

Helplessness predicts the development of hypertension in older Mexican and European Americans[☆]

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Received 30 June 2008; received in revised form 11 March 2009; accepted 22 April 2009

Abstract

Objective: The mechanisms by which depression is associated with an elevated risk of cardiovascular disease remain unclear. It is possible that depressive symptoms could increase the risk of hypertension, which in turn could predispose to cardiovascular disease. The goal of this study was to explore whether individual depressive symptoms might predict the incidence of hypertension in a cohort of 240 initially normotensive Mexican-American and European-American elders. **Methods:** Subjects were 65–78 years old on entering the San Antonio Longitudinal Study of Aging, an epidemiologic survey, at which time they completed the 30-item Geriatric Depression Scale in English or Spanish. Their blood pressure was reassessed a mean of 7.0 years later. Responses to six key scale items (depressed mood, decreased interest, worthlessness, hopelessness, helplessness, and fatigue) were

Keywords: Depression; Elderly; Ethnicity; Helplessness; Hypertension

evaluated for the ability to predict incident hypertension. **Results:** In univariate analyses, only helplessness significantly predicted incident hypertension (chi-square 13.5, $df=1$, $P=.0003$). In a Cox proportional hazards model adjusted for sex, education, number of comorbid diseases, current drinking, social well-being, and marital status, helplessness remained a very strong predictor [hazard ratio (HR) 4.99, 95% confidence interval (CI) 1.90–13.12, $P=.0011$]. Total depression score also predicted incident hypertension, but less strongly (HR 1.08, CI 1.00–1.17, $P=.0339$). **Conclusion:** Helplessness may predict the development of hypertension in the elderly. Further research into this relationship might lead to interventions to reduce the risk of cardiovascular disease.

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Introduction

Growing evidence suggests that both older and younger individuals with significant depressive symptoms are at greater risk of developing cardiovascular disease [1,2]. The

mechanisms for this link, however, remain unclear. In light of the strong link between hypertension and the risk of cardiovascular disease [3], one plausible hypothesis is that depressive symptoms could increase the likelihood of a person's developing hypertension, which in turn could raise the risk for cardiovascular disease.

Four large prospective studies have evaluated depressive symptoms at baseline and monitored subjects' blood pressure over time [4–7]. Although the findings varied, in the aggregate they suggested that the presence of depressive symptoms might put some individuals at increased risk for the subsequent development of hypertension, particularly African Americans. One study of middle-aged women did not find baseline depression to predict incident hypertension,

[☆] This work was supported by NIA Grant R01-AG10444 (San Antonio Longitudinal Study of Aging), NIA Grant R01-AG16518 (Disablement in an Aging, Bi-ethnic Cohort), and NIH Grant MO1-RR-01346 (Frederic C. Bartter Clinical Research Center).

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but did note that subjects who experienced new-onset depression over the course of the study were more likely to develop hypertension [7]. These studies included few subjects other than African Americans or non-Hispanic whites and few who were older than 65 years.

Rather than look at the full syndrome of depression, Everson et al. [8] used a two-item scale to study a single depressive symptom—hopelessness—in a cohort of 616 middle-aged men from Eastern Finland who were normotensive at baseline. A subject was considered to meet criteria for hypertension if he had a SBP of ≥ 165 mmHg or a DBP of ≥ 95 mmHg or was currently taking antihypertensive medication. After controlling for other hypertension risk factors, the authors found that persons with a baseline score in the highest range of hopelessness were three times more likely to become hypertensive over the course of a 4-year follow-up (odds ratio 3.22, 95% CI 1.56–6.67). Depressive symptoms did not significantly predict the development of hypertension.

Other than the report by Everson et al. [8], the above studies did not look at individual depressive symptoms. In an effort to further explore the relationship between depressive symptoms and hypertension and to extend this area of research to subjects who have not previously been adequately studied, we evaluated whether six key depressive symptoms could predict incident hypertension in a cohort of Mexican-American (MA) and European-American (EA) elders. This population is of particular interest because of the high incidence of hypertension in the elderly [9] and the low rates of hypertensive control in MAs [9]. Moreover, MAs comprise the most rapidly growing segment of US elderly [10].

Method

All participants in this study had completed a home-based assessment as part of the baseline examinations in the San Antonio Longitudinal Study of Aging (SALSA), a community-based study of disablement in a bi-ethnic cohort [11]. The SALSA sample consisted of older persons who had previously participated in the San Antonio Heart Study (SAHS). The reader is directed elsewhere for a more detailed description of the SAHS and SALSA samples and methods [12–14].

From April 1992 to June 1996, we attempted to contact all SAHS subjects who were currently or would soon be between 65 and 79 years of age and ask them to participate in SALSA. Of the 1247 subjects from the SAHS cohort who would have met these age criteria during the study period, 1063 were still alive during the SALSA baseline enrollment period and 749 completed the baseline examination, for a response rate of 70.5% (749/1063). Of the 749 participants, 720 completed the 30-item Geriatric Depression Scale (GDS) [15] and had their blood pressure measured using a random-zero sphygmomanometer. Three

readings were taken in the right arm after a 5-min rest, with the subject seated and their right arm resting on a table; the first reading was discarded, and the mean of the second and third readings was used as the subject's blood pressure. Cuff size (adult small, regular, or large) was based on measurement of the subject's arm circumference. Examiners were trained by an experienced clinical investigator using standardized training tapes and methods developed for the Hypertension Detection and Follow-Up Study [16]. Subjects were considered to have met JNC6 [17] criteria for hypertension if their mean systolic BP was ≥ 140 or their mean diastolic BP was ≥ 90 or they had been prescribed antihypertensive medication by their physician. Three hundred sixty-two subjects (50.3%) were classified as hypertensive and 358 (49.7%) as normotensive.

A SALSA follow-up examination was completed from July 2000 to December 2001 and provides the incidence data for the present study. At the time of this follow-up, 62 of the initially normotensive subjects had died and two had moved out of the area. Fifty-four of the remaining subjects declined to participate, leaving 240 subjects who were normotensive at baseline and whose blood pressure was reevaluated in 2000–2001. The age range for this group at SALSA baseline in 1992–1996 was 65–78 years (mean 68.6) and the mean length of follow-up was 7.0 years (range 4.4–9.7).

Demographic characteristics of the study population

Of the 240 initially normotensive subjects reevaluated in 2000–2001, 73 (30.0%) were MA women, 53 (22.1%) were MA men, 62 (25.8%) were EA women, and 52 (21.7%) were EA men.

Data analysis

The relationship between incident hypertension and six key GDS items—depressed mood (“Do you often feel downhearted and blue?”), decreased interest (“Have you dropped many of your activities and interests?”), worthlessness (Do you feel pretty worthless the way you are now?”), hopelessness (“Are you hopeful about the future?”), helplessness (“Do you often feel helpless?”), and fatigue (“Do you feel full of energy?”)—was explored in univariate analyses using chi-square. For symptoms significantly associated with incident hypertension, a Cox proportional hazards model was used to determine whether this association was independent of demographic characteristics (age, sex, ethnic group, education, and household income), number of comorbid diseases (constructed as the sum of diabetes, myocardial infarction, angina, stroke, arthritis, and cancer, excluding skin cancer), lifestyle factors (current drinker, current smoker, and body mass index), and factors related to social support [married, living alone, number of social contacts, and sense of social well-being (satisfaction with social contacts)]. Time to event in the Cox model was time

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