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Dear Mr. Hackerman:

The defense of my dissertation was just completed on July 8, 1997. The final copies of the dissertation have been submitted and accepted by the Graduate School of the University. Therefore, I am pleased to provide your office a copy of this manuscript.

I am most appreciative and highly honored to have been a recipient of a Health Care Financing Administration Dissertation Fellowship. Please express my humble sentiments to all responsible for extending and providing such an invaluable opportunity .

Should you have any questions or require clarification, I may be reached on 301-295-2648. Again, much gratitude for this distinguished opportunity.

Sincerely,

Sheila Y. Jones

enclosure

cc: Dr. Gary Harris
Dr. Florence B. Bonner
Dr. Ivor L. Livingston

HOWARD UNIVERSITY

PATIENT NONCOMPLIANCE AND THE CARDIOVASCULAR HEALTH OF AFRICAN AMERICAN ELDERLY

*

A Dissertation
Submitted to the Faculty of the
Graduate School of Arts and Sciences

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degree of

DOCTOR OF PHILOSOPHY

Department of Sociology and Anthropology

by

Sheila Yvette Williams Jones

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Washington, D.C.
August 1997

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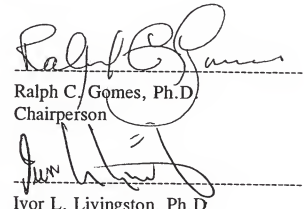

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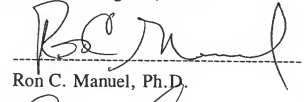

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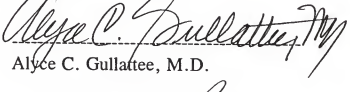

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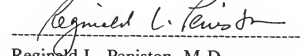

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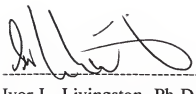

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DEDICATION

In memory of my late parents, Lewis Edward Williams and Virginia Charity Williams Minter on whose shoulders I stand, and who paved the way for the accomplishment of this quest.

To whom much is given much is required

Luke 12:48

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ABSTRACT

The purpose of this study is to examine the extent to which the Health Belief Model and the Reasoned Action Model can explain the occurrence of noncompliance with prescriptions by elderly African Americans and the effect of this noncompliance on cardiovascular health. More specifically, this study sought to ascertain how differences in sociodemographic variables (age, sex, socioeconomic status, education and income), social psychological variables (living arrangements), and intervening variables (knowledge about disease and prior contact with disease) can be predictive of systematic variation of elderly African American's noncompliance with their therapeutic regimen and resultant cardiovascular health.

The study sample consisted of 140 subjects, a questionnaire consisting of questions designed to elicit information about perceived health status, compliance with therapeutic regimen and attitudes, and behavioral practices was administered. The instrument included domains that were related to the variables of the study and that were culturally appropriate to noncompliance that appear relevant to elderly African Americans challenged with cardiovascular disease. Domains included sociodemographic variables, attitudinal/belief factors and normative factors, such as doctor-patient communication. These survey questions were written to operationalized predictors of noncompliance as defined by the study's integrated model. The constituents of the integrated model which guided this study, examined the relationship of sociodemographic factors, attitudinal/belief factors, and normative factors to patient noncompliance. This integrated model was developed from the premise of the Health

Belief Model and the Theory of Reasoned Action Model. The data were analyzed in terms of the relational associations cited in the hypotheses. The main statistical method used to analyze the data was logistic regression.

The results suggest that some of the sociodemographic factors have a positive impact on noncompliance, for example, education attainment emerged as an important predictor of compliance. Although nearly half of the sample had a low educational attainment, most were compliant with their therapeutic regimen. This can be explained by the importance of the predictor variables education and counseling. Neither age nor income had a significant effect on noncompliance.

As it relates to perceptions of disease, elderly African Americans who are cognizant of their predisposition to cardiovascular disease, and who recognize the threat of certain health risk factors have a different attitude/belief perspective which affects their willingness to comply with their prescribed therapeutic regimen. Of all the normative factors examined in this study, doctor-patient communication, as well as education and counseling emerged as the two normative factors which were significant predictors of noncompliance.

In sum, prescription noncompliance is a pervasive multidimensional problem. Compliance relies upon a solid channel of communication between the health provider and the patient. If this "communication cable" is severed, patients, in many instances, can succumb to an interplay of poor communication, and ultimate noncompliance. Failing to comply with their therapeutic regimen has the potential to increase the African American elderly's risk for more serious cardiovascular health problems.

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CHAPTER I

INTRODUCTION AND BACKGROUND TO THE PROBLEM

Growth and Health of the Elderly Population

The graying of America is an emerging twentieth century phenomenon that is without precedent. Specifically, this century has experienced a profound change in the proportion of the United States population aged 65 years and over. In 1900, individuals over 65 years of age constituted 4 percent of the population. By 1988, that proportion had increased to 12.4 percent; by the year 2000, however, this percentage is expected to escalate to 13 percent, and by 2030 to 22 percent (U.S. Bureau of the Census, 1989). In 1978, people who reached 65 years could expect to survive another 16.3 years. By 1989, life expectancy at the same age had increased to 17.2 for a total of 82.2 years (Semla et al., 1993). Therefore, people who attain the age of 65 can expect the possibility of living into their eighties. While these statistics are seemingly encouraging, increased life expectancy can present a host of chronic conditions that lead to compromised health status. For the African American elderly, this relationship between aging and health is not comparable to the white population. Specifically, African American elderly who challenge the seams of life expectancy, often experience more chronic illnesses, which culminate in a sicker and more compromised quality of life.

Growth and Health of the African American Elderly

African Americans comprise 8.2 percent of the total population aged 65 and over (US Bureau of the Census, 1989). It is projected that by the year 2010, this

proportion will increase to 9.8 percent (US Bureau of the Census, 1989). The African American elderly population is growing at a faster rate than their white counterparts and, comparatively speaking, they have higher rates of morbidity and mortality. Therefore, the link between health and race actually is an important concern.

The 1985 landmark document Report of the Secretary's Task Force on Black and Minority Health depicted the persistent and alarming disparity between the health of African Americans and the health of whites. Perhaps the study's most resounding revelation was that 165 fewer African Americans would die each day, if African Americans had the same death rates as the white population. For example, of the 18,181 African Americans who die from cardiovascular diseases each year, over 7,000 would not die, if the death rate were the same as the white population (US DHHS, 1985). As is true for the entire population, cardiovascular diseases are the leading cause of death for African Americans. Between 1979 and 1981, heart disease and stroke accounted for 30.8 percent of the excess deaths among African Americans (US DHHS, 1985).

Although the prevalence rates of coronary heart disease (CHD) in African Americans and whites appear similar, mortality rates are very different. African American men are almost twice as likely to die from suffering a stroke or a heart attack as white men (McGinnis, 1985). Moreover, elderly African Americans are more likely to die from hypertension, commonly referred to as high blood pressure, than their white counterparts. In this vein, hypertension is a significant risk factor for cardiovascular disease. The single most powerful determinant of hypertension

prevalence is race (Clark, 1991). Specifically, African Americans are almost twice as likely as whites to develop hypertension; they tend to have a proclivity for developing the disease at an earlier age, and are five times more likely to have severe hypertension (Clark, 1991). They also suffer more hypertensive related complications than whites (Joint National Committee on Detection Evaluation and Treatment of High Blood Pressure 1988).

Aging and Health Deterioration

Associated with advanced age is the potential for increased acute and chronic conditions, which for many elderly individuals often include more than one condition, that is, co-morbidity. Cardiovascular diseases (diseases of the heart and blood vessels), are the leading cause of death in the United States (Applegate, 1989), and are a paramount threat to the health of the elderly; for example, poorly controlled hypertension, a well recognized factor for cardiovascular disease, remains a health problem of major proportion, particularly among African Americans, the poor, the elderly, and those with lower levels of education and limited access to medical care (Alderman, 1990). An exponential increase prevalence of hypertension coupled with aging deserves close attention.

The major adverse clinical outcomes of hypertension, namely ischemic heart disease and stroke, continue to have substantially higher incidence rates in African American elderly when compared with whites (Klein, 1988). Statistically, prevalence ranges from a low of two percent for white females aged 18 through 24, to 83 percent for African American females aged 65 through 74 (Alderman, 1990).

In the elderly, hypertension tends to accelerate the vascular and endocrine changes that are associated with the physiological aging process, for example, cardiac output, myocardial reserve, aortic elasticity baroreceptor sensitivity, intravascular volume, and plasma resin activity diminish with age, while total peripheral resistance and plasma catecholamines increase with age. (Chobanian, 1988). In essence, as a consequence of aging, the physiological capacity of major organs, that is, the heart and vessels of the circulatory system, suffer deterioration and yield diminished functional capacity. Such dysfunction leads to increased disability and other impeding conditions emerge. Similarly, such disability can lead to premature death, which may result from congestive heart failure deriving from coronary heart disease, angina pectoris, or valvular dysfunction caused by coronary artery disease and cardiac arrhythmias and hypertension.

In sum, the mortality rate from cardiovascular diseases among the elderly is astounding. However, with regards to the African American elderly, they succumb at a disproportionately higher rate, which is primarily due to a higher prevalence of hypertension in this sub-population (US DHHS, 1991). Such an observation has profound clinical implications for the elderly diagnosed with cardiovascular disease. Simply, controlled hypertension through the use of prescribed medical therapy is essential in minimizing stroke and heart attacks and further deterioration of the cardiovascular system. Therefore, compliance with prescribed therapy in an attempt to treat the disease is tantamount to maintaining good health.

Aging, Health, and Noncompliance: Issues & Problems

Noncompliance is exhibited throughout other segments of the United States population; however, it is especially a unique phenomenon to the elderly because of their greater sensitivity to medications, greater propensity for the development of adverse effects, and the greater complexity of therapeutic regimens as they develop chronic illnesses throughout the course of their lives. In addition, interposition of other care givers, decreasing acuity of senses, and problems with memory are indeed factors of concern. Noncompliance is defined as the failure to comply with chemical regimens, which interfaces with the achievement of therapeutic goals. Medications can serve the elderly in a very beneficial manner. However, misapplication and/or misuse of medications may result in undesirable outcomes, ranging from lack of maximum efficacy, annoying side effects, diminished quality of life, and even life-threatening adverse outcomes (Weintraub 1990).

Among the elderly population, especially African Americans, the challenge of compliance with chemical therapy becomes an arduous task. Advanced age supports multiple clinical disorders that require a regimen of potent pharmaceuticals that are designed to arrest the symptoms and, in an optimum scenario, maintain the quality of life. The treatment of chronic conditions results in a formidable challenge for both the physician and the elderly patient. These circumstances require a valiant effort by the physician to keep drug regimens simplistic, yet efficacious. Nonetheless, the elderly, due to problems of co-morbidity, frailty, and the like, have more to gain from proper adherence to a prescribed regimen and more to lose from lack of compliance.

It has been documented that noncompliance is considered a serious health concern (Weintraub 1990; Becker & Maiman 1975; Kasl, 1975; Sackett & Haynes 1976). Low compliance rates are particularly significant in relation to cardiovascular health among the elderly because of the increasing evidence that certain behavioral changes can have dramatic impact on the course of chronic illnesses, especially among African Americans who are disproportionately affected by cardiovascular disease. Compliance failure is a syndrome with multiple etiologies. Noncompliance can be determined by pill counts, timing of refills, blood and urine drug levels, and observation of therapeutic effects. Contributing factors to this phenomenon include vision, hearing, and memory impairment, side effects, drug interaction, fear of drug dependency, difficulty in obtaining or taking of medication, low educational attainment, low income, complicated regimen and lack of confidence in the clinician. The optimum therapy of the elderly patient with cardiovascular disease requires that the benefit-to-risk ratio is favorable, and only after the pharmacokinetic and pharmacodynamic factors altered by age and disease have been considered.

Previous studies have shown that a substantial proportion of the general population are noncompliant, and estimates of noncompliance among the elderly vary from 26 percent to 59 percent (German, 1988; Homedes, 1991). While several studies have attempted to identify characteristics that predict noncompliance, results have been contradictory. For example, while one study found higher rates of noncompliance among elderly who were 75 years of age, living alone, less educated, and with more diagnoses (Schwartz et al., 1962; Hershman et al., 1995), another study found no

significant differences using these same variables (Cooper, 1982). In addition, most of these studies focused on other chronic diseases such as renal disease, diabetes and psychiatric elderly patients with very little investigation on cardiovascular disease, which is the focus of this study. Moreover, most of these studies that addressed the problem of noncompliance, although empirical in nature, were, for the most part, atheoretical. Furthermore, limited studies on noncompliance have controlled for race, and relatively few studies have examined intra racial differences in compliance among the African American elderly. Thus, empirical answers have yet to be generated to issues such as possible differences between elderly African Americans who come from different strata in terms of their attitudes, beliefs, and or orientations towards noncompliance.

The issues surrounding the compliance of elderly African Americans necessitate that the accompanying theoretical perspective must be conceptualized at the sociological and psychological levels of analysis in order to capture the underlying root cause(s). Therefore, this study begins to address these deficiencies in the literature by examining the African American elderly's noncompliant behavior in relationship to their cardiovascular health. This examination is addressed by utilizing selected aspects of the Health Belief and the Reasoned Action Models. A full discussion of these two models appears in Chapter III.

Statement of the Problem

It is the purpose of this study to examine the extent to which the Health Belief Model and the Reasoned Action Model can explain the occurrence of African American

elderly's noncompliance with prescription drugs and the effect of this noncompliance on cardiovascular health. More specifically, this study seeks to ascertain how differences in sociodemographic variables (age, sex, socioeconomic status, education, and income), social psychological variables (living arrangements), and intervening variables (knowledge about disease and prior contact with the disease) can be predictive of systematic variation of African American elderly's noncompliance with their therapeutic regimen and resultant cardiovascular health. The use of the Health Belief Model and the Reasoned Action Model to the study of the African American elderly's noncompliance with prescribed medications and their cardiovascular health, does not imply that this phenomenon in the African American elderly can be exclusively determined by these models. Conversely, the Health Belief Model and the Reasoned Action Model allow for a systematic evaluation of the priorities that African American elderly assign to competing demands, to interpretations, and to the meaning of health issues and events that are significantly influenced by their beliefs.

Scope of the Study

Approaches to studying noncompliance among the elderly represent diverse theoretical orientations rooted in psychological, economic, and sociological paradigms. The heuristic focus of this study is framed within sociological and psychological paradigms. This approach is important because it may provide solutions to this empirical endeavor, and give explanations which utilize some established rules.

Within these paradigms, substantial theoretical as well as empirical evidence have been amassed on a number of variables used in this study. Thus, this study seeks

to look at those variables for which definitive consensus about their respective causal status has been reached within the general noncompliance literature. Furthermore, this study does not suggest that health status and compliance of the African American elderly are influenced solely by their race, socio-economic status, education, and gender. Instead, this study ascertains how far differences in sociodemographic factors, attitudinal/belief factors and normative factors of the Health Belief Model and the Reasoned Action Model are predictive of systematic variation among the African American elderly.

The use of the Health Belief Model and the Reasoned Action Model as theoretical tools in the study of health related issues and events is not entirely new. Previous studies by Taylor (1990) and Klein (1988) of elderly American beliefs have been used to explain elderly attitude and behavior. Taylor suggests that in the case of elderly hypertensives, if all parameters have been addressed, the behavior exemplified is one of"pseudoresistance." Moreover, Klein suggests that modification in behavior and attitude must be juxtaposed with some educational intervention,thus increasing the level of knowledge. The importance of health knowledge has often been theorized to be a potentially critical determinant of compliance behavior; consequently, various attempts at promoting compliance through educational intervention have previously been exercised.

The explicit use of the Health Belief Model and its constituents sharpens this concern and provides a theoretical guidance as well as enables researchers to draw readily upon well established findings to guide our theorizing. Additionally, the use of

these two models facilitates operationalization of theoretical concepts that deal with persistent and intricate problems of the elderly's health, attitudes, beliefs, and behavior.

Significance of the Study

This study has theoretical, methodological, and practical significance. Particularly in approaching the problem of patient noncompliance with prescription drugs among the African American elderly and their cardiovascular health as being influenced by the indicators of the Health Belief Model and the Reasoned Action Model, this study has theoretical and methodological significance. Theoretically, this study furthers the understanding of the manner and the extent to which the African American elderly are noncompliant with prescription medications. The study also explains how the elderly are influenced by selected variables under the Health Belief Model and the Reasoned Action Model, as well as how they are affected by the intersection of various variables of the two models on the resultant cardiovascular health in the African American elderly population. This being the case, this study also contributes to a better understanding of the utility of the Health Belief Model and the Reasoned Action Model in explaining and possibly predicting health and related outcomes such as compliance and cardiovascular health.

Methodologically, this study demonstrates the applicability of the parameters of the Health Belief Model and the Reasoned Action Model to the study of African American health problems. These models are used, in part, as an effort to sharpen researchers' concern with the methodological guidance of relevant variables, which would enable them to draw readily on well- established facts derived from research on

beliefs, attitudes, social class background, and education that could explain African American's health and behavior.

This study also offers some practical constructive information regarding how African American elderly jeopardize their health because of the need for necessities such as food and shelter, or simply because of lack of understanding the proper instructions for administration of medication. From a more pragmatic perspective, one may argue that the study is likely to have some implication for adequate education and counseling for elderly African Americans who suffer from cardiovascular disease. If health providers know with greater certainty the determinants of noncompliance of elderly African Americans, then they would be in a better position to develop a more cogent approach towards servicing these patients. This knowledge would improve the understanding of African American elderly and their use of prescription drugs, and this relationship to emerging cardiovascular health related problems.

In sum, there has been a rather extensive exploration of noncompliance in the literature addressing other chronic illnesses such as diabetes and kidney disease, but little information regarding the effect of noncompliance among individuals suffering from cardiovascular disease.

Because cardiovascular disease remains the primary killer among African Americans, a critical need exists to ascertain those factors and possible intervention(s) that can promote a better understanding of the importance of African Americans complying with a prescribed therapeutic regimen. In addition, the effect of noncompliance among the elderly, who in many instances, in addition to cardiovascular

disease, shoulder a multiplicity of other chronic diseases that require a prescribed therapeutic regimen, need also to be studied. These factors emphasize the significance of this research.

Plan of the Dissertation

This dissertation is presented in six major chapters. Additionally, each chapter has subdivisions. Chapter I discusses the introduction and background to the problem, the underpinning on which the study is based, the statement of the problem, and the significance of the study. In Chapter II, the related literature is presented, and the relevance of sociodemographic, psychosocial and physical barriers are explained. The theoretical framework and hypotheses which underscore the research are described in Chapter III. The methodology, that is, the sampling design, data collection, measurement of the variables and the data analysis techniques are discussed in Chapter IV. Chapter V provides a presentation of the results through multivariate analyses and the findings pertinent to the data. Chapter VI closes the study with a discussion of the results as well as conclusions and implications for future research.

Summary

The introduction and background to the problem addressed in the study have been the focus of this chapter. It also contains a description of the emergence and impetus of the ever increasing number of elderly and the impact of this phenomenon in the United States. Finally, the statement of the problem, significance of the study and plan of the dissertation were discussed.

CHAPTER II

REVIEW OF RELATED LITERATURE

Overview

In this chapter a comprehensive, but selective, discussion is presented on noncompliance among the elderly who suffer from cardiovascular disease (i.e. focusing on the main variables used in the study). First, a definition of noncompliance as used in the study is presented along with research that presents noncompliance discussed in relation to the elderly. Second, a presentation is made on selected factors that contribute to noncompliance among the elderly, namely, the issue of doctor-patient relationship and related selected studies. Specifically, these studies will present the importance of doctor-patient interaction and how certain dimensions of this issue can affect compliance either negatively or positively. Third, subsequent sections of the literature focus on studies relating to barriers of noncompliance. Particularly, these studies present how specific obstacles such as cost, living arrangements, functional limitations, physical impairments and adverse drug reactions can prevent an elderly individual from complying with prescribed therapeutic regimen. Fourth, the final section of the review includes studies which discuss the impact that a complex medical regimen can have on compliance, thus potentially leading to misuse and underuse of medications by elderly patients. Premised on the aforementioned information, the literature review is organized in the following manner:

A. Definition of noncompliance and selected studies

B. Normative (Cues to Action) Factors--

1. The doctor-patient Relationship, which explains the value of this communication line and its importance to patient compliance;
2. Barriers to noncompliance, which show those factors that exist and may cause an individual not to adhere to a prescribed regimen--this is addressed in the literature on the basis of the following:
   a. Physical Barriers
   b. Vision and hearing impairments
   c. Social isolation--living arrangement
   d. Financial cost
   e. Functional limitation factors
   f. Adverse drug reactions
   g. Complexity of therapeutic regimen.

Introduction

The general clinical literature available on patient noncompliance is voluminous. From a sociological perspective, selected sociodemographic factors, such as age, sex, income, education, and living arrangements are reviewed. This study demonstrates that these factors have a differential impact on behavioral outcome, specifically on noncompliance.

Compliance with a prescribed medical regimen is a growing challenge in contemporary society, particularly among the elderly who suffer from chronic

conditions that demand, in many situations, a polypharmacologic approach. Many studies show that nearly one-third to one-half of elderly patients fail to comply with the prescribed therapeutic regimen (Ouslander, 1981; Cramer and Spilker, 1991; Delafuente et al., 1992), possibly jeopardizing health outcomes.

Several factors exist that make compliance a complex phenomenon among the elderly. Mild and chronic disorders that require prophylactic or suppressive therapy; disorders in which the consequences of stopping therapy may be delayed; and physiological, cognitive, social and economic obstacles may impair the ability of the elderly patient to comply (Brand, 1977).

A. Noncompliance

Drug noncompliance in this study is any nontrivial deviation from the prescribed medication regimen. It can be intentional or unintentional, and includes dosage errors (underuse and overuse), interruption of treatment, failure to take drugs at specified times, taking them at incorrect intervals, and/or the addition of other drugs, for example over-the-counter drugs.

Noncompliance is a widespread phenomenon among the ambulatory elderly, especially those who have succumbed to chronic disease conditions requiring maintenance treatment modalities. In this regard, approximately 86 percent of persons over age 65 years have one or more chronic conditions, requiring long-term medical regimen (Hershman et al., 1995). Thus, the elderly are heavy consumers of medication. For example, in the United States, the elderly comprise 11 percent of the general population but consume 25-30 percent of prescriptions (Schmader, 1994), and

average, including repeats, some 13 prescriptions per year (Nolan and O'Malley, 1989). The extent of noncompliance among the elderly is estimated to be approximately 40 percent (Clark 1991; German 1988; Cooper, Love & Raffoul 1982; Hemminki & Heikkila, 1975; Neely & Patrick, 1968).

B. Normative (Cues to Action) Factors-The Doctor-Patient Relationship

Poor communication between physician and patient may be the single most important impediment to effective compliance to treatment (German, 1988). Physicians must spend time educating patients about the crucial need to adhere to prescribed therapeutic regimen. Conversely, patient responsibilities include keeping follow-up appointments, following nonpharmacologic recommendations, and alerting the physician to other medications prescribed or taken, as well as any problems experienced with medications. Dimensions of the doctor-patient interaction that are associated with noncompliance include malintegrative behavior, authoritative patient, nondirective antagonism by the physician, and nonreciprocal information seeking by the physician (Cramer & Spilker, 1991).

Malintegrative behavior exists when both the physician and patient exhibit negative social and emotional interactions. Both persons appear formal, show passive rejection, and withhold assistance from the other. During a physician-patient visit, compliance can be positively affected when both the physician and the patient engage in tension-release mechanisms. In this instance, malintegrative behaviors that had mounted during the visit can be released through joking, laughing, and showing some satisfaction with the relationship. Also, negatively associated with compliance is the

pattern of communication between an authoritative patient and a physician who passively accepts this position (Cramer & Spilker, 1991). In this regard, researchers believe that these patients provide their own analysis of the problem and solution and do not accept what the physician contributes. Nondirective antagonism is suggestive of a physician who neglects to give the patient information, explanation, or orientation. The physician confines his or her activity to expressing opinions and concerns about the existing circumstances. Lastly, nonreciprocal information-gathering reflects the way in which physicians collect information from a patient to make a diagnosis without providing feedback to the patient (Cramer & Spilker, 1991).

The overview of some past studies highlight an increasingly frequent leitmotif in compliance discussions and the importance of the doctor-patient relationship (German, 1988; Lipton and Lee, 1988). This relationship figures prominently in the argument that compliance is particularly significant in the process and content of treatment of chronic disease; therefore, it deserves prominence in the discussion of its influence on compliance. In a study by German (1984), it was hypothesized that for chronic disease patients, while treatment might proceed without the intense involvement of the patient, it was not likely to go well unless the patient was as knowledgeable as possible and willing to cooperate with the treatment modality in a proactive manner, including taking appropriate responsibility for the overall regimen.

Other cogent and well argued positions urging involvement of patients had been made previously, but the Hollander-Szasz model, which interestingly had been designated as an issue in the philosophy of medicine, represented something of a

benchmark in views of the doctor-patient relationship as the nidus for compliance. The years that followed this work showed increasing use of the nature of the doctor-patient relationship as an influence on compliance with treatment (Becker, 1985); however, the subject is complex and multifaceted. According to Becker (1985), in a review of various studies ascribing a "solid" doctor-patient relationship to compliance, essential required components consisted of understanding the disease and its treatment, satisfaction with care, and adherence to the regimen prescribed. Similarly, a study conducted by Kern (1986), demonstrated the importance of the clinician's orientation toward close communication with the patient on the outcome in compliance as well as in control of the condition being treated. Although the process through which this occurs is not fully understood, the evidence is mounting for the importance it has in compliance (Becker, 1985; Kern, 1986).

While chronicity of disease is an acute concern, age also seems to be equally important to this relationship. In studies by Klein and German (1984), their findings illustrate the following: Preventive behaviors have higher levels of noncompliance than direct-care behaviors. In the strictest sense, any regimens for individuals with chronic conditions are preventive. However, since these regimens are aimed at keeping the condition from worsening, thus avoiding secondary complications, these actions can be said to comprise secondary or tertiary prevention. Directions that fall into this secondary or tertiary prevention are common modalities for caring for individuals suffering from chronic conditions. It has been documented from this study by Klein and German, that such direction is more difficult to comply with than other types of

regimens, and substantiates the particular burden of compliance in chronic disease care.

Specifically, the elderly suffer overlapping symptoms and these often go unreported by the patient who may categorize such signs and symptoms as related to the normal changes of aging. In addition, there are many concerns older individuals have at any visit to a physician, and since the time available with the clinician is limited, a priority setting occurs, and issues that have less salience for the patient are often omitted. An additional influence on less reporting of symptoms and side effects of any regimen is that many elderly patients presume that this is to be borne as part of the treatment for their conditions. These hypothetical views regarding behavior of patients with chronic conditions lend credence to the crucial importance of the doctor-patient relationship. This powerful relationship may be the cornerstone to compliance, overall treatment, and the design of intervention strategies to improve compliance. Generally, when assessing the quality of a doctor-patient relationship, careful attention should be given to the substance and means of communication, the level of trust engendered, specific education about the condition present and about the treatment regimen. Clearly, this is a cyclical process so that changes occur, adjustments are made, and appropriate education and ongoing monitoring are repeated.

Physicians who interact and care for the elderly learn that care sometimes means supporting patients in their efforts to comply with their own choices rather than the choices provided by the traditional medical approach to treatment of an illness or disease (Cramer & Spilker, 1991). For example, to help diminish the outlay of expenditures, and to insure, at least immediate compliance, the physician will supply

the patient with medicine samples from their office pharmaceutical supply. In light of soaring medication costs and a hostile economic climate, for an individual with limited resources this provides some relief.

Elderly patients have often thought about their mortality and have expressed some degree of fear about the prospect of a medical intervention imposed on them when they cannot speak for themselves. Thus, if the physician is not cognizant of a patient's preferences for treatment, dissatisfaction with an outcome may occur with both physician and patient.

C. Normative (Cues to Action) Factors-Barriers to Compliance

This section explains the physical, functional limitations, social isolation, and adverse drug reaction barriers that characterize the elderly population. The understanding of these barriers, enables the introduction of an appropriate intervention design that can enhance compliance among elderly patients.

Physical Barriers

Almost half of the noninstitutionalized elderly are limited in mobility because of chronic conditions. Two conditions, heart disease and arthritis, account for almost half of the activity limitation (Hindmarsh and Estes, 1989). Decreased activity and dexterity can limit an individual's ability and willingness to have prescriptions filled, take drugs regularly, and open and close the childproof containers that, to arthritic hands, are simply unmanageable. For example, in one sample of elderly people, (Kendrick and Bayne (1982) found that 13 percent could not open flip-top pill containers, 53 percent had difficulty with palm-turned caps, and nearly two-thirds had

difficulty with caps which required the lining up of two arrows. A further finding was that 58 percent could not discriminate between pills of differing shades of yellow. These findings make the examination of noncompliance rates in the elderly a matter of concern.

Visual and Hearing Impairments

Vision and hearing impairments, which afflict many of the elderly, also contribute to noncompliance. Eighty percent of the elderly wear eyeglasses. Even with glasses, many have impaired vision. Failing eyesight reduces the ability to read small print on prescription labels and package inserts (Morrow, 1988). Approximately 30 percent of this population, aged 65 years and older, suffer significant hearing loss (Furner and Kozak, 1993; National Center for Health Statistics, 1985). Yet, only 5 percent of the nation's elderly wear hearing aids. Many elderly people do not recognize hearing problems, are unwilling to acknowledge them, or find that hearing aids do not help. Hearing loss limits patients' ability to hear directions for appropriate drug use and discourages them from asking questions for clarification in fear they might not hear the answers (Applebaum and Grisso, 1988). Further, hearing loss can contribute to social isolation.

Social Isolation--Living Arrangements

Studies have demonstrated that compliance tends to be a greater problem when patients are socially isolated (Haynes, Sackett & Taylor, 1980; Hussar, 1975; Blackwell, 1973). One study reported that medication errors were more likely to be made by the elderly patient living alone than by those who lived with others.

Potentially serious errors were made by 42 percent of the elderly who lived alone, whereas such errors were made by 18 percent of those living with one or more persons (Schwartz et al., 1962). Social isolation is more common among the elderly, specifically among elderly women, which is nearly 41 percent (Gerber & Nehemkis, 1979). Living alone does not always imply isolation. For example, approximately 80 percent of persons over 65 have at least one surviving child and about 75 percent of those adults with children saw them within the last week (Federal Council on Aging, 1981). Even in the best of situations, where parent and child have an easy, mutually enjoyable relationship, this contact may not compensate for a lost spouse or a dwindling social network. Individuals who have been classified as loners in their earlier years are typically comfortable with that lifestyle in later years (Lipton and Lee, 1988).

In practical terms, the repercussions of social isolation can seriously impede crucial doctor-patient relationship. When such circumstances prevail, the lack of contact over a prolonged period of time with other individuals presents a problem. First and foremost the elderly's patient social skills will be diminished from underutilization, thus altering the nature of conversation by appearing abrupt, tentative and/or confused. In addition, the individual might have definite problems framing questions and may not be able to respond with the required information in the allotted time. As a result, compliance efforts may be sabotaged.

Financial Cost

Another barrier to compliance is financial cost--the patients'inability to afford

prescription drugs in the amounts enumerated in the prescription directions. This problem presents a severe problem because if elderly patients are unable to afford their medications, their health can be adversely affected. Consequently, as the cost of prescription drugs continue to escalate, cost appears to be a more frequent impediment to effective therapy, than is generally appreciated (Soumerai et al, 1987; Saunders, 1986). Health providers have expressed serious concerns about the elderly who are on minimal and fixed incomes. Their inability to purchase necessary medications may cause them to discontinue required medical regimen (Lipton and Lee, 1988).

The relationship between noncompliance and drug cost has not been the subject of much empirical research. Drug costs are often neglected in studies designed to elicit information about patients' drug therapy decisions (Testimony submitted by Helene Lipton to Senate Special Committee on Aging, U.S. Congress, July 20, 1987). The studies that are available, however, indicate that drug costs are a factor in noncompliance. For example, in a study of 290 chronically ill patients discharged from a general hospital in Canada (before Health Care Reform), researchers found that the financial burden imposed by drug costs was the primary reason given by patients for noncompliance with drug treatment (Brand, Smith & Brand, 1977).

In a more recent study, 155 elderly residents of an urban subsidized apartment building revealed that 6.4 percent of those surveyed reported drug expenditures as a problem, even though 24 percent had insurance covering drug expenses (Darnell et al., 1986). Other research has addressed the burden of financial cost from another perspective. For example, (McKenney and Harrison,1976) interviewed all patients

admitted to a general ward in a large teaching hospital during a two-month period to ascertain the reasons for admission. In the sample of 216 patients, it was found that 10 percent of admitted cases reported noncompliance with their medication regimen. Helling (1987) also assessed reasons for admission to medical wards among a sample of 205 patients and found that 20 percent of cases admitted were noncompliant. Thus, between a tenth and a quarter of medical inpatient beds were occupied by patients who were in the hospital because of noncompliant behavior.

Functional Limitations

To achieve compliance with medication regimens, a patient must have a sufficient degree of functional ability; that is, they must be able to purchase their medication, which involves both getting to a pharmacy and paying for the medication. They must be able to open the prescription vial, take out the prescribed dose, and swallow the medication. In this vein, many patients may be partly impaired in their activities of daily living and rely on family members or other care givers for assistance. Meyer et al., (1989) studied the functional abilities of 93 elderly patients to perform medication taking tasks. The skills assessed included the ability to read and interpret labels of prescription vials, to open and close prescription vials, to remove tablets, and to identify tablet colors. Patients who were responsible for their own medications were more likely to be able to read and understand medication directions, remove tablets, and to identify colors.

An additional functional risk factor for noncompliance in the elderly is the ability to read computer-printed directions for medication use on prescription vials and

to remove vial tops of medication containers. Misinterpreting prescription directions may arise not so much from an inability to read or to understand directions, but from smudged or lightly printed labels (Murray et al., 1986).

Adverse Drug Reactions

Research into a patient's behavior with respect to medication taking behavior is less well-studied but potentially more valuable in developing mechanisms for altering behavior that places an elderly individual at high risk for an adverse outcome. Research shows that the overall incidence of adverse drug reactions in the elderly is about two to three times higher than found in the younger population (Nolan & O'Malley, 1988).

The number of medications an elderly patient consumes has been correlated with adverse patient outcomes. In the hospital setting, an increased incidence of iatrogenic problems is observed with increasing numbers of medications prescribed. In the outpatient setting, Shrimp et al. (1985) reported an average of 11 medication problems in a selected group of patients referred by the physician or social service agency. The medication-related problems were directly correlated to the number of medications the elderly patient consumed and many of these problems were issues of inappropriate medication administration (Shrimp et al., 1985).

The number of medications an elderly patient takes is also correlated to adverse functional effect. For instance, the chance of an elderly patient falling is correlated to the number of medications taken (Hindmarsh & Estes, 1989). Moreover, elderly patients have enhanced susceptibility to adverse drug reactions from both altered

pharmacokinetic and pharmacodynamic changes that occur with age, resulting in higher blood and tissue levels of active drugs; decreased homeostatic mechanisms such as capacity to respond to postural changes and changes in blood pressure, blood glucose, temperature, cardiac output etc., which create difficulty in compensating for drug effects (Vestal, 1982).

Periodically, patients intentionally alter prescription directions to prevent perceived adverse drug reactions to a medication. Studies show that omission or underuse of medication is the most common form of noncompliance by elderly ambulatory patients (Darnell et al., 1986; Wandless & Davis, 1977). The prevalence of errors of omission is not a new phenomenon to the literature. This concern has been discussed in research conducted both in the United States and abroad (Lundin, 1980; Hemminki & Heikkila, 1975; Darnell et al., 1986). However, few studies have examined the cause of underuse. In one study investigating the problem, researchers found not only that underuse is the most prevalent type of noncompliance, but also that many elderly patients underuse prescribed drugs and do so deliberately, primarily because they think that they do not need the drug in the dosage prescribed (Cooper, Love & Raffoul, 1982).

Periodically, patients intentionally change prescription directions to prevent perceived adverse drug reactions to a medication (Spriet et al., 1980). Such behavior has been termed "intelligent" noncompliance (Spriet et al., 1980). Intelligent noncompliance can be defined as a rational act of altering prescribed therapy by patients who do not suffer adverse consequences as a result (Weintraub, 1984). In the

study conducted by Spriet et al., (1980), the results suggest that patients discontinue or decrease doses when they believe they are experiencing an adverse reaction, and they discontinue medications when a desired outcome is not achieved. Further, this study found no correlation between any predictor variable and compliance (including age, sex, packaging type, or memory aid stickers on medication vials). The study also reported that patients who achieved a good therapeutic outcome continued their medication regimen and those who experienced adverse reactions discontinued therapy or reduced the prescribed dose.

D. Complexity of Medical Regimen

The elderly tend to make more medication errors as the number of their medications increases (Curtis, 1961; Hulka et al, 1976; Neely & Patrick, 1968). Patients who consume a large number of medications and who do not understand their medication directions are also significantly at a greater risk for medication compliance problems. Reducing polypharmacy in the elderly should, therefore, be a desirable outcome to both the patient and the physician. The literature shows, however, that it is often difficult to achieve physician compliance to recommendations for improvements in pharmacotherapy. For instance, Kroenke and Pinholt (1989) surveyed 272 elderly persons and discovered 89, that is 33 percent, were taking five or more prescriptions. Recommendations were formulated to simplify these patients' medical regimens, and 59 percent were implemented by the physician. A small but significant reduction in total number of medications was achieved.

Summary

A complete synthesis of the literature on noncompliance was beyond the parameters of this chapter. In this chapter, emphasis was placed on some of the major causal factors used in this study to ascertain to what extent noncompliance is prevalent among the elderly. Knowledge of contributing factors to noncompliance is important, primarily because compliance with medication regimen is essential for the success of medical therapy, especially in the treatment of chronic, long-term illnesses. This chapter presented some of the causal factors of noncompliance in the elderly population including isolated living situations, decreased mobility, and limited fixed incomes.

CHAPTER III

THEORETICAL FRAMEWORK AND HYPOTHESES

Overview

This section contains 1) a discussion of the Health Belief Model (Becker, 1974) and the Theory of Reasoned Action (Fishbein and Ajzen, 1975); 2) the conceptual integration of the two models which provide the theoretical framework for this study; and 3) a discussion of the relationships among selected variables and hypotheses of the study.

Introduction

Reliance on the validity of the Health Belief Model (Becker, 1974) and the Theory of Reasoned Action (Fishbein & Ajzen, 1975) for the purposes of this research rests with the many applications of the models which have been reported in the past, for example: the Health Belief Model: Becker and Maiman, 1975; Kirscht, 1974; Becker et al., 1977; Larson et al.,1979; Cummings, et al 1978; Janz and Becker, 1984. The Theory of Reasoned Action has been used in Davidson & Jaccard, 1975; Davidson and Morrisen, 1983; Jorgensen & Sosnstegard ,1984; Crawford & Boyer, 1985. Diagrams of the elements of the Health Belief Model and the Theory of Reasoned Action are provided in Figures 1.0 and 2.0 (p.32 and p.38) respectively.

The use of the conceptual integration of the Health Belief Model and the Theory of Reasoned Action Model in this study enables the researcher to combine scattered data in a coherent manner and provide a framework for explaining the elderly African American patient's compliance, noncompliance, and cardiovascular health. What the

explicit use of this integration of models does is to sharpen the concern about noncompliance of health practices of African American elderly patients and enable researchers to draw readily upon well established empirical facts about noncompliance of health practices of elderly patients. Also, the integrated model of this study permits analysis and procedures on the sociological and psychological levels without falling into the ingrained habit of obliterating one level in favor of the other.

Both models address and specify mechanisms of examining health and illness behavior. The Health Belief Model establishes the argument that an individual's perception influences behavior and that such perceptions are governed by prevailing attitudes/beliefs. The Theory of Reasoned Action contends that attitudes, normative considerations, and subjective interpretations of norms are dependent on the views and pressures of a reference group. This inference leads the individual to a "reasoned action." In this vein, both models address health and illness behavior; however, the approach each employs differs to some extent. Specifically, the Health Belief Model does not emphasize reasoned action. Here, reasoning is the direct result of certain perceptions. Conversely, the Reasoned Action Model purports that, after consideration of various factors, it is "reason" which determines intention and, subsequently, action and behavior. Premised on these ideas, and based on the data used in this study, it seems reasonable to extrapolate the relevant intents from the two models and combine them to formulate a conceptual model for this study. This derived model is presented later as (Figure 3.0, p.46).

THE HEALTH BELIEF MODEL

The use of the Health Belief Model (HBM) as the theoretical and conceptual framework for this study is an attempt to examine perceptions and beliefs about compliance with therapeutic regimens among African American elderly who have cardiovascular disease. The Health Belief Model has been used extensively to organize theoretical predictors of preventive health actions, including individual perceptions of disease, individual perceptions of preventive actions and modifying factors such as demographic and social characteristics. In previous studies, mammography usage (Stein et al., 1992); Bulimia Prevention, (Grodner, 1991); Predictors of Breast Cancer Screening (Fulton et al., 1991) and Safer Sex intentions among Adolescents (Petosa and Jackson, 1991) are examples of the Health Belief Model serving as the guiding theoretical framework.

Becker (1974) who has used the HBM extensively and with considerable success, has suggested that the Model has shortcomings in accurately treating behavior in the singular, that is, behavior in a unidimensional vacuum. Rosenstock's (1966) use of the singular was intended to conceptualize health as an entity and belief as a composite whole, a concept which will be examined later, since it is important in the context of the American socio-economic milieu, as Parsons (1958) clearly demonstrated. A diagram of the Health Belief Model reproduced from Becker et al (1974) follows in Figure 1.0.

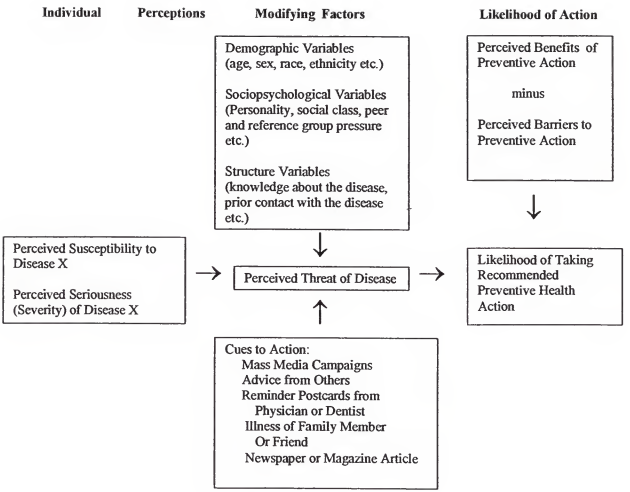


Figure 1.0 The Health Belief Model
Source: Becker, 1974

Rosenstock (1974) provided the following dimensions of the Health Belief Model: **Perceived Susceptibility.** Perceived Susceptibility refers to the individual's feelings of personal vulnerability to an illness or disease. While some individuals, for a myriad of reasons, think or believe themselves highly vulnerable, others do not. Regarding the issue of medically established illness, Becker and Maiman (1982) noted that the susceptibility dimension has been further reorganized and is influence by the patient's belief in the diagnosis and his/her health history over time. To this end, those who had a good health history and also believed themselves to be healthy responded to the threat of a particular disease by a concept of low susceptibility, a phenomenon which may be transferred to the clinical diagnosis.

Further, from Rosenstock's perspective, susceptibility had a high correlation with one's subjective perception of the risk in contracting a disease. In the view of Becker and Maiman (1982), the clinical diagnosis could be doubted by the patient. Such posture does not require a second opinion; rather, it is simply an issue of belief. In this vein, it is important to note that the perception of susceptibility, therefore, has its roots and foundation in the individual's psyche as well as in social influences. Hence, the susceptibility factor may be influenced by individual experiences about health, inner motivations, cost of medicines, and medical regimens, all of which could affect illness behavior.

Becker (1974) discovered that the concept of perceived susceptibility varied with experience. This was particularly a valid argument in those studies relating to mothers' reaction to the re-susceptibility of their children. This phenomenon was concretized by

the mother's response to both the therapeutic regimen and follow-up procedures which varied significantly from their belief that the sick child could be further affected by the disease. Becker et al (1974); Becker et al (1977) and Cardis et al (1969) agreed on this finding.

In all these studies, while the correlation between perceived susceptibility and illness behavior was very high, there was some divergence related to belief. However, there was no indication as to the causative factors which influenced belief in any direction. Unequivocally, further research in this area is needed and is beyond the parameters of this study.

Perceived Severity. Perceived Severity is the feeling concerning the seriousness of contracting an illness or disease. This factor can be influenced by rational and/or irrational fear. It is, therefore, primarily dependent, on the individual's personal values and attitudes or beliefs which may counter balance such fear. Similarly, severity refers to consequences or what Becker (1974) called social repercussion of the illness as these consequences are perceived by the individual; therefore, severity has both social and clinical connotations. It includes duration with possible consequences of pain, disability, death, and nature of illness, as well as the influence of these consequences and of medical regimens on social, economic, and family life. Hence, severity is highly significant to patient noncompliance.

Perceived Benefits. Rosenstock (1974) suggests a correlation between mechanism to relieve the symptoms of a condition and the belief of the individual in the benefits perceived to result from a treatment modality. In addition, Rosenstock's findings

denoted a relationship between the extent of action with the perception of the benefits which related to the individual's value system. This is a phenomenon of self-awareness, which in terms of personal belief, is significant and known to be very important to the individual.

A number of studies have established higher correlations between perceived benefits and patient compliance. Specifically, Heinzelmann (1962) and Elling et al. (1960), both conducted studies with patients who were prescribed penicillin to prevent the recurrence of rheumatic fever. From these studies, two salient issues emerged. The first was that the patients were children and those who adhered to the therapeutic regimens and persisted in the follow-up therapy were adult parents. Secondly, the severity of the malady, rheumatic fever, suggested that severity may have a correlation with benefits. The importance of these issues rest in a study conducted by Cardis et al (1969), who found a negative response to the effectiveness of medication related to the previous argument that severity and benefits become significant variables when there is high correlation between them.

This argument becomes more poignant because Gabrielson et al (1967) and Gerber and Nehemkis (1979) found high correlation of benefits and severity with compliance and the same two issues prevailed. Gabrielson et al. further explored follow-up work with school children and found high compliance related to severity and benefits.

Perceived Barriers. Perceived barriers are the potential negative aspects of a particular health action, which may act as impediments to undertaking the

recommended behavior. Rosenstock (1974) believes that an individual weighs the issues in the context of a cost benefit analysis, wherein the individual weighs an action's efficacy against perceptions that it may be expensive, dangerous (having negative side effects or iatrogenic outcomes), unpleasant (painful, difficult, upsetting), inconvenient or simply time-consuming.

The end result of the decision making process in health and illness behavior, however, is much broader than cost or any specific issue. It usually involves a combination of at least two of the prevailing issues. Premised on a wide range of motivating influences, action is sparked for or against the health or illness condition. Such mentally sparked mechanisms were called by Rosenstock (1974) "cues to action." These "cues to action" may be evident by an internal and/or biological phenomenon, for example, physical symptoms. Externally, "cues to action" may be apparent through the use of media campaigns, interpersonal interaction, follow-up recommendations from health care professionals, and financial costs. Additionally, however, there are psychosocial variables that are possible factors in the formula and extend far beyond the cost benefit analysis suggested by Rosenstock.

Cues to Action. Cues to Action may counter the influence to "barriers to action." Simply stated an individual's belief system may convert cues to action into barriers. To further explain, an individual who is satisfied with his/her health status may in the course of time or for employment purposes and/or for insurance reasons, seek a medical physical examination. As a part of this endeavor, a reminder notice from the health care provider may "cue" the individual to believe that possibly something might

have shown and the "cue to action" becomes a "barrier to action."

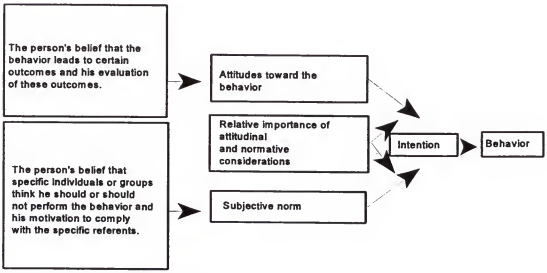
According to Janz and Becker (1984), few studies have attempted to evaluate the contribution of "cues" to predicting health action. A plausible explanation for the availability of many studies is the elusiveness of such "cues" for purposes of empirical study. "Cues" have their foundation in the inner sanctity of the individual's psyche, from the influence of socialization, from demographic factors such as sex, race, age, as well as from social psychological, and culturally structured variables.

THE THEORY OF REASONED ACTION

Concomitantly, the Reasoned Action Model (Fishbein and Ajzen, 1975), underscores the theoretical lining for this study. The purpose of this study is not an attempt to test the Reasoned Action Model; instead, the Theory of Reasoned Action is employed because it proposes the probability that reasoned behavior could be conditioned to regulate action in a manner that would induce behavioral change. A change of this nature could ultimately reduce patient noncompliance and improve health outcome. Despite the fact that the nature of this study is not predictive, rather exploratory, it does pursue the possibility of the prediction of behavior and behavioral outcomes, where feasible.

The Theory of Reasoned Action posits that behavioral intentions, which are the immediate antecedents to behavior, are a function of salient information or beliefs about the likelihood that performing a particular behavior will lead to a specific outcome.

The validity of the model rests in the previous applications such as Madden et al., 1992; Boyd and Wandersman 1991; Tedesco et al., 1991; Lierman et al., 1990; Brubaker and Fowler 1990; Ajzen and Fishbein, 1970 and 1980; Ajzen, 1985; Lowe and Frey, 1983; and Pagel and Davidson, 1984. A diagram of Ajzen's and Fishbein's (1980) model is presented in Figure 2.0. The model was originally developed in 1967; however, it was later refined in 1975 by Fishbein and Ajzen. To this end, Fishbein and Ajzen individually as well as collectively with other researchers endeavored to test and re-test the model for its reliability in the conceptualization of the use of the behavioral process in examining health behavior and preventive health



THE REASONED ACTION MODEL
Note: Arrows indicate the direction of influence
Source: Ajzen and Fishbein, 1980, Figure 1-1.

Figure 2.0 The Reasoned Action Model.

action. Moreover, Carter (1990) emphasized that the Theory of Reasoned Action can be considered as a "state-of-the-art" model with the capacity to predict whether a person will perform specific health behaviors" (pp. 85-86).

In this vein, it must be emphasized that according to Fishbein and Middlestadt (1989), in the social environment an intention should not be the driving force to indicate that a specific behavior will result. Instead, it should be restated that while an intention to be noncompliant with a therapeutic regimen may be conceptually broad, the manner of such relationship will be specific. To this end, it is only when the specific is known that education toward behavior modification may be attempted. Even then, it does not necessarily mean that the intention will provoke a specific behavior. Neither does it deny that a specific behavior will occur. More specifically, the individual behavioral response is predicated on the relative importance of attitudinal and normative considerations within the value system of individual reference group or peer group.

The proponents of the model made two distinct assumptions. First, the model makes no provision for institutional or traditional attitude (Fishbein & Ajzen, 1975). This assumption in regard to the present study allows for the exclusion of the wider value system of the society. Simply, sharing medications, skipping prescribed doses, or not taking the prescribed medications at all are viewed for what they are, as elements that promulgate and support noncompliance (Frishman and Aronson, 1993). As a result of such behavior, their behavioral intent is seen as a measure of the motivation to control or avoid this phenomenon of noncompliance as it relates to the

individual.

The second assumption, which is the primary concern of this study, is that behavior is more a matter of expediency than an expression of what is liked or disliked (Fishbein & Ajzen, 1975). From one perspective, expedience may suggest that behavior may be readily amenable to control. This perspective is not always viewed as the norm because expediency may be influenced by the entire range of elements as exhibited in the model.

The two distinct assumptions purported by the proponents of the Theory of Reasoned Action, nonetheless, do not exclude those elements of the Attribution Theory (Heider, 1958; Kelley, 1967, 1973; Weiner, 1985). Moreover, they do not exclude the assumptions set forth in the Multiattribute Utility Theory (Heider, 1958; Kelley, 1967, 1973; Weiner, 1985). In this domain, Carter (1990) posits that the Theory of Reasoned Action and Multiattribute Utility theory presently represent the state-of-the-art paradigms for predicting whether an individual will engage in certain health behaviors. This posture expressed by Carter is unequivocally, valid for the operationally defined form of the Multiattribute Utility Theory. The arrangement provides a hierarchial structure of multi-consideration decision problems divided into smaller behavioral components to ensure better management, by the individual, of the decision making process resulting in a behavioral outcome. Similarly, the factor of controllability of decision making that leads to behavioral outcomes, as derived from Attribution Theory, when juxtaposed to Weiner (1985) criteria definitely suggest that Multiattribute Utility Theory and Attribution Theory significantly weigh on the Theory

of Reasoned Action. While the Theory of Reasoned Action is cautious about predicting behavior, it still maintains an intimate relationship with Multiattribute Utility Theory and Attribution Theory suggesting the importance of behavioral outcomes when the controllability of the individual's decision making process is readily known. These elements, which are derivatives of Multiattribute Utility Theory and Attribution Theory, are critical and indicate that an understanding of the individual's multi-consideration decision process and the amount and nature of controllability exercised by the individual would enhance initiatives toward behavioral changes.

A distinct aspect of the Fishbein and Ajzen model, as well as the Health Belief Model, is that attitude and behavior, gives birth to expediency of a desirable outcome. Hence, selective types of behavior premised on an individual's attitude, if accepted subjectively could, as a matter of consequence, have a negative impact on patient compliance. In other words, when an elderly patient pursues a behavioral form contrary to compliance, the negative connotations that emerge can pose detrimental threats to health outcome. This posture can be relative, that is, as it pertains to a value scale. The emergence of such attitudes toward the behavioral framework of compliance and health outcome would allow selectiveness in that aspect which would have the highest relative importance. The association of this phenomenon to the components of the Health Belief Model is acceptable.

The concept of relativity is defined as those values which are deemed to be successful in changing the attitudes and beliefs of African American elderly toward compliance with prescribed medical regimen(s) in the treatment of cardiovascular

disease. Extrapolated from the Health Belief Model, it is clear that the premise for behavior is derived from its intent, and intent is itself the outcome of a balance of the relative importance of attitudinal and normative considerations as perceived by the individual.

Intervention Strategy for Behavioral Modification

Studies have shown (Fincham, 1988; Owens et al., 1991) that education and patient counseling are critical components to improving patient compliance. Additionally, particularly in reference to the African American elderly, a complete cultural and socioeconomic metamorphosis must occur and should begin with the values and attitudes of this sub-population, how they manifest them and how, in their subjective evaluation, a modification may be possible. The latter"how" is strongly influenced by why should the individual change and what exactly should be the change in relation to outcome. The failure of not considering these "hows" and "whys" could result in an ineffective intervention strategy based on values. The aforementioned circumstances, as it pertains to the Fishbein-Ajzen model as well as the Health Belief Model, are examined critically to establish a case for change by reasoned action and beliefs about cardiovascular disease related illness and noncompliance.

Relationship Among Variables

The Theory of Reasoned Action, as previously indicated, is premised on the assumption that an individual's behavior is predetermined by their underlying belief. Belief when translated into perception can, then, be associated to the Health Belief Model. As a result, when the behavior has been identified, it can then be assumed that

the determinant of any behavior is the individual's intention to perform that behavior. Such a decision is a function of the individual's attitude toward the behavior and his/her perceptions of the social pressures to perform or not to perform the behavior. Moreover,sociodemographic characteristics predetermine attitudinal, belief and normative considerations. Thus, the conceptual integration of the Health Belief Model and the Theory of Reasoned Action, mentioned earlier, which simultaneously considers the impact of sociodemographic factors, attitudinal/belief factors and normative factors, would greatly enhance one's understanding of elderly African American noncompliant behavior.

CONCEPTUAL INTEGRATION OF THE HEALTH BELIEF MODEL AND THEORY OF REASONED ACTION

Justification

The Health Belief Model and the Reasoned Action Model have made significant contributions towards understanding the finer mechanisms through which beliefs and intentions are seen as causal variables for behavior in health related issues. However, the major limitations of the Reasoned Action model is its emphasis only on the psychosocial and psychological variables. These variables are viewed as important on the causal processes which operate at the more structural level and remain obscure in the two models.

The preceding discussion on earlier pages has summarized the theorizing and major findings of the Health Belief Model and the Reasoned Action Model. The major thrust of the Health Belief Model is "that beliefs are in themselves sufficient conditions

for action" (Rosenstock, 1988, p.49). Similarly, the Reasoned Action Model assumes that individual behavior is determined largely by individual intentions (Michener, Delameter and Schwartz 1990, p.176). Despite their sophistication, there are limitations associated with these two models. The Health Belief Model operates only at the psychosocial level of analysis (Rosenstock, 1988 p.49). Similarly, the Reasoned Action Model, which operates at the psychological level of analysis (Lierman et al., 1990, p.178) are limited in accounting for much of the variations of individual behaviors in health-related issues.

Rosenstock (1988) commented on the limitations of the Health Belief Model and suggested that a more exhaustive set of variables should be included in the Health Belief Model. He proposes an emphasis on five factors: 1) intra personal factors, 2) interpersonal processes, 3) institutional factors, 4) community factors and 5) public policy including law. In this manner, Rosenstock is suggesting a model operating at the sociological and psychological levels of analysis.

In a similar vein, Lierman et al. (1990) suggest the shortcomings of the Reasoned Action Model for operating only at the psychological level of analysis. They stated that "... the Reasoned Action Model applies primarily to behavior under the individual's volitional control. Thus, the Reasoned Action Model does not apply to all behaviors, but is useful for explaining and predicting behaviors under the person's conscious, volitional control" (p.178).

These criticisms suggest that the variables included in the Health Belief Model and the Reasoned Action Model may not exhaust all the critical factors that are likely to

influence individual behavior in all health-related circumstances. A second concern of this study was the causal link between beliefs and behavior, as proposed in the Health Belief Model. In this model, sociodemographic variables were used as intervening variables. However, research on behavior underscores the importance of sociodemographic variables as independent variables rather than intervening variables.

Considering these criticisms, the proposed model of this study attempts to integrate the Health Belief Model and the Reasoned Action Model with relevant sociological variables, that is, using sociodemographic factors into a broader paradigm to guide this research and allowing for possible explanations of elderly African American noncompliant behavior.

Thus, this conceptual integration of the models, Health Belief and the Theory of Reasoned Action, which simultaneously consider the impact of sociodemographic factors, attitudinal/belief factors and normative factors, should greatly enhance the understanding of elderly African American noncompliant behavior. The variables that are components of the integrated model are presented below on page 47. Additionally, the discussion that follows outlines the direction of influence of these variables and their relationship in the proposed model for this study (Figure 3.0).

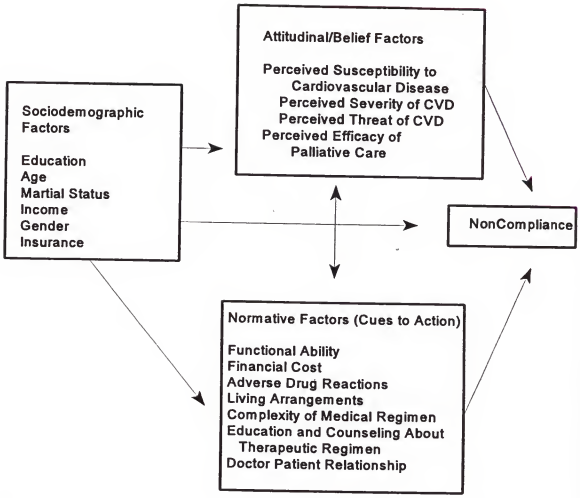


Figure 3.0 A Conceptual Model of Factors Explaining Patient Noncompliance Among African American Elderly

Note: This model was developed by the researcher. It employs concepts from the Health Belief Model (Becker et al., 1977) and the Theory of Reasoned Action (Ajzen & Fishbein, 1980).

List of Dependent and Independent Variables In the Study

DEPENDENT VARIABLE

Patient Noncompliance to Therapy

INDEPENDENT VARIABLES

Sociodemographic Factors

Education
Income
Age
Marital Status
Gender
Insurance

Intervening Variables

Attitudinal/Belief Factors
Perceived susceptibility to Cardiovascular Disease
Perceived Severity of Cardiovascular Disease
Perceived Threat of Cardiovascular Disease
Perceived Efficacy of Palliative Care

Normative Factors (Cues to Action)
Physical Barriers
Functional Ability
Financial Cost
Adverse Drug Reactions
Living Arrangements
Complexity of Medical regimen
Education and Counseling of Therapeutic Regimen
Doctor-Patient Relationship

Sociodemographic Variables (Independent Variables)

Education, sex, age, income, and marital status are used for describing the population under study. It is important to determine whether these variables could possibly be correlated to account for significant changes in behavior, such as an elderly's capacity to comply with a prescribed therapeutic regimen. It is possible for an interaction between any two variables to exude a variation between a patient's intent to follow prescribed regimen and the actual behavior toward compliance with the regimen. In this regard, the behavioral significance of such practices is of particular importance as it relates to African American elderly, who often sacrifice their health to achieve the basic necessities of life.

Sociodemographic variables influence both beliefs, and the behavioral outcome and as such would significantly affect an individual's decision whether to comply with a medical regimen or entertain those measures required to conquer economic deficiency and deprivation. The covariance of these variables and their limitations with behavior as an impetus to noncompliance was investigated. This study also provided information on specific correlations that dictate an individual's proclivity not to comply with medical regimen and possible measures of intervention that could promote change and ultimately increase compliance among African American elderly. Combined, the sociodemographic factors do not connote an attitude, an intent, or a behavior. However, according to Cummings et al. (1979) these variables better serve in promoting a more precise understanding of attitudinal behavior and their effect on resulting behavioral response.

Attitudinal/Belief Factors (Intervening Variables)

The attitudinal/belief factors of the model act as predictors and will provide a more concrete understanding of noncompliance of the study population. These factors include perceived susceptibility to cardiovascular disease, perceived severity of cardiovascular disease, perceived threat of cardiovascular disease, and perceived efficacy of palliative care.

While attitudes are not considered behaviors, they are antecedent to behavior and are determined by an individual's belief in an expected outcome (Fishbein & Ajzen, 1975). Herein lies the value of these factors to this study. Specifically, attitudinal/belief factors provide a channel to understand specific behavior and shed light on possible intervention to instill the commitment to and performance of compliance behavior.

To this end, a direct correlation between Attitudinal/Belief factors with Normative Considerations" Cues to action," an action when utilized enforces attitudes and beliefs is an ongoing interacting cycle. This relationship between attitudinal/belief factors and cues to action are represented as a bi-directional flow of influence (see figure 1.0 p. 32). This relationship denotes the major issue for behavior control.

Normative Consideration/Cues to Action (Intervening Variables)

This variable is a composite of several variables. Perhaps more than any other variable, its importance is determined by the reasoned actions which are important to the subject. Attitudes to normative behavior, influences not only the belief about the outcome, but also, the intent to weigh the issues specifically to determine the relevance

of behavior to some essential need (Fishbein, 1977; Fishbein & Ajzen, 1975; Ajzen, 1985).

In the view of Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980), the attitudes to normative behavior are most important because they are predictive. The intention to perform a certain behavior is well defined in the mind of the individual and has two major components: first, the individual's intention to respond with a specific behavior; and second, the strength of the social environment. Ward (1979), supported this position, but moved further to emphasize that it is important to enumerate very precisely the nature of those attitudes towards the behavior rather than the subject who is affected. If this is clear, then the act of sharing medications by the elderly is understood as an attempted mechanism to adhere to therapy. To attach responsibility for the consequences of such an action is to extend beyond the realm of the behavior into the realm of subjective values which may not have entered into the original intention. Therefore, these variables are examined carefully for the purpose of predictability.

Patient Noncompliance (Dependent Variable(s)

What is intended by the use of these variables is to provide a measure of outcome and behavioral purpose. This is in concert with the argument by Fishbein and Ajzen (1975) that the prediction of a specified behavior is predicated on the measurement of an equally specific behavioral intention. The variables, therefore, make the reference to specific behaviors from which patient noncompliance can be measured. Here, intentions are an alliance to motives or purpose, but intentions,

though attitudinally derived, are not attitudes per se.

Cummings et al. (1979) supported this approach, but extended the argument further by suggesting that the attitude towards an object may have no particular relation to a specific behavior. They contend that the emerging attitude towards a particular behavior must be specifically linked with the behavior before it can clearly be indicative of the behavior.

To predict a behavior presupposes a knowledge of the existence of modifying causal influences, cognitive factors, physical barriers, and possible consequences, outcomes and, ultimately, alternative protective courses of action (Fishbein & Middlestadt, 1989). When these are fully discovered and known to be under the volition of the individual, the probability of a specific behavior may be assumed.

A specific behavior is the ultimate outcome of reasoned action, but such outcomes are experienced by individuals via cognitive components, personal value judgments, and ultimate evaluation. In this vein, the proportion of reasonableness/unreasonableness will be the determinant of behavior and is relative to the purpose. Additionally, intervention to change behavior must be a derivative from that which is shown to be unreasonable in the ultimate sense of personal value and, therefore, a change in purpose. Assuredly, the individual must be induced to normatively realize the optimum manner of achieving safer and even more profitable results.

Summary

The conceptual paradigm, as it has been presented in this section, delimits four

critical factors: 1) the dependent elderly African American's noncompliant behavior; 2) the elements of the elderly sociodemographic factors which may determine the elderly African American's noncompliant behavior; 3) the intersection of those elements of their attitudinal/belief factors and the elements of the normative factors which may be determined by the elements of the sociodemographic factors; and 4) the influence of the sociodemographic factors on the attitudinal/belief factors and normative factors which, in turn, influence elderly African American noncompliant behavior.

The working assumptions of the study may be stated as follows: the sociodemographic factors influence the elderly African American's noncompliant behavior, and also their attitude and beliefs which, in turn, influence their noncompliant behavior. Furthermore, the sociodemographic factors influence both their attitudinal beliefs and normative factors, which, in turn, influence their noncompliant behavior.

Hypotheses

Based on the foregoing review of literature, theoretical framework and general purpose of this research, the hypotheses indicated below are to be examined in this study. These hypotheses are an attempt to respond to questions raised on studies centering on noncompliance. The direction of the hypotheses is influenced, in part, by the structure (e.g. sociodemographic, intervening attitudinal factors, intervening normative factors) of the conceptual model used in the study (see fig. 3.0, p. 46)

Kerlinger (1986) described hypotheses as important and indispensable tools of scientific research; they are "conjectural statement(s) of the relation between two or

more variables. However, just as important are the problems behind the hypotheses. In addition, hypotheses are presented in "declarative sentence form and related, either generally or specifically, variables to variables" (p.18). The following hypotheses are so described:

1. **Sociodemographic factors are predictors of patient noncompliance among African American elderly with cardiovascular disease.**

    H1a. Educational attainment has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

Educational Attainment (H1a): The available literature with regard to education and noncompliance was virtually nonexistent. Previous studies did not per se include this variable in the test equation. However, as a part of this study, close attention will be given to this variable. Education is vital to the reading and understanding of prescribed directions. Seemingly, low educational attainment should lead to an elderly individual being more noncompliant.

    H1b. Income has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Income (H1b): Fixed income among the elderly is of grave concern. This problem according to Lamy (1980) translates into a patients' inability to afford prescription drugs in the amounts called for by prescription directions. The relationship between noncompliance and drug costs has not the been the topic of much empirical research. Thus, drug costs are often neglected in studies to elicit information about patients' drug therapy decisions. However, despite the paucity of data, one emerging result from these studies (Darnell 1986; Brand 1977) suggested that patients were noncompliant

because of the astronomical cost of drugs and merely must opt for those necessities required for survival. In a later study by Col et al. (1990), the findings revealed that the patients' inability and/or willingness to pay for their medication (reflected in variables such as monthly cost of medications, opinion on the cost of medications, insurance coverage of medications, and income level) likewise affected the risk of noncompliance, in addition to the risk of hospitalization related to noncompliance.

H1c. Age (young-old, middle old, old and old-old) has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

Age (H1c): The literature is inconsistent in showing whether age is correlated to noncompliance. Clinicians may expect to see a high incidence of noncompliance in older patients because of the associations between age and the number of medications taken. Further, in a study conducted by Schwartz et al (1962), the findings suggested that advanced age may result in cognitive impairments such as amnesia, senility, and dementia which can prohibit an elderly individual from understanding and adhering to the prescription directions, thus leading to noncompliance. Noncompliance resulting from errors caused by cognitive impairment is particularly serious in the elderly individual residing at home alone. In this study, it is hypothesized, that the young old (50^{+}) are more compliant than the old-old, that is, those individuals (80^{+}).

H1d. Marital status; (i.e. not being married) has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

Marital Status (H1d): According to Schwartz et al. (1962), proportionately fewer

single and married patients were noncompliant than those who were widowed, separated, or divorced. The results of this study has indicated that all medication errors whether minor or serious were made most frequently by those persons whose marital status had changed. Additionally, the study showed that the potential of medication noncompliance was lowest for single persons and highest for those divorced or separated. Lastly, this study revealed that although the differences among categories are not large, marital status appears to offer some clue to medication noncompliance. Those individuals who fell into the same marital category all of their adult lives, whether single or married, were less prone to be noncompliant than those who shifted from married to nonmarried.

H1e. Gender: Males with cardiovascular disease are more noncompliant among African American elderly.

Gender (H1e): According to the findings reported for age, the sex of patients was not a factor in the tendency for an elderly person to be noncompliant. In this vein, both males and females were virtually identical with respect to medication noncompliance (Col et al.,1990).

In sum, sociodemographic factors as identified in the conceptual model, comprise one group of the factors affecting patient noncompliance among hypertensive cardiovascular African American elderly. Cummings et al. (1980) suggest that studies premised on beliefs and values for intervention strategies such as the Health Belief Model, indicate that non-attitudinal variables such as sociodemographic characteristics may facilitate a more coherent understanding of attitudinal behavior. It is anticipated,

therefore, that while sociodemographic factors are primarily descriptive of the group, the correlations between these factors and attitudinal/belief factors and normative factors may shed some light on behavior.

Health related attitudes are influenced by the sociodemographic factors, sex, age, marital status, income, and education. These components of the sociodemographic factors of this hypothesis and its sub hypotheses will be combined because of overlapping.

Leavitt (1979), examines the percentage of variance in general health service utilization by attitudinal and demographic variables. His findings suggest that the individual's perspective of vulnerability to illness is the best single predictor of utilization; however, as Leavitt conceded, the individual behavior is a product of several sociodemographic variables.

2. **Selected attitudinal/belief factors are predictors of Patient Noncompliance among African American elderly.**

   H2a. Perceived susceptibility has an inverse relation to patient noncompliance among African American elderly with cardiovascular disease.

Perceived Susceptibility (H2a): Presented earlier, perceived susceptibility refers to the individual's feelings of personal vulnerability to a disease condition; while some individuals may, for a myriad of reasons, think or believe themselves highly vulnerable, others do not. The perception of susceptibility has its origin within the individual's psyche and in social influences. Hence, the perceived susceptibility may be influenced by cost of treatment, therapeutic regimen, and motivation all of which could affect health-related behavior. Furthermore, while researchers (Becker et al.,

1974, Heinzelmann, 1962) identified correlation as well as divergence between perceived susceptibility and health-related behavior, there were no suppositions as to the causal factors that may influence belief in any direction.

H2b. Perceived severity has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Perceived Severity (H2b): Becker (1974) stated that perceived severity should be inclusive as an essential component of a sociobehavioral model of compliance. This element is dependent upon social consequences of the disease condition as perceived by the individual. As such, perceived severity can sustain both social and clinical implications, and can jeopardize an individual's health outcome predicated on duration with consequences of pain, disability, nature of illness and death, as well as the possible impact of these consequences and of therapeutic regimens on social, economic, and family factors.

H2c. Perceived threat of patient noncompliance has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Perceived Threat (H2c): Perceived threat customarily is discussed in terms of cost-benefit theories of perceived susceptibility and perceived severity. To this end, as a measure of threat, most available models reconcile cost and benefits as indicators of action (Becker & Maiman,1982; Cleary, 1987; Pagel & Davidson, 1984; Weinstein, 1987). These cost-benefit models usually establish a relationship between threat to a measure of harm or inhibition of function. However, Ajzen and Fishbein (1980), Fishbein (1977), and Fishbein & Ajzen (1975) consider threat in expectancy terms; that

is, threat measured in terms of the expectations which relief processes might produce. With regards to cardiovascular disease and patient noncompliance, clinical relief includes only palliative versus curative care, and the concept of threat, therefore, is related to the therapeutic regimen as a possible response to meeting the hazards of the disease. Kruglanski & Klar (1985) suggest hazard as the initial consideration in addressing the concept of threat. Perceived threat, therefore, is contingent on perceived susceptibility. The response to patient compliance would rely on the individual's perception of threat when there is fear of susceptibility.

H2d. Perceived efficacy of palliative care has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Perceived Efficacy (H2d): Perceived Efficacy according to Bandura (1977a), can be explained in the concept of self-efficacy. Here, Bandura (1977a) defines self-efficacy as distinct from outcome expectation. He presents it as " the conviction that one can successfully execute the behavior required to produce the outcomes" (p.79). For example, in order for an individual to comply with a prescribed therapeutic regimen, they must believe that such course of action will address their disease condition and protect them from negative health outcome. Therefore, individuals must believe that such a modification will be beneficial by yielding a valued outcome at acceptable cost. Moreover, the individual must feel competent (self-efficacious) to implement the change (Bandura 1977b).

3. Cues to action are predictors of patient noncompliance among African American elderly with cardiovascular disease.

H3a. Functional ability (i.e. an ambulatory individual) has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Functional Ability (H3a): In studies pertaining to functional ability of elderly patients to comply with medical regimen conducted by Meyer et al., (1989), the findings show that patients who were responsible for their own medication regimens were more likely to be able to read and understand medication directions, remove tablets, and identify pill colors. Patients with cognitive deficits were less likely to be able to perform these activities, although the presence of a cognitive impairment was not correlated with motor skills needed to take medications (i.e. they could still open prescription vials and remove and swallow tablets).

H3b. Adverse drug reactions have a positive effect on patient noncompliance among African American elderly with cardiovascular disease.

Adverse Drug Reactions (H3b): Adverse drug reactions for this study are defined as admission by the respondent of any undesirable clinical manifestation that is consequent to and caused by the administration of a particular drug. The clinical manifestation may be a clinical sign, or a symptom, or it may be a cluster of abnormal signs and symptoms. Adverse drug reactions continue to plague the elderly population. For example, Lindsay (1981) summarized data indicating that 24 percent of a group of hospitalized patients 80 years or older demonstrated adverse drug reactions.

H3c. Living arrangements (i.e. household size) have an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Living Arrangements (H3c): Approximately 25 percent of the nation's elderly live alone and the numbers are escalating. Many have experienced not only loss of spouse but also loss of relatives and friends; consequently, social isolation is becoming a commonplace among the elderly. Studies have demonstrated that compliance tends to be a greater problem among elderly individuals who are socially isolated (Haynes, Sackett & Taylor 1980; Hussar 1975; Blackwell 1973). One study reported that medication errors were more likely to be made by elderly people living alone than by those who lived with others. Potentially, serious errors were made by 42 percent of patients living alone, whereas such errors were made by 18 percent of those living with one or more persons (Schwartz et al., 1962).

H3d. Complexity of medical regimen has a positive effect on patient noncompliance among African American elderly with cardiovascular disease.

Complexity of Medical Regimen (H3d): Studies of drug use consistently show a negative relationship between patient compliance and the number of drugs taken by the patient (Francis, Korsch & Morris, 1969; Latiolais & Berry, 1969; Weintraub, Au & Lasagna, 1973; Hulks et al., 1975; Parkin et al 1976: Caplan et al. 1976; Darnell et al. 1986). Taking three or more drugs increases the likelihood that the patient will be noncompliant, either deliberately or unknowingly because 25 percent of elderly individuals consume three or more drugs as part of their daily treatment regimen (Botelho and Dudrak, 1992).

H3e. Education and counseling of therapeutic regimen have an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

Education and Counseling about Therapeutic Regimen (H3e): Education and counseling is in congruence with the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein, 1980). It presumes the dissemination of information by an acceptable medium significant enough to influence behavior against risk. A number of studies have observed that when an individual is counseled and provided with specific and in-depth instructions about their medical regimen, compliance is enhanced (Svarstad, 1976; Hulka et al., 1976). In this vein, a number of studies have documented that the elderly lack basic information about their medical regimen. They are uninformed about the name and purpose of the drugs, the dosage schedules, and the duration of the regimen and its possible side effects, or adverse consequences (Lundin et al. 1980; Lofholm, 1978; Klein et al, 1982).

The statistical significance of cues to action will be assessed by those processes, influences, or attitudes and beliefs, internal or external to the individual. In this study, cues to action are qualitative and normative factors. These factors are considered to be financial cost, living arrangements, complexity of medical regimen, physical barriers, functional ability, adverse drug reaction, education and counseling about therapeutic regimen and doctor-patient relationship. Since cues to action are normative, then culture, peers, and fundamental physiological forces would all influence action. These variables, however, are difficult to measure, but intent to select an action or not to act is considered by Ajzen and Fishbein (1980) to be reasonable substantiation of probable behavior.

4. **To determine the relative contributions of sociodemographic factors, attitudinal/belief factors, and cues to action in predicting patient noncompliance among African American elderly with cardiovascular disease.**

H4. Sociodemographic factors, attitudinal/belief factors, and cues to action have relative effects in predicting patient noncompliance among African American elderly with cardiovascular disease.

Noncompliance is a complex issue and can be difficult to understand; therefore, to ascertain a more comprehensive understanding of this phenomenon, this study employed as discussed earlier, a multivariate model of approach. To this end, a combined/cumulative and interactive effect was observed to better explain the variance in noncompliance among African American elderly. Ajzen and Fishbein (1980) argue that factors which predict behavior must not be mistaken with behavioral outcomes. The behavior outcome, in the opinion of Rosenstock (1974), Becker (1974) Janz and Becker (1984) suggests a dependence on attitudinal/belief factors, and can influence behavioral outcome. Hence, attitudinal/belief factors are indicative of the likelihood of a behavior.

Summary

In this chapter, a review was presented of the Health Belief Model (Becker, 1974) and the Reasoned Action Model (Ajzen & Fishbein, 1980). Such a review was required to ascertain the modified theoretical lining for this study. The modified model (see figure 3.0 p.46) consisted of combined elements from the two models. From the Health Belief Model (e.g. perceived susceptibility, perceived severity) and the Theory

of Reasoned Action (e.g. behavioral intention). The final section of the chapter ends with a selection of research hypotheses and a discussion of these hypotheses.

CHAPTER IV

METHODOLOGY

Overview

In this chapter, the methodology is presented. The emphasis is centered on the procedure employed in this empirical research endeavor. The chapter presents a discussion on the primary data collection method utilized in the study. Included are the discussion data source, sample design, data collection, operationalization of variables, data analysis and limitations of the study.

Pilot Study

Pilot tests were conducted to ascertain the appropriateness of the questionnaire. This was completed in three separate waves. In the first wave, a pilot test was conducted using a random sample at a local physician's office. During this wave, the purpose was to determine if the length of the questionnaire affected the study, as well as, the face validity of questions. The results of the first wave suggested that the questionnaire was too lengthy, and that certain questions which would not produce the required information in the study be deleted. Consequently, where appropriate, stronger questions that would yield responses salient to the study were substituted. Based on the observations made in the first wave, modifications were made to the questionnaire. In the second wave, the questionnaire was similarly tested using a random sample of inpatients drawn from the Veteran's Administration Hospital in Washington, D.C. Data were analyzed using SPSS. The findings of the second wave suggested that more sound questions were needed around the issue of

predisposing risk factors for cardiovascular disease. Based on the analysis of the data, the third wave included a final revision of the questionnaire.

Data Source

The study examined the extent to which African American elderly, both outpatient, that is those persons whose medical care is being managed by continued routine and follow-up office visits to their physician and inpatients, those whose acute needs are being addressed in the hospital proper were noncompliant with their prescribed therapeutic regimen. The entire patient mix in the study had cardiovascular disease. Approximately fifty percent of the survey consisted of demographic, and general health questions. These questions provided information on basic health characteristics of the sample. The remaining fifty percent was designed to elicit responses regarding behavioral intention with respect to compliance with prescribed medical regimen.

Sample Design

The sample design was a systematic random sample which facilitated a cross-sectional sampling of the non-institutionalized and institutionalized elderly population. The sample size was 140 completed interviews (70 outpatient and 70 inpatient). A representative outpatient sample of elderly African Americans diagnosed with cardiovascular disease was drawn from personal interviews in the offices of two participating physicians with community-based practices. The combined patient population of these two physicians was approximately 1000. However, because of the parameters of the study, the patient mix that met the criteria of the study was narrowed

to 70 persons. On two days each week, the participating physicians kept office hours that would produce patients who were eligible for the study.

Similarly, the inpatient sample was obtained from patients admitted to Howard University Hospital, Washington, D.C., a 285 bed acute-care facility bearing the same study population profile as those selected from the outpatient population. This sample size still ensured a representative sample with a tolerated error of 6% in either direction of the estimate within a 95% confidence limit (Bohrnstedt and Knoke, 1982).

Research Design

The research design used in this study was a cross-sectional survey. Respondents were randomly selected from a patient population of elderly African Americans who bear a diagnosis of cardiovascular disease, both in outpatient and inpatient settings.

Reasons for Using a Cross-Sectional Survey Design

This design was the most appropriate one for this study for the following reasons:

(1) The design represents valid strategies for formulating causal propositions to the extent that theoretical guidance and randomization procedures are utilized.

(2) It is the best design to reduce pretest effect.

(3) Limitation of time and funds make this design the most feasible.

Measurement Instrument and Variables

A study questionnaire consisting of a series of questions designed to elicit

information about perceived health status, compliance with therapeutic regimen and attitudes, and behavioral practices was administered. The questionnaire reflected questions related to major variables of the study. These survey questions were written to operationalized predictors of noncompliance as defined by the study's integrated model. The instrument include domains that were related to the variables of the study and that were culturally appropriate to noncompliance that appear relevant to the African American elderly population challenged with cardiovascular disease.

Questions were constructed using primarily dichotomous and Likert-Type ratings. Domains include sociodemographic variables, attitudinal/belief factors and normative factors, such as financial costs, physical barriers, etc. The questionnaire (see sample of study questionnaire in Appendix II) was comprised of three basic sections: general health, sociodemographic, compliance, and behavioral intention. The essential concepts measured in the general health section included respondent's knowledge about cardiovascular disease, precursory factors of the disease, understanding the nature of the disease, as well as perceived susceptibility to the disease. Additionally, questions relating to health care access, health care utilization, disability and perceived health status were also ascertained. The specific questions addressed illness, functional disability and chronicity of disease, as well as the social, demographic and economic attributes of the respondent. The questions in the compliance section specifically addressed the doctor-patient relationship, the ability to cope with diagnosis, and adherence to a complex therapeutic regimen. In the behavioral intention section, the questions addressed the respondent's intent to engage

in behavioral modification based on beliefs about the efficacy of palliative methods and behavioral practices to prevent cardiovascular disease. Table 1 presents an overview of the measurement instruments of the study. The selected measurements meet the challenge of validity and reliability as evidenced in previous studies, Moore, 1991; Cramer and Spilker, 1991; Lipton et al 1988; Homedes, 1991; as well as through the exercise of the pilot study.

TABLE 1

OVERVIEW OF MEASUREMENT INSTRUMENTS OF THE STUDY

Variable	Type	Measurement	References
Perceived Susceptibility to Cardiovascular Disease	Independent Variable	Four Predisposing Health Conditions; 3 Antecedent Issues of Cardiovascular Disease	Moore, MA (1991) NHLBI American Journal of Public Health (1992)
.Hypertension			
.Diabetes			
.High Cholesterol			
.Weight Control			
.Prone to Heart Disease			
.Lifestyle			
.Family History			
Perceived Severity of Cardiovascular Disease	Independent Variable	Three Indicators of Severity of Cardiovascular Disease	Derived from Review of Literature and Pilot Testing

CONTINUED

TABLE 1 (continued)

Variable	*Type*	*Measurement*	*References*
Perceived Threat of Cardiovascular Disease	*Independent Variable*	*Two Measures of Fear on a Likert Scale for Each*	*Cramer and Spilker (1991)*
Perceived Efficacy of Palliative Care	*Independent Variable*	*Two Measures of Effectiveness Using a Likert Scale for Each*	*Cramer and Spilker (1991)*
Compliance	*Dependent Variable*	*Five Related Factors Each Yielding a Summated Likert Score on each of its Scales*	*Lipton et al (1988) Homedes (1991)*
.Follow instructions (FOLINSMD)			
.Take medications frequently (FRQTKEMD)			
.Intend to purchase all medicines (ITPDCHMD)			
.Skip/stop taking medications (PEFFSKST)			
.Likely to take medicines as prescribed (TKEMDPRE)			

Data Collection

Administration of Questionnaire

All data were collected by the researcher. To collect the data, the researcher utilized face-to-face interviews, after obtaining informed consent. The Outpatients respondents were interviewed in the private offices of two participating physicians both of whom specialize in cardiovascular diseases. The combined patient population of the two physicians is approximately 1000. However, due to the parameters of the study, the patient mix that met the criteria of the study was narrowed to 70 persons.

The inpatient data were collected solely from respondents admitted to Howard University Hospital, Washington D.C. Howard University Hospital is a 285 bed teaching facility, that provides acute care. The patients who were participants of the study had a spectrum of diagnoses, and, supported a clinical history of cardiovascular disease. These patients were African Americans 50 years or older, who, in some cases, had previous admissions due to some form of noncompliance of prescribed therapeutic regimen, as indicated in patient charts. Each interview was approximately twenty minutes in duration. The interviews were started in March 1995 and completed in August 1995.

IRB Approval

The study's provisions for protection of human subjects were reviewed by the Howard University Institutional Review Board. Approval was granted for a period of August 29, 1994 to August 28, 1995.

Informed Consent

Each participant in the study sample was advised of the research purpose. Subjects were informed that participation was voluntary and that they may withdraw and discontinue participation in the study at any time without jeopardizing their relationship with Howard University.

Confidentiality

Each respondent was advised that absolute confidentiality would be maintained. Moreover, the survey questionnaire does not contain any identifying information about participants. Subjects were assigned respondent identification numbers (RID), for data entry purposes.

Measurement of Variables

Sociodemographic and Related Characteristics of the Sample

Table 2 indicates frequency distributions of attitudinal/belief factors and normative factors as it relates to the sociodemographic variable education used in the analysis. There are six major sociodemographic variables in the study. These variables include education, age, marital status, income, gender and insurance. Table 2 descriptively suggests that education is a important factor as it pertains to an individual's perception about certain aspects and contributing factors to cardiovascular disease.

TABLE 2

Frequency and Percentage Distributions of Sociodemographic Factors of the Study Population

Variable	*Number*	*Percent (%)*
GENDER		
Male	*62*	*(44.3)*
Female	*78*	*(55.7)*
AGE		
50 - 59	*24*	*(17.1)*
60 - 69	*38*	*(27.1)*
70 - 79	*56*	*(40.0)*
80 >	*22*	*(15.7)*
MARITAL STATUS		
Single	*21*	*(15.0)*
Married	*49*	*(35.0)*
Widowed	*43*	*(30.7)*
Divorced	*20*	*(14.3)*
Separated	*7*	*(5.0)*
EDUCATION		
0-11 Years	*67*	*(47.9)*
High School Graduate	*25*	*(17.9)*
Some College	*17*	*(12.1)*
College Graduate	*13*	*(9.3)*
Graduate/Professional/ Degree	*13*	*(9.3)*

Continued

Table 2 (continue)

Variable	*Number*	*Percent (%)*
PERSONAL INCOME		
< 5,000	*35*	*(25.0)*
$ 5,001 - 10,000	*37*	*(26.4)*
$10,001 - 20,000	*17*	*(12.1)*
$20,001 - 30,000	*14*	*(10.0)*
$30,001 - 40,000	*16*	*(11.4)*
>40,001	*14*	*(10.0)*
Missing	*7*	*(5.0)*
HEALTH INSURANCE COVERAGE		
Medicare (MCR)	*19*	*(13.6)*
Medicaid (MCD)	*19*	*(13.6)*
HMO	*7*	*(5.0)*
Private Carrier (PVT Carrier)	*40*	*(28.6)*
MCR & MCD	*16*	*(11.4)*
MCR & HMO	*16*	*(11.4)*
MCR & PVT Carrier	*17*	*(12.1)*

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 3

Frequency Distributions of Attitudinal/Belief Factors and Normative Factors By Education Level (all are percents except as indicated)

Variable	Level I*	Level II	Level III	Probability+
Perceived Susceptibility to Cardiovascular Disease (CVD)				
Prone to heart disease	71.7	63.4	58.1	.3970
Have diabetes	48.5	45.2	25.8	.0986
Have high cholesterol	38.1	48.8	20.0	.0458
Have hypertension	86.6	90.5	87.1	.8223
Family history of heart disease	53.0	66.7	48.4	.2339
Lifestyle contribute to heart disease	61.3	75.0	80.0	.1278
Have weight problems	41.5	47.6	32.3	.4192
Perceived Severity of CVD				
Lifestyle affected since heart disease diagnosis	55.2	42.9	53.3	.4365

CONTINUED

TABLE 3 (continued)

Variable	Level I*	Level II	Level III	Probability+
Pain since diagnosed in heart disease	53.7	35.7	22.6	.0096
Perceived Threat of CVD				
Do you take medications prescribed	80.6	92.7	96.7	.0427
Fear of seeing doctor	11.9	11.9	3.3	.3833
Perceived Efficacy of Palliative Care				
Feel better taking prescribed medication	83.6	73.2	54.8	.0103
Skip or stop taking medication when feel better	58.2	23.8	9.7	<.0001
Functional Ability				
Walk with a cane or walker	44.6	38.5	13.3	.0117
Able to walk with or without assistance	56.7	66.7	83.9	.0308
Financial Cost				
How expensive are medications	28.8	48.8	41.9	.0996
Living Arrangements				
Living alone	41.8	31.0	38.7	.5217

CONTINUED

TABLE 3 (continued)

Variable	Level I*	Level II	Level III	Probability+
Living with a significant other	38.8	28.6	41.9	.4298
Doctor Patient Relationship				
Evaluate physician relationship (Good relationship with doctor)	85.1	85.7	100	.0762
Complexity of Medical Regimen				
Number of medications currently taking **(AVG)*** **	3.3(1)	3.5(1)	3.2(1)	No significant between means
Education and Counseling About Therapeutic Regimen				
Doctor discuss prescription	58.2	78.0	73.3	.0753

Level 1 < High School Diploma
Level 2 High School Diploma and/or Some College
Level 3 College Degree

+Chi-Square
No Difference by ANOVA

Sociodemographic Characteristics

Age

Age was obtained by asking the respondent's chronological age in years. The age of the study population ranged from 50-97 years. The age categories used in the study are as follows:

1. 50-59
2. 60-69
3. 70-79
4. 80 and over

These categories are based on the gerontological definition of young-old (50-59), middle old (60-69), old (70-79), and old-old (80 and over).

Gender

This variable is of importance seemingly since African American women have a longer life expectancy than their male counterpart. Consequently, the likelihood of experiencing more chronic illnesses is a distinct possibility as well as potentially noncompliance.

Marital Status

Respondents were asked to indicate marital status as follows:

1. Single (living alone)
2. Single (living with someone)
3. Married
4. Widowed

5. Divorced

6. Separated

However, for purposes of the study analysis, the categories of the variable were Living With Significant Other (LWSO **married**(=1) and **not married**(=0).

Education

Respondents were asked to indicate the number of years of school they had completed in the following categories:

1. Elementary

2. High School Graduate

3. College Graduate

4. Some Graduate School

5. Graduate Degree

6. Technical School

7. Professional School

In the analysis, this variable was collapsed to three levels of educational attainment: less than high school(=1), high school but some college(=2), college graduate(=3).

Personal Income

Respondents were asked to identify their personal income from a range beginning with less than $5,000 and concluding with $40,000 and over. The income categories were as follows:

0. less than $5,000

1. $5,001-10,000

2. $10,001-20,000

3. $20,001-30,000

4. $30,001-40,000

5. $40,001 and over

In terms of analysis, the income levels were assigned a value of 0-5. These values were treated as continuous variables in the T-test and Logistic Regression.

Household Income

Similarly, respondents were asked to identify their household income from a range beginning with less than $10,000 and concluding with $60,000. The income categories were as follows:

0. less than $10,000

1. 10,001-20,000

2. 20,001-30,000

3. 30,001-40,000

4. 40,001-50,000

5. 50,001-60,000

Likewise, as used in the analyses of personal income, the household income levels were assigned a value of 0-5. These values were treated as continuous variables in T-test and Logistic Regression.

Operationalization of the Independent Variables

The independent variables were comprised of sociodemographic factors which have been previously described. The other independent variables included

attitudinal/belief factors and normative factors also known as "cues to action."

Intermediate Variables

The intermediate independent variables were comprised of attitudinal/belief factors and normative (cues to action) factors. The attitudinal/belief factors included perceived susceptibility to cardiovascular disease, perceived severity to cardiovascular disease, perceived threat of cardiovascular disease and perceived efficacy of palliative care. The normative (cues to action) factors included functional ability, financial cost, adverse drug reactions, physical barriers, living arrangements, complexity of medical regimen, doctor-patient relationship and education and counseling about therapeutic regimen.

Attitudinal/Belief Factors

Perceived Susceptibility to Cardiovascular Disease

This variable was determined by responses to the following questions:

Do you have any of the following medical problems? Hypertension, diabetes, high cholesterol or overweight.

1. Yes
2. No
6. Don't Know (DK)
7. Not Applicable
8. Refused

Do you feel you are prone to heart disease?

1. Yes

2. No

6. DK

7. Not Applicable

8. Refused

Do you have a family history of heart disease?

1. Yes

2. No

6. DK

7. Not Applicable

8. Refused

Have you ever used tobacco products?

1. Yes

2. No

6. DK

7. Not Applicable

8. Refused

Do you feel an individual's lifestyle may cause heart disease?

1. Yes

2. No

6. DK

7. Not Applicable

8. Refused

Perceived Severity of Cardiovascular Disease

This variable was determined by the responses to the following questions:

Have you experienced much pain since your diagnosis?

1. yes
2. No
6. DK
7. Not Applicable
8. Refused

Since diagnosed with heart disease has your lifestyle been affected?

1. Yes
2. No
6. DK
7. Not Applicable
8. Refused

Have you become disabled since being diagnosed with heart disease?

1. Yes
2. No
6. DK
7. Not Applicable
8. Refused

Perceived Threat of Cardiovascular Disease

Determination of this variable was ascertained from responses to the following

questions:

For fear of becoming sicker, do you take your medication(s) as directed?

1. Yes
2. No
6. DK
7. Not Applicable
8. Refused

Has fear of seeing a doctor ever kept you from getting medical care?

1. Yes
2. No
6. DK
7. Not Applicable
8. Refused

Perceived Efficacy of Palliative Care

This variable was described by responses to the following questions:

When you take your medication(s) as directed, do you feel better?

1. Yes
2. No
6. DK
7. Not Applicable
8. Refused

When you are feeling better, do you skip or stop taking your medications?

1. Yes

2. No

6. Dk

7. Not Applicable

8. Refused

Normative Factors (Cues to Action)

This variable was determined by responses to the following questions:

Functional Ability

Do you walk with a cane or walker?

1. Yes

2. No

Have you become disabled since being diagnosed with heart disease?

1. Yes

2. No

Financial Cost

How expensive would you say medications are for you?

1. Not Expensive at all

2. Slightly expensive

3. Expensive

4. Very Expensive

However, in the analysis, this variable has been recoded as expensive(=1) and not expensive(=2).

Adverse Drug Reaction

Has any of your medications ever made you sick?

1. Yes
2. No
6. Don't Know
7. Not Applicable
8. Refused

Did you stop taking the medications?

1. Yes
2. No
6. Don't Know
7. Not Applicable
8. Refused

Operationalization of the Dependent Variables

Manifestations of patient noncompliance are the dependent variables to be explained in this research. These variables are explained in the context of behavioral intention. The definition of behavioral intention is based on Ajzen and Fishbein (1980) and Becker et al (1974;1988). While the study utilized six measures of noncompliance, three were examined to ascertain the relative relationship and impact. The three measures selected included likely to take medicines as prescribed; skip/stop taking medications; and take medications frequently. Noncompliance was assessed by interpreting responses to the following:

When you are feeling better, do you skip or stop taking your medications? (PEFFSKST)

1. Yes
2. No
6. Don't Know
7. Not applicable
8. Refused

How likely are you to take the medicines as prescribed by your doctor? (PEFFMED)

1. Very Unlikely
2. Unlikely
3. Likely
4. Very Likely

How frequently would you say that you take your medications? (FRQTKEMD)

1. Not at All
2. Sometimes
3. Frequently
4. Very Frequently

Do you follow the instructions on how and when to take your medications? (FOLINSMD)

1. Yes
2. No

6. Don't Know

7. Not Applicable

8. Refused

Do you intend to purchase all prescribed medicines? (ITPDCHMD)

1. Very Unlikely

2. Unlikely

3. Likely

4. Very Likely

How likely are you to take the medicines as prescribed by your doctor? (TKEMDPRE)

1. Very Unlikely

2. Unlikely

3. Likely

4. Very Likely

Statistical and Data Analysis

The data from the interviews were first examined for predicted patterns, categories, and themes. A coding scheme was developed and the resultant coded data were statistically analyzed. Specific case anecdotes are described below to amplify the quantitative results.

Statistical information provides a context for viewing the relationships among the variables in order to assess the extent to which the theoretical assumptions embodied by these relationships are sustained by the data. Therefore, the data was

analyzed in terms of the relational associations cited in the hypotheses. Test for statistical significance used in the analysis of the data were two sample T-tests with appropriate measures of variance to compare means, analysis of variance, chi-square, test for proportion, and logistic regression. Significance was accepted at the $<.05$ level.

Logistic regression allows the researcher to analyze the effects of a set of independent variables on a dichotomous dependent variable. Initially, a preliminary analysis was conducted to examine the bivariate relationship between hypotheses H1a through H1e and the dependent variable. Moreover, frequency and percentage distributions were examined for the purpose of describing the study population. In addition, each of the predictor variables (i.e. sociodemographic factors, attitudinal/belief factors, normative factors) were inserted sequentially into the logistic regression analysis to ascertain the relative contribution of each factor.

Logistic regression is an appropriate statistical tool for this research because it allows the researcher to do the following according to Nie et al (1975).

1. Describe the separate, collective, and relative degree of influence a set of independent variables may have on the multiple predictions of a single dichotomous dependent variable;
2. Show changes in the dependent variable as a result of changes in the independent variables; and
3. Used as an inferential tool by which the relationships in the population are evaluated from the examination of sample data.

Logistic regression analysis is an alternative method of classification when the multivariable normal model is not justified. Contrary to ordinary least squares regression models, logistic regression models "are premised on the assumption that the underlying relationship can be represented as a logistic function" (Cleary & Angel, 1984). Therefore, logistic regression analysis presents a relationship that is nonlinear; that is, the relationship between the independent variable and the probability is nonlinear, and the probability estimates should always lie between 0 and 1.

In this study, the probabilities associated with the logistic regression are used to determine how specific sociodemographic, attitudinal/belief factors, and normative factors increase or decrease the probability of utilizing actions that would decrease patient noncompliance among African American elderly with cardiovascular disease.

The technique of logistic regression is increasingly becoming a more utilized tool among social scientists (Morgan & Teachman, 1988). Additionally, according to Walsh (1987), this technique, unlike any other, permits the researcher the ability to examine the effects of a set of predictor variables on a dichotomy with "Minimal statistical bias and loss of information." However, the logistic regression technique has been in existence and has been employed in statistical analyses for many years. It was not until Truett, Cornfield, and Kannel (1967) utilized the model to provide a multivariate analysis of the data collected from the Framingham Heart Study, that researchers gained an insight into the technique's complete capacity. Because of this landmark utilization of this technique, it has become the acceptable model for regression analysis of dichotomous data, particularly among the clinical and social

science arena.

Similarly, like multiple regression and other statistical models, logistic regression provides support to the nomothetic approach to understanding social phenomena. In accordance with Babbie's (1983) perspective of the nomothetic approach as "probabilistic," the logistic regression model estimates the probability of an individual being classified into one of two populations, that is, the possibility of an event occurring or not occurring and the odds ratio being a measure of the association between the two possibilities. Further, when this model is used to describe risk factors, it is an estimation of the dominance of a factor as it relates to the relative risk. For example, the likelihood of utilizing an action or not utilizing an action to preclude an individual from being noncompliant for such factors as sociodemographic factors, attitudinal/belief factors, and normative factors as discussed in the present study.

Assumptions

To obtain the most consistent results in relation to the data, the researcher must be cautious and use the qualified appropriate statistical technique. To this end, Pedhazur (1982) states that the proper use of a technique requires that the researcher be cognizant of the corresponding rationale and assumptions underlying the technique. If such knowledge is not known by the researcher, violations of the assumptions would lead to biases. Close adherence to these assumptions must be followed to ensure the appropriate employment of the procedure. As a result, with mandatory compliance to procedure, correct estimates and generalizations derived from the use of the technique are ensured, and then the basic assumptions are achieved.

For the technique of logistic regression analysis, there are four major assumptions which must be satisfied in order to yield sound unbiased estimators when using multiple logistic regression.

These assumptions are as follows:

1. Heteroscedasticity
2. Normality
3. Use of a categorical dependent variable
4. Multicollinearity

Heteroscedasticity

In the logistic regression model, the regression coefficients are not held constant over the range associated with the variable of outcome. Instead, the logistic regression coefficients indicate the possibility of an event occurring or not occurring. Hence, the effect of logistic coefficients varies with the magnitude of the responses and, consequently, are interactive, and the effect of each independent variable, through the interactive nature of the variables is a function of other independent variables in the equation. This characteristic is fundamental and required for this type of analysis (Cleary and Kessler, 1982). It differentiates the Sigmoid models from the linear models. In this regard, it is essential to determine the value of each independent variable to the analysis. Heteroscedasticity improves the reliability of the outcome in the study of population samples.

Heteroscedasticity is achieved when the error terms are not equally distributed across values of each independent variable. This assumption was not violated in this

study. Examining whether the assumption of heteroscedasticity was violated required examining the variables to determine if they were highly related to each other. The variables in this study are not highly related to each other (see appendix VIII, correlation matrix). Specifically, none of the correlations between the independent variables in the study was as high as .80 or .90.

Normality

The test for normality is accomplished when the maximum likelihood logistic regression is not distributed multivariately normal (McFadden, 1976). The maximum likelihood logistic regression is the most appropriate technique of measurement, subject to the sigmoid form. In this vein, it is expected that a marginal increase in a lower level of an independent variable is unlikely to result in the same increase in probability of a marginal increase in the higher levels of the dependent variable. For example, when the probability of the log odds of fall into either of two groups represented by the value of the dependent variable, the log odds lie within the range of .25 to .75, and the relationship between the log odds and probability becomes nearly linear. This linear function yields reliable information concerning the relative value of the predictor variables.

The assumption can be made that when the log odds of the dependent variable lies within the range of .25 to .75, the array of the dependent variable will demonstrate a normal design assimilating the curvilinear design to a linear function (Babbie, 1983). According to Tabachnick and Fidell (1989)--

"If variables are univariate normal, they do not necessarily have a multivariate

normal; however, it is more likely that the assumption of multivariate normality is met if all the variables are normally distributed" (p.79).

Thus, normality was examined by observing the distribution of the variables, in particular, the skewness and kurtosis value of the variables. When the distributions of variables are normal, the values of skewness and kurtosis are zero, although the values of plus or minus 1.0 are also acceptable (George and Mallery, 1995); Tabachnick and Fidell, 1989). None of the variables in this study violated the assumption of normality.

Use of Categorical Dependent Variable

Categorical variables in which the measurement variables are a set of categories will usually be indicated by the latter letters X,Y, and Z of the alphabet. Conversely, explanatory or independent variables are represented by letters in the first segment of the alphabet, for example, A,B,C only if they are qualitative. If a letter of the end of the alphabet is assigned they are quantitative. Although this specification must be satisfied, both variables have no formal ordering such as race, marital status, sex, and ordinal variables, for example, attitudinal response factors which have no ordered levels, and are inclusive among the categorical variables which are measured in this study. The order in which these variables are listed have no statistical significance.

Logistic regression is based on the assumption that the parameters of the model are estimated on the maximum likelihood method. Here, the coefficients that comprise the observed results have the highest probability of being selected. The logistic regression model is curvilinear in nature; thus, an iterative algorithm facilitates the required parameter estimation. Arithmetically, the value of the variables can readily be

established on a scale of 0 to 1.

The data used in this research met this assumption because the following dependent variables, although originally measured on an ordinal scale, were recoded into a dichotomous variable (zero=yes and one= no).[1]

1. Take medications frequently (FRQTKEMD)
2. Intend to purchase all medicines (ITPDCHMD)
3. Skip/Stop taking medications (PEFFSKST)
4. Likely to take medicines as prescribed (TKEMDPRE)

The fifth dependent variable, follow instructions on how to take medications (FOLINSMD), was originally measured as a dichotomous variable (one=yes and two=no).

Multicollinearity

Multicollinearity by definition is the high correlation of the independent variables with varying fluctuations of coefficients across the variable sets. In these circumstances, which is the rule more often than the exception, the coefficients may not be uniquely determined. It is still a requirement to test for multicollinearity by the regression of each independent variable on the others with which it shows correlation. The purpose of the test is to establish linearity as an indication of correlation and then measure the tolerance level of each variable in the regression equation. If results suggest a low tolerance level, this is indicative of multicollinearity among the variables

[1] In the analysis, yes (0) was the equivalent to compliance and 1 (no) was the equivalent to noncompliance.

and the possibility of a need to collapse highly correlated variables to form a new variable.

According to Norusis (1988), a tolerance level of greater than .01 is acceptable for this analysis and as such, multicollinearity should not pose a problem in the analysis for this study. Multicollinearity was tested by examining whether the independent variables were highly correlated using the correlation matrix. According to some analysts (Asher, 1983; Tabachnick and Fidell, 1989), multicollinearity is problem when the variables are too highly correlated (.80 or .90). This assumption was not violated in this study

because none of the correlations between the independent variables in the study were as high as .80 or .90.

Summary

Logistic regression analysis can be a statistically complex technique. However, because of this characteristic, the preceding discussion attempted to provide clarity to utilization, and to the assumptions that must be met. This clarity leads to the appropriateness of when this technique can be employed by the researcher. The assumptions as they apply to logistic regression are clearly delineated. To ascertain if any of the assumptions were violated, several measures were utilized. First, in relation to heteroscedasticity, the residuals were examined with the predicted values of the dependent variable. Second, normality was examined by observing the distribution of the variables--in particular, the skewness and kurtosis value of the variables. Finally, pertaining to multicollinearity, the purpose was to test for linearity as an indication of

correlation and then measure the tolerance level of each variable in the regression equation. In this study, none of the variables were highly correlated according to the correlation matrix. A value of .80 or .90 would suggest that the variables were highly correlated.

Limitations of the Study

This study presents limitations which include a small facility-based sample size including only African Americans. African Americans are somewhat under represented in studies of this nature, but have higher morbidity and mortality rates for cardiovascular disease and hypertension. Consequently, it is important to ascertain if there existed a relationship between noncompliance and African American elderly who have cardiovascular disease. Nonetheless, the findings about these patients' perceptions, attitudes, and behavioral practices around taking medications as prescribed are consistent with similar compliance studies using larger community based samples of African Americans and facility-based samples of whites (Blumhagen, 1982).

CHAPTER V

RESULTS

Overview

This chapter reviews the results of logistic regression as a statistical technique to determine which variables emerge as significant independent predictors of noncompliance. Standard bivariate techniques were employed to uncover any association of the various classes of independent variables with the measure of noncompliance. Logistic Regression generates an odds ratio as an instrument of measurement. Specifically, when the odds of noncompliance, as measured by behavioral intent, are accompanied by a p value of $< .05$, then it can be concluded that behavioral intent has a strong probability of being accepted as an independent variable which reflects patient behavior.

Introduction to Results

The interview schedule sought to assess respondents' intent to engage in noncompliance. Logistic regression provides maximum likelihood estimates of the effects observed by independent dichotomous variables. Specifically, this technique uses the "odds ratio" to measure the strength and magnitude of relationships between variables. According to Fienberg (1985), there are several desirable properties of the odds ratio as a measure of association. First, an odds ratio greater than 1.0 suggests for example, a higher probability of patient noncompliance. Conversely, an odds ratio of less than 1.0 denotes decreasing probability of noncompliance. Second, logistic coefficients indicate the probability of the odds of an event or variable occurring, e.g.,

in this study, the probability that the patient will or will not comply with their prescribed therapeutic regimen. Hence, a coefficient greater than one increases the odds, while a value less than one decreases the odds. The important concern related to the usefulness of the log coefficient lies in the significant level assigned to it, which is .05 or .01.

Bivariate Relationships

Tables 4 and 5 present the relative effects of education and gender respectively, in relation to attitudinal/belief and normative factors. Specifically, Table 4 reflects how each of the independent attitudinal/belief factors (H2a-H2d) (see hypotheses), as well as normative factors (H3a-H3f) impact noncompliance, when compared with education (H1a). The findings suggest that within each variable category of attitudinal/belief factors there is at least one variable that exhibits significance. For example, in the category of perceived susceptibility to cardiovascular disease having high cholesterol proved to be significant ($p < .0458$). While perceived severity of cardiovascular disease reflected significance in pain since diagnosed with heart disease ($p < .0096$). Similarly, with regard to perceived threat, cardiovascular disease taking medications as described was significant ($p < .0427$). Lastly, perceived efficacy of palliative care suggested significance when feeling better and medications are skipped or stopped ($p < .001$). Thus, one might conclude that in those with lower educational attainment, attitudinal factors are more likely to be predictors of noncompliance.

Similarly, the data in Table 5 present the identical independent variables in association with gender (H1e). Conversely, the results indicate that only three of the

variables within the category of normative factors are significant. For example, males are more likely to walk without assistance than females. According to Cramer and Spilker (1991), this is important for individuals to comply with a therapeutic regimen. Other such impeding issues that are effected by functional ability include ensuring that prescriptions to be filled are submitted to the pharmacy and, ability to open medicine vials. These concepts have been used to indicate an individual's perception of adherence to a therapeutic regimen as well as the likelihood of complying. Combined, these factors are significant and indicative of whether individual intend to be compliant with their prescribed therapeutic regimen. Although these factors may be significant, it should not be construed to imply that they are absolute measures. Thus, such a limitation can be supported within the realm of logistic regression, which yields odds for or against the behavior exhibited and has been considered the most appropriate statistical measure of the data.

TABLE 4

Frequency of Percent Distributions of Attitudinal/Belief Factors and Normative Factors By Education Level

Variable	Level I*	Level II	Level III	P+
Perceived Susceptibility to Cardiovascular Disease (CVD) & Related Problems				
Prone to heart disease	71.7	63.4	58.1	.3970
Have diabetes	48.5	45.2	25.8	.0986
Have high cholesterol	38.1	48.8	20.0	.0458*
Have hypertension	86.6	90.5	87.1	.8223
Family history of heart disease	53.0	66.7	48.4	.2339
Lifestyle contribute to heart disease	61.3	75.0	80.0	.1278
Have weight problems	41.5	47.6	32.3	.4192
Perceived Severity of CVD				
Lifestyle affected since heart disease diagnosis	55.2	42.9	53.3	.4365
Pain since diagnosed with heart disease	53.7	35.7	22.6	.0096*

CONTINUED

TABLE 4 (continued)

Variable	Level I*	Level II	Level III	P+
Perceived Threat of CVD				
Taking medications as prescribed	80.6	92.7	96.7	.0427*
Fear of seeing doctor	11.9	11.9	3.3	.3833
Perceived Efficacy of Palliative Care				
Feel better taking prescribed medication	83.6	73.2	54.8	.0103*
Skip or stop taking medication when feeling better	58.2	23.8	9.7	<.0001*
Functional Ability				
Walk with a cane or walker	44.6	38.5	13.3	.0117*
Able to walk with or without assistance	56.7	66.7	83.9	.0308*
Financial Cost				
How expensive are medications	28.8	48.8	41.9	.0996

CONTINUED

TABLE 4 (continued)

Variable	Level I*	Level II	Level III	P+
Living Arrangements				
Living alone	41.8	31.0	38.7	.5217
Living with a significant other	38.8	28.6	41.9	.4298
Doctor Patient Relationship				
Evaluate physician relationship (Good relationship with doctor)	85.1	85.7	100	.0762
Complexity of Medical Regimen				
Number of medications currently taking **(AVG)*****	3.3(1)	3.5(1)	3.2(1)	No significant between means
Education and Counseling About Therapeutic Regimen				
Discuss by health professional proper administration of medicines	58.2	78.0	73.3	.0753

***Level 1 < High School Diploma**
Level 2 High School Diploma and/or Some College
Level 3 College Degree

****No Difference by ANOVA**
+Chi-Square

TABLE 5

Frequency of Percent Distributions of Attitudinal/Belief Factors and Normative Factors By Gender

Variable	Female (N = 62)	Male (N = 78)	Probability
Perceived Susceptibility to CVD			
Prone to heart disease	59.3	71.2	.1512
Have diabetes	46.8	39.0	.3542
Have high cholesterol	40.7	34.7	.4751
Have hypertension	82.3	92.3	.0706
Family history of heart disease	52.5	59.0	.4424
Lifestyle contribute to heart disease	70.7	68.9	.8261
Have weight problems	37.7	44.2	.4447
Perceived Severity of CVD			
Lifestyle affected since heart disease diagnosis	58.1	45.5	.1393
Pain since diagnosed in heart disease	40.3	42.3	.8128

CONTINUED

TABLE 5 (continue)

Variable	Female (N = 62)	Male (N = 78)	Probability
Perceived Threat of CVD			
Do you take medications prescribed	83.3	91.0	.1729
Fear of seeing doctor	9.8	10.3	.9349
Perceived Efficacy of Palliative Care			
Feel better taking prescribed medication	67.7	79.2	.1246
Skip or stop taking medication when feel better	43.5	32.1	.1620
Functional Ability			
Walk with a cane or walker	22.6	47.2	.0030*
Able to walk without assistance	75.8	57.7	.0249*
Financial Cost			
How expensive are medication (2 missing)	59.0	64.9	.4761

CONTINUED

TABLE 5 (continue)

Variable	Male (N = 62)	Female (N = 78)	Probability
Living Arrangements			
Living alone	33.9	41.0	.3860
Living with a significant .other	48.4	26.9	.0088
Doctor Patient Relationship			
Evaluate physician relationship	87.1	89.7	.6249
(Good relationship with doctor)			
Complexity of Medical Regimen			
Avg Number of medications (SD) currently taken	3.3(1)	3.4(1)	.3419
Education and Counseling About Therapeutic Regimen			
Doctor discuss prescription	66.7	67.9	.8735

**No Difference by ANOVA
+Chi-Square

Multivariate Relationships

Patient perception is an integral component as an indicator of intent, and intent is indicative of behavioral practice, i.e. noncompliance. Thus, this dichotomized variable is given a value of 1 for "yes" versus 0 for "no" responses (see p.69 measurement of variables). In this vein, Attitudinal/Belief factors and Normative factors (Cues to Action) are examined relative to the dependent variable, noncompliance. Logistic regression was utilized to determine the relative influence of the independent variables on the dependent variables.

Table 6 describes the importance of determining whether or not the odds," yes or no," can be established independently, or perhaps over and above its effect through attitudinal/belief factors and normative factors in the study using one of the measures of noncompliance, that is, the frequency of how medications are taken. The fit of the model to the data is evaluated by the maximum log likelihood ratio chi-square statistics and the model chi-square statistics. A logistic regression equation model is considered to be significant at the $p < .05$ to $p < .001$. For example, in Table 6, where one of the measures for the dependent variable, that is, the frequency with which medicines are taken, the attitudinal/belief factor perceived susceptibility,family history of heart disease is significant (beta, .304 $p < .02$.).

Conversely, the measure of perceived severity was not significant. Moreover, normative factors good relationship with doctor (beta, .911 $p < .02$) and education and counseling (beta, .918 $p < .001$) reflect a significant relationship.

Because the interaction of the independent variables cause a cumulative effect on the dependent variable, it was necessary to assess the Attitudinal/ Belief factors in the context of Sociodemographic factors and the Normative factors. This being the case, hypothesis (H4) examined the relationships among all factors entered in the model (see Figure 3.0, p.46).

TABLE 6

Logistic Regression Coefficients and Odds Ratios of Likelihood of Noncompliance on Attitudinal/Belief Factors Based on Frequency of Medicines Taken

Variable	*Beta*	*Odds*	*P*
Attitudinal Belief Factors			
Perceived Susceptibility			
Family History of heart disease	*.304*	*.27*	*.02*
Perceived Threat			
Fear of becoming sicker	*.110*	*.12*	*.00*
Take medications as prescribed			
Perceived Efficacy			
Skip/Stop medications when feeling better	*.561*		*<.0001*
Normative Factors (Cues to Action)			
Good relationship with doctor	*.911*	*.15*	*.02*
Discuss by health professional Proper administration of medicines	*.918*	*.15*	*.001*
Sociodemographic Factors			
Education	*.156*	*.86*	*.01*

***No Difference by ANOVA*
+Chi-Square

Sociodemographic factors are predictors of patient noncompliance among African American elderly with cardiovascular disease.

H1a. Educational attainment has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

The results in Table 7 indicate that this hypothesis is supported. As the years of education increases, the respondent significantly was less likely to be noncompliant (beta, -.331 $p < .0001$). The comparable odds ratio was .72.

H1b. Income has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

The findings suggest that this hypothesis is supported univariately. The higher the personal income the less likely the respondent exhibited noncompliance. This finding was particularly observed in its effect on two of the measures of noncompliance. Specifically, the variable on how frequently the respondent takes medication(s) and when he/she feels better and skips or stops taking medication(s). Both are significant. Similarly, this finding is supported in reference to household income. As household income increases, the likelihood of noncompliance decreases. However, when entered into the regression model, this variable was not a significant independent predictor.

H1c. Age has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

This hypothesis was not supported. To analyze these data, age was recoded from a continuous to categorical variable. These categories included : 50-59 years; 60-69; 70-79; and 80+ (see Table 10). There is no statistical significance between age and

TABLE 7

Logistic Regression Coefficients and Odds Ratios of Likelihood of Noncompliance Based on Skipping or Stopping Medicines

Variable	*Beta*	*Odds*	*P*
Attitudinal Belief Factors			
Perceived Threat *Fear of becoming sicker* *Take medications as directed*	*.225*	*.11*	*.01*
Fear of seeing a doctor *Prevent seeking medical attention*	*.476*	*32.33*	*.001*
Normative Factors			
Discuss by health professional *Proper administration of medicines*	*.947*	*.14*	*.001*
Sociodemographic Factors			
Education	*-.331*	*.72*	*.0001*

***No Difference by ANOVA*
+Chi-Square

noncompliance.

H1d. Marital status (i.e. being married) has a negative effect on patient noncompliance among African American elderly with cardiovascular disease.

This hypothesis was not supported by the results. In order to test the hypothesis, the variable marital status was recoded into two categories. Category I--living with significant other (LWSO) and category II not married. Both categories were not significant. There was a non-significant relationship between these two factors and non-compliance.

H1e. Gender is significantly related to patient noncompliance among African American elderly with cardiovascular disease.

This hypothesis was not supported. The variable was compared with each of the three measures of noncompliance and the findings were not statistically significant.

Selected attitudinal/belief factors are predictors of patient noncompliance among African American elderly with cardiovascular disease.

H2a. Perceived susceptibility has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

To test this hypothesis, the variables (prone to heart disease); (hypertension); (high cholesterol); (diabetes); (weight control); (lifestyle); and (family history of heart disease) were compared to each of the three measures of noncompliance. Table 6 indicates that these variables did not attain statistical significance, the only exception was the variable family history of heart disease when measured with (frequency of taking prescribed medications). The odds ratio for PHIST is .27. Moreover, the beta coefficient of -.304, p.02) supports this finding.

H2b. Perceived severity has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

In order to test this hypothesis, the variables **PSEVAFF** (i.e. since diagnosis with heart disease has your lifestyle been affected); **PSEVPAIN** (experienced much pain since diagnosis); and **PSEVDABL** (became disabled since diagnosis of heart disease) were measured with each of the three measures of noncompliance. This hypothesis was not supported.

H2c. Perceived threat has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

This hypothesis was supported. To analyze the data, the variables of **PTHRSICK** (for fear of becoming sicker, medications are taken as directed); and **PTHRSEE** (has fear of seeing a doctor ever precluded seeking medical care) were measured with the three measures of noncompliance, **TKEMDPRE** (likely to take medicines as prescribed); **FRQTKEMD** (frequently medications are taken); and **PEFFSKST** (feeling better, skip or stop taking medications). **PTHRSICK** was statistically significant for two of the three variables used to measure noncompliance, likelihood of taking medicines (beta, -.836 $p<.002$); and stop medicines when feeling better (beta,-.225 $p<.01$) respectively. Similarly, **PTHRSEE** was significant for only one of the measures, that is, stop medicines when feeling better (beta, .476 $p<.001$).

H2d. Perceived efficacy of palliative care has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

To test this hypothesis, two variables **PEFFMED** (taking medications as directed respondent feels better); and **PEFFSKST** (feeling better, skip or stop taking medications)

were measured with the measures of noncompliance. Table 6 indicates that **PEFFSKST** was statistically significant with the measure of noncompliance, frequency of taking medicines (beta .561 p<.0001). This hypothesis was partially supported.

Cues to action are predictors of patient noncompliance among African American elderly with cardiovascular disease.

H3a. Functional ability has an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

To examine this hypothesis, the variable **ACWALK** (ability to walk without assistance) and **ACPROP** (the necessity to use a cane or walker) were measured with the three variables of noncompliance. This hypothesis was not supported.

H3b. Adverse drug reactions have a positive effect on patient noncompliance among African American elderly with cardiovascular disease.

In order to test this hypothesis, the variable **SICKMED** (any medications ever made the respondent sick) was measured with the variables of noncompliance. This hypothesis was not supported.

H3c. Living arrangements have an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

To examine this hypothesis, the variable **HLDPRAST** (anyone in the household to care for the respondent should they become too sick to care for themselves) was measured with the variables of noncompliance. The relationship was not statistically significant, and therefore the hypothesis was not supported.

H3d. Complexity of medical regimen has a positive effect on patient noncompliance among African American elderly with cardiovascular disease.

To test this hypothesis, the variable **NBRMED** (number of medications prescribed) was

measured with the measures of noncompliance. None of the relationships were statistically significant; therefore, the hypothesis was not supported.

H3e. Education and counseling of therapeutic regimen have an inverse effect on patient noncompliance among African American elderly with cardiovascular disease.

In order to test this hypothesis, the variable **MEDTALK** (doctor or other health professional discussed the proper administration of the prescribed medication) was measured with each of the measures of noncompliance. The findings showed statistical significance with **FRQTKEMD** (beta, -.918 p<.001, Table 6) and **PEFFSKST** (beta, -.947 p<.001, see Table 7). This variable, however, did not reflect statistical significance when measured with **TKEMPDRE** (likely to take medicines as prescribed). This hypothesis, therefore, was partially supported.

H3f. Doctor patient relationship has a positive effect on patient noncompliance among African American elderly with cardiovascular disease.

To test this hypothesis, the variable **EVALPHYS** was modified as good relationship with doctor (GRWD) and measured with each of the measures of noncompliance. Statistical significance was observed between various measures of the doctor patient relationship (beta, .911 p<.02); (beta, .947 p<.001) and the two of the indices of noncompliance (frequency medications are taken and stop medicines when feeling better). This hypothesis was supported.

To determine the relative contributions of sociodemographic factors, attitudinal/belief factors, and cues to action in predicting patient noncompliance among African American elderly with cardiovascular disease.

H4. The relative effects of sociodemographic factors, attitudinal/belief factors, and cues to action are predictors of patient noncompliance among African American elderly with cardiovascular disease.

This hypothesis was partially supported. Initially, as Table 8 indicates, eight of the variables exhibited significant association. This table was constructed under the premise of determining the factors that emerge as predictors of compliance. To this end, the researcher examined those variables that were indicative of compliance among respondents. However, none of these variables when entered into the regression model cumulatively reflected significance, except **MEDTALK** (physician or another health professional discussed how to take medication(s), beta .119 $p<.001$). Combined, the study sample demonstrated low perceptions of susceptibility, severity, and threat, regarding patient noncompliance.

Summary

In general, these results reflect a low statistical significance. However, four of the hypothesis were supported while two were partially supported. Unequivocally the importance of doctor-patient communication has emerge as a distinct predictor of patient noncompliance. When a there is a sound channel of communication between the patient and the physician, the patient is less likely to be noncompliant with their prescribed therapeutic regimen. Moreover, the findings of this study clearly suggest that education about prescriptions reduces the likelihood of noncompliance. When this variable was measured as an independent predictor of noncompliance, it reflected significance for two of the three variables measured. Other predictors such as education and income suggested a contributory role to noncompliance, but did not

TABLE 8

Univariate Associations with Compliance

Variable	*Valid Percent*	*P*
Years of Education		
Compliant	*12.9*	
Noncompliant	*8.9*	*<.0001*
Personal Income	*--*	*<.0001**
Household Income	*--*	*.0003**
Compliant	*31.5*	
Noncompliant	*51.5*	*.0166*
Fear of becoming sicker Take medications as prescribed		
Compliant	*98.6*	
Noncompliant	*75.0*	*<.0001*
Fear of seeing doctor prevent From seeking medical care		
Compliant	*2.8*	
Noncompliant	*18.2*	*.0028*
Feeling better skip/stop Taking medications		
Compliant	*0.0*	
Noncompliant	*77.3*	*<.0001*

CONTINUED

TABLE 8 (continue)

Variable	*Valid Percent*	*P*
Health Professional		
Discuss administration of medications		
Compliant	*86.3*	
Noncompliant	*45.3*	*<.0001*

P = <.05

manifest the level of significance produced by the importance of a doctor-patient relationship. In any such case, the response may well serve to measure some insight into why the phenomenon of noncompliance is prevalent among African American elderly with cardiovascular disease.

CHAPTER VI

DISCUSSION

Overview

Understanding a medication regimen is necessary to ensure compliance. Patients' compliance with their medication regimen is especially vital in the treatment of chronic or long-term illnesses. Perceptions of cardiovascular disease, its risk factors and ancillary contributors, such as income and cost of medication, have become an obstacle to compliance. This study examined patient noncompliance using potential factors that may influence behavior. Relatively few studies have undertaken the challenge of focusing on the issue of patient noncompliance among African American elderly with cardiovascular disease.

Researchers should understand what impeding factors influence an individual's perception of disease and the possible behavioral outcomes. A requirement of this understanding, is an examination of those factors which cause individuals to perceive themselves at risk, and what reasons exist to explain the variance in the interpretation of risk.

According to Kerlinger (1986), the discussion should encompass an examination of the findings and analysis, as well as make inferences about the factors and relationships under study. Further, he emphasizes that conclusions on the associations among variables be referenced and highlighted. Therefore, this chapter will discuss the various variable relationships as presented in the Conceptual Integrated Model (Figure 3.0, p. 46), as well as offer an interpretation of the findings.

Research Objective

The objective of this study was to examine causal factors that may contribute to patient noncompliance with a prescribed medical regimen among African American elderly who have cardiovascular disease. The factors which were examined include 1) sociodemographic factors, 2) attitudinal/belief factors, and 3) normative factors. A comprehensive discussion on associations of these factors will follow.

Models used in the Study

The framework used to guide this study is premised on an integrated model that is comprised of two theoretical constructs--the Theory of Reasoned Action and the Health Belief Model (see Figure 3, p. 46).

1) The Theory of Reasoned Action (Fishbein, 1977; 1980; Ajzen & Fishbein, 1980) implies a series of relationships "linking (a) behavior to intentions; (b) intentions to weighted combinations of attitudes and subjective norms; and attitudes and subjective norms to behavior and normative beliefs" (Fishbein & Middlestadt, 1989); and

2) The Health Belief Model (Becker, 1974; Rosenstock, 1974; Janz & Becker, 1984) state four postulates. These include perceived susceptibility to ill-health, perceived severity of ill-health, perceived threat to ill-health, perceived efficacy, and cues to appropriate action.

Major Findings

The present study attempted to examine the extent to which African American elderly who have cardiovascular disease are noncompliant with their

prescribed therapeutic regimen. Because of the complexities associated with the study of noncompliance, this study included a variety of conditions as dictated by the literature and the models used. These conditions included sociodemographic factors, attitudes, beliefs and normative considerations to the understanding of health-related behavior. The constituents of the integrated model which guided this study, examined the relationship of age, marital status, income, gender and education to patient noncompliance. The results suggest although not definitively, that these sociodemographic factors and others have a positive impact on noncompliance. Previously, researchers addressed these individually, for example, beliefs (Janz and Becker, 1984); attitudes (Oliver and Berger, 1979); values (Kristensen) 1985. However, none of these studies addressed these factors as a collective group of variables that were categorized under various parameters in a model.

Summary Status of Hypotheses in the Study

In relation to the integrated model (see figure 3, p. 46) used in the study, the following is an overview as to which hypothesis was supported/or was not supported. With regard to **sociodemographic factors,** the hypothesis that educational attainment has a negative effect on patient noncompliance was supported. Increasing levels of education was related to lower levels of noncompliance. This is supported by the integrated model and the literature (Owens, Larrat and Fretwell,1991). However, the remaining factors, that is income, marital status, age and gender were not supported.

In terms of **attitudinal/belief factors,** the hypothesis that perceived threat and perceived efficacy have an inverse effect on patient noncompliance was supported. The

perceptions of a threat or feeling of efficacy were related to lower levels of reported noncompliance. Conversely, the hypothesis that perceived susceptibility and perceived severity have an inverse effect on patient noncompliance was not supported. As purported by Janz and Becker(1984), these components of the Health Belief Model have an effect on the likelihood of a behavioral outcome. Similarly, the integrated model incorporates these postulates; however, the data suggests that only certain of these have an effect on patient noncompliance.

Under the rubric of **normative factors**, cues to action are predictors of patient noncompliance. The two factors which showed a relationship to noncompliance are education and counseling as well as doctor-patient relationship. These findings suggest that when patients were advised on the proper administration of their medications, they were less likely to be noncompliant. In addition, when there exists a "sound" relationship with solid communication between the doctor and patient, there is less likelihood that a patient will not comply with his or her prescribed therapeutic regimen. These findings are in direct correlation with the integrated model and the literature (Opdycke et al., 1992). However, the remaining normative factors such as functional ability, living arrangements, adverse drug reactions and complexity of medical regimen were not supported.

Relationship Between Sociodemographic Factors and Patient Noncompliance among African American Elderly who have Cardiovascular Disease

Combined sociodemographic factors included age, education, marital status, gender, and income. These variables, though treated selectively in the data, are

discussed as a group of interrelated variables. Each of the sociodemographic variables was studied univariately with the variables of noncompliance. Only education and income had statistical significant relationships. When examined in the multivariate model, neither of the two variables were significant independent predictors of noncompliance. It is important to note, however, that previous studies (e.g., Cramer and Spilker, 1991; Clark, 1991; and Opdycke et al., 1992) suggest a positive correlation between education, and noncompliance, while others (e.g Col, 1990) purports a direct correlation between income and noncompliance.

Specifically, with reference to income, the results of the study suggest that the higher the income the less likely a patient will be noncompliant. Table 2 indicates that 51.4 percent of the study sample has an income of $10,000 or less. Therefore, the correlation between poverty and health should be a salient concern for policy makers attempting to address conditions to ameliorate noncompliance behaviors among African American elderly with cardiovascular disease. In the study sample, several of the respondents indicated that their fixed income was highly absorbed by out-of-pocket cost for medications. Many lamented that due to a polytherapeutic regimen and limited resources, they are confronted with the decision of requesting the pharmacist to partially fill a prescription. Such situation allow the individual to, at least, be in a position to take the prescribed medications until more financial resources are available.

Given the mix of Medicare, Medicaid and private health insurance, the poor elderly must still shoulder significant out-of-pocket costs. According to the Agency for Health Care Policy Research (1987), although poor elderly persons paid a relatively minuscule

portion of their health care costs, these costs represent a relatively large proportion of their income. Specifically, the poor elderly paid 16 percent of their total health care costs themselves, compared with up to 24 percent for nonpoor elderly persons. These costs represented nearly 20 percent of their total income, compared with less than 13 percent of the total income of nonpoor elderly persons.

Table 3 suggests that as educational level increased, the more likely it is that individuals will be compliant with their therapeutic regimen. The results of the study indicate that nearly half (47.9%, Table 2) had less than a high school diploma. This would suggest that coupled with fixed income, chronicity of disease and other impeding issues, noncompliance becomes more of a reality for these at-risk African American elderly persons. Because of low educational attainment, the question of literacy and understanding emerge as additional denominators to the problem. A previous study, Opdycke et al., 1992, denoted that lack of education is a precursor to inadequate medication knowledge and results in the single most contributing factor to noncompliance among elderly patients.

The respondents in this sample, while exhibiting low educational attainment, still reflect some aspects of compliance with medical regimen. Further, if the patient is educated and advised about the proper administration of the medication, results indicate that there is less likelihood of noncompliance. Theoretically, this finding is supported by the integrated model used in this study. The variable education as indicated in the model, suggests that educational attainment is important in the behavioral outcome of whether or not an individual will be noncompliant. Ostensibly,

low educational attainment can result in poor understanding of the proper administration of a prescribed medication. Moreover, when there exists low educational attainment, the possibility of inadequate income emerges because the individual is not able to accumulate the reservoir of resources necessary to accommodate the clinical and social needs in retirement.

Given the importance of age, it is surprising that its significance to noncompliance is inconsistent with the reported literature (e.g. Owens, Larrat and Fretwell, 1991). Age was entered into the logistic equation but did not prove significant. However, in another study conducted by Lipton and Lee (1988) the findings indicate that noncompliance is more prevalent among the elderly 75 years and older.

In relation to the integrated model for this study, age can potentially predispose an individual to be noncompliant. The literature suggests that an increase in age can promote more certainty of noncompliant behavior (Opdycke et al., 1992). This result can be attributed to such problems as amnesia and other cognitive impairments. Also, living arrangements can be a contributing factor to noncompliant behavior. For example, if an elderly individual is residing alone, there is no immediate person to serve as a reminder about when and how to take medications. This absence leaves the elderly person vulnerable to either not taking their medications or, in some instances, doubling the administration of the medication to account for a missed dosage. This approach is not only a noncompliant behavior, but can prove to be clinically detrimental.

Neither gender nor marital status appeared significant in the study. That is, being either male or female and being married did not affect reported noncompliance behavior. During the interviews, several of the male respondents indicated that they complied with their medical regimen partially. When asked to explain, they responded that the nature of some prescribed drugs affected their sexual drive and affected their masculinity. Moreover, they reported that it becomes burdensome to have their lives constantly regulated by pills; therefore, when they are feeling better, their inner thoughts suggest that there will be no harm produced by just skipping a dosage periodically. Of course, this practice can prove to be detrimental and can jeopardize an individual's health, which has already been compromised by the mere diagnosis of cardiovascular disease. In a study conducted by Donovan and Blake (1992), results suggest that men were more likely to be noncompliant. In this same study there were no supportive relationships shown between marital status and compliance behavior.

Relationship Among Attitudinal/Belief Factors and Patient Noncompliance Among African American Elderly who have Cardiovascular Disease

The importance of each of these variables as independent predictors of patient noncompliance is paramount. The interaction of these variables suggest the likelihood of a specific outcome, that is, patient noncompliance. The relevant variables are Perceived Susceptibility, Perceived Severity, Perceived Threat and Perceived Efficacy in which the responses are measured as "yes" or "no." The discussion, therefore, emphasizes the magnitude, the direction of the effects, and the related odds ratio of the variables.

The odds ratio is utilized because it provides a meaningful approach to interpreting the relationship between the predictor variables and the disposition towards patient noncompliance. In the case of dichotomous predictor variables, the interpretation of the odds ratio is determined by the value of the beta coefficient (i.e. irrespective of having a negative or positive value).

In a previous study by Owens, Larrat, and Fretwell, 1991, the results suggested that elderly patients will comply with their therapeutic regimen, if they believe they are at risk for a complication from their diagnosis. Additionally, given their diagnosis, elderly patients will comply to further minimize manifestations or symptoms of their disease. Consequently, they will take their medications as prescribed, if they believe the medication will correct or reduce symptoms without sustaining adverse reactions to the medications. Thus, an elderly patient's perceived susceptibility for cardiovascular disease and its outcome is contingent on that person's belief regarding vulnerability. If patients feel a sense of vulnerability, they are more likely to comply.

In this study, the issue of patient vulnerability was supported. Several respondents expressed that because there existed a family history of heart disease, (Table 6 beta .304 $p < .02$) they felt somewhat more compelled to take their medicines as prescribed. The odds ratio (.27) suggests that if elderly individuals have a family history of heart disease, they are approximately 73 percent less likely to be noncompliant in taking their medications as prescribed. There was a keen concern among those respondents who knew cardiovascular disease to be the primary cause of death to a family member. Others, despite a family history of heart disease, stated that

the constant regimen of taking medications was a heavy burden to carry. These respondents stated that from their perspective, the occasional skipping of a medication dosage would not be deleterious.

The odds ratio values of the variable Perceived Threat, derived from a measurement of preventive action that come from attitudinal/belief factors and normative factors (see Table 7), suggest that elderly patients will take their medications as prescribed for fear of becoming sicker. The odds ratio of .11 indicates that the respondent is 89 percent less likely to skip or stop taking their medications for fear of becoming sicker.

The odds ratio (32.33) in the association between fear of seeing a doctor and seeking medical care for the study sample indicates that the respondent is 32 times more likely to visit a physician when ill and comply with the prescribed medical regimen. Therefore, the fear of seeing a doctor is not the impetus for creating noncompliance behavior. Rather it is the fear of the cardiovascular diagnosis, the needed lifestyle changes, and the psychological impact of the need to remain on medication for the duration of life.

Research on perceived severity shows that low levels are not sufficiently motivating, whereas high levels produce fear and are inhibiting (Owens, Larrat and Fretwell, 1991). The definition of "severity" for the elderly is perceived in a different realm from that of a younger individual. In this study, the variable perceived severity was not significant when measured with the three measures of noncompliance. Interestingly enough, however, several respondents were concerned about the severity

of cardiovascular disease and its possible progressive chronicity. In particular, heightened concern surrounded the parameters of disability, lifestyle changes and experience of pain. Several respondents lamented that "growing old" is a change that requires positive adjustment. This quickly molds into a complex phenomenon, when one is confronted with a host of chronic diseases, which is a major challenge for the elderly. Although the hypothesized relationship that perceived severity is related to noncompliance was not supported in this study, the responses indicate that it is an important measure still worthy to be considered in relation to noncompliance.

In sum, elderly persons who are cognizant that predisposing contributing factors to cardiovascular disease exist, and who recognize the threat of these factors to their health are aware of the severity of their diagnosis. As such, many are satisfied with the efficacious nature of their prescribed therapeutic medical regimen and tend to be compliant. This posture is in direct correlation with the presentation of these variables in the integrated model. The model suggests that these attitudinal factors will affect the behavioral practice of noncompliance. The aforementioned findings support this theoretical relationship.

Relationship Among Normative Factors (Cues to Action) and Patient Noncompliance Among African American Elderly who have Cardiovascular Disease

Of all the normative factors examined in this study, only doctor-patient relationship, as well as education and counseling regarding proper administration of medication emerged as the two significant predictors of noncompliance. Normative factors in this study addressed the variables doctor-patient relationship in which the

responses were yes/no; education and counseling about therapeutic regimen measured by yes/no; living arrangements; functional ability; financial cost; adverse drug reactions, and complexity of medical regimen. Cues to Action, as conceived herein, normatively are construed to induce a behavioral outcome. As such, cues to action are premised on beliefs which reflect "enlightened reasoning" in the view of the individual actor (Fishbein and Middlestadt, 1989). For example, the concepts of exercise and diet routinely found in the literature in relation to cardiovascular disease are normative. This means, then, that exercise and diet refer to an attainable goal to be reached but does not define, by individual choice, the behavior that would accomplish the goal. Cues to action, therefore, depend on the individual's estimate of goal attainment behaviors. This estimate of judgement can effectively be made with education and dissemination of information. However, this education or information must be in a form to abate old behaviors and prompt health promotion actions.

Physicians who interact and care for elderly patients learn that care sometimes means supporting patients in their efforts to comply with their own choices rather than the choices provided by the traditional medical approach to treatment of an illness. Often older patients have devoted thought to their mortality and express some degree of fear about the prospect of medical intervention imposed on them when they cannot speak for themselves. Table 6 clearly suggests that a good doctor-patient relationship is a significant predictor of patient noncompliance (beta. 911 $p < .02$, odds ratio is .15). There are other studies that report the importance of the doctor-patient relationship to patient noncompliance (Davis, 1987; Greenfield, Kaplan and Ware 1985; Owens,

Larrat and Fretwell 1991). In this study, respondents indicated that a good relationship with a doctor was a cornerstone in the maintenance of their health. Some even remarked that because of the death of a physician or some other extenuating circumstance, which forced them to find another physician, they experienced stress. This "shadow of a doubt" may emerge because the management of care for these persons had been conducted by a physician, usually for an extended period of time. A change to another physician yielded skepticism about the competence of this new physician. In some instances, respondents admitted they did not take their medications as prescribed. One reason given was that perhaps the new physician may have changed medications and they felt the previous prescription was more efficacious. Changes in physicians, then, may trigger habits of noncompliance.

A patient's understanding of the medication regimen is one of the most critical variables associated with noncompliance. Expecting that a patient will comply with a medical recommendation presupposes that the patient knows the proper administration of the medication (Owens, Larrat, and Fretwell, 1991). Patients who do not understand the purpose of their drug therapy are more likely not to comply with the proper administration of their medications. Whether counseling a patient to reinforce medication knowledge and prescription taking skills will cause noncompliance to abate has been previously reported (Owens, Larrat and Fretwell, 1991). The findings of this study indicate that education and counseling are highly associated with noncompliance. Moreover, when a health professional intervenes to instruct a patient with prescribed medical regimen, compliance is enhanced.

In a study conducted by Opdycke et al., 1992, patient education about the proper administration of prescriptions was a significant finding. The study was guided by the PRECEDE Model, which means Predisposing, Reinforcing and Enabling Causes in Educational Diagnosis and Evaluation, a model used primarily for health education planning (Squyres, 1985). The findings indicate pharmacists identified an average of 5.6 problems related to medication usage. The problems commonly identified involved inadequate drug knowledge (25.5%), noncompliance (22.7%), and inappropriate drug use (17.4%). In this study, similar results emerged. When a health professional discussed the proper administration of the medication with the patient, the findings indicated that the patient was less likely to be noncompliant (beta .947 $p < .001$, odds ratio was .14). This result suggests that the likelihood of noncompliance is 86% less likely to occur, and patients will continue the therapeutic regimen as prescribed without stopping or skipping their medications, even if they are feeling better.

For purposes of this study, a new variable called "compliance" was assigned a positive value to those participants who responded negatively to any and all of the following three variables: skip or stop taking medications when feeling better(PEFFSKST); frequently take medications (FRQTKEMD); and likelihood to take medications as prescribed (TKEMDPRE), which indicated any degree of noncompliance.

When "compliance" was used as a dependent variable, numerous independent variables were shown to have a significant relationship (see table 8). When these independent variables are combined, however, in a logistic regression, the findings

suggest that the only significant independent predictor of compliance was MEDTALK (whether a doctor or other health professional talked with the patient about how to take his/her medication(s). Specifically, when a health professional discussed the proper administration of a prescribed medication, the patient was more likely to adhere to the therapeutic regimen.

In sum, prescription nonadherence is a pervasive multidimensional problem. Adherence depends on a chain of communication from physician to pharmacist and patient, and then from pharmacist to patient. As this study suggests, when there exists a solid avenue of communication, the incidence of noncompliance is reduced. However, if the chain of communication between health professional and patient is severed, patients, in many instances, may receive information that they cannot readily understand or remember. This study, suggests (as well as in a previous study, Gryfe et al., 1986), that prescription noncompliance among the elderly reflects an interplay of poor communication on the part of health professionals and, in some cases, the elderly person's reduced cognitive abilities.

Patients who consume a large number of medications and who do not understand their medication directions are also of a significantly greater risk for medication compliance problems (Darnell et al., 1986; Col 1990; Owens, Larrat, and Fretwell, 1991). These studies suggest that taking three or more medications increase the likelihood that the patient will be noncompliant. In the present study, nearly 60 percent of the study sample were taking three or more medications. However, when this variable was examined with the measures of noncompliance in this study, it was

not a significant predictor.

The number of medications an elderly patient takes has been correlated with adverse patient outcomes (Shrimp et al., 1985). Older patients have an enhanced susceptibility to adverse drug reactions from both altered pharmacokinetic and pharmacodynamic changes that occur with aging. Research shows that the overall incidence of adverse drug reactions in the elderly is about two to three times higher than that found in younger patients (Nolan and O'Malley, 1988). In this study, only a small number of respondents reported an adverse drug reaction. However, the survey included limited probing questions regarding adverse drug reactions. Consequently, this variable was not a significant measure of noncompliance.

In a previous study (Owens, Larrat, and Fretwell, 1991), it was reported that there is a correlation among the complexity of medical regimen, adverse drug reactions, functional ability, and their relationship to noncompliance. For example, the number of medications an older patient takes is correlated with adverse functional effects. Specifically, the chance of an older patient falling is correlated with the number of medications taken (Hindmarsh and Estes, 1989). Nearly 20 percent of the respondents in the present study reported or exhibited some functional impediment or disability. In some cases, the respondent relied on a care giver to purchase medication and assist in the administration, while others though physically challenged, still managed to pursue other avenues such as public transportation, in an effort to purchase medications. Despite this admission, this variable was not a significant predictor of patient noncompliance.

In a study conducted by Meyers et al., 1989, the findings suggest that to achieve compliance with a medication regimen, a patient must have a sufficient degree of functional ability. Specifically, this research studied the functional abilities of 93 older patients to perform medication-taking tasks. Findings indicate patients who were responsible for their own medications were more likely to be able to read and understand medication directions, remove tablets, and to identify colors. Further, as would be expected, patients who had cognitive impairments were less likely to be able to perform these activities. Another interesting result of this study was that motor skills were not correlated with cognitive skills, that is, patients who were cognitively impaired could open, and close prescription containers, and remove tablets from prescription vials.

The relationship between noncompliance and drug costs has not been the subject of much empirical research. However, according to Darnell et al., 1987, drug costs are a factor in noncompliance. As a caution, it must be noted that the researchers did not determine whether those who considered drug costs a problem were the individuals most likely to be noncompliant; nor did they attempt to assess actual drug expenditures and relate these figures to compliance. This is a topic outside the realm of the present study, but certainly it is worthy of more in-depth probing and exploration.

The respondents in this study overwhelmingly admitted, however, that the costs of their medications were exorbitant. Further, it was stated that, if they were not participants in a prescription program offered by insurance firms and Medicaid, the likelihood of being noncompliant would be even more of a problem. Seemingly, since

the majority of the respondents in the study had some type of prescription coverage, this variable was not a significant predictor of noncompliance. In general, this study reflected that certain normative factors are significant independent predictors of noncompliance. This suggests that there is some interplay of reasoned barriers to action, vis-a-vis cues to action, unless other reasons derived from the individual's normative/belief system give them the inclination to weight some personal benefit from participation over the element of patient noncompliance. This supports the theoretical construct, Theory of Reasoned Action which was utilized in the integrated model for this study.

Relationship Among Sociodemographic Factors, Attitudinal/Belief Factors, Normative Factors and Patient Noncompliance among African American Elderly who have Cardiovascular Disease

In sum, there was at least one variable from each of these components in the integrated model that emerge as a significant predictor of noncompliance among the study sample. The importance of the theoretical underpinning of this study is crucial because it is vital to link sociodemographic factors with behavior and intention, intention with attitudes and subjective norms, attitudes and subjective norms with behavioral and normative beliefs. In addition, it is essential to subsume these factors under the normatively subjective components of perceived susceptibility to cardiovascular disease, perceived severity of cardiovascular disease, and perceived threat of cardiovascular disease. The real decision through the use of personal reasoning is the finite moment of whether or not to pursue an action. The nature and course of the final process may be varied.

In a study from May 1985 through July 1986, conducted in a public hospital clinic in New Orleans, 54 (72%) of 75 black women aged 45-70 years who were receiving treatment for essential hypertension were included in the sample (MMWR 1990). The study ascertained if there was a relationship between beliefs about hypertension and compliance with antihypertensive treatment among the black women in the sample.

Of the 32 women who believed in non-traditional health care delivery such as folk medicine, (63%) complied poorly with their antihypertensive treatment, compared with (27%) of 22 who believed in the biomedical diagnosis of hypertension. Specifically, this study suggests that patients who believe in folk medicine were 2.4 times as likely to be poor compliers as those who believed they had biomedical hypertension. This further supports the theoretical lining of the present study that perception of illness can be an important factor as to whether or not patients will be compliant with their prescribed therapeutic regimen.

This study suggests that while all of these factors are important in determining an association with noncompliance, only those previously mentioned as significant, for example, education, doctor-patient relationship and education about proper administration of medication were independent predictors. What is of interest about this study is that there is at least one measure from each variable category that either reflected significance or emerged as a variable worthy of discussion.

From a sociodemographic perspective, income by univariate testing was significant, but when subjected to more rigorous sophisticated analysis it was not

significant. Although income was not significant in this study as in other studies (Col, 1990), the mere fact that more than half of the study sample had an average annual income of $7,000 is cause for concern. Certainly, a poignant question becomes how far can such a finite resource base extend to include the basic necessities, e.g. food and housing as well as absorb the cost of prescriptions. Unfortunately, this has become status quo and elderly persons must grapple not only with the socioeconomic forces in life, but also the palliative nature of their treatment regimen for cardiovascular disease.

Similarly, education, another sociodemographic factor, is paramount to securing and understanding the recommended therapeutic regimen. There were several respondents who reported they were either illiterate or their educational base was substandard and that they relied on other persons, such as relatives, friends, and care givers to read and understand the proper administration of their medication.

With regard to attitudinal/belief factors, skipping/stopping medication when feeling better was significant when measured with noncompliance. The general attitude of most of the respondents was that even though they felt better as a result of taking their medications, a fear of increased severity with their disease such as heart attack or stroke may result. This attitude was very keen among those persons who had a family history of heart disease. The other attitudinal/belief factors, for example, family history of heart disease, (take medication as directed for fear of becoming sick) that were significant in the study indicate that issues surrounding attitudes and beliefs may be contributors to whether or not a patient will comply with their therapeutic regimen.

These findings are consistent with the integrated model used to guide this study.

From a theoretical perspective, these findings support the constructs of the Health Belief Model and Theory of Reasoned Action. Specifically, as behavioral models, these findings suggest that the attitudes and beliefs of an individual act as precursors to their behavioral practice. For example, in this study, if there existed a family history of heart disease, the individuals recalling the severity of the disease were more likely to take medications as prescribed. Some of the respondents stated "an ounce of prevention is worth a pound of cure." Therefore, they had a fear of becoming sicker by not properly taking medications as prescribed given their previous experience of other family members who suffered from cardiovascular disease. This perspective is congruent with the two theoretical constructs of the Health Belief Model which suggest that attitudinal factors are essential in behavioral outcome while the Theory of Reasoned Action similarly suggest that attitude toward behavior in addition to intention results in positive outcome.

As it pertains to Normative factors (cues to action), good doctor-patient relationship and discussing the proper administration of a prescription are the two most important normative factors. A sound doctor-patient relationship is crucial for a patient. For the elderly, once confidence has been established and there is a feeling of comfort in the competence of the physician, many of the respondents in the sample stated that they would not like to be confronted with another physician, unless there was no other recourse.

In summary, it can be said that some of the findings of this study are not in agreement with the literature. Whereas there can be several explanations, some

possibilities include the relatively small sample size, which was limited to African Americans who were in a facility-based environment. However, in selected respects, the findings are consistent with other studies that used larger community based samples of blacks (Wilson, 1988) and (Snow, 1985).

Conclusion

The majority of the respondents in this study are Medicare beneficiaries. The Medicare program which is administered by the Health Care Financing Administration (HCFA) was designed and implemented to provide health care coverage to persons sixty-five years of age or older, in a traditional fee-for-service venue or Health Maintenance Organization (HMO), where the premiums are paid by the government.

The sustenance, viability, and financing of the current Medicare program has been the center of fierce and scorching controversy to reduce potential bankruptcy of the Medicare hospital trust fund projected for the year 2001. Despite the impending demise of the Medicare program, the current administration recently vetoed a Republican legislative bill to streamline the Medicare program in its present form. The proposed Republican bill triggered an explosive battle in Congress and was tailored to shave $270 billion from Medicare over a seven year period. Lawmakers and the White House feel that the cuts the Republicans proposed were too global in scope and would ostensibly greatly affect the service package Medicare currently provides to its beneficiaries.

Many contend that the recommended cuts by the White House are potentially as devastating as the bill that the Republicans supported. In its present draft, the White

House's counter bill could produce similar effects that may prove equally as deleterious to a population that is already at-risk-- disadvantaged, sicker, and in many instances, poorer than other population groups. Specifically, if adopted, the White House Medicare reduction plan recommends an estimated $20 billion in cuts from the Medicare Health Maintenance Organizations (HMOs') premiums over the next five years. Such cuts would yield less money to care for patients and fewer resources to provide extra services that traditional Medicare providers do not offer.

Medicare HMOs presently offer their enrollees free prescription drugs and other perks to lure then away from traditional providers. However, with the onslaught of severe reduction in premium payments to Medicare HMOs, HMO proponents suspect that this form of health care delivery will become less attractive both to existing and potential enrollees.

The theory behind the White House administration's proposed cuts is that many HMOs simply are being overpaid in comparison with other Medicare providers. Health Maintenance Organizations are thought to attract a disproportionate share of the healthiest seniors and, as a result these organizations incur lower costs than the current premium formula now assumes.

If legislation is passed by Congress to effectuate the proposed cuts, significant impact on noncompliance with prescribed medical therapy is inevitable in a segment of the Medicare population. Many of the respondents in this study stated that if financial assistance was not provided through the prescription drug program offered by Medicare HMOs, serious decisions regarding purchasing medications juxtaposed to security of

the basic necessities of life would be of critical magnitude. Therefore, to cut approximately $2 billion dollars per year over the next five years from Medicare HMOs could suggest detrimental consequences for a significant number of the current four million beneficiaries who are enrolled in a Medicare HMO.

The results of this study show that the majority of the sample exhibited compliance; however, the literature suggests that estimates of up to 25 percent are noncompliant and may cause enough morbidity to increase hospitalization. It is clear that compliance with prescriptions and medical advice is important and related to communication for those who provide and receive care. One major reason for this importance is that patients, particularly the elderly and those with chronic, incurable diseases, make the best decisions they can without worrying about compliance. In effect, patients exercise their own cost-benefit analysis for each treatment they are offered. They weigh the expected benefits and outcome (usually symptomatic relief) against the severity of the symptoms and the perceived risks of the medical regimen (side effects, dependence, and effort involved) according to their respective lay beliefs and the information at their disposal. The elderly population are no different in that they have many beliefs and theories which suggest courses of action, and these are moderated by information from others, particularly family members, health professionals, and the media.

Education and communication about prescribed medicines are paramount. While this study centered on noncompliance, it was of equal importance to examine the effect of education and counseling about prescribed medication upon those participants

in the sample who exhibited complete compliance. The findings show that where patients received advice on the proper administration of the prescribed therapeutic regimen, they complied as a direct result. Thus, education and counseling, as well as doctor-patient communication surge forward in this study as the most important predictors of both compliance and noncompliance among African American elderly who have cardiovascular disease.

Implications for Future Research

More detailed studies of large black populations, designed to permit analyses of sub-groups based on age, sex, ethnic group, region of residence, degree of urbanization and socioeconomic status are needed in order to complete the epidemiologic picture of noncompliance, in its relation to cardiovascular disease. Such results would facilitate more effective intervention to decrease noncompliance and the burden of cardiovascular disease.

Patient noncompliance with prescribed medical regimen has provided the focus for enormous amounts of research in medicine and social science. The phenomenon of noncompliance is portrayed as deviant behavior and ensures that the blame is directed largely towards the patient. This proliferation of work has discovered that noncompliance exists on a large scale, but investigations into the cause of noncompliance have proved inconclusive, even contradictory. This exists primarily because of the multi-faceted nature of noncompliance. Moreover, it becomes exceedingly difficult to address all the dimensions of noncompliance in a single study. Herein lies the need for future research.

Future research regarding patient noncompliance in the elderly perhaps should address issues such as physical and cognitive impairments. With regard to physical impairments, these would include vision and hearing loss. Approximately eighty percent of the elderly wear eyeglasses (Lipton and Lee, 1988). Even with glasses many still have impaired vision. Failing eyesight reduces the ability to read prescription labels and package inserts, thus increasing the likelihood of noncompliance. In addition, approximately thirty percent of the population aged 65 years and older suffer significant hearing loss, yet only 5 percent of the nation's elderly wear hearing aids (National Center for Health Statistics, 1985). Moreover, many elderly people do not recognize hearing problems, are unwilling to acknowledge them, or find that hearing aids do not help. Hearing loss limits patients' ability to hear directions and educational counseling of the appropriate drug administration. Further, the problem of hearing loss discourages them from asking questions for fear they might not hear the answers. Consequently, with such existing problems, the risk of noncompliance remains imminent. The potential impact of these phenomena on noncompliance is worthy of additional research.

The effect of cognitive impairment for example, Alzheimer's disease and dementia, on noncompliance although not addressed in this study, are suggested issues for further research. Recent research has shown that drug compliance requires a patient to perform at varying cognitive levels (Sales, 1992). A significant number of clinically ill outpatients encounter difficulty in understanding or correctly remembering medication regimens. This concern suggest perhaps, that an elderly patient's cognitive

and functional capacity to comply with medical regimen of differing complexity should be of concern. Moreover, the importance of these factors suggest that future research could focus on the efficacy of pre-evaluating patients whose compliance capacity is in question. The parameters of the profile could include factors such as age, number of medications currently being taken, medical history, and diagnosis. In this vein, a design of an assessment instrument may be helpful in detecting those who may require assistance with medications, thus identifying the need for intervention before poor compliance can lead to rehospitalization, soaring medical costs, and increased morbidity.

To summarize, this study recommends three topics for future research. First, the effects of cognitive impairments as possible precursors to noncompliant behavior. Fifteen percent of people over 60 years of age have difficulty with memory, and the percentage increases with age. To speculate, for some the problem is related to prescribed medications; for others, it is far more serious in that the relationship is associated with senile dementia. In this regard, dementia poses another level of concern because it is difficult to recognize in its early stages. Thus, physicians and others involved in the management of the elderly patient may not foresee possibilities for noncompliance.

Second, length of time a medicine has been prescribed for a patient is another issue for additional research. In one previous study (Owens, Larrat and Fretwell, 1991), patients were more likely to be noncompliant with medications that had been prescribed for less than a year. This study suggested that better compliance was

achieved with medications prescribed for a period of one year or more. The question of how does the length of time a medication has been prescribed to an individual impact a patient's compliance behavior is noteworthy for clinicians and their approach of case management of their patient.

Third, the study of other factors that might explain the phenomenon of a poorer health status for African Americans than to whites and the relationship of these factors to noncompliance needs to be addressed (State of Black America, 1994). Among the African American elderly, folk beliefs, self-diagnosis and economics can be cited as possibilities of noncompliance. This proposes another avenue of exploration. Such possibilities suggest a measurable relationship between patients' perceptions of illness and compliance behavior; physicians responsible for the management and care of the elderly in general and the African American elderly in particular, should be aware of their patient's perceptions of their illness; and the importance of training physicians to elicit patient's conceptions of their illness before selecting a therapeutic regimen is paramount to ultimately insuring compliant behavior with prescribed medications. As it relates to cardiovascular disease and its contributing factors, the incidence and prevalence of these factors exist to a more significant degree among African Americans than whites. Specifically, the prevalence of hypertension, a recognized contributor of cardiovascular disease is 1.5 times higher among the Black population (25.&%) than among whites (MMWR, 1990). For the aged population, the similarity of these statistics exist. A plausible explanation for these circumstances is poor compliance with prescribed treatment; thus, there is inadequate control of the hypertensive

condition.

"Growing old" is a challenge and often an arduous task for the African American elderly. While this population now enjoys a longer life expectancy, although not the same longevity as their white counterparts, the burdens of physiological deterioration, impeding clinical manifestations, and economic strife in the form of soaring out-of-pocket health care costs still support the hypothesis of "double jeopardy." "Double Jeopardy" suggests that the circumstances surrounding the black aged are best described as resulting from the combined effects of growing old and ethnicity, that is, chronological age and the increase melatonin of an individual's skin suggest that the likelihood of a vibrant health status and compliant therapeutic lifestyle potentially lay in the "balance." This relationship places a melancholy overture to elderly African Americans, who are often disadvantaged, at risk, bearing a multiplicity of chronic diseases, and their ability to comply with a prescribed therapeutic regimen.

APPENDIX I

VARIABLES USED IN THIS STUDY

TABLE 9

Variables Used In The Study

Variable Name	Description of Variable
Sociodemographic Variables	
Age	Age of Respondent
Gender	Gender of Respondent
Income	Annual Personal Income of Respondent
Education	Years of School Completed
Marital Status	Marital Status
Insurance	Has Health Insurance
Attitudinal Belief Factors	
Perceived Susceptibility to Cardiovascular Disease	
PHTN	Respondent Has Hypertension
PDIAB	Respondent Has Diabetes
PCHOL	Respondent Has High Cholesterol
PWGTCON	Respondent Is Overweight
HEART	Prone To Heart Disease
PLIFE	Lifestyle May Cause Heart Disease
PHIST	Family History of Heart Disease
PTOBAC	Used Tobacco Products
Perceived Severity of Cardiovascular Disease	
PSEVAFF	Since Diagnosis, Lifestyle Affected
PSEV PAIN	Experienced Pain Since Cardiovascular Disease Diagnosis
PSEVDABL	Become Disabled Since Cardiovascular Diagnosis
Perceived Threat of Cardiovascular Disease	
PTHRSICK	Fear of Becoming Sicker, Take Medications as Directed
PTHRSEE	Fear of Seeing a Doctor Prevent Seeking Medical Care

CONTINUED

TABLE 9 (continue)

Perceived Efficacy of Palliative Care	
PEFFMED	Take Medications as Directed -- Feel Better
PEFFSKST	When Feeling Better -- Skip or Stop Taking Medications
Normative Factors (Cues to Action)	
Functional Ability	
ACWALK	Able to Walk With/Without Assistance
ACPROP	Walk With Cane or Walker
Financial Cost	
EXPMED	How Expensive Are Your Medications
Adverse Drug Reactions	
SICKMED	Any Medications Ever Made You Sick
Living Arrangements	
HOUSIZE	Number of Persons Other Than Self in Household
HLDPRAST	Too Sick to Care for Self is Someone in Household to Provide Assistance
Complexity of Medical Regimen	
NBR MED	How Many Medications Currently Taking
Education and Counseling About Therapeutic Regimen	
MEDTALK	Doctor or Other Health Discuss How to Take Medication(s)
Doctor Patient Relationship	
EVALPHYS	Evaluate Relationship With Your Doctor

APPENDIX II

STUDY QUESTIONNAIRE

Patient Noncompliance and the Cardiovascular Health
of African American Elderly

RID _ _ _		**(1-3)/1**
DATE _ _ _		**(4-9)**
TIME OF DAY ____ ____ (HR) (MIN)	**AM = 1** **PM = 2**	**(10-14**

I. Perceived Susceptibility to Cardiovascular Disease

1. Do you have any of the following medical problems?

	Yes	No	DK	NA	RF	
a. Hypertension	1	2	6	7	8	**(16)**
b. Diabetes	1	2	6	7	8	**(17)**
c. High cholesterol	1	2	6	7	8	**(18)**
d. Weight control	1	2	6	7	8	**(19)**

2. Do you feel you are prone to heart disease? **(20)**

Yes 1
No 2
DK 6
NA 7
RF 8

3. Do you feel an individual's lifestyle may cause heart disease? **(21)**

Yes 1
No 2
DK 6
NA 7
RF 8

4. Do you have a family history of heart disease? **(22)**

Yes 1
No 2
DK 6
NA 7
RF 8

5. Do you feel enough information has been provided regarding how to prevent heart disease? **(23)**

Yes 1
No 2
DK 6
NA 7
RF 8

6. Has a doctor or health professional ever talked with you about ways that you can prevent heart disease? **(24)**

Yes 1
No 2
DK 6
NA 7
RF 8

7. Have you ever used tobacco products? **(25)**

Yes 1
No 2
DK 6
NA 7
RF 8

If yes, how long? ___ **(26-28)**

II. Perceived Severity of Cardiovascular Disease

1. Since diagnosed with heart disease has your lifestyle been affected? **(29)**

   Yes 1
   No 2
   DK 6
   NA 7
   RF 8

2. Have you experienced much pain since your diagnosis? **(30)**

   Yes 1
   No 2
   DK 6
   NA 7
   RF 8

3. Have you become disabled since being diagnosed with heart disease? **(31)**

   Yes 1
   No 2
   DK 6
   NA 7
   RF 8

   Explain?_____

III. Perceived Threat of Cardiovascular Disease

1. For fear of becoming sicker, do you take your medication as directed? **(32)**

   Yes 1
   No 2
   DK 6

NA 7
RF 8

2. Has fear of seeing a doctor ever kept you from getting medical care? **(33)**

Yes 1
No 2
DK 6
NA 7
RF 8

IV. Perceived Efficacy of Palliative Care

1. When you take your medications as directed, do you feel better? **(34)**

Yes 1
No 2
DK 6
NA 7
RF 8

2. When you are feeling better, do you skip or stop taking your medications? **(35)**

Yes 1
No 2
DK 6
NA 7
RF 8

V. Access

1. Do you have a regular doctor? **(36)**

Yes 1
No 2
DK 6
NA 7
RF 8

If no, skip to question 3.

2. Is your regular doctor: **(37)**

Black or African American	1
Caucasian	2
Hispanic	3
Other	4
DK	6
NA	7
RF	8

3. Do you have health insurance? **(38)**

Yes	1
No	2
DK	6
NA	7
RF	8

4. What type of health insurance do you currently have?
(CHECK ALL THAT APPLY)

a. Medicare **(39)**
b. Medicaid **(40)**
c. HMO (Health Maintenance Organization) **(41)**
d. Private carrier _____ (Specify) **(42)**

5a. Are you able to walk without any assistance? **(43)**

Yes	1
No	2
DK	6
NA	7
RF	8

If No, go to question 5b.
If Yes, skip to question 6.

b. Do you walk with a cane, walker, etc? **(44)**

Yes 1
No 2
DK 6
NA 7
RF 8

6. Where do you usually go for health care

		Yes	No	DK	NA	RF	
1.	a private doctor's office	1	2	6	7	8	**(45)**
2.	a local public health clinic	1	2	6	7	8	**(46)**
3.	a walk-in emergency clinic	1	2	6	7	8	**(47)**
4.	a hospital emergency room	1	2	6	7	8	**(48)**
5.	a hospital outpatient						**(49)**
6.	a HMO (Health Maintenance Organization)	1	2	6	7	8	**(50)**

7. Does your insurance cover **(CHECK ALL THAT APPLY)**

	Covered	Not Covered	DK	NA	RF	
Hospital Stays	1	2	6	7	8	**(51)**
Doctor's Visit	1	2	6	7	8	**(52)**
Preventive Care	1	2	6	7	8	**(53)**
Prescription Drugs	1	2	6	7	8	**(54)**

VI. Health Care Delivery

Thinking back over your experiences in getting health care, do you think that because of your race:

1. A doctor or nurse turned you down to receive services **(55)**

Yes	1
No	2
DK	6
NA	7
RF	8

2. Were you ever treated rudely? **(56)**

Yes	1
No	2
DK	6
NA	7
RF	8

3. Did you receive the treatment you felt you deserved? **(57)**

Yes	1
No	2
DK	6
NA	7
RF	8

4. How many times in the last year have you seen a doctor or other health care professional for any reason? **(58)**

Once	0
less than 5 times	1
More than 5 times	2
Other	3
DK	6
NA	7
RF	8

5. Do you prefer receiving medical attention from a doctor who is: **(59)**

Black or African American	1
Caucasian	2
Hispanic	3
No preference	4

DK	6
NA	7
RF	8

VII. Demographics

1. What is the last grade of school you have completed? **(60-62)**

Elementary	01 02 03 04 05 06 07 08
High School	09 10 11 12
College	13 14 15 16
Some Graduate School	17
Graduate Degree	18
Technical School	19
Professional School	20
RF	21
DK	22
NA	23

2. Are you currently **(63)**

Retired	1
Unable to work	2
Self-employed	3
A homemaker	4
Out of work for more than a year	5
Out of work for less than a year	6
DK	7
RF	8
NA	9

If employed what is your job title?_____

3. Do you receive any kind of public assistance, disability of veteran's benefits as part of your income? **(64)**

Yes 1
No 2

DK	6
NA	7
RF	8

4. Which of the following categories would you estimate your annual personal income falls within? **(65)**

$<5,000	0
$ 5,001 - 10,000	1
$10,001 - 20,000	2
$20,001 - 30,000	3
$30,001 - 40,000	4
$ over - 40,000	5
DK	6
NA	7
RF	8

5. What is your marital status? **(66)**

Single (living alone)	1
Single (living with someone)	2
Married	3
Widowed	4
Divorced	5
Separated	6

6. How many persons other than yourself are in your household? **(67)**

Zero	0
One	1
Two	2
Three	3
Four or More	4
DK	6
NA	7
RF	8

7. If you become too sick to care for yourself, is there anyone in your household to provide assistance? **(1/2)**

Yes	1
No	2
DK	6
NA	7
RF	8

8. What category would you estimate your household's total income? **(2/2)**

$ < 10,000	0
$ 10,000 - 20,000	1
$ 20,001 - 30,000	2
$ 30,001 - 40,000	3
$ 40,001 - 50,000	4
$ 50,001 - 60,000	5
DK	6
NA	7
RF	8

9. Which of the following best describes your residence? **(3)**

Single family home	1
Retirement Community	2
Nursing Home	3
Apartment or Condo	4
Other ____ (Specify)	5
DK	6
NA	7
RF	8

10. What was your age as of your last birthday? ___ **(4-6)**

11. What is approximate weight? ___ **(7-9)**

12. What is your height? ___ft. ___in.___ **(10-12)**
(Total Inches)

13. What is the gender of respondent? **(13)**

Male	1
Female	2

VIII. Compliance

1a. Do you currently take any medication? **(15/2)**

Yes	1
No	2
DK	6
NA	7
RF	8

If no; skip to question #3.

1b. **If yes; how many?** **(16)**

One	1
Two	2
Three	3
Four or More	4
DK	6
NA	7
RF	8

2. How expensive would you say your medications are for you? **(17)**

Not Expensive at All	1
Slightly Expensive	2
Expensive	3
Very Expensive	4

3. How frequently do you not have a prescription filled by the pharmacist because it is too expensive? **(18)**

Not At All	1
Seldom	2
Frequently	3
Very Frequently	4

4. Because you feel medications are expensive, when you run out, do you: **(19)**

Not have prescription refilled	1
Share similar medications	2
Purchase over the counter drugs as a substitute	3
DK	6
NA	7
RF	8

5a. Has any of your medications ever made you sick? **(21)**

Yes	1
No	2
DK	6
NA	7
RF	8

If No, skip to question #6.

b. Did you stop taking the medications? **(22)**

Yes	1
No	2
DK	6
NA	7
RF	8

6. Upon receiving your prescriptions did your doctor or other health professional talk with you about how to take the medication? **(23)**

Yes	1
No	2
DK	6
NA	7
RF	8

7. How would you evaluate the relationship you have with your doctor? **(24)**

Poor	1
Fair	2
Good	3
Very Good	4
Excellent	5

8. Do you follow the instructions on how and when to take your medications?

(25)

Yes	1
No	2
DK	6
NA	7
RF	8

9. How frequently would you say that you take your medications?

(26)

Not At All	1
Sometimes	2
Frequently	3
Very Frequently	4

IX. Behavioral Intention

a. Do you feel your diet has played a role in your diagnosis of heart disease? **(27)**

Yes 1
No 2
DK 6
NA 7
RF 8

b. Prior to your diagnosis of heart disease, did your diet have foods rich in fats? **(28)**

Yes 1
No 2
DK 6
NA 7
RF 8

c. Do you think you need to make any changes in what you eat or how it is cooked? **(29)**

Yes 1
No 2
DK 6
NA 7
RF 8

If yes, which changes do you intend to make? **(30)**

Stop cooking foods rich in fat 1
To bake or broil rather than fry 2
To eat more vegetables and fruits 3
All of the above 4

d. Do you intend to purchase all prescribed medicines. **(31)**

Very likely 4
Likely 3

Unlikely	2
Very unlikely	1

e. How likely are you to take the medicines as prescribed by your doctor. **(32)**

Very likely	4
Likely	3
Unlikely	2
Very unlikely	1

f. When your medicines have all been taken, do you intend to contact your doctor and advise him/her.

(33)

Very likely	4
Likely	3
Unlikely	2
Very unlikely	1

Your opinions are valuable asset to the study.

Do you have any questions? _____

Thank you for your participation.

END TIME ___ ___ **AM = 1** **(34-38)**
HR MIN PM = 2

APPENDIX III

INFORMED CONSENT
(PREAMBLE)

Patient Noncompliance and the Cardiovascular Health of African American Elderly

IRB-94-SAGS-04

PREAMBLE

For Investigative Procedure
Howard University
Washington, D.C. 20059

This study will examine the extent to which the Health Belief Model and the Reasoned Action Model can explain the occurrence of African American elderly's noncompliance with prescription drug therapy and its effect on cardiovascular health. The instrument will be administered at Howard University Hospital. This interview will only take approximately twenty minutes of your time.

The study will enable the researcher to evaluate, in a systematic manner, the priorities that African American elderly assign to competing demands and to the interpretation and meaning of health issues and events that are significantly influenced by their beliefs.

This instrument does not contain any identifying information about participants. Thus, absolute confidentiality is maintained. I understand that any written notes of my interview will be kept confidential by the researcher and that they will be secured in locked files until they are destroyed at the conclusion of this study. You may anticipate minimal psychological risks and some personal

inconveniences, that is, regarding your time, while participating in the study. You may withdraw and discontinue participation in this study at any time without jeopardizing your relationship with Howard University Hospital.

I also understand that the information I provide, as well as my name or any other identifying information, will remain anonymous and not appear in any reports produced by the study. If you would like any further information about this study, please contact Dr. Ivor L. Livingston or Ms. Sheila Y. Jones (202)806-5173. You may also want to call the Office of Executive Secretary of the Howard University Institutional Review Board at (202) 806-7818, if you would like to discuss this study with someone other than the study investigator.

RID__ __ _

Patient Noncompliance and the Cardiovascular Health

of African American Elderly

INTRODUCTION OF INTERVIEWER TO RESPONDENT

My name is_____, and I am currently studying factors that affect Patient Noncompliance among, elderly African Americans who have cardiovascular disease and have been admitted to Howard University Hospital This interview will only take about 20 minutes of your time.

The information that is shared today will help me understand the possible factors that may cause an individual not to take their medication as prescribed Further, it is hoped that this information can serve as a foundation for improving compliance among African Americans who are cardiovascular patients. I shall record your responses as we speak, however, none of your comments will be reported in a manner that can, in any way, identify you.

APPENDIX IV

DISTRIBUTION OF SOCIODEMOGRAPHIC FACTORS

TABLE 10

Percentage Distribution of Personal Income Within Gender Group

Variable	Male	Female
$<5,000	22.6	26.9
$ 5,001 - 10,000	22.6	29.5
$10,000 - 20,000	12.9	11.5
$20,001 - 30,000	8.1	11.5
$30,001 - 40,000	16.1	7.7
Over $40,000	12.9	7.7
Other (Refused, etc.)	4.8	5.1

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

Table descriptively provides distribution of personal income within gender groups.

TABLE 11

Percentage Distribution of Household Income Within Gender Group

Variable	Male	Female
$ < 10,000	24.2	43.6
$ 10,001 - 20,000	21.0	12.8
$ 20,001 - 30,000	9.7	11.5
$ 30,001 - 40,000	12.9	5.1
$ 40,001 - 50,000	11.3	9.0
$ 50,001 - 60,000	11.3	10.3
Other (Refused, etc.)	9.7	7.7

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

Table descriptively provides distribution of household income within gender groups.

TABLE 12

Percentage Distribution of Age Within Gender Group

Variable	Male	Female
50 - 59	19.4	15.4
60 - 69	29.0	25.6
70 - 79	41.9	38.5
80+	9.7	20.5

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

Table provides a basic description of the age variance within gender groups.

TABLE 13

Percentage Distribution of Marital Status Within Gender Group

Variable	Male	Female
Single	16.1	11.5
Single (Living with someone)	0.0	2.6
Married	48.4	24.4
Widowed	17.7	41.0
Divorced	17.7	11.5
Separated	0.0	9.0

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

Table indicates the distribution of marital status within gender groups

TABLE 14

Percentage Male and Female to Specific Educational Attainment

Variable	Male	Female
<High School Diploma	58.1	39.7
High School Diploma/or some College	16.1	41.0
College Degree	25.8	19.2

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

Table supports a general description of the gender in the sample by educational attainment.

TABLE 15
Percentage Distribution Education by Noncompliance

Variable	Less High School Diploma		High School Diploma and/or Some College		College Degree	
	Likely	Unlikely	Likely	Unlikely	Likely	Unlikely
Follow instruction	91.0	9.0	92.7	7.3	96.7	3.3
Take medications frequently	37.3	62.7	78.6	21.4	87.1	12.9
Intend to purchase all medicines	91.0	9.0	97.6	2.4	93.5	6.5
Intend to contact doctor when medication(s) run out	94.0	6.0	92.7	7.3	96.8	3.2
Take medications as prescribed -- feel better	83.6	16.4	73.2	26.8	54.8	45.2
Skip/Stop taking medications	41.8	58.2	76.2	23.8	90.3	9.7

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

APPENDIX V

DISTRIBUTIONS OF ATTITUDINAL/BELIEF FACTORS

TABLE 16

Percentage of Male and Female Perceived Susceptibilities for Cardiovascular Disease

Variable	Yes		No		Other*	
	Male	Female	Male	Female	Male	Female
Prone to Heart Disease	56.5	66.7	38.7	76.9	4.8	6.4
Family History of Heart Disease	51.6	59.0	46.8	41.0	1.6	0.0
Lifestyle May Cause Heart Disease	66.1	65.4	27.4	29.5	6.5	5.1
Health Professional Discuss Ways to Prevent Heart Disease	45.2	50.0	54.8	48.7	0.0	1.3
Ever Use Tobacco Products	88.7	50.0	11.3	50.0	0.0	0.0

*Refused; Don't Know; Not Applicable

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 17

Percentage of Male and Female Distribution for the Variables on Perceived Severities of Cardiovascular Disease

Variable	Yes		No		Other*	
	Male	Female	Male	Female	Male	Female
Lifestyle affected since Diagnosis of Cardiovascular Disease (CVD)	58.1	44.9	41.9	53.8	0.0	1.3
Experienced pain since diagnosis of (CVD)	40.3	42.3	59.7	57.7	0.0	0.0
Become disabled since diagnosed with (CVD)	37.1	39.7	62.9	60.3	0.0	0.0

*Not Applicable; Don't Know; Refused

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 18

Percentage of Male and Female Distribution for the Variables on the Perceived Threat of Cardiovascular Disease

Variable	Yes		No		Other*	
	Male	Female	Male	Female	Male	Female
Fear of becoming sicker, take medications as directed	80.6	91.0	16.1	9.0	3.2	0.0
Fear of seeing doctor prevent seeking medical care	9.7	10.3	88.7	89.7	1.6	0.0

*Not Applicable; Don't Know; Refused

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 19

Percentage of Male and Female for the Variables on the Perceived Efficacy of Palliative Care

Variable	Yes		No		Other*	
	Male	Female	Male	Female	Male	Female
Take medications as directed do-- you feel better	67.7	79.2	9.7	3.9	22.6	16.9
When feeling better -- skip or stop taking medications	43.5	32.1	53.2	66.7	3.2	1.3

*Not Applicable; Don't Know; Refused

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

APPENDIX VI

DISTRIBUTION OF NORMATIVE FACTORS

TABLE 20

Percentage of Male and Female for Variables on Functional Ability

Variable	Yes		No		Other*	
	Male	Female	Male	Female	Male	Female
Able to walk without assistance	75.8	57.7	24.2	42.3	0.0	0.0
Walk with cane, walker etc.	22.6	46.6	77.4	50.7	0.0	2.8

*Not Applicable; Don't Know; Refused

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

APPENDIX VII

DISTRIBUTION OF BEHAVIORAL INTENTION

TABLE 21

Variables That Have A Significant Association With Those Who Skip or Stop Medication When Feeling Better

Variable	Percent	P
Years of education	If Yes - 8.2 (±4.2) [If No - 12.6 (±4.4)]	.0001
Personal income level (See Appendix)		.0003
Household income level (See Appendix)		.0017
History of hypertension		
NO	12	
YES	41	.0209
Have you experienced much pain since your diagnosis?		
NO	29	
YES	48	.0219

CONTINUED

TABLE 21 (Continue)

Variable	Percent	P
For fear of becoming sicker, do you take medication as directed?		
NO	82	
YES	31	.0001
Has fear of seeing a doctor ever kept you from getting care?		
NO	33	
YES	79	.0008
When you take your medications as directed, do you feel better?		
NO	43	
YES	22	.0287
Did doctor or health care professional talk about how to take your medications?		
NO	60	
YES	27	.0002

Source: Computer generated statistics from the study questioinnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 22

Variables That Have A Significant Association With Those Who Take Their Medications Infrequently

Variable	Percent	P
Years of education	YES - 8.5±4.3 NO - 12.6±4.5	.0001
Personal income level (See Appendix)		.0006
Household income level (See Appendix)		.0052
Family lifestyle of heart disease		
NO	57.4	
YES	43	.0104
For fear of becoming sicker, do you take medication as directed?		
NO	28	
YES	72	.0001

CONTINUED

TABLE 22 (Continue)

Variable	Percent	P
When feeling better, do you skip or stop taking your medication?		
NO	27	
YES	73	.0001
Has any of your medications ever made you sick?		
NO	19	
YES	81	.0197
Housize		
0	47	
1	24	
2+		.0482
Did doctor or other health professional talk about how to take your medications?		
NO	60	
YES	40	.0001
Good relations with doctor?		
NO	20	
YES	80	.0103

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

TABLE 23

Variables That Have a Significant Association with the Likelihood of Taking Medications Prescribed

Variable	Unlikely To Take Medications	P
History of hypertension?		
NO	18	
YES	5	.0457
History of diabetes?		
NO	10	
YES	2	.0472
For fear of becoming sicker, do you take medication as directed?		
NO	29	
YES	3	.0001
Has fear of seeing a doctor ever kept you from getting care?		
NO	5	
YES	21	.0172

Source: Computer generated statistics from the study questionnaire, Patient Noncompliance and the Cardiovascular Health of African American Elderly.

APPENDIX VIII

CORRRELATION MATRIX

TABLE 24

CORRELATION MATRIX
--Correlation Coefficients--

	PTHRSICK	PTHRSEE	PLIFE	PHEART	PHIST	PINFO
PTHRSICK	1.0000	-.0188	.0017	.0830	.0049	.0275
PTHRSEE	-.0188	1.0000	.0102	.0783	-.0321	-.0818
PLIFE	.0017	.0102	1.0000	.0967	-.1813*	.0642
PHEART	.0830	.0783	.0967	1.0000	.0590	.1603
PHIST	.0049	-.0321	-.1813*	.0590	1.0000	.0226
PINFO	.0275	-.0818	.0642	.1603	.0226	1.0000
PPROF	.0304	-.1125	.0421	-.0373	.0128	.2282**
PDIAB	.1189	.0702	-.0486	.0678	.1298	.0804
PHTN	.0988	-.0854	.0392	.0553	-.0005	.1279
PCHOL	.0096	.0636	.0253	.0219	.0530	.0685
PWGTCON	.1060	-.1639	.0005	.0105	.0668	.1136
PSEVAFF	.1269	.0280	-.0193	.0500	-.0872	-.0477
PSEVPAIN	.1133	.2174**	.0067	.0645	.1006	.0025
PSEVDABL	.0988	.1650	-.0335	-.0594	.0576	-.2208**
PEFFMED	.1106	.1854*	.1014	.2132*	-.0056	.0764
PEFFSKST	.2761**	.0582	.0087	-.1041	-.1583	-.0889
PINCOME	.0157	.1757*	-.0016	-.0484	.0168	-.1393
GENDER	-.1710*	-.0764	-.0134	.0244	-.1096	.0017
AGE	-.1081	-.0198	.1573	.0427	.1079	.0991
DEMGRADE	.0189	.1108	-.0919	-.1293	-.1461	-.2311**
MARITAL	.0913	.0551	-.0641	.0997	-.0808	-.0398

CONTINUED

TABLE 24 (Continue)

	PTHRSICK	PTHRSEE	PLIFE	PHEART	PHIST	PINFO
HOUSIZE	.0297	.0137	.0064	.0157	-.0100	-.0376
MEDTALK	.5122**	-.0940	-.0866	.0251	.0297	-.0505
EVALPHYS	.0319	.1169	-.0098	.1029	-.0275	-.1115

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)
" . " is printed if a coefficient cannot be computed

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