2005

The Association Between Eating Habits and Hypertension Among African American Women Compared to Other Women

Anike N. Clark
Virginia Commonwealth University

Master of Public Health Research Project

The Association Between Eating Habits and Hypertension Among African American Women Compared to Other Women

by

Anike Noel Clark

Faculty Advisor
C.M.G. Buttery, MD, MPH

Preceptor
Carol B. Pugh, Pharm.D, MS

Department of Epidemiology and Community Health

Master of Public Health Program
MPH Research Project: EPID 691

Virginia Commonwealth University/VCU Medical Center
School of Medicine
Richmond, Virginia

December 2005

To Mom, Dad, and Crystal, for always believing in me and being such great blessings and sources of strength and encouragement during this time and all my life. I love you all.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

I could not have done this without the grace of God. This has truly been a challenging year and a half, and I am very thankful to have had this experience.

I would like to thank my advisor, Dr. Kim Buttery, for helping me start and finish this project. Thank you for inviting me into your lovely home and helping me find what it was that I wanted to do my project on. You've been a great role model for me in public health and have given me much to look forward to in my career.

To Dr. Carol Pugh, you are a Godsend. I cannot thank you enough. Words cannot express how much you have helped me through this semester. I would have never been able to do this analysis if it wasn't for you. Thank you for teaching me new statistics software and being patient with me while I learn. This has been a great experience. It has been wonderful to have you as my preceptor for this project.

Special thanks goes to Linda Clark, Bob Clark, and Crystal Jones (Mom, Dad, and Sis'). Thank you so much for your prayers and words of encouragement. I could not have gotten through this without you all. I've finally found my niche! Thank you, also, to my grandparents, Bernice Townes, Marjorie Clark, and Robert Clark, Sr. for even more prayers and words of encouragement. You are the best family anyone could ever ask for. In memory of my late grandfather, Frank Townes, I know you are watching over me. You are always in my thoughts. Thank you for your life and for stressing the importance of education. I love you all so much.

Aaron McKoy, I can't even begin to tell you how much having you in my life has meant to me. Thank you for being there for me when I needed someone to talk to about this project, even though you probably didn't know what a logistic regression was (smile). Thanks for being such a good friend. You are truly a special person.

To my best MPH friends, Rachel Barker, Marilyn Batan, Amanda Wattenmaker, Thuy Quyhn Do, and River Pugsley. Thanks for late night Grant House visits, outings to different countries for dinner, and true friendship. I couldn't have gone through this all on my own. Thanks for encouraging me and keeping me sane.

To anyone I have forgotten, I thank you for support during my experience in this program.

ABSTRACT

Background: Hypertension is a major public health concern for African American women. Many studies have shown a greater prevalence of hypertension, as well as physical inactivity, excess weight, and diabetes, in African Americans.

Objective: To determine if differences in eating patterns, as measured by Healthy Eating Index (HEI) scores, between African American women and other women in the United States are associated with hypertension.

Methods: Data were extracted from the Third National Health and Nutrition Examination Survey (NHANESIII). The sample included 31,189,534 women aged 45 years or greater after survey weights were applied. The majority was White (86.1%); minority groups included African Americans (10.5%) and Mexican Americans (3.4%). Women were considered to have hypertension if they reported that a doctor diagnosed them. Other predictor variables included age, body mass index, income, education, marital status, residence, health insurance coverage, regular source of care, smoking history, hypercholesterolemia, history of myocardial infarction, attempted weight loss, and physical activity level. The Cochran Mantel Haenszel (CMH) statistic and logistic regression were used to determine the magnitude of the association of study variables with the outcome.

Results: African American women were more likely to have hypertension than White and Mexican American women. Diet, based on the HEI score, was significantly related to the development of hypertension (CMH chi-square = 428.39, p-value = <0.0001). Women who consumed diets low in sodium were about 3% less likely to develop hypertension. A diet high in variety was also associated with a lower risk for hypertension.

Conclusions: These findings provide further support the need to established interventions that target this population. The key to prevention is education and promotion of healthier eating habits.

INTRODUCTION

Cardiovascular disease (CVD) has been a major public health concern in the United States for many years. The problem is not getting any better. Rates of overweight and obesity are climbing steadily as are morbidity and mortality rates. CVD is ranked as the number one cause of death in all Americans, claiming the lives of nearly 38% of more than 2.4 million Americans who died in 2002 (927,448 lives or 1 of every 2.6 deaths).[1, 2] Over 150,000 Americans killed by CVD are under the age of 65.[2] It is estimated that about 34% of non-Hispanic white men and 32% of non-Hispanic white women have CVD.[1] Furthermore, among Mexican Americans, 29.2% of men and 29.3% of women also have a CVD.[1] Approximately 70.1 million Americans have some form of CVD, which includes diseases of the heart, stroke, congestive heart failure, congenital cardiovascular defects, hardening of the arteries, and hypertension (high blood pressure).[1] Although death rates from CVD from 1992 to 2002 declined, in the same 10-year period the actual number of deaths increased 0.8%.[2] This year, Americans will end up paying $393.5 billion for CVD-related medical costs and disability.[1]

Hypertension, a key risk factor for cardiovascular disease morbidity and mortality[3], affects about one in every three American adults.[4] About 65 million Americans age 20 years or older have hypertension.[1] Overall, hypertension is prevalent in about 28% of the U.S. population.[5] According to the American Heart Association (AHA), hypertension in adults is defined as having a blood pressure reading greater than or equal to 140mm Hg systolic pressure or greater than or equal to 90mm Hg diastolic pressure. Failure to control hypertension can lead to heart attack, stroke, heart

failure, or kidney failure.[4] In most cases of hypertension (90-95%), the cause is unknown (primary hypertension).[4] There are no symptoms of hypertension, and nearly one-third of people with hypertension do not know that they have it. Some individuals have hypertension for years without knowing. Therefore, hypertension has earned the surname "silent killer."[4] Contrary to earlier reports that hypertension rates are decreasing, more recent studies show that hypertension prevalence is increasing in the United States.[3] Although hypertension control rates are improving, they are still very low.[3]

Hypertension is also a global public health concern. As stated in the 2003 World Health Organization/International Society of Hypertension statement on management of hypertension, this disease is estimated to cause 7.1 million premature deaths and 4.5% of the disease burden (64 million disability-adjusted life years). Because of increasing longevity and contributing factors such as obesity, physical inactivity, and unhealthy diets, hypertension is becoming a very common health problem worldwide.[6] The situation in other countries is similar, or worse, than it is in the United States.[6,7] According to a survey conducted in the United Kingdom, only 6% of hypertensive participants had their blood pressure lowered to less than 140/90 mm Hg.[7] The World Health Organization (WHO) also conducted a survey in Finland (North Karelia), Italy (Padua), Mongolia (Ulan Bator), and Cuba (Havana).[7] Results revealed that awareness and treatment rates in these four communities were much lower than those in the United States, especially in Mongolia. Interesting results were also found in the Canadian Heart Health Survey. Out of 23,129 participants chosen at random, the prevalence was 22%.[7] Fifty-nine percent of that group of participants were aware of

their hypertension, and 58% of this group were not receiving treatment.[7] Other global surveys of this nature bear similar results.

The leading cause of death for African Americans is heart disease. Over 4 in every 10 non-Hispanic African American adults have cardiovascular disease.[1] In 2002, 33.4% of African American men (492.5 per 100,000) and 39.6% of African American women (368.1 per 100,000) died as a result of cardiovascular disease, including congenital cardiovascular defects.[1,8,9] More African Americans died from cardiovascular disease than even cancer, diabetes, or HIV/AIDS.[8,9] Cardiovascular disease is most likely to affect those who are middle-aged and older. Over 70,000 of the African American men and women who died of cardiovascular disease in 2002 were 65 years of age and older.[8,9] One of the most influential risk factors of cardiovascular disease in the African American community is hypertension. Hypertension is more likely to occur in African Americans than Whites or any other ethnic group. AHA states that the prevalence of high blood pressure in African Americans in the United States is among the highest in the world. Hypertension is prevalent in 35% of the African American population.[5] In addition to having a higher prevalence of hypertension, African Americans develop hypertension much earlier in life, have higher rates of more severe hypertension, have higher average blood pressures, and have a greater burden of target organ damage.[5,8,9] Consequently, African Americans have a 1.3 times greater rate of nonfatal stroke, 1.8 times greater rate of fatal stroke, a 1.5 times greater rate of heart disease death, and a 4.2 times greater rate of end-stage kidney disease.[8,9] Those with the highest rates tend to be older (middle-aged and older), less educated,

overweight or obese, physically inactive, and diabetic.[8,9] In 2002, hypertension claimed the lives of over 11,000 African Americans.[8,9]

The population suffering from this disease at a disproportionate rate is African American women. Black women have higher rates of hypertension than White and Hispanic women.[10] Many studies have shown a greater prevalence of hypertension, as well as physical inactivity, excess weight, and diabetes, in African Americans.[11] Among African Americans aged 20 years and older who had hypertension in 2002, 45.4% were women.[8,9] Hypertension caused the deaths of 6311 African American women in the same year.[8,9] Hypertension is especially prevalent among middle-aged and older women. The NHANES III found that hypertension is more prevalent among women after age 59.[12,13]

The fact that so many African American women are affected by cardiovascular disease and hypertension may be attributed to the higher rate of overweight and obesity. Between the years of 1999 and 2002, 78% of non-Hispanic black women were overweight and 50.8% were considered obese.[14,15] Within this issue, cultural differences, as well as environmental and hereditary factors, play a very important role.[15] Although overweight is very prevalent in the African American community, especially among women, it is more acceptable for black women to be overweight. African American girls and women experience less social pressure about their weight, tend to be more satisfied with their bodies, and have less negative attitudes about overweight compared to white girls and women.[16] Furthermore, the greater acceptance of a wider range of body sizes and the rejection of the "ultrathin" ideal for African American women may be protective from problems with self-esteem, over-exercising,

and eating disorders.[15,16] Although this way of thinking is healthy, the resulting tolerance may lead to more obesity and serious obesity-related health complications.[15]

Some environmental factors that influence what African American women eat are availability, convenience, cost, what others eat around them, and what they were taught as children.[15] Findings from the National Growth and Health Study (NGHS) show that African American girls were more than twice as likely to engage in overweight-related eating practices, such as eating in front of the television, eating alone, eating snack food, and skipping meals.[16,17] Studies also show that African American girls learn their eating habits from their mothers.[18] According to the Black Women's Health Imperative, investigators found that low-income African American women often learn from their mothers to be "grateful" for the food they are given, but may get a few lessons on which foods are healthier than others.[18] Discussions with 21 African American women between the ages of 25 and 65 revealed that they were often taught that food was scarce, and that they should eat everything that they were given.[18] This practice often led to overeating. Many of the women also revealed that they often picked up their attitudes about their bodies from their mothers.[18] They were also taught by their mothers to be happy with their bodies, and their mothers only rarely spoke about wanting to lose or gain weight.[18] Mothers are more likely to make food and diet decisions and play the lead role in food shopping and preparation for their families.[19] Within the family, communication from mother to daughter about food could be used as an opportunity to educate about what to eat and African American mothers could act as a role model by eating healthy foods.[19] Passing down healthy eating habits to children

in the African American community may help to decrease the prevalence of hypertension in the future.

The purpose of this study was to determine if differences in eating patterns between African American women and other women in the United States are associated with hypertension. In addition to assessing the diet of African American women, this study also assessed other potential risk factors known to influence hypertension, such as body mass index, poverty income ratio, education level, location of residence, and other demographic characteristics.

METHODS

Data were extracted from NHANES III, a cross-sectional study conducted by the National Center for Health Statistics (NCHS) that involved 33,994 participants aged 2 months and older. NHANES III was conducted from October 1988 to October 1994 in two 3-year phases. This survey, like the two NHANES surveys before it, used a stratified, multi-stage probability design to sample the population. The first phase was conducted from October 18, 1988 to October 24, 1991 at 44 locations, and the second was conducted from September 20, 1991 to October 15, 1994, at 45 locations. Seventy-eight percent of the participants were given examinations in a mobile examination center (MEC) and 493 additional participants were given limited examinations in their home. A health examination was administered to the subjects, as well as five interviews or automated questionnaires. During the health examination, blood and urine samples were taken in addition to body measurements, spirometry, fundus photography, x-rays, electrocardiography, allergy and glucose tolerance tests,

and ultrasonography. Measurements were also taken of bone density and hearing, as well as physical, cognitive, and central nervous system function. The questionnaires and interviews that were given included the MEC Adult Questionnaire, MEC Youth Questionnaire, MEC Proxy Questionnaire, 24-Hour Diet Recall, and Dietary Food Frequency (for adolescents aged 12-16 years). The types of questionnaires and tests that were given were dependent on the age of the individual being examined, as well as other factors.[20]

All variables, with the exception of the HEI scores, were extracted from the Interview and Exam Components Adult files released July 1997, which contain data collected during household interviews of adults aged 17 years and older. The data were collected from three different interviews: the Screener, Family, and Household Adult questionnaires. Information rendered from the Screener interview was for demographic and survey-related variables. The Family questionnaire provided data that were based on educational levels, occupation, health insurance coverage, income, and food security of family members. It also recorded characteristics of the house itself. Finally, the Household questionnaire was given to the participant or a proxy. This questionnaire covered issues such as certain conditions, health services utilization, dental care, tobacco use, and vitamin, mineral, and medicine use.[20]

Definition of Variables

For this analysis, all female patients aged 45 years or greater were selected from the NHANES III survey. This sample consisted of 5167 women who completed all surveys and medical examinations described above. This age group was chosen

because increased likelihood of hypertension. The women in this study were considered to have hypertension if a doctor told them that they had hypertension or high blood pressure. A total of 22 records were dropped from the analysis because of missing values for this variable.

NHANES III requires all participants to identify themselves as Black; Mexican or Mexican American; White; Asian or Pacific Islander; Aleut, Eskimo, or American Indian; or other Latin American or other Spanish.[20] Only the 4963 women who chose one of the first three categories were included in this analysis. Other races/ethnicities were excluded due to the small number of subjects in those groups.

In order to assess the association between diet and hypertension, the primary predictor variable that was chosen for this study was the Healthy Eating Index (HEI) score released January 2000. This index was developed by the U.S. Department of Agriculture to measure the overall quality of one's diet. The HEI score is based on the sum total of the dietary components that make up the Index, which were specific to the Dietary Guidelines recommendations. These components included consumption of the Food Guide Pyramid food groups (grain, fruit, vegetables, dairy, and meat groups), total fat consumption (food energy intake), saturated fat consumption, cholesterol intake, sodium intake, and the amount of variety in one's everyday diet over a period of one day. The overall HEI score ranges from 0 to 100. The individual HEI scores based on the food groups previously discussed, range from 0 to 10. The higher the score, the better the quality of diet, and more conformed it is to the Dietary Guidelines for Americans and the Food Guide Pyramid.[21] Women who had no record of an HEI score

or its components were excluded from the analysis; this resulted in the loss of 1053 records, for a final sample size of 3910.

Geographic location was broken down into four broad census regions: Northeast, Midwest, South, and West. The women were assigned urbanization classifications based on the USDA Rural-Urban continuum codes, which distinguish metropolitan counties by size and non-metropolitan counties by degree of urbanization and proximity to metro areas.[20, 22] Smoking status was also measured. Women were asked if they had smoked 100 or more cigarettes in life. Then they were asked about their current smoking status, how many cigarettes they smoked per day, and how many years they have smoked this amount. This information was used to calculate smoking history, measured in pack-years. Because of a large amount of missing data and low prevalence of smoking, a new discrete variable was created for smoking history. Women were categorized as having never smoked, smoked before but do not smoke anymore, and those who currently smoke.

Poverty income ratio was also computed for this study. The computation of this ratio allows income data to be analyzed in a way that they are comparable across the six years of the study and to previous NHANES data. This ratio was calculated using the midpoint of the observed family income as the numerator and the poverty threshold (which is produced annually by the Census Bureau in dollar amounts), the age of the family reference person, and the calendar year in which the family was interviewed as the denominator. Threshold values were calculated based on calendar years and adjusted for inflation throughout those calendar years.[20] Those who reported having no income were assigned a value of zero.

Other variables that were used for this analysis included level of education, marital status, health insurance, general health, regular place of health care and provider, diagnosed heart attack, height, weight, attempted weight loss, physical activity, and diagnosed high blood serum cholesterol. Height and weight were used to calculate values for body mass index (BMI). Individuals were considered underweight if their BMI was below 18.5, normal if BMI was between 18.5 and 24.9, overweight if BMI was between 25 and 29.9, and obese if BMI was 30 or greater. All participants who were missing information for any predictor variables were excluded from the analysis.

Data Analysis

All analyses were conducted using SAS 9.1 for Windows. Univariate comparisons of discrete variables were performed using chi square analysis. As a result of the skewed nature of many of the continuous variables, the Wilcoxon rank sum test was employed for univariate comparisons. The Cochran Mantel Haenszel test was used to measure the relationship between participants with and without hypertension, based on the subjects' overall HEI scores, stratified by race. In order to adjust for HEI score, participants were divided into quartiles, with the minimum score being zero and the maximum score being 99.9. Logistic regression was used in order to control for confounding variables, and odds ratios and 95% confidence intervals were calculated to determine statistical significance.

RESULTS

This study was conducted to evaluate the association between diet of black women and hypertension and compare it to that of other women. The sample selected from the NHANES III included 938 Black, 2174 White, and 798 Mexican American women who completed each part of the NHANES III survey as well as the HEI survey. Because of the large over sampling of African Americans and Mexican Americans in the NHANES III survey, it was critical that sample weighting be used in this analysis. The purpose of weighting the sample is to produce an estimate of statistics that would have been obtained if every individual in the United States had been surveyed. Sample weights are considered measures of the number of people that this particular sample represents.[20] If sample weights had not been used, the results would have been misinterpreted. After the sample was weighted, the number of people represented in this study was 41,168,605. The number of missing values for the hypertension variable totaled 114,208. When these records were dropped, 41,054,397 participants remained. Next, 2,138,279 records were dropped due to participants who did not report being Non-Hispanic White, Non-Hispanic Black, or Mexican American, leaving 38,916,118 subjects. Finally, 7,726,584 more records were excluded from the study because of missing HEI scores. The final sample included 26,853,402 White, 3,272,921 African American, and 1,063,211 Mexican American women, totaling 31,189,534 women.

Table 1 shows the distribution of the population of the study with regards to hypertension and demographic and lifestyle characteristics. Chi-square analysis was used to compare women with hypertension to those without. The majority of the women was White (86.1%), had at least a high school education (54.2%), and was married

(60%). Most of the participants also resided in the south (33.3%) in rural areas (58.1%). The majority of women also reported having health insurance (92.9%), a regular place of health care (90.4%) and health care provider (83.8%), and perceived their health to be good, very good, or excellent (76.5%). When physical activity was addressed, many of the participants reported the same level of activity when comparing the past month to the past year (59.5%) and when comparing themselves to men and women of the same age (43.5%). However, many of them were less active than they were 10 years ago (59.4%) and over half of the participants have not attempted to lose weight in the past 12 months. The continuous variables used in the analysis are listed in Table 2. Since many of these factors did not have a normal distribution, the median was chosen as the measure of central tendency and the 25^{th} and 75^{th} percentiles were used to determine dispersion. The non-parametric Wilcoxon two-sample test was used to perform univariate analyses of the continuous variables.

The results of this analysis showed that in women over the age of 45, diet played a significant role in the risk of hypertension. The Cochran Mantel Haenszel statistic was calculated to give a stratified statistical analysis of the relationship between HEI score and hypertension, after controlling for race. See Table 3 for the results. HEI score was significantly associated with hypertension (Cochran Mantel Haenszel chi-square = 428.39, p-value = <0.0001). Significant differences were found in the 1^{st} and 4^{th} quartiles of HEI scores. Compared to African American women, the majority of White and Mexican American women were in the 4^{th} quartile, indicating higher HEI scores.

The individual HEI scores that, based on previous studies, have the most potential influence on the development of hypertension were used in the logistic

regression: sodium, fruit, vegetable, and variety. All of the discrete variables and all of the non-HEI continuous variables were also used as predictor variables in the logisitic regression model. A summary of the results can be found in Table 4. The analysis showed that women who consumed diets low in sodium (i.e. had a high sodium HEI score) were about 3% less likely to develop hypertension after adjusting for confounding variables. The analysis also showed that having a variety of foods in one's diet slightly lowers the risk for hypertension. The fruit and vegetable HEI scores returned results opposite from what was expected. According to the analysis, diets that were high in fruits and vegetables increased the risk for hypertension (OR=1.013, 95% CI=1.012, 1.013 and OR=1.018, 95% CI=1.018, 1.019, respectively). Prior studies have shown that fruits and vegetables were beneficial in decreasing the risk of hypertension.

The other variables used in this analysis proved to be significantly associated with hypertension. As has been noted in previous studies, African American women are more likely to have hypertension than White and Mexican American women. This analysis showed that White and Mexican American women were about one-third less likely than African American women to have hypertension. BMI also played a significant role in the likelihood of hypertension among these subjects. Subjects who had education beyond high school were about 20% less likely to have hypertension than those who at least had a high school education. Participants who had less than a high school education were 25% times more likely to have hypertension than those with a high school education. Results of the analysis showed that women who lived in the Northeast, Midwest, and Western regions were less likely to have been diagnosed with hypertension than those residing in the South. Participants who lived in urban areas

were approximately 20% more likely to have hypertension than those who lived in rural areas. It was also beneficial for women to be married, as they were about 9% less likely than unmarried women (which included single, separated, divorced, and widowed women) to have hypertension. Participants who had smoked at some time in their lives and participants who currently smoked were more likely to have hypertension than women who had never smoked. Other indicators of decreased risk of hypertension were general good health and physical activity.

DISCUSSION

African Americans have the highest prevalence of hypertension of any ethnic group in the United States.[23] They also experience higher rates of hypertension-related outcomes, such as stroke and end-stage renal disease compared to Whites.[23] In particular, African American women are disproportionately affected by hypertension. Although it is documented that hypertension is very prevalent among African American women, it is still a major public health concern for which more research needs to be conducted. Along with hypertension, there has also been a high prevalence of lack of physical inactivity, excess weight, and diabetes. In 2002, hypertension claimed the lives of 6311 African American women in the United States.[8,9]

I could not find studies that were conducted to assess the relationship between diet and hypertension in African American women using HEI scores. This study showed that African American women were more likely to have hypertension and that diet was an important correlate of hypertension in that population. In this study, 40.5% of the women had been told by a doctor that they had hypertension. African American women

made up 10.5% of the participants surveyed in this study, but accounted for 14.8% of hypertension cases overall. The majority (56.8%) of African American women had hypertension, compared with 38.6%of White women and 37.2% of Mexican American women.

Some of the variables in the analysis provided unexpected results. One example was the reporting of regular a place of health care. Women who reported having a regular place of health care were more likely to be diagnosed with hypertension because a possible explanation for this finding is that the women with hypertension were being treated for the condition and had a certain place of health care from which they receive their treatment. The results also showed that women with health insurance were more likely to have hypertension. The rationale for the women who had a regular place of health care is a likely explanation here as well. Women were more likely to be diagnosed by a doctor if they had health insurance. Women who had ever attempted to lose weight were also more likely to have hypertension. It is possible that these participants were advised by their doctors to try to lose weight to slow progression to CVD and keep blood pressure at a manageable level.

When looking at the HEI scores for fruits and vegetables, a high score on a scale of 1 to 10 indicates that the participant is consuming the recommended daily servings of fruits of vegetables. The results of this study showed that subjects with high fruit and vegetable HEI scores were more likely to have hypertension. The explanation for this could be the same as those subjects who had attempted to lose weight. In an effort to reduce symptoms of hypertension and lower risk for CVD and other hypertension-

related adverse outcomes, these women may have been advised by their doctors to increase their intake of fruits and vegetables.

Strengths and Limitations

The NHANES III is the most inclusive national survey thus far with data on CVD risk factors for African American, Mexican American, and White women.[11] This study contained a large sample population that was nationally representative. Most of the data were collected through actual health examinations and home interviews, where the subjects were more likely to feel comfortable and answer questions truthfully. Data were collected by individuals who underwent intensive initial training, and then formal retraining throughout the survey to ensure that high skill levels were maintained. Interviews were conducted in both English and Spanish. The methodology used to conduct NHANES III was very consistent throughout the course of the study. The data has undergone many quality control and editing procedures, reducing the possibility of error. All interview, laboratory, and examination data were sent to NCHS for final processing. NCHS staff developed data editing specifications that checked data sets for valid codes, ranges, and skip pattern consistencies and examined the consistency of values between interrelated variables.[20]

The cross-sectional study design is one limitation of the study. While it has many advantages, it does not establish a causal relationship between the exposure and the outcome. For example, when smoking status was examined, there were many women who had smoked before in their lives, but currently do not smoke. However, it was not certain whether the participants stopped smoking before or after their hypertension

diagnosis; was it last week when they decided to quit smoking, or was it ten years ago? Also, some of the information used for this analysis was self reported, increasing the possibility for recall bias. For example, it may have been difficult for the participants to gauge how physically active they are compared to other women their age. It was probably easier to compare how active they are now compared to how active they were during the past month, even 10 years ago. There was also a possibility for nonresponse bias when reporting family income. According to the documentation of the NHANES III, there were some participants who refused to report their income or income category to the interviewer. Finally, in the analysis, only one unit of BMI and HEI score and one year of age were analyzed at a time. The odd ratios of these variables would have been larger if more than one unit or year had been analyzed at a time.

Recommendations

Intervention strategies need to be put into place that target African American women at risk for hypertension. It is easy to tell African Americans to decrease their intake of high-fat, high-sodium foods, or to adhere to their medication for hypertension, but the difficult task lies in African Americans actually taking steps on their own to adhere to these guidelines. Although many researchers attribute this health outcome to the poor adherence to medication, others accredit it to beliefs about treatment in this population.[23] Ogedegbe, et al. describe a clinic-based study of older hypertensive African American women in Louisiana conducted by Heurtin-Roberts, et al.[23,24] This study identified the traditional biomedical model where hypertension was viewed as a chronic illness, and a nonbiomedical model where hypertension was viewed as an acute

illness that occasionally leads to high blood pressure. The participants with nonbiomedical beliefs of hypertension were less likely to adhere to treatment and had poorer blood pressure control than those who had traditional biomedical models.[23, 24] Programs need to be developed to change the mentality and behavior of African American women when it comes to illnesses like hypertension. After examining findings from the Multi-Ethnic Study of Atherosclerosis (MESA), Kramer, et al. suggested that such programs should improve hypertension treatment and control and should focus on a better understanding of the differences of prevalence rates amid the ethnic minority groups in the United States.[25]

Many studies have been conducted on how African Americans can prevent and/or manage hypertension. Sacks, et al. reported on the effects of reduced dietary sodium on blood pressure and the Dietary Approaches to Stop Hypertension (DASH) diet.[26] They performed a randomized, controlled dietary study that compared the effect of the DASH diet versus a typical diet high in fat. The DASH diet is high in fruits, vegetables, fiber, and low-fat dairy foods.[27] The results of this study showed that the reduction of sodium intake to levels below the current recommended level in conjunction with the DASH diet played a significant role in lowering blood pressure.[26] The long lasting health effects depend on subjects' willingness to make long-term changes to their diets.[26] The DASH diet has proven to be very effective in African Americans who have participated in this dietary study. In African American participants with hypertension, the DASH diet reduced systolic blood pressure and diastolic blood pressure by 13.2 mm Hg and 6.1 mm Hg, respectively.[27] Even though this diet is

beneficial for everyone, it is recommended that health care providers strongly suggest the DASH diet to all of their African American patients.

Diet and lifestyle change in African American women is the first step to reducing hypertensive symptoms. However, change in diet may have to be combined with antihypertensive therapy to keep blood pressure low. Controlling blood pressure protects target organs from hypertension-related damage and to reduce illness or death due to cardiovascular disease. In the African American Study of Kidney Disease and Hypertension (AASK), 2 to 3 antihypertensive drugs were needed, on average, to reduce mean arterial blood pressure to lower than 92 to 107 mm Hg in African Americans with hypertension and mild-to-moderate renal dysfunction.[27,28] It has also been noted that African American patients who receive an early and adequate regimen of antihypertensive therapy achieve similar overall control in blood pressure and experience a greater reduction in cardiovascular disease incidence than White patients.[5,32,33] This proves that adherence to hypertension treatment is very beneficial to African American population and needs to be further addressed by health care providers to their African American patients.

CONCLUSION

There are many ways to prevent and treat hypertension. With hypertension occurring in African American women as young as 20 years of age, it is important to start educating and promoting healthy lifestyles at early stages of life. This study validates studies that have also documented the prevalence of hypertension in African American women. Fortunately, hypertension is highly preventable, which emphasizes

the need for more effective prevention methods. More research needs to be done in order to administer intervention that is geared specifically toward African American women. These interventions should address cultural differences (i.e. body image, celebrations, emotional eating, etc.) and incentives should be given for participating. Support groups would also be helpful in increasing motivation to eat healthier.

REFERENCES

1. Heart Facts 2005: All Americans/African Americans. American Heart Association website. 2004. Available at: http://www.americanheart.org/presenter.jhtml?identifier=3000992. Accessed October 16, 2005.
2. Cardiovascular Disease Statistics. American Heart Association website. 2005. Available at http://www.americanheart.org/presenter.jhtml?identifier=4478. Accessed October 16, 2005.
3. Hajjar I, Kotchen TA. Trends in Prevalence, Awareness, Treatment, and Control of Hypertension in the United States, 1988-2000. *JAMA*. 2003; 290 (2): 199-206.
4. Blood Pressure. American Heart Association website. Available at www.americanheart.org. Accessed on October 3, 2005.
5. Wright JT, Agodoa L, Contreras G, et al. Successful Blood Pressure Control in the African American Study of Kidney Disease and Hypertension. *Archives of Internal Medicine*. 2002; 162 (14): 1636-1643.
6. Kaplan N, Mendis S, Poulter N, Whiteworth J (World Health Organization, International Society of Hypertension Writing Group). 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. *Journal of Hypertension.* 2003; 21 (11): 1983-1992.
7. Julius S. Worldwide Trends and Shortcomings in the Treatment of Hypertension. *American Journal of Hypertension.* 2000; 13 (5 pt 2): 57S-61S.

8. African Americans and Cardiovascular Diseases—Statistics. American Heart Association website. 2004. Available at http://www.americanheart.org/downloadable/heart/1107370380764FS01AF05rev0131.pdf. Accessed September 2, 2005.

9. Centers for Disease Control and Prevention. National Center for Health Statistics. 2004. Available at http://www.cdc.gov/nchs/hus.htm. Accessed on September 2, 2005.

10. High Blood Pressure (Hypertension and African American Women: NWHIC. National Women's Health Information Center website. 1998. Available at http://www.wrongdiagnosis.com/artic/hypertension_and_african_american_women_nwhic.htm. Accessed September 15, 2005.

11. Winkleby MA, Kraemer HC, Ahn DK, Varady AN. Ethnic and Socioeconomic Differences in Cardiovascular Disease Risk Factors: Findings for Women From the Third National Health and Nutrition Examination Survey, 1988-1994. *JAMA*. 1998; 280 (4): 356-362.

12. August P, Oparil S. Commentary: Hypertension in Women. *The Journal of Clinical Endocrinology & Metabolism*. 1999; 84 (6): 1862-1866.

13. Burt VI, Whelton P, Rocella EJ, et al. Prevalence of hypertension in the US adult population: results of the Third National Health and Nutrition Examination Survey, 1988-1991. *Hypertension*. 1995; 25 (3): 305-313.

14. Obesity in Minority Populations. American Obesity Association website. 2002. Available at www.obesity.org/subs/fastfacts/Obesity_Minority_Pop.shtml. Accessed October 17, 2005.

15. African American Health: African Americans and Diet. Net Wellness: Consumer Health Information website. 2005. Available at www.netwellness.org/healthtopics/aahealth/healthybody.cfm. Accessed October 17, 2005.

16. Sherwood NE, Story M, Obarzanek E. Correlates of Obesity in African-American Girls: An Overview. *Obesity Research.* 2004; 12 (Supplement 1): 3S-6S.

17. McNutt SW, Hu Y, Schreiber GB, Crawford PB, Obarzanek E, Mellin L. A longitudinal study of the dietary practices of black an white girls 9 and 10 years old at enrollment: the NHLBI Growth and Health Study. *Journal of Adolescent Health.* 1997; 20 (1): 27-37.

18. McCook A. Daughters Learn Eating Habits from Moms. Black Women's Health Imperative website. 2004. Available at. www.blackwomenshealth.org/site/News2?id=6363. Accessed October 17, 2005.

19. Wilson DB, Musham C, McLellan MS. From Mothers to Daughters: transgenerational food and diet communication in an underserved group. *Journal of Cultural Diversity.* 2004. Available at http://www.findarticles.com/p/articles/mi_m0MJU/is_1_11/ai_n6183825/pg_3. Accessed on October 17, 2005.

20. U.S. Department of Health and Human Services (DHHS). National Center of Health Statistics. Third National Health and Nutrition Examination Survey, 1988-1994, Household Adult Data File Documentation. 1996; Series 11 No. 1A.

21. U.S. Department of Health and Human Services (DHHS). National Center of Health Statistics. Third National Health and Nutrition Examination Survey, 1988-1994, Healthy Eating Index Data File. 2000; Series 11 No. 6A.

22. United States Department of Agriculture. Data: Rural-Urban Continuum Codes. Available at http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/. Accessed November 11, 2005.

23. Ogedegbe G, Mancuso CA, Allegrante JP. Expectations of Blood Pressure Management in Hypertensive African-American Patients: A Qualitative Study. *Journal of the National Medical Association.* 2004; 96(4): 442-449.

24. Health beliefs and compliance with prescribed medication for hypertension among black women—New Orleans, 1985-1986. *MMWR Morbidity Mortality Weekly Report.* 1990; 39: 701-704.

25. Kramer H, Han C, Post W, et al. Racial/Ethnic Differences in Hypertension and Hypertension Treatment and Control in the Multi-Ethnic Study of Atherosclerosis (MESA). *American Journal of Hypertension.* 2004; 17 (10): 963-970.

26. Sacks FM, Svetkey LP, Vollmer WM, et al. Effects on Blood Pressure of Reduced Dietary Sodium and the Dietary Approaches to Stop Hypertension (DASH) Diet. *The New England Journal of Medicine.* 2001; 344(1): 3-10.

27. Douglas JG, Bakris GL, Epstein M, et al. Management of High Blood Pressure in African Americans: Consensus Statement of the Hypertension in African Americans Working Group of the International Society ob Hypertension in Blacks. *Archives of Internal Medicine.* 2003; 163 (5): 525-541.

28. Wright JT Jr, Brakis G, Greene T, et al. Effect of blood pressure lowering and antihypertensive drug class on progression of hypertensive kidney disease: results from the AASK trial. *JAMA.* 2002; 288 (19): 2421-2431.

29. Lee JY, Greene PG, Douglas M, et al. Appointment attendance, pill counts, and achievement of goal blood pressure in the African American Study of Kidney Disease and Hypertension Prevention Pilot Study. *Controlled Clinical Trials.* 1996; 17(Supplement 4): 34S-39S.

30. Agodoa LY, Appel L, Brakis GL, et al. Effect of ramipril vs amlodipine on renal outcomes in hypertensive nephrosclerosis: a randomized controlled trial. *JAMA.* 2001; 285 (21): 2719-2728.

31. Sica DA, Douglas JG. The African American Study of Kidney Disease and Hypertension (AASK): new findings. *Journal of Clinical Hypertension (Greenwich).* 2001; 3 (4): 244-251.

32. Hypertension Detection and Follow-up Program Cooperative Group. Five-year findings of the Hypertension Detection and Follow-up Program: mortality by race-sex and blood pressure level: a further analysis. *Journal of Community Health.* 1984; 9 (4): 314-327.

33. Ooi WL, Budner NS, Cohen H, Madhavan S, Alderman MH. Impact of race on treatment response and cardiovascular disease among hypertensives. *Hypertension.* 1989; 14 (3): 227-234.

Table 1. Distribution of Discrete Variables With Regard to Hypertension and Demographic Characteristics

Variable	Total (N = 31,189,534)		Women With Hypertension (N = 12,635,047)		Women Without Hypertension (N = 18,554,486)		Chi-Square Results (for each variable)		
	N	%	N	%	N	%	chi-square	df	p-value
Race							428,706	2	< 0.0001
Non-Hispanic Black	3,272,921	10.5	1,875,484	14.8	1,397,437	7.5			
Non-Hispanic White	26,853,402	86.1	10,364,189	82.0	16,489,212	88.9			
Mexican-American	1,063,211	3.4	395,374	3.1	667,837	3.6			
Education Level							590,275	4	< 0.0001
None	265,756	0.9	122,955	1.0	142,801	0.8			
Elementary School	1,055,204	3.4	533,527	4.2	521,677	2.8			
Middle School	3,424,185	11.0	1,654,821	13.1	1,769,364	9.5			
High School	16,889,707	54.2	7,400,502	58.6	9,489,205	51.1			
College	9,404,639	30.2	2,882,657	22.8	6,521,982	35.2			
Unknown *	150,043	0.5	40,586	0.3	109,457	0.6			
Marital Status							555,852	2	< 0.0001
Married	18,705,970	60.0	6,937,290	54.9	11,768,680	63.4			
Widowed	7,247,406	23.2	3,797,584	30.1	3,449,822	18.6			
Single **	5,189,870	16.6	1,879,488	14.9	3,310,382	17.8			
Unknown *	46,287	0.1	20,685	0.2	25,602	0.1			
Rural/Urban Residence							9,381	1	< 0.0001
Urban	13,061,959	41.9	5,160,460	40.8	7,901,499	42.6			
Rural	18,127,574	58.1	7,474,587	59.2	10,652,987	57.4			
Region							92,262	3	< 0.0001
Northeast	6,189,842	19.8	2,582,866	20.4	3,606,976	19.4			
Midwest	7,944,288	25.5	3,275,212	25.9	4,669,076	25.2			
South	10,395,542	33.3	4,414,776	34.9	5,980,766	32.2			
West	6,659,863	21.4	2,362,194	18.7	4,297,669	23.2			

Table 1. Distribution of Discrete Variables With Regard to Hypertension and Demographic Characteristics

Variable	Total (N = 31,189,534)		Women With Hypertension (N = 12,635,047)		Women Without Hypertension (N = 18,554,486)		Chi-Square Results (for each variable)		
	N	%	N	%	N	%	chi-square	df	p-value
Health Insurance							4,002	1	< 0.0001
Yes	28,977,982	92.9	11,792,359	93.3	17,185,623	92.6			
No	1,679,831	5.4	642,183	5.1	1,037,648	5.6			
Unknown *	531,720	1.7	200,505	1.6	331,215	1.8			
General Health							109	1	< 0.0001
Excellent/Very Good/Good	23,862,503	76.5	8,334,246	66.0	15,528,257	83.7			
Fair/Poor	7,298,312	23.4	4,298,463	34.0	2,999,849	16.2			
Unknown *	28,719	0.1	2,339	0.0	26,380	0.1			
Regular Place of Healthcare							464,532	1	< 0.0001
Yes	28,193,282	90.4	11,971,892	94.8	16,221,390	87.4			
No	2,996,251	9.6	663,155	5.2	2,333,096	12.6			
Primary Care Provider							66,508	1	< 0.0001
Yes	26,147,510	83.8	11,279,631	89.3	14,867,879	80.1			
No	2,043,341	6.6	692,261	5.5	1,351,080	7.3			
Unknown *	2,998,682	9.6	663,155	5.2	2,335,527	12.6			
Diagnosed High Cholesterol							408,022	1	< 0.0001
Yes	10,595,600	34.0	5,296,274	41.9	5,299,326	28.6			
No	13,246,817	42.5	4,896,199	38.8	8,350,618	45.0			
Unknown *	7,347,117	23.6	2,442,574	19.3	4,904,543	26.4			
Diagnosed Heart Attack							353,081	1	< 0.0001
Yes	1,574,932	5.0	995,525	7.9	579,407	3.1			
No	29,413,844	94.3	11,573,709	91.6	17,840,135	96.1			
Unknown *	200,757	0.6	65,813	0.5	134,944	0.7			

Table 1. Distribution of Discrete Variables With Regard to Hypertension and Demographic Characteristics

Variable	Total (N = 31,189,534)		Women With Hypertension (N = 12,635,047)		Women Without Hypertension (N = 18,554,486)		Chi-Square Results (for each variable)		
	N	%	N	%	N	%	chi-square	df	p-value
Smoking History							38,609	1	< 0.0001
Never (< 100 cigarettes in life)	16,714,307	53.6	6,803,226	53.8	9,911,081	53.4			
Past (>=100 cigarettes, but not smoking now)	8,326,132	26.7	3,534,561	28.0	4,791,571	25.8			
Now (>=100 cigarettes and smoking now)	6,149,096	19.7	2,297,261	18.2	3,851,835	20.8			
Ever Tried to Lose Weight?							207,949	1	< 0.0001
Yes	15,225,271	48.8	6,788,348	53.7	8,436,923	45.5			
No	15,949,742	51.1	5,832,179	46.2	10,117,563	54.5			
Unknown *	14,521	0.0	14,521	0.1	0	0.0			
Physical Activity -- past month compared to past year							42,268	2	< 0.0001
More active	4,045,335	13.0	1,793,647	14.2	2,251,688	12.1			
About the same	18,564,328	59.5	7,274,473	57.6	11,289,855	60.8			
Less active	8,576,580	27.5	3,566,928	28.2	5,009,652	27.0			
Unknown *	3,291	0.0	0	0.0	3,291	0.0			
Physical Activity -- compared with men and women of same age							305,889	2	< 0.0001
More active	11,186,217	35.9	3,963,163	31.4	7,223,054	38.9			
About the same	13,573,979	43.5	5,567,537	44.1	8,006,442	43.2			
Less active	5,621,012	18.0	2,777,158	22.0	2,843,854	15.3			
Unknown *	808,327	2.6	327,190	2.6	481,137	2.6			

Table 1. Distribution of Discrete Variables With Regard to Hypertension and Demographic Characteristics

Variable	Total (N = 31,189,534) N	%	Women With Hypertension (N = 12,635,047) N	%	Women Without Hypertension (N = 18,554,486) N	%	Chi-Square Results (for each variable) chi-square	df	p-value
Physical Activity -- self-comparison with 10 years ago							421,020	2	< 0.0001
More active	3,611,049	11.6	1,344,087	10.6	2,266,962	12.2			
About the same	9,052,797	29.0	2,938,935	23.3	6,113,862	33.0			
Less active	18,520,228	59.4	8,352,027	66.1	10,168,201	54.8			
Unknown *	5,461	0.0	0	0.0	5,461	0.0			

* Unknown values not included in chi-square analysis
** Includes women who are single, separated, or divorced

Table 2. Distribution of Continuous Variables With Regard to Hypertension

	Women with Hypertension (N=12,635,047)					Women without Hypertension (N=18,554,486)					Wilcoxon Two-Sample Test	
Variable	Minimum Value	25th Percentile	Median	75th Percentile	Maximum Value	Minimum Value	25th Percentile	Median	75th Percentile	Maximum Value	Z	Two-sided p-value
Healthy Eating Index Score	22.7	58.2	69.0	78.1	95.9	21.8	58.7	68.4	78.6	99.2	-58	< 0.0001
Grains, HEI Score	0.0	4.1	6.3	8.6	10.0	0.0	4.3	6.4	9.1	10.0	-149	< 0.0001
Fruit, HEI Score	0.0	0.5	5.1	10.0	10.0	0.0	0.5	4.5	10.0	10.0	101	< 0.0001
Vegetable, HEI Score	0.0	3.4	7.5	10.0	10.0	0.0	3.6	7.0	10.0	10.0	91	< 0.0001
Dairy, HEI Score	0.0	2.6	5.7	10.0	10.0	0.0	3.0	6.4	10.0	10.0	-323	< 0.0001
Meat, HEI Score	0.0	3.8	6.5	10.0	10.0	0.0	3.9	6.7	9.8	10.0	41	< 0.0001
Fat, HEI Score	0.0	3.8	8.1	10.0	10.0	0.0	3.7	8.0	10.0	10.0	47	< 0.0001
Saturated Fat, HEI Score	0.0	3.4	9.0	10.0	10.0	0.0	3.4	8.6	10.0	10.0	72	< 0.0001
Cholesterol, HEI Score	0.0	10.0	10.0	10.0	10.0	0.0	10.0	10.0	10.0	10.0	-146	< 0.0001
Sodium, HEI Score	0.0	6.7	9.9	10.0	10.0	0.0	6.4	9.9	10.0	10.0	18	< 0.0001
Variety, HEI Score	0.0	6.0	10.0	10.0	10.0	0.0	6.0	10.0	10.0	10.0	-168	< 0.0001
Age (in years)	45	55	64	73	90	45	50	58	68	90	1114	< 0.0001
Height (in inches)	48	62	64	66	73	48	62	64	66	73	4	0.0005
Weight (in pounds)	65	139	160	185	350	75	126	142	161	350	1352	< 0.0001
Body Mass Index (in kg/m^2)	13.9	24.0	27.5	31.9	56.5	12.1	21.8	24.4	28.0	52.6	1460	< 0.0001
Income Poverty Ratio	0.0	1.3	2.4	3.9	11.1	0.0	1.8	3.1	4.9	11.3	-801	< 0.0001

Table 3. Hypertension Diagnosis -- Adjusted for HEI Score by Race

Non-Hispanic Black Women

HEI Score		Total N	%	With Hypertension N	%	Without Hypertension N	%
1st Quartile	0.00 - 53.59	776,542	23.7	450,751	24.0	325,791	23.3
2nd Quartile	53.60 - 63.94	827,994	25.3	449,956	24.0	378,038	27.1
3rd Quartile	63.95 - 73.19	816,286	24.9	472,999	25.2	343,287	24.6
4th Quartile	73.20 - 99.99	852,098	26.0	501,778	26.8	350,320	25.1
Total		3,272,920	100.0	1,875,484	100.0	1,397,436	100.0

Non-Hispanic White Women

HEI Score		Total N	%	With Hypertension N	%	Without Hypertension N	%
1st Quartile	0.00 - 53.59	3,473,146	12.9	1,388,924	13.4	2,084,222	12.6
2nd Quartile	53.60 - 63.94	6,495,387	24.2	2,456,822	23.7	4,038,565	24.5
3rd Quartile	63.95 - 73.19	6,060,325	22.6	2,365,370	22.8	3,694,955	22.4
4th Quartile	73.20 - 99.99	10,824,546	40.3	4,153,075	40.1	6,671,471	40.5
Total		26,853,404	100.0	10,364,191	100.0	16,489,213	100.0

Mexican American Women

HEI Score		Total N	%	With Hypertension N	%	Without Hypertension N	%
1st Quartile	0.00 - 53.59	174,562	16.4	74,563	18.9	99,999	15.0
2nd Quartile	53.60 - 63.94	241,590	22.7	90,010	22.8	151,580	22.7
3rd Quartile	63.95 - 73.19	288,629	27.1	93,799	23.7	194,830	29.2
4th Quartile	73.20 - 99.99	358,430	33.7	137,002	34.7	221,428	33.2
Total		1,063,211	100.0	395,374	100.0	667,837	100.0

Cochran Mantel Haenszel chi-square = 428.39, p-value < 0.0001

Table 4. Odds Ratios with 95% CI for Hypertension by Demographic and Other Characteristics

Effect	Odds Ratio	95% CI Lower	95% CI Upper
Fruit, HEI Score	1.013	1.012	1.013
Vegetable, HEI Score	1.018	1.018	1.019
Sodium, HEI Score	0.971	0.970	0.971
Variety, HEI Score	0.993	0.993	0.994
Age (years)	1.042	1.042	1.042
Poverty Income Ratio	0.977	0.977	0.978
Body Mass Index (kg/m^2)	1.100	1.099	1.100
Race			
Non-Hispanic Black	1.000	---	---
Non-Hispanic White	0.668	0.665	0.670
Mexican American	0.626	0.622	0.630
Education Level			
High School	1.000	---	---
Less than High School	1.256	1.254	1.259
Greater than High School	0.806	0.804	0.808
Married = Yes	0.913	0.912	0.915
Urban Residence = Yes	1.211	1.208	1.213

Table 4. Odds Ratios with 95% CI for Hypertension by Demographic and Other Characteristics

Effect	Odds Ratio	95% CI Lower	95% CI Upper
Region			
South	1.000	---	---
Northeast	0.949	0.947	0.952
Midwest	0.935	0.933	0.937
West	0.734	0.732	0.736
Health Insurance = Yes	1.207	1.202	1.212
Good to Excellent General Health = Yes	0.520	0.518	0.521
Regular Place of Healthcare = Yes	2.317	2.309	2.326
Diagnosed Heart Attack = Yes	1.413	1.407	1.419
Smoking History			
Never	1.000	---	---
Past	1.330	1.328	1.333
Now	1.142	1.139	1.145
Ever Tried to Lose Weight = Yes	1.365	1.362	1.367
Physical Activity = More/Same (vs. Less) -- past month	0.955	0.953	0.956
Physical Activity = More/Same (vs. Less) -- compared with men and women of same age	0.809	0.807	0.811
Physical Activity = More/Same (vs. Less) -- self-comparison with 10 years ago	0.852	0.851	0.854