# KNOWLEDGE, ATTITUDES, BELIEFS, AND BLOOD PRESSURE CONTROL IN A COMMUNITY-BASED SAMPLE IN GHANA

Cardiovascular disease, in particular hypertension (HTN), is a significant and growing public health problem in developing countries, such as sub-Saharan Africa. As such, it is imperative to develop a public health approach to the management and treatment of hypertension. In order to address the growing prevalence of hypertension in this region, an in-depth understanding of patients' knowledge, and awareness about the treatment and prevention of hypertension is needed. As part of a faith-based medical clinic in the Sekondi-Takoradi area in Ghana, we conducted a cross sectional survey of 1135 patients who attended a free medical clinic between March 2001 and March 2002, to assess the prevalence, awareness, knowledge, and treatment of HTN. Using qualitative methodology, we also explored patients' beliefs about hypertension and its consequences. Of the 1135 patients, 30% were hypertensive (and 62% of these had Stage II hypertension), 73% were aware of their diagnosis, 59% were being treated, and only 5% had adequate blood pressure (BP) control defined as blood pressure <140/90 mm Hg. Patients with hypertension were typically older (average age was 61 vs 42 for normotensives), obese (30% had a BMI  $\geq$  30) and not physically active (65%). These findings resemble trends noted in developed countries. Results of the gualitative interviews indicated that patients had several misconceptions about hypertension that were not consistent with a traditional biomedical model. For example, one person defined high blood pressure as having "too much blood in the body." In collaboration with the Ghana ministry of health we plan to utilize the findings of this study to develop a community-based educational program that will provide culturally competent patient education about hypertension, with a particular emphasis on the misconceptions about the etiology of hypertension and its associated complications. (Ethn Dis. 2005;15:748–752)

Key Words: Attitudes, Beliefs, Ghana, Hypertension, Knowledge

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### BACKGROUND

Historically, the reported prevalence of hypertension in rural African communities has been relatively low, ranging from 2% to 13%.<sup>1-3</sup> More recently, studies have revealed that hypertension is on the rise with prevalence rates approximating 28%.<sup>4,5</sup> This rate is comparable to that noted among African Americans<sup>6</sup> and represents a substantial rise in the reported prevalence of hypertension in sub-Saharan African countries. This rising rate of hypertension parallels increasing rates of obesity globally. This trend has been directly linked to unhealthy diets and physical inactivity as leading causes of noncommunicable diseases, including cardiovascular disease, and contributes substantially to the global burden of disease, death and disability.<sup>7,8</sup>

Research by Amoah et al demonstrated that 33% of hypertensive patients in Ghana were aware of their diagnosis, 18% were treated, and 4% had adequate blood pressure (BP) control.<sup>4</sup> Possible explanations for these low numbers may reflect the complex relationship between patients, providers, and economic resources in this part of the world. For example, patients may lack knowledge about hypertension, or they may harbor beliefs that are discordant with those of the traditional medical paradigm regarding the treatment and causes of hypertension.9 Providers may have insufficient time and resources to provide the necessary

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education and treatment, given that healthcare resources in these countries have been historically used for infectious diseases such as malaria and tuberculosis rather than chronic conditions such as hypertension.

One practical and cost-effective approach to improving the management of hypertension in sub-Saharan African countries is to address patient-centered factors such as knowledge and health beliefs. We conducted a study in collaboration with the Ghana Health Mission (GHM) to evaluate the health needs of community residents in Sekondi, Ghana. The objectives of this study were to assess the prevalence, knowledge, awareness, and treatment of hypertension among communitydwelling residents who attend a free health clinic and to qualitatively explore the meaning of hypertension and its consequences among these residents.

#### **METHODS**

A monthly blood pressure clinic was established at the GHM to treat and monitor a group of patients with hypertension. Each patient is expected to return monthly for follow-up for blood pressure levels and attend the two

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sessions for re-evaluation and an additional supply of medication. Throughout the year, the clinic is overseen by a local healthcare provider who corresponds regularly with the executive board members on the progress of patients.

#### Population, Setting, and Data Collection

The study was conducted during two of the established GHM clinic sessions from March 2002 to March 2003. Patients were predominantly from the Sekondi-Takoradi area, adjacent communities referred to as the "twin cities," with a combined population of 400,000 (the third largest city in Ghana). Patients were eligible for inclusion in the survey if they were aware that they had hypertension, if they were currently receiving treatment for hypertension, or had BP  $\geq 140/90$  mm Hg on two consecutive readings. Patients who were unable to provide verbal consent were excluded from the study. Verbal rather than written consent was obtained from patients because of the high level of illiteracy in this community. A total of 100 patients were enrolled in this study. Approval for this study was obtained from the Weill Medical College of Cornell University and the New York-Presbyterian Hospital Institutional Review Board for Human Research. In addition, the board of the GHM granted approval for the participation of its members and access to the clinic site. The local Ministry of Health in Ghana was also in support of the study.

### Cross Sectional Survey

Blood pressure, weight, and height were measured on all patients as part of the standard clinic triage. Two blood pressure readings were obtained with a mercury sphygmomanometer while patients were seated with their arm at a 90-degree angle; a small or large cuff was used depending on appropriate fit. Readings were based on Korotkoff first- and fifth-phase sounds. Patients' weights were measured on a locally purchased standard scale in kilograms rounded to the nearest 1 kg. Height was measured in inches to the nearest 0.5 inch by using a measuring tape attached to the wall (patients were asked to remove their shoes before each measurement). Patients' body mass index (BMI) was computed by using the standard formula: BMI=weight (kg)/ height  $(m)^2$ . Overweight was defined as having a BMI  $\geq$ 25 and obesity was a BMI  $\geq$ 30. Patients were offered cholesterol screening obtained with a fingerstick on a portable cholesterol meter (Accu-check Instant Plus #976, Roche Diagnostics).

A standardized questionnaire was administered in a semistructured, faceto-face interview with the assistance of an interpreter when needed. The questionnaire obtained information on basic demographics, such as education and marital status, tobacco use, and general health status. Patients' beliefs about hypertension were assessed by asking them whether they thought salt, being overweight, exercise, tobacco, or alcohol each had an effect on high blood pressure. If patients responded yes, then they were asked whether it raised or lowered blood pressure. In addition they were asked, "Do you think hypertension can be cured?"

### Qualitative Interviews

Individual interviews were conducted with each patient by using an open-ended format.<sup>10,11</sup> Patients were asked the following questions:

- 1) What does high blood pressure mean to you?
- 2) People explain their illnesses in many different ways, what do you think has caused your high blood pressure?
- 3) What does high blood pressure do to you? How does it affect your body?
- 4) What do your fear most about high blood pressure?

5) Are there any consequences from having high blood pressure?

Patients' responses were recorded verbatim in field notes.

# DATA ANALYSIS

### **Cross-Sectional Survey**

Patients were categorized as hypertensive if they reported a prior diagnosis of hypertension, if they were receiving treatment for hypertension, or if they had an elevated BP ( $\geq 140/90$  mm Hg) at the clinic on two separate occasions. Blood pressure was further classified into prehypertension, stage I, and stage II according to JNC-7 criteria.<sup>6</sup> Standard univariate descriptive statistics were used to describe the study sample. The Student *t* test was used to compare continuous variables between patients with hypertension and those without. Chi-square tests were used to compare categorical variables. All reported probability values were two-tailed, and values of  $P \leq .05$  were considered significant. Analyses were computed by using SPSS 11 statistical package (SPSS software version 11, SPSS Inc. Chicago, Ill).

### **Qualitative Analysis**

Patients' responses to the openended questions were analyzed by using standard qualitative research techniques.<sup>11</sup> Interview notes were read multiple times and responses coded into recurring concepts, which were then sorted and grouped into categories of similar content. At the point of data saturation, when no new concepts emerged on analysis of additional responses, the identified categories were labeled and the themes uniting them identified. To address issues of reliability, two of the authors analyzed the data independently (JS and EP), and differences in categories and themes generated from the analysis were resolved by discussion.

	n	%	$P(\chi^2)$
Gender			
Men	78	23	.338
Women	265	77	
Age, y			
18–34	5	2	.000*
35-54	87	25	
55-74	203	59	
$\geq 75$	48	14	
Body mass inde	x, kg/m <sup>2</sup>		
Normal	128	37	.000*
Overweight	114	33	
Obese	101	30	

### RESULTS

#### Cross-Sectional Survey

A total of 1135 patients were seen in the clinic during the 12-month study period. The overall mean age of the patients was 48 years, and 76% were female. Thirty percent were not working (unemployed, retired, homemaker, or student). Among those individuals who were working, 30% were traders, 11% worked in the fishing and agricultural industry, and 7% were employed in personal services (eg, hairdresser). The mean systolic blood pressure was 134 mm Hg ( $\pm$ 33), and the mean diastolic blood pressure was 79 mm Hg  $(\pm 18)$ . When patients were classified according to JNC-7 criteria, 31% were normotensive, 39% had pre-hypertension, and 30% were hypertensive; 62% of hypertensive patients had stage II hypertension. Normotensive patients were younger (42 vs 61 years), had a lower BMI (24 kg/m<sup>2</sup> vs 27 kg/m<sup>2</sup>), and were more likely to be working (74% vs 64%) compared to patients with hypertension (all values significant at P<.05).

Among those with hypertension, no difference was seen in rates between men and women. The prevalence of hypertension increased with age and BMI. Rates were highest in those aged 55–74 years (59%) and those with BMI

Table 2. Characteristicstensive survey patients ( $N$ =	of hypeı =100)
Marital status, %	
Married	40
Never married	10
Divorced	26
Widowed	19
Highest level of education, %	
No formal education	45
Primary school	28
Secondary school	17
College/technical	8
General heath status, %	
Very good	13
Good	21
Fair	62
Poor	3
Health compared to age	
counterparts, %	
Very good	14
Good	39
Fair	46
Cholesterol (mg/dL), %	
≤200	76
>200	5
Smoked tobacco	2
Reported any level of physical exercise, %	35

 $\geq$  30 kg/m<sup>2</sup> (30%). The lower rate of hypertension in the age group 75 and older is most consistent with the shorter life expectancy of this population (Table 1). A subgroup (*n*=100) of patients with hypertension were questioned about their awareness of their diagnosis and treatment plan and basic knowledge questions about hypertension. Characteristics of the subgroup are shown in Table 2. The mean age of the group was 63 years, 68% were female,

40% were married, and 45% had no formal education. Most of these patients reported fair general health (62%). Few people smoked tobacco (2%), and one third reported engagement in any daily physical activity. While more than half of the group was overweight or obese, 5% had a cholesterol level >200 mg/ dL. As shown in Table 3, the awareness of hypertension in this group of patients was high (73%). Among those who knew they had high blood pressure, 59% were treated and 5% were controlled (SBP <140 and DBP <90). As with awareness, the knowledge of hypertension was high in this group of patients. More than 50% knew that salt, being overweight, smoking tobacco, and drinking alcohol had a negative effect on BP, and almost 40% recognized the beneficial effect of physical activity on BP.

#### Qualitative Analysis

A more detailed understanding of each patient's knowledge and attitudes about hypertension was revealed in the qualitative segment of the interview. In response to the question, "What does high blood pressure mean to you," many patients reported physical characteristics, such as rapid heart rate, increased blood volume, and symptoms of headache or fatigue. Other patients reported no knowledge of the disease. When asked about what they thought caused high blood pressure the following concepts emerged: 1) daily life

Table 3.	Awareness and	knowledge of	hypertension	among survey	patients
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Items	%
Aware of high blood pressure	73
Aware, treated	59
Aware, treated, controlled	5
Do any of the following have an affect on high blood pressure?	
Salt raises blood pressure	68
Being overweight raises blood pressure	50
Exercise lowers blood pressure	39
Tobacco raises blood pressure	67
Alcohol raises blood pressure	64
Do you think it (hypertension) can be cured?	
Yes	58

stressors, 2) traumatic life events, 3) comorbid health conditions, and 4) behavioral factors.

Regardless of individual belief about the cause of hypertension, almost all patients reported various physical symptoms that hypertension caused. These symptoms included joint pain, dizziness, and headaches. These symptoms played a major role in the concepts that emerged in response to the question, "Are there any consequences from having high blood pressure?" Patients described how symptoms negatively affected them by restricting activities; some felt that hypertension symptoms were a sign that death was imminent. However, several patients reported that hypertension had no long term effects.

Lastly, the concept of control over adverse consequences was represented by patients' beliefs that medications and nonpharmacologic approaches such as diet and exercise could prevent longterm sequelae of high blood pressure.

# DISCUSSION

We assessed the prevalence, awareness, knowledge, and treatment of hypertension among a communitybased sample of residents who attended the GHM free medical clinic in the Sekondi-Takoradi area of Ghana. Our results indicate that 30% of residents were hypertensive, and 39% were prehypertensive. This prevalence is comparable to other community-based studies conducted in West Africa<sup>4,5</sup> and underscores the importance of hypertension as a major cause of morbidity and mortality in Ghana.<sup>14–16</sup>

In contrast to findings in Ghana and other developing countries,<sup>13,17–19</sup> the rates of hypertension awareness and treatment in our study were high (73% and 59%, respectively). This finding may reflect the presence of the GHM hypertension clinic as well as the proximity of local and regional hospitals in the Sekondi-Takoradi area. However, Our results indicate that 30% of residents were hypertensive; 39% were prehypertensive.

in spite of this we found similar low rates of blood pressure control (5%). These low rates of control warrant further investigation, given the high prevalence of hypertension in these communities. While potential reasons for such low rates of hypertension control have been well outlined by Amoah<sup>4</sup> we propose that another barrier to BP control is patients' beliefs about hypertension.<sup>20–22</sup>

Our findings reveal that patients' beliefs were mostly discordant with the traditional medical paradigm of hypertension. For example, patients believed that high blood pressure was secondary to having "too much blood in the body," and they attributed a considerable number of physical ailments, such as joint pain, to the diagnosis of hypertension. In addition 58% of patients reported that hypertension was curable, which represents a misconception that high blood pressure is an acute condition rather than a chronic condition requiring lifelong treatment. This perception could affect compliance with long-term use of antihypertensive medication. These misconceptions could explain the disparately lower rate of hypertension control noted in our study population (5%), despite a high rate of awareness (73%) and treatment (59%). Previous studies have shown BP control to be closely linked to patients' beliefs, ie, patients whose beliefs are discordant with traditional biomedical concepts of hypertension have poorer BP control than those whose beliefs are concordant with the biomedical paradigm.<sup>22-26</sup> In one study, patients whose beliefs corresponded to the biomedical model were twice as likely to have their BP controlled compared to patients whose beliefs did not correspond.<sup>22</sup>

Our study had several limitations. First, the burden of disease may be greater in this self-selected group of patients who were aware of the activities of the GHM and came seeking health care. This fact may in part explain the high level of awareness and hypertension treatment noted in our study. Second, during the interviews, some information may have been lost in the process of translation. Words such as "cure" do not have a direct correlation in the Ghanaian dialect and thus may have led to misinterpretation. Thirdly, because of staffing limitations, we were only able to interview approximately one third of the hypertensive patients in our clinic population.

To our knowledge this study is the first to explore patients' beliefs about hypertension and its treatment in sub-Saharan Africa. In collaboration with the Ghana ministry of health we plan to use the findings of this study to develop a community-based educational intervention that will form part of the GHM annual sessions. Our goal is to provide culturally competent patient education about hypertension, with emphasis on misconceptions about the etiology of hypertension and its associated complications. In addition, we will focus on nonpharmacologic approaches to BP management such as increased physical activity, low sodium diet, and weight loss.

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- Design and concept of study: Spencer, Ogedegbe
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- Data analysis and interpretation: Spencer, Ogedegbe, Phillips
- Statistical expertise: Phillips, Ogedegbe
- Acquisition of funding: Spencer
- Administrative, technical, or material assistance: Spencer
- Supervision: Spencer