		65 years (n = 440)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Current smoker	2.98 [1.72, 5.15]	2.14 [1.14, 4.03]	1.96 [1.29, 2.96]	1.60 [1.00, 2.56]	1.20 [0.93, 1.54]	1.30 [0.98, 1.74]
Alcohol consumption per week						
None drinker (0 drinks)	1.00	1.00	1.00	1.00	1.00	1.00
Moderate drinker (1-14 drinks)	0.53 [0.28, 1.01]	0.73 [0.31, 1.71]	0.73 [0.49, 1.09]	0.93 [0.54, 1.58]	0.65 [0.50, 0.85]	0.81 [0.56, 1.16]
Heavy drinker (15 drinks)	1.07 [0.55, 2.08]	1.20 [0.52, 2.77]	1.04 [0.66, 1.65]	1.23 [0.67, 2.27]	0.60 [0.34, 1.04]	0.63 [0.34, 1.18]
Physically inactive	1.53 [0.88, 2.64]	1.25 [0.67, 2.32]	1.64 [1.08, 2.49]	1.53 [1.08, 2.17]	1.49 [1.13, 1.96]	1.28 [0.93, 1.76]
Weight status						
Underweight	2.08 [0.56, 7.63]	1.33 [0.13, 13.9]	0.82 [0.25, 2.67]	0.54 [0.11, 2.55]	1.35 [0.46, 4.02]	1.49 [0.57, 3.86]
Normal	1.00	1.00	1.00	1.00	1.00	1.00
Overweight	0.97 [0.53, 1.76]	0.99 [0.49, 1.99]	0.73 [0.46, 1.17]	0.72 [0.47, 1.10]	0.74 [0.54, 1.02]	0.63 [0.44, 0.92]
Obese	1.40 [0.84, 2.32]	1.26 [0.60, 2.65]	1.05 [0.58, 1.89]	0.84 [0.48, 1.48]	0.82 [0.62, 1.08]	0.69 [0.47, 0.99]
Fair/poor HEI score	0.40 [0.14, 1.18]	0.49 [0.14, 1.76]	1.76 [0.63, 4.93]	1.40 [0.44, 4.45]	1.35 [0.64, 2.87]	1.22 [0.48, 3.14]

Note. NHANES III = Third National Health and Nutrition Examination Survey; HEI = Healthy Eating Index.

^aThis mortality file includes death certificate data up through December 31, 2006. Model 1 adjusted for health behaviors. Model 2 further adjusted for age, education, poverty-to-income ratio, insurance status, marital status, and number of chronic conditions. Chronic conditions included diabetes, arthritis, congestive heart failure, stroke, asthma, hypertension, and chronic obstructive pulmonary disease (emphysema or bronchitis).