Hypertension in Adults Across the Age Spectrum

Current Outcomes and Control in the Community

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Context Data are sparse regarding current rates of hypertension treatment and control, and risks associated with hypertension, among persons older than 80 years.

Objective To determine the prevalence of blood pressure stages, hypertension treatment and control, and cardiovascular risk among older patients with hypertension.

Design, Setting, and Participants A community-based cohort study in which data were collected during all Framingham Heart Study examinations attended in the 1990s. Participants were pooled according to age: younger than 60 years, 60 to 79 years, or 80 years or older. There were 5296 participants who contributed 14 458 person-examinations of observation, including 7135 hypertensive person-examinations (4919 treated).

Main Outcome Measures Prevalence of hypertension, its treatment, and its control were compared across age groups. Risks for incident cardiovascular disease during follow-up of up to 6 years were estimated as multivariate-adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) using Cox proportional hazards regression.

Results Prevalence of hypertension and drug treatment increased with advancing age, whereas control rates were markedly lower in older women (systolic <140 and diastolic <90 mm Hg). For ages younger than 60 years, 60 to 79, and 80 years and older, respectively, control rates were 38%, 36%, and 38% in men ($P=.30$) and 38%, 28%, and 23% in women ($P<.001$). Relative risks for cardiovascular disease associated with increasing blood pressure stage did not decline with advancing age, and absolute risks increased markedly. Among participants 80 years of age or older, major cardiovascular events occurred in 9.5% of the normal blood pressure (referent) group, 19.8% of the prehypertension group (HR, 1.9; 95% CI, 0.9-3.9), 20.3% of the stage 1 hypertension group (HR, 1.8; 95% CI, 0.8-3.7), and 24.7% of the stage 2 or treated hypertension group (HR, 2.4; 95% CI, 1.2-4.6).

Conclusions Relative to current national guidelines, rates of blood pressure control in the community are low, especially among older women with hypertension. Short-term risks for cardiovascular disease are substantial, indicating the need for greater efforts at safe, effective risk reduction among the oldest patients with hypertension.

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ELDERLY PERSONS ARE AMONG THE fastest growing segments of the US population[1] and they have the highest prevalence of hypertension.[2] Despite numerous trials demonstrating the benefits of blood pressure lowering among older individuals with hypertension,[3-9] available data suggest that rates of treatment and control are suboptimal.[10-13] Studies from national surveillance data, however, are typically limited to adults younger than 75 years of age.[10,14,15] Data are sparse regarding current patterns of treatment and control of hypertension among individuals 80 years of age and older. In addition, contemporary risks associated with hypertension in this oldest age group are poorly characterized. Therefore, we sought to determine the current prevalence, patterns, treatment, control, and risks of hypertension in persons aged 80 years or older compared with younger individuals with hypertension in the community.

METHODS

Study Sample

Study design and entry criteria for the Framingham Heart Study have been detailed elsewhere.[16,17] All examinations and procedures were approved by the institutional review board of Boston Medical Center and all participants provided informed consent.

For the present study, we considered each routine examination a participant attended to be a discrete observational unit; thus, any single participant could contribute 1 or more person-examinations to the study base. Our sample comprised examination data collected be-

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tween January 1, 1990, and December 31, 1999, from Framingham Heart Study original cohort members (enrolled 1948-1952 and reexamined at 2-year intervals) and offspring cohort members (enrolled 1971-1973 and reexamined at 4-year intervals). Participants with prevalent cardiovascular disease (CVD) at the time of their examination were excluded from analysis. Since the original cohort was reexamined twice as often as the offspring cohort, we compensated by taking person-examination data from every offspring cycle but from only every second cycle in the original cohort. We stratified participants into 3 age groups based on their age at examination: younger than 60 years, 60 to 79, or 80 years and older.

Definition of Hypertension and End Points

At each examination, blood pressure was measured twice in the left arm by a physician, and the average of the 2 values was used as described previously.[13] Hypertension was defined as systolic blood pressure (SBP) greater than or equal to 140 mm Hg or diastolic blood pressure (DBP) greater than or equal to 90 mm Hg, or receiving medication specifically for the indication of hypertension. Control to goal blood pressure was defined as SBP less than 140 mm Hg and DBP of less than 90 mm Hg among treated hypertensive participants. Levels of other cardiovascular risk factors were obtained concurrently with blood pressure. After review of all participant medical records by a panel of 3 trained physicians using previously published Framingham Heart Study criteria,[18] we defined a major cardiovascular event as the occurrence of a major coronary heart disease event (coronary death, myocardial infarction, or coronary insufficiency), stroke, hospitalized congestive heart failure, or other CVD cause of death. Hospitalized congestive heart failure was defined according to the Framingham criteria.[19]

Statistical Analysis

All analyses were performed using SAS statistical software version 8 (SAS Institute, Cary, NC).[20] The period of follow-up for incident CVD began on the date of examination and continued until another examination was attended, or for a maximum of 6 years, after which follow-up was censored. Each eligible examination attended prior to December 31, 1999, ended the follow-up period from the prior examination and initiated a new person-examination with the age group reclassified as appropriate. Also at each eligible examination attended during this time, the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) hypertension stage was reclassified, medication use and other covariate data were collected, and follow-up for incident CVD was begun at the time of the new examination date. Follow-up for CVD events was continued through December 31, 2004, at which time all remaining observations were censored. This method of pooling person-examinations allows covariate data to be updated as collected while avoiding overlapping periods of follow-up. It has been used extensively and has yielded estimates of effect comparable to Cox proportional hazards regression analyses with time-varying covariates.[21]

We determined the prevalence of JNC 7 blood pressure categories[14,22] in each age group by sex, classifying participants into the following mutually exclusive categories: normal blood pressure (<120/<80 mm Hg), prehypertension (SBP 120-139 and/or DBP 80-89 mm Hg), stage 1 hypertension (SBP 140-159 and/or DBP 90-99 mm Hg), or stage 2 hypertension or treated (untreated SBP ≥160 and/or DBP ≥100 mm Hg or receiving antihypertensive therapy). We determined the prevalence of antihypertensive treatment, the number of agents used, the types of antihypertensive agents used, and control of hypertension to goal levels (<140/<90 mm Hg) by sex and age group. Finally, we determined the incidence of the 3 CVD outcomes (major cardiovascular events, major coronary heart disease events, and hospitalized congestive heart failure as defined previously) for up to 6 years following each examination by sex and age group. Sex-specific prevalence of hypertension therapy, hypertension control, and CVD incidence were compared across age groups using the Cochran-Mantel-Haenszel statistic. Cox proportional hazards regression analysis was used to estimate the influence of blood pressure stage on CVD risk within age groups by sex, with participants in the normal blood pressure group serving as the referent. Models were adjusted for age and sex, or age, sex, smoking status, diabetes status, and total/high-density lipoprotein cholesterol ratio. A 2-tailed P value ≤.05 was considered statistically significant.

RESULTS

Study Sample

There were 5296 eligible participants (2317 men and 2979 women) who contributed 14 458 person-examinations during the study period. Participants with hypertension contributed 7135 (49.3%) person-examinations and were receiving antihypertensive therapy at 4919 of these examinations. Characteristics of the study sample are shown in TABLE 1. Consistent with prior observations,[15,23] SBP was higher at more advanced ages, whereas DBP decreased in participants aged 60 years or older.

Patterns of Hypertension

The distribution of JNC 7 blood pressure stages is shown in FIGURE 1, stratified by sex and age groups. As expected, the prevalence of hypertension increased markedly with advancing age: 27.3% among participants younger than 60 years of age, 63.0% in those aged 60 to 79 years, and 74.0% in those aged 80 years or older, with 33.3%, 23.5%, and 19.1%, respectively, classified as prehypertension, and the remaining 39.4%, 13.5%, and 6.9%, respectively, in the normal blood pressure category.

Treatment

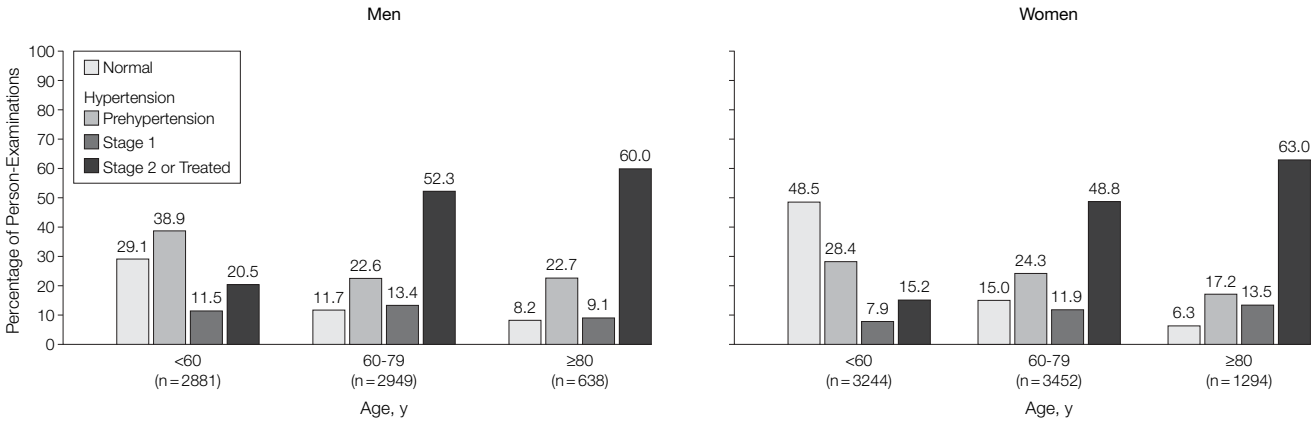
The overall prevalence of treatment among participants with hypertension was 68.9%. Treatment rates in-

Table 1. Characteristics of Study Sample by Sex and Age Group*

	Men, y			Women, y		
	<60 (n = 2881)	60-79 (n = 2949)	≥80 (n = 638)	<60 (n = 3244)	60-79 (n = 3452)	≥80 (n = 1294)
Age, mean (SD), y	50 (6)	69 (6)	84 (4)	50 (6)	70 (6)	85 (4)
Blood pressure, mean (SD), mm Hg						
Systolic	125 (15)	137 (19)	140 (22)	120 (18)	138 (21)	146 (24)
Diastolic	78 (9)	75 (10)	69 (12)	74 (10)	73 (10)	69 (12)
Current smoking, No. (%)	628 (22)	287 (10)	24 (4)	682 (21)	449 (13)	74 (6)
Diabetes, No. (%)	297 (10)	693 (24)	123 (19)	176 (5)	494 (14)	106 (8)
Cholesterol, mean (SD), mg/dL						
Total	200 (37)	197 (38)	188 (36)	203 (38)	217 (38)	209 (39)
HDL	43 (12)	42 (12)	42 (12)	57 (15)	55 (17)	54 (17)
Total/HDL cholesterol ratio (SD)	5.0 (1.8)	5.0 (1.6)	4.8 (1.5)	3.8 (1.4)	4.3 (1.5)	4.3 (1.5)
BMI, mean (SD)	28.6 (4.5)	28.2 (4.0)	26.6 (3.8)	26.8 (5.9)	27.5 (5.6)	26.4 (4.6)

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by square of height in meters); DBP, diastolic blood pressure; HDL, high-density lipoprotein; SBP, systolic blood pressure.
SI conversion factor: To convert cholesterol to mmol/L, multiply values by 0.0259.
*Data are based on 14 458 person-examinations from 5296 individuals (2317 men and 2979 women).

Figure 1. Prevalence of JNC 7 Blood Pressure Stages and Treatment



JNC 7, seventh report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure.

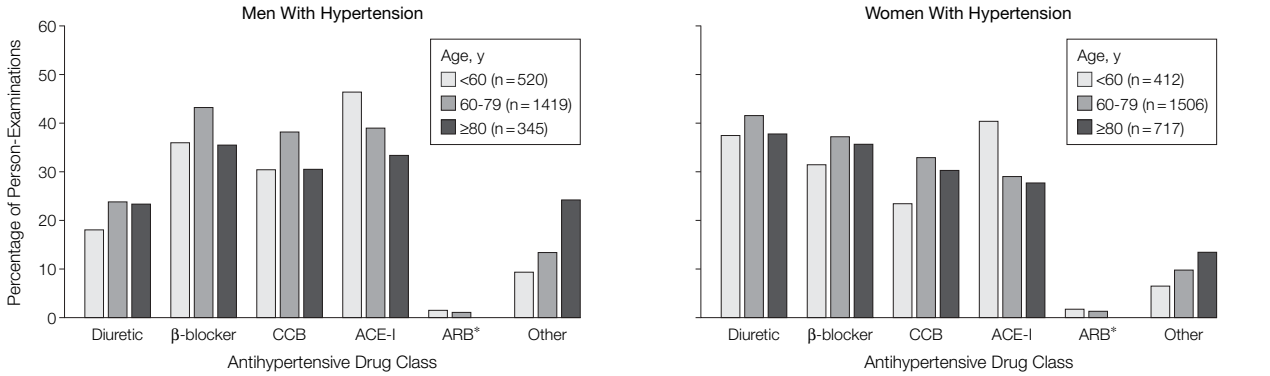
creased substantially from the younger than 60 years age group (55.7%) to the 60 to 79 years age group (72.5%) with no further increase in the oldest group (74.2%). Among treated individuals, however, the number of antihypertensive medications used was similar across age groups, with approximately 60% of treated patients with hypertension using only 1, 30% using 2, and 10% using 3 or more antihypertensive medications.

Patterns of use differed for distinct classes of antihypertensive agents across age groups and by sex (FIGURE 2). Use of thiazide diuretic agents increased in patients older than age 60 years, with women consistently using them more than men. Among treated patients with hypertension who were older than 80 years, 23% of men and 38% of women were using thiazide diuretic agents for antihypertensive therapy. Use of β-blocker and calcium channel blocker medications were most prevalent in the 60 to 79-year-old group, with somewhat lower rates among the younger and the oldest groups. In contrast, angiotensin-converting enzyme (ACE) inhibitor use declined with advancing age from 44% in the youngest treated patients with hypertension to 33% in persons aged 80 years or older. As expected, use of angiotensin receptor blockers was low among all ages, because these agents were first introduced during the study period. Use of other classes of antihypertensive agents increased steadily with advancing age, especially among men in whom use of α-blockers increased from 6.5% in the youngest to 15.7% in the oldest. The increase in α-blocker use among men was likely due to treatment for concomitant hypertension and symptoms of prostatism.

Control

Among all participants with hypertension, the prevalence of control to blood pressure <140/<90 mm Hg was 32.4%.

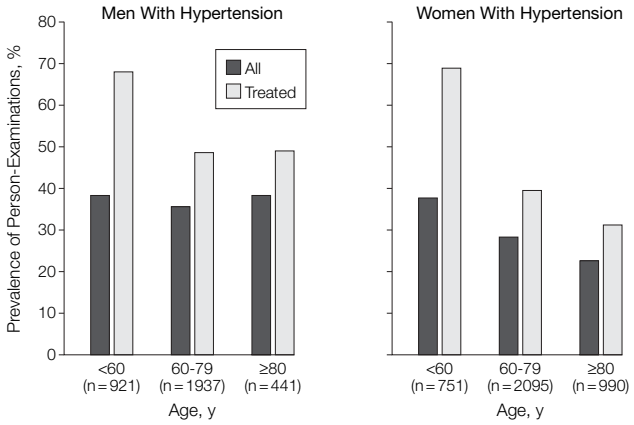
Figure 2. Prevalence of Use of Antihypertensive Drugs Among Treated Hypertensive Men (n=1833) and Women (n=2348) by Age Group



CCB, calcium channel blocker; ACE-I, angiotensin converting enzyme inhibitor; ARB, angiotensin II receptor blocker.
*Percentage of person-examinations of men and women aged 80 years or older using ARB is 0% and 0.1%, respectively.

Overall prevalence of control declined with advancing age, due entirely to substantially lower rates of control in older women, as shown in FIGURE 3. Among treated participants with hypertension, the overall prevalence of control of SBP to less than 140 and DBP to less than 90 mm Hg was 47.0%, with significantly lower rates of control with advancing age in both men and women.

Figure 3. Prevalence of Control to Goal Blood Pressure Among All Hypertensive and Treated Hypertensive Men and Women



Goal blood pressure systolic <140 mm Hg and diastolic <90 mm Hg. Differences across age groups are significant ($P<.001$) for treated men, all women, and treated women with hypertension.

Risks of Hypertension

The numbers of cardiovascular events during follow-up are presented in TABLE 2, stratified by age. The absolute rates and HRs for CVD end points during up to 6 years' follow-up, including major CVD events, major coronary heart disease events, and hospitalized congestive heart failure, are shown in TABLE 3. Compared with individuals with normal blood pressure, the *relative* risks (HRs) associated with hypertension increased with higher blood pressure levels within each age group, and they were at least as high among participants aged 80 years or older as among younger hypertensives. However, *absolute* rates of CVD were substantially higher among persons aged 80 years or older. Furthermore, absolute rates of CVD increased much more markedly with increasing blood pressure stage among persons aged 80 years or older compared with younger participants with hypertension.

When we analyzed outcomes by classifying blood pressure stage ignoring antihypertensive therapy, treated individuals were included among those with normal, prehypertension, and stage 1 hypertension categories. In this analysis, the absolute and relative risks for CVD outcomes increased in these lower blood pressure categories, whereas absolute and relative risks decreased in the highest blood pressure group (data not shown). In a separate analysis, we excluded treated participants with hypertension and examined outcomes only among those who were untreated. In this analysis, from which the highest-risk individuals were excluded, the findings were similar to those shown in Table 3 for the oldest age group, but absolute and relative risks were lower among younger hypertensive participants.

COMMENT

Principal Findings

In the current investigation of patterns of hypertension prevalence, treatment, control, and outcomes in the community in the decade of the 1990s and beyond, we observed the following: among those older than age 80 years, the prevalence of hypertension exceeds 70% and fewer than 10% have normal blood pressure levels; among the oldest par-

ticipants with hypertension, only 38% of men and 23% of women were controlled to blood pressure levels of less than 140/90 mm Hg; and among treated participants with hypertension in the oldest age group, 62% were receiving only one antihypertensive medication and only 23% of men and 38% of women were receiving a thiazide diuretic. With regard to outcomes, the relative hazards for CVD events associated with hypertension do not decline with advancing age and the absolute risks increase markedly, especially among the oldest participants with hypertension.

Clinical and Public Health Implications

With the aging of the population, the burden of hypertension is expected to increase significantly. The current data provide an important look at the status of hypertension in the oldest individuals. The very elderly group is one of the fastest growing segments of the US population.[1] Thus, urgent public health efforts are needed for patients and physicians to improve awareness of risks of hypertension at older ages, strategies and benefits of therapy, and importance of achieving blood pressure reduction, if possible to goal blood pressure levels.

As expected, we observed that persons aged 80 years or older had the greatest prevalence of hypertension. Whereas average DBP increases until approximately age 55 years and then decreases throughout the remaining lifespan, average SBP increases linearly with age until near the end of life.[15,23] Thus, elderly persons have a high incidence and prevalence of hypertension, which is overwhelmingly due to isolated systolic hypertension. It is rare to escape the development of hypertension with aging: even for individuals free of hypertension at age 65 years, the remaining lifetime risk of developing hypertension is approximately 90%.[24]

Individuals who are susceptible to CVD as a result of hypertension would be more likely to die or have CVD at younger ages, and therefore would have been excluded from our study sample. Nonetheless, we observed relative hazards for CVD that were similar among the oldest as among younger hypertensives. Given the similar relative and very high absolute risks among those aged 80 years or older, our data suggest that this group may have the most to gain from blood pressure reduction, even in the face of their shorter remaining lifespan.

Our results confirm that the risks for CVD associated with prehypertensive blood pressure levels (SBP 120-139 and/or DBP 80-89 mm Hg) are higher than for normal blood pressure levels (<120/<80 mm Hg).[25] Clinical trial data are needed in all age groups to determine whether aggressive lifestyle or other interventions can reduce CVD risk and also progression to hypertension.

Table 2. Number of Cardiovascular Events in Each Age Group

	Age, y		
	<60	60-79	≥80
Major cardiovascular events	90	408	336
Major coronary heart disease events	59	214	127
Hospitalized congestive heart failure	19	167	194

Table 3. Risk for Major Cardiovascular Events According to Age Group and Blood Pressure Category

	Age <60 y			Age 60-79 y			Age ≥80 y		
JNC 7 Stage	Events, %	Age- and Sex-Adjusted HR (95% CI)	Multivariate-Adjusted* HR (95% CI)	Events, %	Age- and Sex-Adjusted HR (95% CI)	Multivariate-Adjusted* HR (95% CI)	Events, %	Age- and Sex-Adjusted HR (95% CI)	Multivariate-Adjusted* HR (95% CI)
Major cardiovascular events									
Normal	0.7	1.0	1.0	2.9	1.0	1.0	9.5	1.0	1.0
Prehypertension	1.5	1.7 (0.9-3.1)	1.7 (0.9-3.1)	4.9	1.5 (1.0-2.5)	1.4 (0.9-2.2)	19.8	2.0 (1.0-4.0)	1.9 (0.9-3.9)
Stage 1	1.7	1.9 (0.8-4.2)	1.8 (0.8-3.9)	6.0	1.7 (1.1-2.9)	1.5 (0.9-2.5)	20.3	1.9 (1.0-4.0)	1.8 (0.8-3.7)
Stage 2 or treated	3.0	3.1 (1.6-5.8)	2.9 (1.5-5.5)	9.6	2.7 (1.8-4.2)	2.1 (1.4-3.3)	24.7	2.5 (1.3-5.0)	2.4 (1.2-4.6)
Major coronary heart disease events									
Normal	0.5	1.0	1.0	1.2	1.0	1.0	2.9	1.0	1.0
Prehypertension	0.8	1.0 (0.5-2.0)	0.9 (0.4-2.0)	2.4	1.8 (0.9-3.6)	1.6 (0.8-3.3)	7.4	2.4 (0.7-8.0)	2.0 (0.6-6.7)
Stage 1	1.2	1.4 (0.6-3.6)	1.3 (0.5-3.4)	3.3	2.3 (1.1-4.9)	2.1 (1.0-4.4)	5.9	1.8 (0.5-6.5)	1.5 (0.4-5.2)
Stage 2 or treated	2.2	2.4 (1.2-4.8)	2.2 (1.1-4.5)	5.0	3.4 (1.8-6.5)	2.7 (1.4-5.2)	8.5	2.8 (0.9-8.8)	2.2 (0.7-7.1)
Hospitalized congestive heart failure									
Normal	0.1	1.0	1.0	1.2	1.0	1.0	7.2	1.0	1.0
Prehypertension	0.3	2.0 (0.5-7.9)	1.8 (0.5-7.3)	1.3	0.9 (0.4-1.9)	1.0 (0.4-2.1)	9.2	1.2 (0.5-2.9)	1.1 (0.5-2.6)
Stage 1	0.5	2.9 (0.6-14.4)	2.5 (0.5-12.8)	1.7	1.0 (0.5-2.4)	1.2 (0.5-2.7)	8.0	1.1 (0.4-2.6)	0.9 (0.4-2.3)
Stage 2 or treated	0.5	2.3 (0.5-10.0)	1.8 (0.4-8.2)	4.0	2.0 (1.0-3.8)	2.6 (1.3-4.9)	13.9	1.9 (0.9-4.1)	1.7 (0.8-3.7)

Abbreviations: CI, confidence interval; HDL, high-density lipoprotein; HR, hazard ratio; JNC 7, the seventh report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure.
*Hazard ratio adjusted for age, sex, total/HDL cholesterol, current smoking, and diabetes.

Whether such a strategy would reduce CVD event rates among individuals with hypertension aged 80 years and older is unproven, and may be worthy of study in clinical trials in light of our findings.

Treatment

Significant controversy exists regarding the relative risk/benefit ratio of antihypertensive therapy for persons aged 80 years and older. Using data from the European Working Party on High Blood Pressure in the Elderly (EWPHE) study, Amery et al[26] suggested that drug treatment may be less effective or even harmful in patients with hypertension aged 80 years and older. Data from a pilot study suggested a 53% reduction in stroke but a 23% increase in risk for total mortality with antihypertensive therapy in persons aged older than 80 years.[27] A meta-analysis from the Individual Data Analysis of Antihypertensive intervention trials (INDANA) group[5] combined data on the subsets of individuals aged 80 and older from 4 major double-blind placebo-controlled trials: SHEP,[4] SHEP-pilot,[28] Syst-Eur,[7] and STOP-Hypertension.[3] Among the 1670 trial participants aged 80 years and older, active treatment compared with placebo was associated with a 34% reduction in stroke rates, 22% reduction in major CVD, and 39% reduction in congestive heart failure. There was a nonsignificant 6% increase in risk for all-cause mortality among treated participants compared with the placebo group.[5] Thus, as recently reviewed by Chaudhry et al,[29] currently available data suggest overall benefit for treatment in this age stratum, although data are weak for treatment of stage 1 hypertension. The Hypertension in the Very Elderly Trial, a large multicenter, placebo-controlled trial in hypertensive patients aged 80 and older, is ongoing, and is comparing initial diuretic therapy with initial ACE inhibitor therapy and placebo.[30] This trial should provide important, direct information regarding the benefits and risks of antihypertensive therapy in the oldest age group.

Perhaps due to the uncertainty regarding safety discussed previously, our data suggest major gaps in the implementation of antihypertensive therapies recommended by current clinical practice guidelines in the community. Individuals aged 80 years and older, and particularly women in this group, had the lowest rates of blood pressure control of any group. It appeared that poor control was due in part to lack of use of combination therapy and perhaps, to poor selection of drug classes. Despite a wealth of evidence suggesting that thiazide diuretics are the most cost-effective agents for blood pressure reduction,[31-33] and that they are particularly efficacious among the elderly,[4] we found overall low rates of thiazide use, particularly among men. We observed high prevalence of use of more expensive agents such as ACE inhibitors and other classes of drugs (eg, α-blockers), although data supporting their efficacy in older hypertensive patients are limited. Our findings confirm at the community level the trends that have been observed in national surveillance data and large databases regarding underuse of thiazides and preferential prescription of newer antihypertensive agents rather than thiazide diuretics.[34-37]

Control of blood pressure is more difficult to achieve when starting at a higher baseline blood pressure, as is often the case with older hypertensive patients. Clinicians may be reluctant to treat older patients as aggressively because of perceived lower benefits or possible increased risk of adverse effects. Nonetheless, the treatment principles recommended by JNC V (1993),[38] JNC VI (1997),[39] and JNC 7 (2003)[14,22] have been essentially the same for older as for younger hypertensive patients, including those with isolated systolic hypertension. JNC 7 recommends that for the elderly, physicians should start with low doses, add additional medications that can work synergistically at low doses, and gradually continue to increase doses and add medications to attempt to reach goal blood pressure levels.[14,22] In the recently completed Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT)[40,41] of antihypertensive therapies among hypertensive patients aged 55 years and older (mean [SD] age, 66.9 [7.7] years), two thirds of those who achieved goal blood pressure required 2 or more medications to do so, consistent with the findings of other studies. Among older hypertensive patients, achieving goal levels would be expected to require even more. Polypharmacy and medication expenses for the elderly are of great concern, but there are a number of inexpensive, highly effective, once-daily medications (including thiazide diuretics) that have proven efficacy at lowering blood pressure and reducing CVD events. There are also increasing numbers of combination pills available with variable doses of standard agents.

Limitations

Since the Framingham Heart Study original and offspring cohort participants are, with few exceptions, whites of European extraction, the generalizability of our findings to other racial groups may be limited. The prevalence of hypertension, however, is known to be higher among some other races, including African Americans.[11] The overall prevalence of blood pressure control we observed (32.4%) is almost identical to the 34% observed in the NHANES sample from 1999 to 2000,[2,11] suggesting that patterns in this community closely mirror national trends. We chose to classify blood pressure according to the current JNC 7 staging scheme in individuals examined in the 1990s. As several primary studies[25,42,43] have now documented extensively, there is a continuum of risk that increases linearly from normal blood pressure through prehypertensive levels to frank hypertension. Since we sought to define risk in the oldest group, we believe that using the current understanding of blood pressure risk to classify individuals is most appropriate. We may have underestimated the risks of CVD associated with hypertension, given that hypertensive participants (and particularly treated hypertensive participants) may have been more likely to receive other therapies designed to reduce CVD risk during follow-up (eg, statins). If there was age-related bias in such treatment, it may have skewed our results somewhat but

we did not directly compare hazard ratios across age groups. Thus, our results should provide a representative contemporary picture of prevalence, treatment, control, and risks associated with hypertension in the community.

Author Contributions: Dr Lloyd-Jones had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: Lloyd-Jones, Evans, Levy.
Analysis and interpretation of data: Lloyd-Jones, Evans, Levy.
Drafting of the manuscript: Lloyd-Jones.
Critical revision of the manuscript for important intellectual content: Lloyd-Jones, Evans, Levy.
Statistical expertise: Evans.
Administrative, technical or material support: Levy.
Study supervision: Lloyd-Jones, Levy.

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