

HYPERTENSION PREVALENCE AND KNOWLEDGE ASSESSMENT IN RURAL HAITI

Objective: Hypertension is an important risk factor for cardiovascular disease throughout the world. Little is known about the prevalence of hypertension in rural Haiti. Our study aims to estimate prevalence and knowledge of hypertension in Northern Haiti.

Design: Cross-sectional.

Setting: Four rural communities surrounding Milot, Haiti.

Participants: Participants (69 males, 106 females, 175 total) were eligible to take part if they were aged >18 years and not pregnant. Enrollment was voluntary.

Methods: Two initial blood pressure measurements were taken for each participant. Participants who had an average systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg were instructed to return in 1 week for two additional confirmatory measurements. Based on these measures, participants were classified as either hypertensive or not. All participants were surveyed to assess their knowledge of hypertension.

Results: The prevalence of hypertension among the study sample was 36.6%. Overall, 47% of women and 21% of men were hypertensive. Approximately 30% of women of reproductive age (18–39 years) were hypertensive. Participants showed little knowledge of the asymptomatic nature of hypertension and the need for lifelong treatment.

Conclusions: Hypertension is prevalent in Haiti. The high prevalence of hypertension among women of reproductive age is a concern since it is a risk factor for cardiovascular disease. Lack of knowledge surrounding hypertension indicates low awareness of the condition and is a possible target for future educational interventions. (*Ethn Dis.* 2014; 24[2]:213–219)

From Tufts University Department of Public Health and Community Medicine, Boston (LP, AS, JS, JF); and Department of Emergency Medicine St. Elizabeth's Hospital, Boston (MP); and Hôpital Sacré Coeur, Milot, Haiti (HP).

Address correspondence to Janet E. Forrester, PhD; 36 Harrison Avenue; Boston, MA 02111; 617.636.2978; 617.636.3810 (fax); janet.forrester@tufts.edu

Logan Pierce, BA; Alexander Shannon, BA; Julian Sonnenfeld, BA; Mark Pearlmuter, MD; Harold Previl, MD; Janet E. Forrester, PhD

Key Words: Hypertension, Haiti, Blood Pressure, Knowledge, Caribbean, Cardiovascular Disease, Awareness

INTRODUCTION

According to the World Health Organization (WHO), over 80% of cardiovascular disease (CVD) deaths take place in low- and middle-income countries.¹ However, high quality data on the prevalence of risk factors for CVD are still lacking in many countries.² Specific data on the prevalence and awareness of risk factors at the local level are needed to develop and implement CVD prevention programs. One of the most common risk factors for CVD is hypertension.³ Several studies of hypertension have been conducted in the Caribbean region (Barbados, Jamaica, and St. Lucia), although few have been conducted in Haiti.^{4,5} In 2004, 70% of CVD admissions to the Haiti State University Hospital were associated with hypertension,⁶ suggesting that hypertension is an important contributor to CVD in Haiti. Therefore, the purpose of our study was to determine the prevalence of hypertension, as well as to evaluate knowledge and awareness of hypertension in a Haitian community. This study was conducted in the area surrounding the town of Milot located in the Northern Department of Haiti.

METHODS

Study Population and Recruitment

Milot is a small town in Northern Haiti located 20 km southeast of Cap Haitien. It has a population of approximately 25,000 people and is surrounded by small agrarian communities. This study took place during June and July

2012. Participants were eligible to take part if they were aged >18 years and not pregnant. Enrollment was voluntary and records were kept confidential. Recruitment of participants was done with the help of local officials and community health care workers. All eligible participants were included. All participants gave oral informed consent; this study was approved by the Institutional Review Board of the Tufts Medical Center/Tufts University School of Medicine.

Overview of Study Visits

Following informed consent procedures, participant blood pressure was taken following the process described below. If the participant was found to have a high average blood pressure, he or she was asked to return for a second visit one week later at which time two more blood pressure readings were taken, and a second average blood pressure was calculated. Figure 1 shows the flow of the study visits.

Determination of Blood Pressure

Brachial blood pressure readings were taken on the right side with a manual blood pressure cuff while participants were seated with both feet on the ground. An average of two blood pressure readings taken at least five

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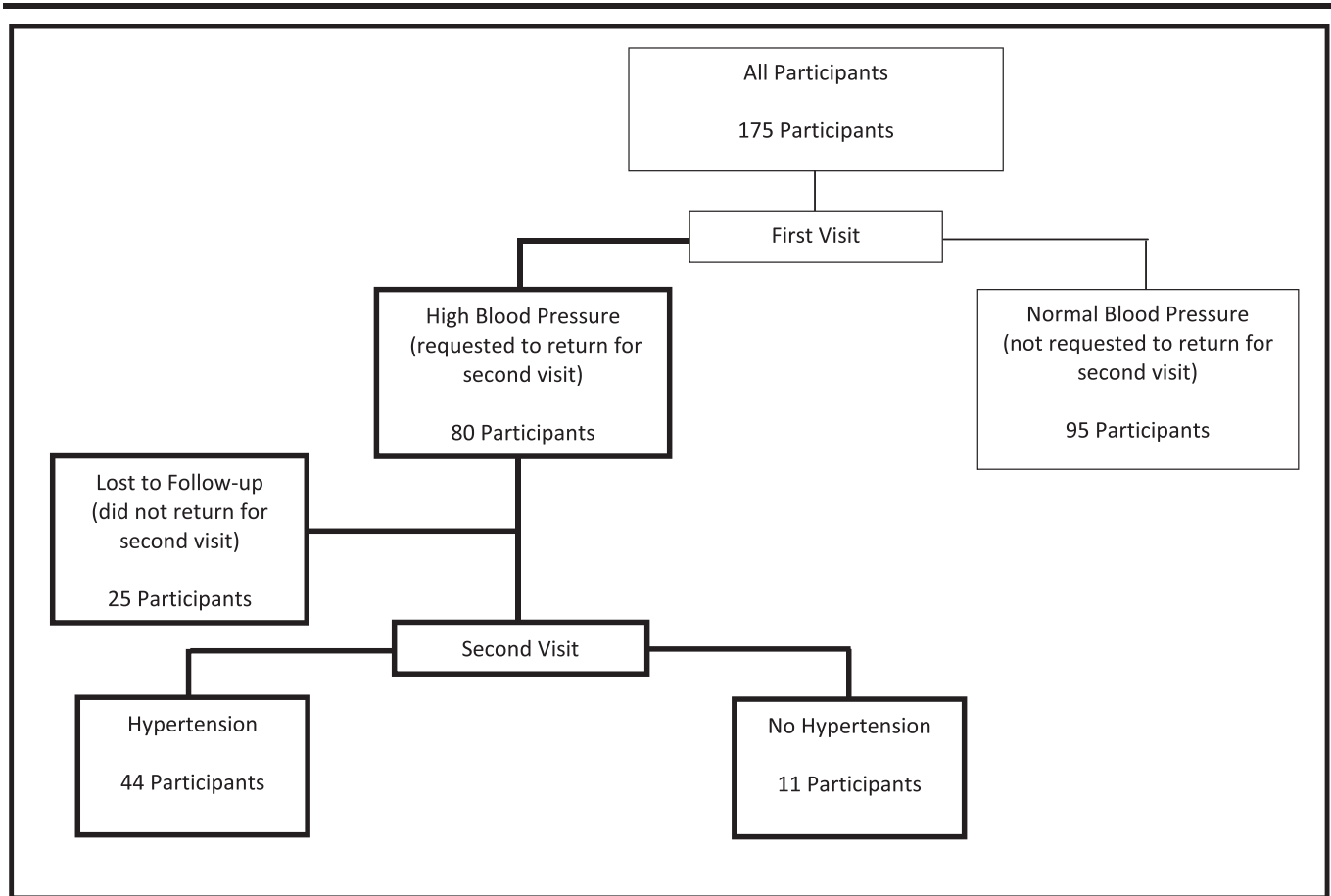


Fig 1. Overview of study visits

minutes apart determined the participant's blood pressure at that visit. If the participant had, based on these two readings, an average systolic blood pressure (SBP) ≥ 140 mm Hg or average diastolic blood pressure (DBP) ≥ 90 mm Hg at the first visit, the participant was asked to return in one week for another two blood pressure readings. The presence of hypertension was defined as an average SBP ≥ 140 mm Hg or an average DBP ≥ 90 mm Hg at each of two visits at least one week apart (ie, high blood pressure at both visits). This definition is in accordance with the JNC guidelines.⁷

Participants with an average SBP < 140 mm Hg or DBP < 90 mm Hg at the first visit were told they had normal blood pressure.

Counseling

All participants with high blood pressure at the first visit were counseled on the importance of dietary sodium reduction and exercise to prevent hypertension. Participants with dangerously high blood pressure (average SBP ≥ 200 mm Hg or an average DBP ≥ 100 mm Hg) at the first visit were immediately referred to Hôpital Sacré-Coeur in Milot. Participants who did not have high blood pressure at the first visit were told they had normal blood pressure, and no further counseling was provided.

Participants who had high blood pressure based on the average of two readings at the second visit were diagnosed with hypertension, and subsequently referred to Hôpital Sacré-Coeur for further evaluation and treatment.

Survey Data

A survey was developed that included questions about previous diagnoses of hypertension, anti-hypertensive medication use, family history, and questions to assess knowledge of hypertension. The survey was translated from English to Haitian Creole and back-translated to ensure the quality of the translation. The survey was administered orally in Haitian Creole through an interpreter to each participant at the first visit between blood pressure readings. The same three interpreters were used throughout the study.

STATISTICS

The prevalence of high blood pressure and hypertension were estimated using three different methods.

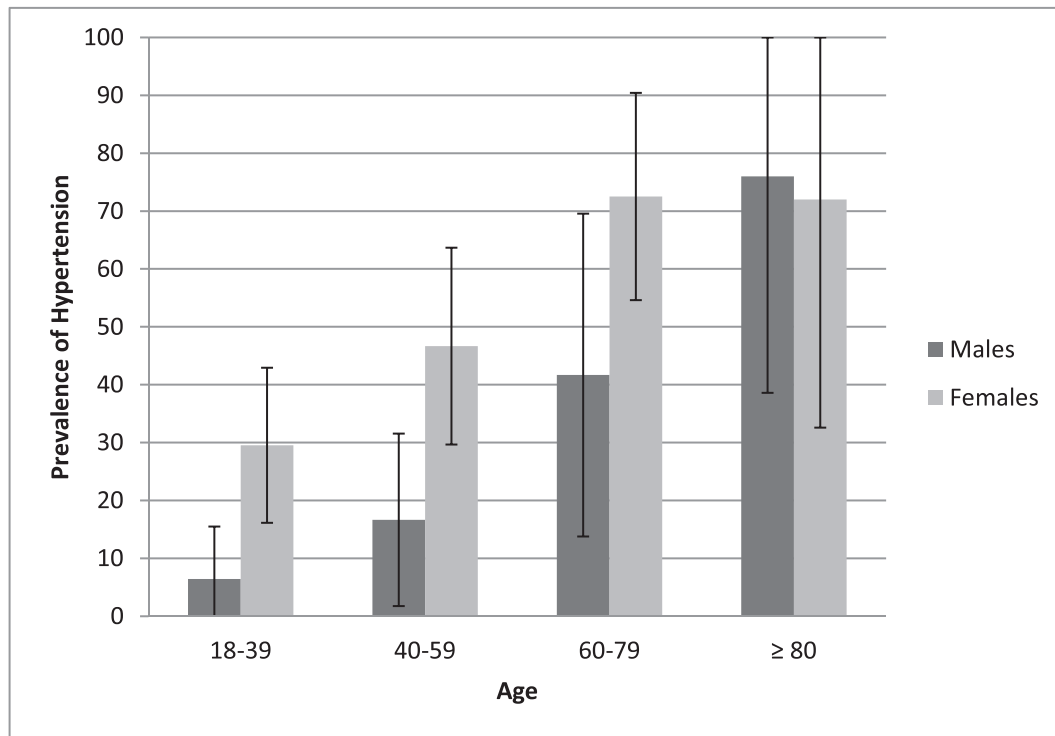


Fig 2. Prevalence estimates of hypertension in relation to sex and age. Bars represent 95% confidence intervals

In Method 1, the prevalence of high blood pressure was estimated using the average of two blood pressure readings taken at the first visit. This approach allowed us to compare our results with previous studies using similar methods.^{4,5}

In Method 2, the prevalence of hypertension (as opposed to high blood pressure) was estimated, in accordance with the JNC guidelines, based on two visits.⁷ Participants who failed to return as requested for the second visit (ie, lost to follow up) were not included in this estimate.

In Method 3, the prevalence of hypertension derived from Method 2 may have been biased by the loss to follow up among the group with high blood pressure at the first visit (Figure 1). Therefore, we used the prevalence of hypertension among the participants who returned for the second visit to impute the prevalence of hypertension among those lost to follow up. This assumes that the lost to follow

up occurred at random (ie, was not related to the blood pressure status determined at the first visit). The data shown in Figure 2 are prevalence estimates using Method 3.

We assessed differences in knowledge of hypertension between participants with a self-reported history of a previous hypertension diagnosis and those without by using a chi-squared test for the between-group difference in percentage with a correct score. Each question was analyzed separately.

RESULTS

A total of 175 participants (69 males and 106 females) from four communities in the greater Milot area agreed to participate in this study. The mean age of the men was 47.5 (± 18.7) years and the mean age of the women was 47.4 (± 17.9) years. Overall, very low rates of smoking and alcohol use were observed (Table 1).

Eighty of the 175 participants had high blood pressure at the first visit and were asked to return for a second visit. Of those 80 participants, 55 returned for the second visit and 25 were lost to follow up. Of the 55 participants who returned for the second visit, 44 (80%) were found to have high blood pressure at the second visit. This group was diagnosed with hypertension (Figure 1).

The prevalence of high blood pressure determined using Methods 1, 2 and 3 was 45.7% (80/175), 29.3% (44/150), and 36.6% (64/175), respectively.

The estimated prevalence of hypertension using Method 3 was further examined in relation to age and sex (Figure 2). The data show the expected trend of a higher prevalence of hypertension with increasing age. The estimates of prevalence of hypertension were higher in women than men in all age categories except that of ≥ 80 years. Among men and women of reproductive age (18–39 years), hypertension prevalence was significantly higher

Table 1. Characteristics of the study participants at first visit, % of total N

Characteristic	Male (n=69)	Female (n=106)	Total (N=175)
Age, years			
18–39	16.0	25.1	41.1
40–59	13.7	18.9	32.6
60–79	6.9	13.7	20.6
≥80	2.9	2.9	5.7
Body mass index, kg/m ²			
<18.50	4.0	4.0	8.0
18.50–24.99	28.0	34.3	62.3
25.00–29.99	6.3	11.4	17.7
≥30.00	1.1	10.9	12.0
Level of education			
No school	8.0	17.7	25.7
Primary school	11.4	24.0	35.4
Secondary school	17.1	16.6	33.7
University	2.8	2.3	5.1
Smoking status			
Smoker	6.9	0.5	7.4
Non-Smoker	32.6	60.0	92.6
Alcohol status			
Drinks alcohol	12.0	1.7	13.7
Does not drink alcohol	27.4	58.9	86.3

among women (29.5%) vs men (6.4%, $P < .05$).

All of the participants responded to the survey at the first visit. Of the 175 participants, 63 (36%) reported having received a previous diagnosis of hypertension from a health care professional. Of those 63 participants, 37 (59%) reported current use of anti-hypertensive medications. Among the 37 participants who reported use of anti-hypertensive medication at the time of the first visit, 20 (54%) were found to have uncontrolled hypertension. Figure 3 shows the distribution of the 175 participants according to self-reported history of a previous hypertension diagnosis, use of anti-hypertensive medications and hypertension status based on blood pressure readings taken at two study visits.

All participants answered the survey questions to assess their knowledge of hypertension. Knowledge assessment scores were analyzed in relation to a self-reported history of a previous hypertension diagnosis (Table 2). There was no significant difference in knowledge

scores between participants with and without a previous hypertension diagnosis for any of the questions (P for all $> .05$). Participants scored highest on Question 7 (89.7% correct) pertaining to the relationship between smoking and hypertension, and lowest on Questions 3 (43.4% correct) and 4 (5.1% correct) pertaining to the treatment of hypertension and the asymptomatic nature of the disease, respectively.

DISCUSSION

The data in our study provide insight into three major issues that surround hypertension in Haiti. We found a high prevalence of hypertension in our study population, especially among women of reproductive age. Secondly, survey data revealed a large knowledge deficit among many Haitians pertaining to hypertension, even among those who have had a previous hypertension diagnosis. Lastly, among people currently taking antihypertensive medications, many remain hypertensive.

Similar to previous studies conducted in other regions of Haiti and the Caribbean, we found a significant burden of high blood pressure in the adult population.^{4,5,8–10} However, estimates based on a single measure need to be interpreted with caution because they likely overestimate the prevalence of hypertension. As expected, our estimated prevalence of hypertension (36.6%) using the JNC guidelines was lower than our estimated prevalence of high blood pressure (45.7%) based on measures conducted on a single day. The prevalence based on the JNC guidelines for the diagnosis of hypertension better estimates the population in need of medical treatment.⁷ However, these guidelines are difficult to apply in a field setting like this due to loss to follow-up between visits.

Hypertension was more common overall among women compared to men ($P < .05$). In addition, a striking proportion of young women of reproductive age (18–39 years) were found to be hypertensive (29.5%). In contrast, about 8% of women aged 20–44 years in the United States are hypertensive.¹¹ The high rates of hypertension in Haitian women of child-bearing age are a concern for maternal and child health. At Hôpital Albert Schweitzer in Haiti, 83% of maternal deaths between 1999 and 2001 were secondary to preeclampsia or eclampsia.¹² Additionally, hypertension during pregnancy predisposes to low birth weight in the newborn.¹³ Routine screenings in women of child bearing age are crucial for early recognition and control of hypertension, which would ultimately decrease the risk of maternal and child death.¹⁴

We found a significant burden of high blood pressure in the adult population

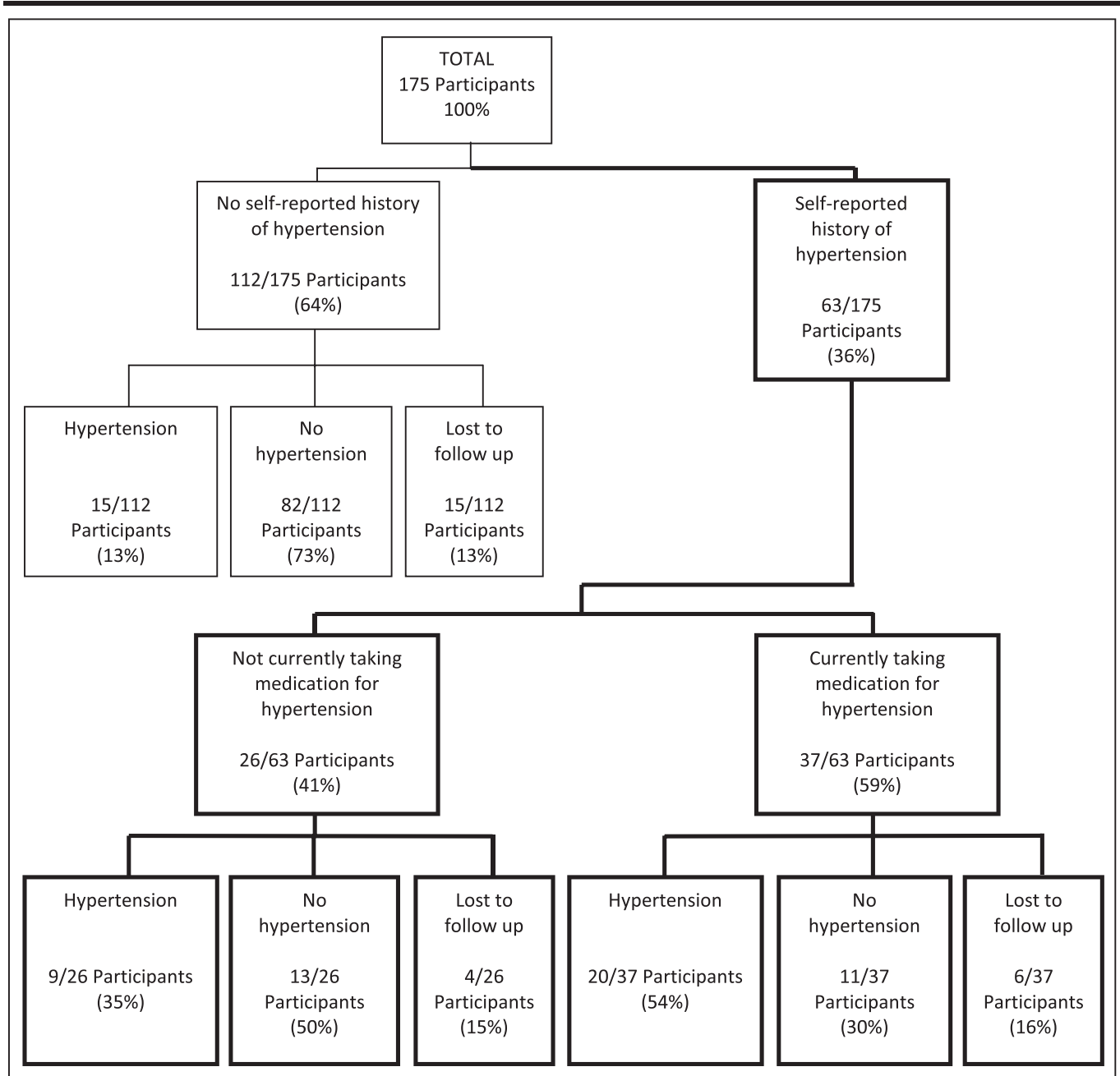


Fig 3. The relationship between self-reported history of a previous hypertension diagnosis, use of anti-hypertensive medications, and hypertension status based on blood pressure readings taken at two study visits

The reasons for the burden of high blood pressure in Haiti are poorly understood. In our study, we observed low rates of obesity and smoking, which are known risk factors for high blood pressure. Other known risk factors such as dietary salt and lack of

access to health care were not measured, and may be an explanation.^{15,16} Though our survey did not specifically assess dietary salt, many of the study participants with high blood pressure reported a high salt intake during our counseling sessions.

Survey results revealed a lack of knowledge about the symptoms and treatment of hypertension. A large majority of participants did not know that hypertension is often asymptomatic. Additionally, most participants believed that hypertension could be cured with a

Table 2. Knowledge of hypertension in relation to a self-reported previous hypertension diagnosis

Statement Used to Assess Participant Knowledge of Hypertension (Correct Response)	% Correct Response ^a		
	Previous Hypertension Diagnosis (n=63)	No Previous Hypertension Diagnosis (n=112)	All Participants (N=175)
1. Hypertension only affects middle age and old people. (false)	44.4	50.0	48.0
2. Hypertension is contagious and may be carried from one person to another. (false)	61.9	59.8	60.6
3. Hypertension can be cured and then the treatment can be discontinued. (false)	42.9	43.8	43.4
4. People who suffer from hypertension feel sick when their blood pressure is high. (false)	4.8	5.4	5.1
5. Proper treatment for hypertension can help avoid heart attacks, strokes and kidney failure. (true)	80.9	77.7	78.9
6. People who are overweight are more likely to suffer from hypertension than those of normal weight. (true)	61.9	72.3	65.6
7. Smoking can cause blood pressure to rise and increase the risk of heart attack. (true)	90.5	89.3	89.7

^a % correct responses did not differ significantly for any question between those with a previous hypertension diagnosis and those without ($P>.05$ for all questions).

limited regimen of medication. These fundamental misunderstandings were also demonstrated in a previous study conducted in an urban Haitian setting.⁵ Reasons for this lack of knowledge may include the long-standing focus on infectious disease in Haiti, for which treatment is generally of short duration.¹⁷

We were surprised to find that participants with a previous diagnosis of hypertension had no more knowledge of hypertension than those without a diagnosis. This indicates a need for improvement in patient-provider communication. Ineffective communication may also partially explain why more than half of participants who reported taking antihypertensive medications were found to be hypertensive on evaluation. Understanding the barriers to effective control of hypertension is an important subject for further research.

Strengths and Limitations

We believe our study is the first to estimate hypertension prevalence in Haiti using the JNC guidelines for the diagnosis of hypertension. The need to impute data from persons in whom we were unable to confirm hypertension may have led to an over or under estimate of the true prevalence. The participants seen were healthy enough

to attend the screening and potentially more concerned about their health than non-participants. They may also live closer to the village center where medical care is more accessible. Since hypertension is highly dependent on age, our estimates of the overall prevalence of hypertension should be interpreted in light of the age distribution of our sample.

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AUTHOR CONTRIBUTIONS

Design and concept of study: Pierce, Shannon, Sonnenfeld, Pearlmutter

Acquisition of data: Pierce, Shannon, Sonnenfeld, Previl

Data analysis and interpretation: Pierce, Shannon, Sonnenfeld, Pearlmutter, Previl, Forrester

Manuscript draft: Pierce, Shannon, Sonnenfeld, Forrester

Statistical expertise: Pierce, Forrester

Acquisition of funding: Pierce, Sonnenfeld

Administrative: Pierce, Shannon, Sonnenfeld, Pearlmutter

Supervision: Pierce, Shannon, Sonnenfeld, Pearlmutter, Previl, Forrester