ELEVATED BLOOD PRESSURE IN EARLY ADULTHOOD AS A PREDICTOR OF LATER CORONARY HEART DISEASE MORTALITY: UP TO 83 YEARS FOLLOW-UP IN THE HARVARD ALUMNI HEALTH STUDY

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Objectives: Few studies have examined the association between blood pressure in early adulthood and later coronary heart disease (CHD). In those that have, whether the impact of early adult blood pressure is mediated via blood pressure in middle age or, if it exerts an independent effect, has yet to be tested. We examined these issues using extended follow-up of the Harvard Alumni Study.

Design: Cohort study of male University students who had a physical examination at college entry between 1914 and 1952 (mean age 18.4 years) when data on CHD risk factors including blood pressure were measured directly. Study participants were traced, mailed a health questionnaire in 1962/1966 (mean age 45.5 years) which included enquiries regarding self-reported physician-diagnosed hypertension, and were followed for subsequent mortality experience – which is >99% complete – until the end of 1998. Blood pressure at college entry was categorised according to Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure criteria: normotensive (<120/<80 mm Hg), pre-hypertension (120–139/<80 mm Hg), stage 1 hypertension (140–159/90–99 mm Hg) and stage 2 hypertension (>160/>100 mm Hg).

Setting: USA.

Participants: 15 488 men enrolled in Harvard University in the given years, who completed the subsequent health questionnaire, and whose vital status could be ascertained.

Main Outcome Measure: CHD death.

Results: Over a maximum of 83.5 years of follow-up (median 52.6 years), there were 1531 deaths from CHD. Following adjustment for age and other CHD risk factors (body mass index, cigarette smoking status and physical activity) at college entry, in comparison to men who were normotensive there was an elevated risk of CHD mortality in those categorised as pre-hypertensive (hazards ratio 1.21, 95% CI 1.07 to 1.36), stage 1 hypertensive (hazards ratio 1.46, 95% CI 1.25 to 1.70), and stage 2 hypertensive (hazards ratio 1.89, 95% CI 1.46 to 2.45) (test for trend: p<0.001). After additional adjustment for self-reported hypertension in middle-age, CHD risk in relation to college blood pressure was somewhat attenuated but remained elevated: pre-hypertensive (1.17; 1.03 to 1.32), stage 1 hypertensive (1.33; 1.14 to 1.56), stage 2 hypertension (1.63; 1.26 to 2.12) (p<0.001 test for trend).

Conclusion: In this cohort, higher measured blood pressure in early adulthood was associated with an elevated risk of CHD mortality several decades later, and these effects appear to be independent of self-reported hypertension in middle-age. These results may suggest that blood pressure lowering strategies should begin earlier in the life course than is currently the case.