The Relationship Between Health Status and Blood Pressure in Urban African Americans

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African Americans have higher rates of hypertension and poorer health status than their white counterparts. This study assessed the relationship between health status, cardiovascular risk factors, and measured blood pressure. Free blood pressure screenings were performed at businesses and organizations located in west Baltimore. All individuals with cardiovascular risk factors were offered health education. Also, participants with a measured blood pressure of ≥140/90 mm Hg were referred for free medical treatment. Participants completed a questionnaire that included demographics, cardiovascular risk factors, the Medical Outcomes Study SF 36, and two tests on cholesterol and heart disease knowledge. A total of 1389 African-American men and women were screened; 20% were found to have high normal blood pressure and 31% had stage 1 hypertension or higher. Those with hypertension reported lower physical functioning and poorer general health than those without high blood pressure. When compared with US normative data, participants reported higher levels in vitality and physical and emotional role functioning, more bodily pain, and poorer general health, but they were similar in physical functioning, social functioning, and mental health. Preliminary data suggest that hypertension does have an effect on health function. (*J Natl Med Assoc.* 1998;90:658-664.)

Key words: cardiovascular risk factors ◆ hypertension ◆ health status

African Americans suffer a disproportionate rate of hypertension than their white counterparts.[1-3] The prevalence of high blood pressure among African Americans is the highest in the world.[4] African Americans develop hypertension at a younger age and have on average higher blood pressure.[4] High blood pressure is one of the most significant risk factors for cardiovascular and renal disease.[5] Moreover, African Americans often receive treatment for their hypertension after a significant delay. This delay in treatment causes a longer duration of elevated blood pressure, which results in more target organ damage and hypertension-related morbidity and mortality.[4]

Lifestyle risk factors such as nutrition, smoking, and obesity contribute to the elevated blood pressure and risk of cardiovascular morbidity and mortality.[6,7] Although many of the differences in health have been attributed to the lifestyles of minority populations, many may be due to social conditions and poor access to quality health care.[8,9] Research indicates that excess risk of elevated blood pressure in African Americans may be derived from psychosocial factors emanating from socioeconomic disadvantage, discrimination, and stress.[10,11] Other proposed mecha-

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nisms include different beliefs or knowledge regarding health practices, lower access to and quality of medical care, more hazardous occupations and living environments, and genetic differences.[3,11-13]

Most authorities believe biologic differences do not account for black-white health status differences. Socioeconomic status is the most likely mediator between the relationship of race and health. Research suggests that the relationship between low socioeconomic status and increased mortality is strong and demonstrable across populations.[11-15] Kington and Smith[2] examined the relationships between wealth and income and selected racial and ethnic differences in those with hypertension, diabetes, cardiac disease, and arthritis. While African Americans reported poorer health functioning than whites, the relationship was eliminated by controlling for socioeconomic status.

This study examines the relationship of health status and cardiovascular risk factors of African Americans with and without high blood pressure. Hypertension is known as the "silent killer." It was expected that people with hypertension would have poorer health status (across all health domains), as well as more cardiovascular risk factors than those with normal blood pressure.

MATERIALS AND METHODS

Procedures

The Empowering Black Men to Access Care program performed free blood pressure and health status screenings at work sites, health fairs, and social/athletic organizations. Each participant was asked questions on demographics, health risk factors (such as height, weight, smoking, being sedentary, family history, etc), health status (SF 36),[16-18] and knowledge of cholesterol (Cholesterol Pursuit)[19] and heart disease (Healthy Heart IQ).[20] Height and weight were converted to the Quetelet body mass index (BMI) (kg/m^2), a widely used indicator for obesity. Additionally, blood pressure and resting pulse rate were measured. Individuals with measured hypertension $\geq$140/90 mm Hg were referred to community health education programs and medical treatment.

Health Status

The SF 36, derived from the original Medical Outcomes studies, is a generic assessment of health that taps into eight health concepts: general health perceptions, physical functioning, vitality, bodily pain, role limitations (physical and emotional), social functioning, and mental health.[16-18] Generic health measures refer to a broad concept of health that is not specifically targeted toward a particular disease and cover functioning, distress, and disability.[21] Among SF 36's advantages is that it is brief (5 to 10 minutes to complete) and self-administered, although it has been adapted for telephone and personal interviews. The SF 36 has been shown to have moderate-to-strong correlations with other health status scales such as the Nottingham Health Profile (−.18 to −.68) and the Sickness Impact Profile (physical functioning −.67 to −.78; mental health −.42 to −.70).[16]

Knowledge of Cholesterol and High Blood Pressure

The National Heart, Lung, and Blood Institute (NHLBI) developed both Cholesterol Pursuit[19] and Healthy Heart IQ.[20] These scales were used as a self-assessment test for community residents to gauge their knowledge of cholesterol and heart disease. These scales have been typically used during NHLBI's National Cholesterol Education Month (September) and American Heart Month (February). Both scales require the respondent to read a series of statements (Cholesterol Pursuit has 10 items and Health Heart IQ has 14 items) and determine if the statement is true or false. Both tests are scored as the percent correct. The correct answer for each question is printed on the back of the form along with a short explanation.

Sample

Individuals were screened at work sites, social organizations, and health fairs. For businesses and social organizations, the screening was scheduled in advance, and with the employer's sanction and support, all employees were encouraged to participate. The intended target population for this study was African-American males between 18 and 65 years of age who lived or worked in west Baltimore communities. The target communities that comprise these catchment areas have a mixture of socioeconomic levels ranging from lower to middle class and are 83% African American based on 1990 Census information. Although the focus was on African-American males, anyone wishing to be screened was evaluated.

Analysis

A total of 1537 people were screened in the pro-

Table 1. Blood Pressure by Demographics

	% (No.) Normal Blood Pressure (n=953)	% (No.) High Blood Pressure* (n=436)
Gender		
Men	67 (640)	76 (330)†
Women	33 (313)	24 (106)
Age (mean±SD)	37.3±12.2	45.1±12.4‡
Education		
<High school graduate	23 (202)	27 (107)
High school graduate	58 (507)	53 (210)
College	19 (166)	20 (77)
Marital Status		
Never married	51 (470)	38 (159)§
Married	24 (216)	34 (143)
Divorced	11 (105)	15 (62)
Separated	8 (71)	8 (32)
Widowed	2 (19)	4 (16)
Co-habitating	4 (38)	3 (12)
Insurance		
No	48 (436)	44 (184)
Yes	52 (474)	56 (230)

*Stage 1 or higher.
†$\chi^2(1)=10.34$, $P=.001$.
‡$t(1368)=-10.95$, $P=.000$.
§$\chi^2(5)=29.83$, $P=.000$.

gram. This analysis focuses only on African-American men and women (1389 or 90% of the sample). In the analysis, chi-square (χ^2) was used to assess relationships between categorical variables and Student's *t*-tests were used for continuous variables. The focus of this analysis was to assess differences between those with hypertension and those with normal blood pressure.

RESULTS

Demographics

Most (70%) of the participants were men. Almost half (45%) were never married, while 26% were currently married. About half (51%) had graduated from high school and had some form of medical insurance (51%).

Hypertensive Participants

Half of the participants had elevated blood pressure: 279 (20%) had high normal blood pressure and 437 (31%) had stage 1 or higher hypertension (21% stage 1, 7% stage 2, 2% stage 3, and 1% stage 4). Men were more likely to have high blood pressure than women ($P=.001$), and individuals with hypertension were older than those with normal blood pressure (45 years compared with 37 years, $P=.000$) (Table 1). Those with hypertension were more likely to be married ($P=.000$); however, no differences were found by education or insurance status.

Risk Factors

Nearly half (48%) of the individuals with measured high blood pressure did not know they had hypertension (Table 2). That is, these individuals represented new or previously undetected cases of hypertension. Moreover, 52% of those with known hypertension were not under control at the time of the screening. Compared with those with blood pressure within the normal range, individuals with high blood pressure had higher resting pulses (76.8 beats per minute compared with 73.2 beats per minute, $P=.000$) (Table 2). Those with hypertension had a higher incidence of obesity than those without high blood pressure: those with normal blood pressure had an average BMI of 25.8±4.5 and those with high blood pressure had an average BMI of 28.2±5.3 ($P=.000$). A BMI of 28 for men is considered to be a clinical cut-off for obesity (25% body fat).

Table 2. Blood Pressure by Risk Factors

	% (No.) Normal Blood Pressure (n=953)	% (No.) High Blood Pressure* (n=436)
Body mass index (mean±SD)	25.8±4.5	28.2±5.3†
Pulse (mean±SD)	73.2±9.7	76.8±11.7‡
Told have high blood pressure		
No	83 (750)	48 (200)§
Yes	17 (152)	52 (215)
Told have diabetes		
No	97 (868)	92 (375)‖
Yes	3 (24)	8 (33)
On special diet		
No	93 (790)	89 (314)¶
Yes	7 (56)	11 (43)
Know cholesterol level		
No	93 (804)	93 (368)
Yes	7 (62)	7 (29)
Have a family physician		
No	57 (492)	54 (208)
Yes	43 (368)	46 (181)
Smoking		
No	62 (552)	57 (234)
Yes	38 (342)	43 (177)
Exercise		
No	44 (384)	53 (213)**
Yes	56 (496)	47 (190)
Family history (yes only)		
High blood pressure	59 (566)	65 (282)
Heart disease	20 (191)	19 (81)
High cholesterol	13 (122)	11 (48)
Stroke	18 (172)	20 (89)
Renal failure	4 (38)	5 (20)
Diabetes	30 (290)	30 (131)

*Stage 1 or higher.
†$t(1268)=-8.37$, $P=.000$.
‡$t(1220)=-5.58$, $P=.000$.
§$\chi^2(1)=172.8$, $P=.000$.
‖$\chi^2(1)=19.46$, $P=.000$.
¶$\chi^2(1)=7.26$, $P=.007$.
**$\chi^2(1)=9.44$, $P=.002$.

Fewer people with high blood pressure (47%) exercised compared to those with normal blood pressure (56%) ($P=.002$). More people with hypertension reported that a physician told them they had diabetes mellitus (10%) compared to those with normal blood pressure (3%) ($P=.000$). Slightly more people with hypertension were on a special diet ($P=.007$). There were no differences between normotensive and hypertensive individuals with regard to the number who currently smoked, knew their cholesterol level, and had a family physician.

Family Risk Factors

Individuals with and without high blood pressure reported similar family histories with cardiovascular and related diseases (hypertension, heart disease, high cholesterol, stroke, renal failure, and diabetes) (Table 2).

Table 3. Blood Pressure by Knowledge of Cholesterol and Heart Disease

	% (No.) Normal Blood Pressure (n=953)	% (No.) High Blood Pressure* (n=436)
High blood pressure symptoms		
No symptoms	28 (170)	30 (90)
Headache	29 (176)	30 (91)
Dizziness	25 (150)	25 (75)
Fatigue	4 (26)	3 (10)
Other	4 (25)	4 (12)
Combination of above	10 (59)	9 (26)
Cholesterol Pursuit Scores		
% correct (mean±SD)	56.6±20.4	56.8±21.5
Health Heart IQ scores		
% correct (mean±SD)	70.1±13.7	72.7±12.7†

*Stage 1 or higher.
†$t(758)=-2.44$, $P=.015$.

Knowledge

Participants were asked about their knowledge of high blood pressure symptoms. Similar percentages of the participants believed that hypertension either had no discernable symptoms or that the first sign of high blood pressure was a headache or dizziness (Table 3). Participants were fairly knowledgeable about heart disease, scoring 70% of the answers correct on the Healthy Heart IQ. Individuals with hypertension scored slightly better (72.7%) on the Health Heart IQ compared to those with normal blood pressures (70.1%, $P=.015$). However, participants were less knowledgeable about cholesterol; the percentage of correct responses was 57% on the Cholesterol Pursuit quiz. No differences were found between those with and without hypertension.

Health Status

The internal reliability (Cronbach's alpha)[22] of the SF 36 subscales ranged from .40 to .93: physical functioning (.93), social functioning (.40), physical role functioning (.80), emotional role functioning (.81), mental health (.66), vitality (.58), bodily pain (.69), and general health (.61). Participants with high blood pressure were similar to those with blood pressure in the normal range in their physical and emotional role functioning, vitality, social functioning, mental health, and bodily pain (Table 4). Individuals with high blood pressure had slightly lower physical functioning than those without high blood pressure ($P=.003$). Moreover, those with high blood pressure evaluated their general health as poorer than those without high blood pressure ($P=.001$).

Compared with US normative data,[16] the sample was similar on three of the subscales: physical functioning, social functioning, and mental health (Table 4). Participants reported higher levels in vitality and physical and emotional role functioning, more bodily pain, and poorer general health.

DISCUSSION

Individuals with measured hypertension were found to be different compared with normotensive individuals. These hypertensive individuals were more likely to be male, older, married, obese and less likely to exercise, and have a higher resting pulse rate and diabetes. Many of these are well-known risk factors for hypertension. With regard to health status, only two domains discriminated between the two groups: physical functioning and general health.

Hypertensive individuals had slightly lower levels of physical functioning and had poorer general health. That is, those with hypertension reported experiencing difficulty in accomplishing daily tasks. Health domains that would indicate the other debilitating effects of a chronic disease (ie, role functioning, vitality, and bodily pain) were similar between the two groups, although reporting poorer overall general health may be an early indicator of dysfunction. Thus, hypertension does not dramatically disrupt an individual's health functioning until a hypertension-related disease occurs (ie, stroke, myocardial infarction, or renal failure). Furthermore, this sample compared favorably with US normative data,

Table 4. Comparing the Health-Related Quality of Life of Individuals from the General Population with Participants in a Hypertension Screening Program

	General US Population* (n=2474)	Normal Blood Pressure (n=953)	High Blood Pressure† (n=436)
Medical Outcomes Study SF 36‡			
Physical functioning	84.1±23.3	88.1±21.2	84.1±23.7§
Social functioning	83.3±22.7	82.4±20.2	82.5±19.5
Role functioning–physical	81.0±34.3	90.0±23.4	88.8±25.7
Role functioning–emotional	81.3±33.0	84.9±30.5	87.9±28.5
Mental health	74.7±18.0	74.2±15.1	74.4±15.4
Vitality	61.0±21.0	66.2±17.3	67.1±16.3
Bodily pain	75.1±23.7	67.3±30.2	65.6±30.5
General health	72.0±20.3	65.3±16.6	61.8±16.1‖

*Normative data drawn from Ware, et al 1993.
†Stage 1 or higher.
‡Only differences between normal blood pressure and high blood pressure groups were assessed.
§$t(1166)=2.95$, $P=.003$.
‖$t(1254)=3.45$, $P=.001$.

although they reported more bodily pain and poorer general health, as well as slightly higher physical and emotional role functioning.

Valid and reliable health status measures could improve the health monitoring of the general population.[23] Standardized health status measures can be used to establish norms, evaluate core elements of health-care policy, assess alternative treatment protocols in clinical trials, and monitor health-care outcomes in clinical settings (eg, assessing functional problems, monitoring disease progression, and assessing quality of care).[24] The SF 36 has been used extensively to examine health status in patients with various medical conditions. Stewart et al[25] compared patients with chronic diseases such as diabetes, hypertension, congestive heart failure, myocardial infarction, arthritis, chronic lung problems, gastrointestinal problems, back problems, and angina with patients having no chronic conditions and found that hypertension, unlike other chronic conditions, did not have a negative effect on functioning and well-being. In contrast, a more recent study by Lawrence et al[26] indicated that individuals with self-reported hypertension (adults 45 to 89 years old) had slightly poorer health scores on the SF 36. The major difference between the studies is that Stewart et al[25] examined a diverse patient sample, while both Lawrence et al[26] and this study assessed African-American samples.

Health status is being used to develop policy and direct medical practice at the individual and systemic level. It is essential that these measures are reliable and valid across a diverse patient population. This diversity should not only reflect disease states, but also socioeconomic status as well. Thus, health status measures should be interpretable and comparable across a wide spectrum of patient populations. The study found that the SF 36 had fair to good internal reliability depending on the subscale. The Cronbach's alpha ranged from .40 to .93. The best reliability was found with physical functioning, physical role functioning, and emotional role functioning, while mental health, bodily pain, general health, and vitality scales were moderate. The poorest subscale was social functioning.

CONCLUSION

These data suggest that there are some early indications that hypertension does affect a person's physical functioning and general health. Moreover, the SF 36 appears to be appropriate for use in young to middle-aged African-American males. However, there were differences in functioning (such as physical role functioning, vitality, bodily pain, and general health) between the general US population and this sample that need further exploration. It is uncertain whether these differences are due to the instrument itself, which may require the SF-36 to be modified for African-American populations, or if it reflects a real difference in health status.

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