

## Blood Pressure and Mortality in Very Old Patients

Satish S, Freeman DH Jr, Ray L, Goodwin JS. The relationship between blood pressure and mortality in the oldest old. *J Am Geriatr Soc* 2001;49:367-74.

### Study Overview

**Objective.** To assess the relationship between systolic and diastolic blood pressure and risk of 6-year all-cause mortality in men and women aged 65 to 84 years versus those 85 years and older.

**Design.** Observational, population-based cohort study.

**Setting and participants.** This study examined data from the Established Population for Epidemiological Studies of the Elderly (EPESE), a series of population-based longitudinal studies that gathered information on community-dwelling patients 65 years and older at 4 different U.S. sites. 12,802 participants were included in the current study; 4843 (38%) were male and 1088 (9%) were aged 85 years or older. Blood pressure was measured twice at baseline using a standard mercury sphygmomanometer with appropriate cuff size after subjects had been sitting for at least 5 minutes. Researchers also collected other self-reported health information at baseline, including comorbidities (heart disease, stroke, cancer, diabetes mellitus), self-rated health status, hospitalizations in the previous year, body mass index, smoking status, and hypertension treatment. Baseline data were collected between 1981 and 1987.

**Main outcome measures.** The primary outcome was all-cause mortality, as determined by death certificate information and interview status.

**Main results.** Unadjusted actuarial survival analyses showed that men aged 65 to 84 years with systolic blood pressure (SBP) less than 130 mm Hg had significantly lower mortality than those whose SBP was more than 180 mm Hg ( $P < 0.001$ ). In contrast, men aged 85 years and older with an SBP of 180 mm Hg or more had significantly lower mortality compared with those with an SBP of less than 130 mm Hg ( $P < 0.001$ ). In Cox proportional hazards analyses controlling for other survival predictors, the hazard of death associated with each 10-mm Hg increase in SBP was positively associated among men age 65 to 84 years and negatively associated among men age 85 and older (hazard ratio, 1.04 [95% con-

fidence interval [CI], 1.01 to 1.07] for younger men versus 0.92 [95% CI, 0.86 to 0.99] for older men). Among women aged 65 to 84 years, the hazard of death significantly increased with SBP increases ( $P < 0.001$ ), whereas no relationship was noted between SBP level and survival in women 85 years and older. Men in both age groups showed a negative relationship between diastolic blood pressure (DBP) and all-cause mortality (hazard ratio for men aged 65 to 84 years, 0.93 [95% CI, 0.88 to 0.97]; for men 85 years and older, 0.90 [95% CI, 0.80 to 1.02]).

**Conclusion.** In men aged 85 years and older, higher SBP is associated with increased survival compared with men aged 65 to 84 years. No association between blood pressure and mortality was found in women aged 85 years and older.

### Commentary

In general, clinical knowledge about health factors affecting the very old is scarce and frequently inferred from data on patients older than 65 years. In the very old population, research limitations are often associated with the small patient sample size available or included in clinical studies and the frequent presence of confounding comorbidities. However, the rapid increase in size of this age-group (with overall better health) stresses a need for accurate data to guide appropriate clinical interventions.

This study described what has been previously reported—a complex relationship between blood pressure, sex, and age in very old patients. The strength of Satish and colleague's research lies in their large patient sample; possible weaknesses include retrospective use of previously collected data and uncertain data quality. In an era when improved blood pressure control in the general population is emphasized, more and better research is needed to avoid iatrogenic blood pressure management among very old patients.

### Applications for Clinical Practice

No definitive recommendation can be drawn from this study regarding blood pressure management pressure in the very old. Clearly, further research is needed, including large clinical trials targeting this specific population.