



Lifestyle behaviors and receipt of preventive health care services among hypertensive Americans aged 45 years or older in 2007[☆]

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ABSTRACT

Objective. The aim of the study was to explore opportunities for more effective interventions on lifestyle modifications among hypertensives.

Methods. Using 2007 data from the Behavioral Risk Factor Surveillance System from the United States, we assessed the prevalence of various lifestyle behaviors and receipt of preventive health care services among US adults aged 45 years or older based on hypertension and treatment status ($n = 218,228$).

Results. Compared with nonhypertensives, hypertensives were significantly less likely to engage in recommended levels of physical activity and to be more obese regardless of treatment status. Compared to nonhypertensives, hypertensives on medical treatment were less likely to consume five or more servings of fruit and vegetables per day, be current smokers, and binge drinkers. Hypertensives not on medical treatment were more likely to be current smokers, binge and heavy drinkers. Hypertensives on medical treatment were more likely to have routine health checkup, have blood cholesterol checkup within previous 5 years and have a flu shot within the previous year than hypertensives not on treatment.

Conclusion. Different patterns of lifestyle behaviors and use of preventive health care services were found based on treatment status among hypertensives. Intervention programs should be tailored accordingly to achieve optimal outcome on lifestyle modification.

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Introduction

High blood pressure continues to be a significant cause of morbidity and mortality in the United States. As of 1999–2000, 65 million adult Americans were estimated to be hypertensive (Fields et al., 2004), and as of 2003–2004, the overall estimated prevalence of hypertension in the United States was 29.3% (Ong et al., 2007). The consequences of hypertension, including elevated rates of long-term complications such as coronary artery disease, stroke, congestive heart failure, and renal failure, impose a substantial burden on the US health care system (Ezzati et al., 2008, Klag et al., 1996, Lenfant et al., 2003, Levy et al., 1996, Stamler et al., 1993).

Noticeably, the blood-pressure-related risk is continuous. According to the Seventh Report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC7), cardiovascular disease (CVD) risk doubles for each

increment of 20/10 mm Hg, beginning at 115/75 mm Hg in those older than age 50 (Chobanian et al., 2003). Control of hypertension is important in reducing complications. Although the percentage of Americans who are aware of the dangers of hypertension, the percentage of those with hypertension who are being treated, and the percentage whose hypertension is controlled have increased over past 2 decades (Lenfant et al., 2003), these increases have not been uniform among all segments of the US population (Collins and Winkleby, 2002, Hertz et al., 2005).

The Healthy People 2010 Objectives for hypertension are to reduce the prevalence of hypertension among US adults from 28% to 16%, to increase the proportion of adults with hypertension who are taking action to control it from 82% to 95%, and to increase the proportion of hypertensive adults who are successful in controlling their blood pressure from 18% to 50% (US Department of Health and Human Services, 2000). A multifaceted approach is needed to achieve these goals. Although pharmacological treatment of hypertension is critical, several reports have documented the importance of lifestyle modifications (exercise, a diet rich in fruits and vegetables and low in fat and sodium, weight control/reduction, restricting alcohol consumption especially excessive drinking) in the prevention and treatment of high blood pressure (Appel et al., 2003, Fuchs et al., 2001, Miller et al., 2002, Neter et al., 2003, Sesso et al., 2008, Tsuruta et al., 2000, Whelton et al., 2002a, Whelton et al., 2002b, Whitworth, 2003, Xin et

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al., 2001). Although nearly all US adults with hypertension were taking some action to control their blood pressure, most could have done more (Centers for Disease Control and Prevention, 2007).

Clinical preventive health care has also been shown to be important in controlling blood pressure and preventing complications of hypertension. JNC7 recommends follow-up visits every 3 to 6 months for people with hypertension who have reached their blood pressure goal (Chobanian et al., 2003). National Cholesterol Education Program reported that lowering total blood cholesterol level of people with high blood pressure has been shown to reduce their risk for coronary heart disease; Adults aged 20 years or older are advised to have their cholesterol level checked at least every 5 years in order to reduce their risk for cardiovascular disease (2002).

In this study, we analyzed 2007 Behavioral Risk Factor Surveillance System (BRFSS) data in an effort to generate more comprehensive national estimates of the prevalence of selected lifestyle behaviors and receipt of recommended preventive health care services among US adults 45 years and over with hypertension. The major objective is to explore opportunities for more effective interventions on lifestyle modification among hypertensive Americans.

Methods

Data source

The BRFSS is an ongoing, state-based surveillance system that conducts telephone health surveys of noninstitutionalized US adults aged 18 years or older in all 50 states, the District of Columbia, Guam, Puerto Rico, and the US Virgin Islands. Survey samples are weighted to reflect state population estimates. In 2007, the median BRFSS response rate was 50.6%, and the median cooperation rate was 72.1%. Further information on data collection, quality control, other survey and analytic methodological issues can be found on the BRFSS Web site (<http://www.cdc.gov/brfss>).

We limited our analysis to 2007 data from respondents aged 45 years or older ($n = 218,228$). Younger individuals were less likely to be aware of the condition even they actually had it (Ong et al., 2007). Our age restriction ensures the validity of the findings. When groupwise comparisons were made, we further restricted the sample to those who gave definite answers pertaining their hypertension and medication use status ($n = 198,642$).

Measures

Hypertension and treatment status

All respondents were asked “Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?” Women who were hypertensive only during pregnancy were not regarded as having hypertension. All the other respondents who answered “yes” to this question were categorized as having hypertension and asked, “Are you currently taking medicine for your high blood pressure?” Respondents who answered “yes” were categorized as receiving treatment for hypertension.

Other variables

Definitions on lifestyle indicators/behaviors (consumption of five or more servings of fruit and vegetables per day, obesity, physical activity, current smoking, heavy and binge drinking) and receipt of preventive health care services, routine health checkup, cholesterol checkup, flu shot) are shown in Appendix. Covariates included age (45–54, 55–64, 65–74, ≥ 75 years), sex, race/ethnicity (non-Hispanic white, non-Hispanic black, other non-Hispanic, Hispanic), education level (less than high school, high school or equivalent, some college or more), and marital status (currently married, previously married, never married).

Statistical analysis

We used SAS-callable SUDAAN (release 9.0; Research Triangle Institute, Research Triangle Park, NC) to account for the complex sampling design. We used the CROSSTAB and DESCRIPT procedures in SUDAAN to estimate the distribution of survey respondents by demographic characteristics and hypertension treatment status. After controlling for demographic characteristics, we calculated adjusted prevalence rate ratio (APRRs) and 95% confidence intervals (CIs) using log-linear models to examine the extent

to which various lifestyle behaviors and receipt of health care services were associated with hypertension and treatment status. In the beginning, we compared the outcome variables by hypertension status and among hypertensives, by treatment status. However, we found that hypertensive adults are a heterogeneous group: hypertensives on treatment differed from those not on treatment for most behavioral variables of our concern, with nonhypertensives in-between. Comparing hypertensives as a whole with nonhypertensives regardless of treatment status is thus not justified. Therefore, we created three categories (nonhypertensives, hypertensives on treatment, and hypertensives not on treatment) and made groupwise comparisons accordingly. The adjusted prevalence rate ratios (APRR) were obtained after adjustment for age, sex, race/ethnicity, education level, and marital status.

Results

Nearly 43% of study population reported a diagnosis of hypertension by a health care professional, and 88% of those with hypertension reported being treated for their condition (Table 1). The hypertensive population disproportionately consisted of persons with older age, lower education, nonwhites, and persons who were previously or never married. Among hypertensives, men and persons with younger age were less likely to be taking antihypertensive medication. Hispanics were less likely to be taking medication than non-Hispanic whites and blacks. Persons who received less than high school education were less likely to be taking medications than others. Persons who had never been married were less likely to be taking medication than persons who were currently or previously married.

Compared with adults without hypertension, those with hypertension were significantly less likely to engage in recommended levels of physical activity (APRR (95% CI) = 0.85 (0.83–0.87)), more likely to be obese (APRR (95% CI) = 2.00 (1.93–2.06)), and have no leisure time physical activity (APRR (95% CI) = 1.37 (1.30–1.44)). However, compared to nonhypertensives, hypertensives on medical treatment were less likely to consume five or more servings of fruits

Table 1

Distribution of survey populations, prevalence of hypertension, and proportion of hypertensives taking antihypertensive medications by select characteristics among US adults aged 45 years or older. 2007 Behavioral Risk Factor Surveillance System.

Variable	Distribution % (SE)	Prevalence of hypertension (%) SE	Proportion of hypertensives taking antihypertensive medications (%) SE
Total	100	43.3 (0.2)	87.5 (0.2)
Sex			
Male	46.4 (0.2)	43.3 (0.4)	85.6 (0.4)
Female	53.6 (0.2)	43.1 (0.3)	89.0 (0.3)
Age			
45–54 y	37.9 (0.2)	29.0 (0.4)	76.3 (0.7)
55–64 y	28.2 (0.2)	44.5 (0.4)	87.0 (0.5)
65–74 y	17.6 (0.2)	56.2 (0.5)	93.4 (0.3)
≥ 75 y	16.1 (0.2)	60.1 (0.5)	94.4 (0.3)
Race/ethnicity			
Non-Hispanic white	76.1 (0.2)	42.2 (0.2)	88.2 (0.2)
Non-Hispanic black	8.6 (0.1)	58.8 (0.8)	89.5 (0.7)
Other non-Hispanic	6.6 (0.2)	38.3 (1.2)	84.8 (1.7)
Hispanic	8.5 (0.2)	40.0 (1.3)	79.1 (1.8)
Educational level			
No high school diploma	10.9 (0.2)	52.3 (0.9)	85.5 (1.0)
High school diploma or GED	29.5 (0.2)	48.3 (0.4)	89.3 (0.4)
Some college or more	59.5 (0.2)	39.0 (0.3)	86.8 (0.3)
Marital status			
Currently married	66.0 (0.2)	40.4 (0.3)	87.3 (0.4)
Previously married	26.5 (0.2)	51.0 (0.4)	89.1 (0.3)
Never married	7.3 (0.1)	40.2 (0.8)	80.6 (1.2)

Note. Differences within demographic categories, except sex, were all significant ($P < 0.01$). SE = standard error.

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