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BARRIERS AND FACILITATORS OF MEDICATION ADHERENCE IN HYPERTENSIVE AFRICAN AMERICANS: A QUALITATIVE STUDY

Objective: This study explored the perspectives of hypertensive African-American patients, in 2 primary care practices, regarding the factors they perceived as barriers or facilitators of adherence to prescribed antihypertensive medications.

Design: This qualitative study used a grounded theory methodology with data collection occurring through in-depth individual patient interviews.

Setting and Participants: One hundred and six hypertensive African-American patients followed at 2 urban primary care practices participated in the open-ended interviews.

Methods: During interviews, patients' experiences taking antihypertensive medications and their perceptions of the challenges they face in adhering to their medications as prescribed were explored. Patients were also asked about the situations that make it easy or difficult for them to take their antihypertensive medications as prescribed and the skills they thought were necessary for patients to adhere to their medications as prescribed. All responses were recorded verbatim and analyzed using grounded theory methodology.

Results: Fifty-eight percent of participants were women, mean age was 56 years, and 60% had uncontrolled hypertension. Four categories of barriers and 5 categories of facilitators were identified. The barriers included patient-specific, medication-specific, logistic, and disease-specific barriers. The facilitators included use of reminders, having a routine, knowledge about hypertension, its treatment and complications, having social support and good doctor-patient communication.

Conclusion: This study provides a framework for investigating issues of medication adherence in hypertensive African Americans by describing a taxonomy of barriers and facilitators of adherence identified by patients. (*Ethn Dis.* 2004;14:3-12)

Key Words: Barriers, Facilitators, Adherence, Hypertension, African Americans, Qualitative Study

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INTRODUCTION

Fifty million people are affected by hypertension in the United States. Although the prevalence of hypertension is high in the United States, the incidence of this disease is even higher in African Americans compared to Caucasians.¹ African Americans have worse hypertension-related outcomes compared to Caucasians²⁻⁶; and poor adherence to prescribed antihypertensive medications may partly explain these less advantageous outcomes.^{7,8} One of the goals of the Healthy People 2010 campaign is to eliminate the racial disparity that exists between African Americans and Caucasians in cardiovascular diseases.⁹ Efforts aimed at eliminating this disparity in hypertension-related outcomes between African Americans and Caucasians must address the issue of poor adherence to prescribed antihypertensive medications.

Several health behavior theories and models such as the Health Belief Model, the Theory of Reasoned Action, Self-

Regulation Theory and Social Cognitive Models have been used to explain adherence to prescribed antihypertensive medications.^{10,11} Although these models account for factors that may be of theoretical relevance to the practitioner, they do not adequately capture patients' perspectives about their medication-taking behavior. Furthermore, the models may not completely account for the social and cultural variations in health behaviors. Recognizing patients' perspectives about their medication-taking behavior is necessary for the development of successful interventions aimed at improving adherence to prescribed regimens.¹² To date, little is known about the perspectives of hypertensive African-American patients regarding adherence to prescribed antihypertensive medications.

The objective of this study was to explore the perspectives of hypertensive African-American patients, followed in 2 primary care practices, regarding the factors they perceive as barriers or facilitators of adherence to prescribed antihypertensive medications.

METHODS

Design

The authors undertook a qualitative study, based on open-ended individual interviews conducted with hypertensive African-American patients followed in 2 primary care practices, either during clinic visits or by telephone, from February 1999 to June 2000. A qualitative approach was chosen because data on

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Efforts aimed at eliminating this disparity in hypertension-related outcomes between African Americans and Caucasians must address the issue of poor adherence to prescribed antihypertensive medications.

the perspectives of hypertensive African-American patients regarding the use of antihypertensive agents is limited. Qualitative method is particularly well suited for exploratory studies for which previous literature is limited; the method is likewise appropriate for generating hypotheses and models of human behavior.^{13,14}

Participants and Sampling

Patients were recruited using a purposeful sampling technique. This technique is defined as the intentional recruitment of participants who are best suited to provide a full description of the phenomenon being studied.¹³ For this study, we intentionally recruited patients who were hypertensive and were taking at least one antihypertensive agent. In order to ensure a maximum variation of the study population, we chose patients from 2 primary care practices in New York City. One practice provides care for a diverse sociodemographic population, while the other practice provides care for a population of predominantly under-served, low-income African Americans. Patients were identified from a review of computerized medical records and appointment logs. All patients scheduled for routine outpatient appointments with their regular physicians between February 1999 and June 2000 were screened for this study. Patients were eligible to partici-

pate in the study if they met the following criteria: diagnosis of hypertension using the ICD-9 codes 401–401.9, African American as determined by self-reported ethnicity, aged 18 years and older, fluent in English, being treated with at least one antihypertensive medication, followed in the primary care practice for a period of at least one year with the same primary care provider. Exclusion criteria included the following: diagnosis of cognitive impairment as determined by the patients' physicians, inability to provide informed consent, and refusal to participate. Individuals did not receive any monetary reimbursement for their participation; participants were also assured confidentiality. Institutional review board approval was obtained for this study.

Data Collection

Eligible patients were approached and the purpose of the study was explained to them either during routine outpatient visits or by telephone. Those consenting to participate were immediately interviewed using one-on-one in-depth format. The number of patients interviewed was determined by theoretical saturation. In other words, recruitment of patients was discontinued when analysis of responses did not yield any new concepts.¹⁵ All interviews were conducted by one of the investigators (GO) and each interview lasted from 20 to 45 minutes.

During interviews, patients were asked four open-ended questions exploring their experiences and the challenges they face in taking their medications. Patients were also asked to identify skills they thought were necessary for maintaining medication adherence:

- 1) *What difficulties do you have in taking your blood pressure medications as prescribed by your doctor?*
- 2) *What situations make it hard for you to take your blood pressure medications as prescribed by your doctor?*
- 3) *What situations make it easy for*

you to take your blood pressure medications as prescribed by your doctor?

- 4) *What are the skills that make it necessary for you to take your blood pressure medications as prescribed?*

All responses to the open-ended questions were recorded verbatim. Other data collected during interviews included demographic data and duration of treatment for hypertension. Medical records were reviewed to determine the number of antihypertensive medications prescribed. Additionally, the records were reviewed to ascertain whether blood pressure was acceptably controlled; this was defined as a systolic blood pressure of less than 140 mm Hg or a diastolic blood pressure of less than 90 mm Hg. Information on comorbid conditions was also extracted from the medical records.

DATA ANALYSIS

As is typical with qualitative research, data analysis and data collection were conducted simultaneously.^{14,16,17} Data were analyzed using grounded theory methodology, which is a qualitative analysis technique that uses constant comparative method to generate theories or explanatory models of the phenomenon being studied.¹⁸ For this purpose, we compared data from previous informants with that of new informants. Using this approach, interview transcripts were read multiple times and coded line by line into meaningful segments or recurring concepts in a process known as open coding.¹⁵ The identified concepts 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, categories were labeled with a word or phrase indicating their meaning. The generated categories were further broken down into sub-categories in order to properly characterize their dimensions and properties in a process known as axial coding.¹⁵ Such charac-

Table 1. Characteristics of participants (N = 106)

Variable	Value
Mean age ± SD, y	55.7 ± 12.8
Women, %	58
Marital status, %	
Married	38
Separated/divorced	22
Widowed	13
Never married	27
Education completed, % (N=95)	
Less than high school	23
High school or advanced degree	77
Employed, %	38
Type of insurance, %	
Medicaid	55
Medicare	25
HMO	15
Private/self-pay	5
Annual income, % (N=70)	
≤10,000	54
10,001–20,000	20
>20,000	26
Uncontrolled hypertension, %	60
Duration of hypertension (median), yrs.	8
Antihypertensive medications used daily (mean)	2
Duration of treatment (median), yrs.	6
Medical conditions, %	
Diabetes mellitus	26
Heart disease	6
Renal failure	1
Cerebrovascular	6
Peripheral vascular disease	3
None	58

terization allows for elucidation of the underlying themes uniting the generated categories and their sub-categories. Finally, the themes uniting the categories were identified and labeled. Throughout this process, selection of participants was initially guided by data saturation. Initially, we reached data saturation at 40 patients; however, because this initial sample was predominantly comprised of women of older ages, additional patients were further recruited in order to ensure inclusion of men and younger patients.

Using the grounded theory procedure described above, 2 of the authors (GO and MH) reviewed all interview transcripts multiple times, coded the data and generated separate sets of cat-

egories independently. In order to ensure credibility, the 2 authors discussed the coding process and the generated categories. Disagreements between them were resolved by discussion. The codes and categories were then refined based on the discussion and a final coding scheme was generated.^{17,19} All interview transcripts were again revised by one of the investigators (GO) based on the final coding scheme agreed upon by the authors. The generated final categories were grouped along 2 axes: those that hinder adherence (barriers) and those that facilitate adherence (facilitators). Frequently occurring categories and their related concepts were calculated. Final coding and frequency counts were determined with the aid of a qualitative

research software package, the Ethnograph version v5.0® for windows,²⁰ designed to organize large textual data and facilitate content analysis. This software allowed groups of related concepts and categories to be counted according to the frequency in which they were mentioned. The software also made it possible for retrieval of discrete units of texts along with their codes for the purpose of illustration.

RESULTS

A total of 120 patients were approached to participate in this study. Five patients refused, 9 patients did not complete the interview; and 106 patients provided complete data for the study (89%). Table 1 shows the demographic characteristics for the 106 patients who completed the interviews over the 16-month study period. The mean age was 56 ± 12 years, ranging from 20 to 83 years. A majority of patients had high school or more advanced education. Sixty percent of patients had uncontrolled hypertension (systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure of ≥90 mm Hg). The duration of treatment for hypertension was highly variable with a median duration of 6 years and a range of 1 to 40 years. Most patients were taking 2 tablets of prescribed antihypertensive medications daily. Medical chart review showed that 26% of the patients had diabetes, 6% had heart disease, 6% had cerebrovascular disease, 3% had peripheral vascular disease, and 1% had renal disease.

Analysis of all interview transcripts identified 152 different concepts. These concepts were grouped into 4 categories of barriers and 5 categories of facilitators. Furthermore, each category had a set of dimensions that further described its meaning. Tables 2 and 3 summarize the taxonomies of the barriers and facilitators; their dimensions along with

Table 2. Taxonomy of barriers to medication-adherence (N = 106)

Category	Dimensions	Concepts
1. Patient-specific	Forgetfulness	Having a busy schedule Old age Waking up late Been away from home
	Beliefs	Addiction to antihypertensives Hypertension self-regulates Medications are undesirable Medications cause impotence
	Attitudes	Denial and negligence Not taking responsibilities for one's health Dislike for pills
2. Medication factors	Medication side effects	Fatigue; impotence; dizziness
	Treatment duration	Taking medications for life
	Dosing frequency	Once daily versus twice daily
	Quality of the pills	Large pill size versus small size
Difficulty swallowing pills and taste		
	Medication cost	High cost versus low cost
3. Disease-specific	Symptoms	Absence of symptom versus having symptoms of hypertension
	Manifestation	Feeling well or not feeling ill
4. Logistics	Access	Not having medications
		Getting refills
Difficulty getting clinic appointments		
	Inconvenience	Clinic and pharmacy location
		Carrying medications
		Medication-adjustment
		Frequent clinic visits
		Having to use bathrooms in public places

the concepts underlying the dimensions are included, respectively.

BARRIERS

Factors associated with a patient's failure to take his/her medicine are known as barriers. Barriers not only encompass a patient's failure to take medication, but may also represent those things that make it impossible for him/her to do so. Four major categories of barriers were identified in our study: patient-specific barriers, medication-specific barriers, disease-specific barriers, and logistic barriers. Table 2 shows the categories of barriers, their dimensions and identified concepts.

Patient-specific Barriers

Patient-specific barriers were the most commonly mentioned barriers; they were cited by 66% of patients. Patient-specific barriers were defined as patient characteristics that hindered them from adhering to their antihypertensive medications. These barriers had less to do with the disease, but more with the individuals, their personality and cognition. Patient-specific barriers were categorized into 3 sub-categories: beliefs, attitudes, and forgetfulness.

Forgetfulness

Forgetfulness was often mentioned by patients as a reason why they did not take their medications, and subsequently used as an excuse by patients for not

doing so. Patients wanted to give the impression that the decision not to take their medication was unintentional. Forgetfulness was the most common patient-specific barrier cited. One patient said,

"The only thing that stops me from taking my medication is I forget."

Another said,

"I guess people forget to take their medications. Sometimes I forget during the day to take mine; that is why I walk around with it."

Common explanations for forgetfulness included old age, waking up late, having a busy schedule, having to rush out of the house to make an early appointment, and "being away from home." Patients forgot to take their antihypertensive medications mostly when they were away from home (either on vacation, at a social gathering, at work, or while traveling on a long journey).

Beliefs

Beliefs were defined as patients' perceptions of the definition and consequences of hypertension, as well as their perceptions of the mechanism of action of antihypertensive medications. The beliefs more commonly cited were issues of drug-associated impotence, drug-dependence or addiction, and aversion to taking medications.

One patient said,

"I don't like to be dependent on medicine; you can become addicted to these medicines, because they are habit forming."

Another said,

"You feel limited with medicines. Headaches went away. Once you take medicines it is like a luggage, you are limited in what you can do. You have to carry it with you everywhere you go."

Many misconceptions among the beliefs cited were worth noting. These misconceptions were separated into those about hypertension and those pertaining to treatment. Misconceptions about hypertension included such beliefs as: there is no need to take medi-

Table 3. Taxonomy of facilitators of medication-adherence

Category	Dimensions	Concepts
1. Reminders	Prompts	Using pillboxes, wrist alarms and blood pressure monitors Putting medications in visible places Being at home Receiving telephone calls from clinics
	Associations	Symptoms of hypertension Blood pressure reading
2. Knowledge	About high blood pressure	Nature of hypertension Complications of hypertension
	About medications	Side effects of medications Benefits of the medications Consequences of not taking medications
3. Doctor-patient communication	Doctor communication skills	Patient education Ability to explain medication side effects and mechanism of action to patients
	Patient communication skills	Being assertive Not feeling guilty about asking questions Knowing what questions to ask
	Quality of interaction	Trust
4. Having a routine	Regular activities	Taking medications first thing in the morning Taking medications with meals Taking medications after tooth brushing
5. Social support networks	Professional support	Reliance on physicians, visiting nurses, and pharmacists
	Family support	Reminder by spouse or children Seeing other family members take their pills Approval by close relatives

cations in the absence of symptoms or when the blood pressure is normal; and high blood pressure can self-regulate, so there is no need to take medications. One patient mentioned, “I am not really sick, or in bed so why should I take these medicines.”

Misconceptions regarding antihypertensive medications included the following beliefs: the medications are toxic and may cause damage to kidneys, liver, eyes or other parts of the body and even death; taking high blood pressure medications daily is addictive or habit-forming; and the belief that the medications do not work, so that there is no reason to take them. These concepts are illustrated by the following quotes, respectively:

“People I know have had bad experience with their medications; they have gone into dialysis and heart failure despite taking the high blood pressure medications. I feel that this is due to the prolonged use of the medication.”

“I don't like to be dependent on medicine, you can become addicted to these medications, and it is habit-forming. We live on faith to a degree, so I can get better without the medication.”

“Some people have trouble taking any kind of medications. It interferes with their way of life. Some think they are stuck with it for life.”

Attitudes

Attitudes were defined as patients’ emotional response to the diagnosis of hypertension and their general health. Denial that one is hypertensive was a particularly pervasive attitude identified. Despite having been told by their physicians that they are hypertensive, many patients ignored their physicians’ diagnosis, claiming that hypertension does not run in their family, maintaining they are not hypertensive. Other attitudes that hindered patients from taking their antihypertensive medications as prescribed included negligence or not

taking responsibility for one’s health, dislike for medications, inability to adjust one’s dietary and other lifestyle recommendations. These concepts are illustrated by the following quotes:

“People have a denial about having high blood pressure. If they have a family with no history of high blood pressure, then they think they don't have it and don't take their pills.”

“I don't like medications. They give it to you for one purpose and you develop something else (my cousin who has high blood pressure took diuretics and developed kidney failure). Another friend developed diabetes mellitus.”

“Some people have trouble taking any kind of medications. It interferes with their way of life. Some think they are stuck with it for life.”

Medication-specific Barriers

Medication-specific barriers encompassed patients’ perceptions of the qualities of the medications, the conse-

quences of taking them, and their experiences with the medications. About half of the patients believed medications were in themselves barriers to adherence. These included factors related to side effects of the medications, number of medications taken daily, frequency of dosing, taste, treatment duration, having to take other medications besides antihypertensive medication, and the cost of the medications. One patient said,

"There is nothing that makes it difficult for me to take my medicines, only the fear of the reactions to the medication. I needed emergency care for acute allergy in the past."

Another said,

"I have had numerous side effects from the medications. One of the things is I have always told my doctor about my side effects and to change the medications when I have them."

"Side effects such as allergies, drowsiness, hive, dizziness, sweating, and reduced appetite make it difficult for me to take my medicine. It reduces sexual desire and causes headaches, and jitteriness."

The most frequently cited barriers were side effects of the medication; the most common side effects were impotence or sexual inhibition.

A female patient said *"I think some men become impotent, not able to have erection, some women don't have sexual desire."*

Other side effects identified were dizziness, fatigue, frequent urination, and dry mouth. Most patients stopped taking their medications, due to side effects, without discussing the decision with their physicians. Surprisingly, cost was mentioned as a barrier by only 9% of patients.

As cited by one patient,

"Some people can't afford the medications and if they do get the medications they give them generic instead of brand name."

Disease-specific Barriers

Disease-specific barriers were defined as patients' perceptions of the manifesta-

tions of hypertension, its immediate consequences, and long-term complications. Disease-specific factors included non-apparent manifestations of hypertension such as absence of symptoms and "not feeling ill." One patient said,

"I am not really sick, or in bed so why should I take these medicines."

Absence of symptoms was a barrier for patients who took their medications only when they experienced symptoms. Some patients perceived such symptoms as a warning sign that their blood pressure was high. For these patients, the asymptomatic nature of hypertension is counterintuitive to their belief that diseases usually manifest with symptoms. Moreover, the fact that hypertension is a condition requiring treatment for the rest of one's life raised concerns for many patients who feared dependence or perceived addiction to the medications.

Logistic Barriers

Logistic barriers were defined as issues related to the inconveniences patients experienced in taking their medications. Examples included issues such as filling their prescriptions, getting refills, obtaining clinic appointments with their physicians for follow-up visits, not having enough prescription refills, running out of medications, and having to use bathrooms when away from home or in public places. Other logistic barriers cited included, carrying medications in order to avoid missing a dose, and frequent visits to the clinic for medication-adjustment. These concepts are illustrated in the following patient quotes:

"I only take my medication at home, but not when I go out because you can't find a bathroom."

"Sometimes, the doctor prescribes too much or not enough medications. It is hard when you have to keep seeing the doctor for medication adjustment."

"I don't take my medications only when I run out of them, which is pretty frequent."

FACILITATORS

In general, facilitators were defined as factors that assisted patients in adhering to their antihypertensive medications. Facilitators were classified into 5 categories: having a routine; using reminders; good social support; good doctor-patient relationship; and knowledge of hypertension, its treatment and complications. Table 3 shows the categories of facilitators, their dimensions and identified concepts.

Reminders

Reminders were circumstances that prompted patients to take their medications or those circumstances that patients associated with their medications. Reminders also served as memory triggers or cues. Patients remembered to take their medications when they carried them around, when the medications were in a visible place, and when they had symptoms of hypertension, such as headaches, which they considered warning signs.

Regarding using symptoms as a warning sign, one patient said, *"If I don't take the pills my blood pressure goes out of control. I develop symptoms when my blood pressure goes up, and this reminds me to take my medications."* Another patient said, *"I usually, keep my pill on me anywhere I go, so when I get symptoms (warning signs) I take them."*

Regarding putting medications in a visible place, a patient said, *"I have my medications prepared on a counter so I can see it when I eat."* Another patient said, *"I use a pillbox, and I focus on the pills and the pillbox to remind me."*

Other reminder systems mentioned by patients included using blood pressure monitors, wrist alarms, and telephone reminders from clinics and pharmacies.

Knowledge

This category included patients' awareness and understanding of hypertension, as well as information obtained

in the process of the doctor-patient communication or the information the patient already possessed either from family experiences or based on their cultural beliefs. This category reflected patients' knowledge of how to take their medications, how the medications affect the body, and the side effects. Patients' knowledge about hypertension and its complications, knowledge of the consequences of not taking antihypertensive medications and literacy or ability to follow written instructions were also explored. Examples of these concepts are highlighted by the following quotes:

"Uneducated poor people don't know what blood pressure is; they have to be educated about it in order to take their medications."

"It is not hard for me to take my medication, because I know I have high blood pressure; and I know I have to take my medication to control my pressure."

"Knowing and understanding that this pill is good for stroke and heart attack makes it easy for me to take my high blood pressure medication."

"If your blood pressure is high, and you know you can have a stroke, it should make taking your medication easy."

Doctor-patient Communication

This category reflected both the quality and quantity of the interaction between patients and their physicians and the issues surrounding their ability to communicate with each other. Doctor-patient communication was defined not only as patients asking questions, but reciprocal communication characterized by physicians addressing patients' questions in a clear and explicit manner. Doctor-patient communication was separated into physicians' communication skills, patient communication skills, trust, and patients' ability to follow instructions. Patient communication skills included patients' abilities to be assertive and to ask pertinent questions about potential side effects of the medications prescribed. Patients' capacities to not feel guilty about asking ques-

tions was also included as a measure of patient communication skills. Physician communication skills identified included the ability of the physician to explain to the patient the action of the prescribed medications and their side effects, and the ability to organize patient education programs. Patients thought their physicians should be the primary source of knowledge about hypertension and its treatment. Finally, trust of the physician was a major facilitator of good doctor-patient communication. Examples of these concepts are illustrated by the following quotes:

"Doctors should explain to patients what to expect from the treatment, the action of the medications, why you take it, what you take it for, and the side effects. Patients should know all these things."

"Some patients don't know how to talk to the doctors because they are afraid or feel guilty. They should be selfish about their health; they should be able to listen and ask questions about their health without feeling guilty about using the doctor's time."

Routine

This category included activities that patients engage in regularly to help them integrate medication-taking into their daily routine. Patients employed a variety of strategies to integrate their medication-taking behavior into their schedule. The most common routine mentioned was taking the medication first thing in the morning. Other routines included taking the medications after brushing their teeth, and taking them with meals, especially breakfast. These concepts are illustrated in the following quotes:

"The first thing I do in the morning when I wake up, after I brush my teeth, is to take my medication."

"I fix my breakfast, and then take my medication first thing after my breakfast; this has been my routine."

Social Support Networks

Social support networks were defined as the sources of influence and en-

couragement that assisted patients in adhering to their medications. These networks included family members, friends, and healthcare providers. Some patients depended on close relatives like spouses, and children to remind them to take their medicine. For instance, several patients stated that they adhered to their medications because they did not want to see their children upset, while others took their medications because of approval by close family members. Others depended on their physicians, pharmacies, or visiting nurses for such support. The following quotes highlight the concepts in this category:

"My daughter makes it easy for me to take my medication, knowing that I want to be alive and here for her."

"I don't like to see my kids upset, so I take my pills. It is scary to see them upset whenever I don't follow my doctor's orders."

"I take my medications; I know I have to take them because I am afraid of having strokes like the rest of my friends. I know my life depends on the medications."

"If doctors will call their patients at home every month and ask about their symptoms and how they are doing with their medications, it will help patients. I have a visiting nurse to assist me."

DISCUSSION

In this study, we explored the perspectives of 106 hypertensive African-American patients in 2 primary care practices, regarding barriers and facilitators of adherence to prescribed antihypertensive medications. Our findings suggested a taxonomy of patient-identified barriers and facilitators of adherence to prescribed medications in this high-risk population. The barriers identified by patients were classified into patient-specific, medication-specific, disease-specific, and logistic barriers. The facilitators that were identified included use of reminders, knowledge about hypertension, good doctor-patient com-

munication, having a routine, and having good social support networks.

Particularly important among the elicited barriers were patients' beliefs about hypertension and its treatment. Beliefs were most commonly cited as factors hindering them from taking their blood pressure medications as prescribed. In fact, many of these views differed from the biomedical model of hypertension and its treatment. For example, regarding treatment of hypertension, 10% of the patients believed that hypertension is a self-regulating phenomenon; therefore, these patients believed they did not need to take their medications. They also believed that blood pressure medications cause death, diabetes, and kidney failure, a belief that led them to stay away from taking the medications altogether or to impose drug holidays if they chose to take the medications. In addition, these beliefs were predominantly rooted within patients' social network and environment, and served as the sources of patients' concerns. Major concerns mentioned included beliefs that they can become dependent or addicted to medications if they take them for the rest of their lives, and perceptions that these medications inhibit sexual desire. Therefore, in caring for this group of patients, it is important to address their illness and medication beliefs before prescribing antihypertensive medications, especially those related to issues of sexual impotence and fear of dependence. Moreover, negative beliefs about the effects of medications and concerns about side effects are correlated with poor medication adherence in patients with chronic diseases including hypertension.^{21,22}

Another barrier that has potential clinical implications for the care of hypertensive African-American patients is the category of disease-specific barriers. The asymptomatic nature of hypertension does not fit into the paradigm of what an illness should be for this group of patients. Rather, hypertension was perceived by this group to be a symp-

tomatic, episodic illness. As a result, patients displayed a tendency to take their medications only when they experienced symptoms, which they considered as "warning signs" of hypertension. Therefore, experiencing no symptoms or not feeling ill was seen as a barrier to medication adherence. This model of hypertension was described by Heuritin-Roberts et al in a group of 60 hypertensive African-American women followed in a primary care practice. The authors showed that the beliefs held by this group of patients were associated with adherence to prescribed antihypertensive medications.²³ In this study, those patients with "lay models" of hypertension were less likely to adhere to their antihypertensive medications when compared with those that had a "biomedical model" of hypertension. Therefore, it is important to elicit the explanatory models of the treatment of hypertension in African Americans in order to better understand the determinants of adherence in these models. Such an approach may enhance the effectiveness of behavioral interventions aimed at improving adherence to prescribed antihypertensive agents.

The high cost of prescription medications and medical care have been identified as important predictors of poor medication adherence perhaps leading patients to adopt cheaper alternatives such as folk remedies.²⁴ Remarkably, in our study, cost did not seem to matter much to patients; cost was cited as a concern by only 11% of patients. This finding may be due to the fact that all patients in this study were insured—they did not have to pay for their prescriptions.

A major facilitator of medication adherence identified by patients in our study was knowledge of hypertension and its treatment. Patient knowledge is an important correlate of adherence to antihypertensive medications,^{25–27} but interventions designed to increase patient knowledge have yielded mixed results.^{28–30} Since these studies may not

have addressed the aspects of knowledge important to patients, this finding is not surprising. However, in our study, we identified several aspects of knowledge important to patients. Knowledge about the side effects of antihypertensive medications, complications of hypertension, and patient education were identified by patients as important issues to them. Most importantly, patients considered their physicians to be the primary source of the knowledge they obtain; they expect to be educated by their physicians. Patient education material designed to improve medication adherence in hypertensive Americans should focus on factors that are identified by patients as important.

A small but growing body of literature is emerging regarding the role of effective communication in treatment adherence and health outcomes^{31,32} and findings in this area suggest that a good doctor-patient communication is positively correlated with improved health outcomes.³³ Good physician communication skills increase patients' satisfaction and explicit communication of medication effects and instructions about taking medications has been shown to increase adherence.^{34–36} In our study, patients identified doctor-patient communication as necessary for adherence to prescribed antihypertensive medications, and it was cited as a facilitator of adherence by 28% of the patients interviewed. With the increasing shift in the paradigm of doctor-patient relationship from that of a paternalistic nature to a shared-decision type, effective doctor-patient communication becomes increasingly important. Strong doctor-patient communication may be used as a tool to increase patients' knowledge of hypertension, including their knowledge of the side effects of antihypertensive medications. Strong doctor-patient communication may help identify patient beliefs, while dispelling identified misconceptions. Patients believed it was necessary for physicians to inquire about their level of understand-

In our study, patients identified doctor-patient communication as necessary for adherence to prescribed antihypertensive medications, and it was cited as a facilitator of adherence by 28% of the patients interviewed.

ing of hypertension, their experiences with the medications, and the side effects they may be experiencing. The implication of these findings for research point to the need for educational interventions incorporating physicians as important portals of patient education, rather than relying solely on the traditional methods of utilizing lay professionals and written materials. Such an approach may enhance the effectiveness of educational interventions.

Having social support networks was identified as a facilitator of adherence to prescribed medications in our study. Similar observations have been demonstrated in other studies.³⁷⁻³⁹ In a comprehensive review of the determinants of adherence, Haynes and his colleagues showed that social support variables such as "influence of family," "influence of friends," "family stability," and "good social environment" are positively associated with self-reported adherence.⁴⁰ In our study, patients identified close relatives, like spouses and children, family members, and friends as important sources of support. However, patients also identified a different group of support that we classified as professional support as sources of social support. This group included physicians, visiting nurses, and neighborhood pharmacies. Calls from pharmacies and physicians' offices were regarded as important facili-

ators of medication adherence by these patients.

Our study had some limitations that are important to note. First, the results may not be transferable to other settings because the participants may not be representative of the broader populations; therefore, a valid conclusion about the prevalence of the identified barriers and facilitators in the broader populations will require larger population-based studies. Second, our sample as selected does not adequately ensure maximum variation. Consequently, the findings in this study may not capture the perspectives of various sociodemographic backgrounds especially those of uneducated, employed, or illiterate patients who comprise only 22% of the study population. Future studies may want to address the issues of medication adherence in this population. In addition, most of the views elicited were those of insured patients; our findings may not reflect the views of elderly Medicare patients who have to pay for their medications. Finally, adherence was not measured in this study; as a result, a causal relationship could not be proposed between the categories identified and actual adherence.

The results of this study have both clinical and research implications. First, the categories of perceived barriers and facilitators of medication adherence that we generated in this study provide a useful framework for communicating with patients about this important topic in a primary care practice setting. Identifying the barriers that patients may have before prescribing antihypertensive medications may help care givers provide more effective and sensitive care for these patients. An especially important discussion for this patient population surrounds the issue of side effects of antihypertensive medications, such as inhibition of sexual performance; this framework also allows for a systematic discussion of the misconceptions patients may have about antihypertensive medications. Second, this framework

can be used in research settings to develop comprehensive multi-component behavioral interventions for investigating issues of adherence to prescribed antihypertensive medications in hypertensive African Americans. Finally, the categories of barriers and facilitators generated from this qualitative study can be used to develop a test-worthy patient-derived model of medication adherence in hypertensive African Americans.

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