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Philadelphia College of Osteopathic Medicine

Department of Psychology

EXAMINATION OF HEALTH ADHERENCE BEHAVIORS AND COGNITIVE
DISTORTIONS IN PATIENTS WITH CHRONIC ILLNESS

By Clint C. Stankiewicz

Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

September 2008

**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

Dissertation Approval

This is to certify that the thesis presented to us by Clint C. Stankiewicz on the 3rd day of June, 2008, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Barbara Golden, Psy.D., ABPP, Chairperson

Robert A. DiTomasso, Ph.D., ABPP

John P. Simelaro, D.O.

Robert A. DiTomasso, Ph.D., ABPP, Chair, Department of Psychology

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Abstract

The relationship between health adherence behaviors and cognitive distortions among patients with chronic illness were investigated. One-hundred eleven participants from two outpatient medical clinics were administered the Health Adherence Behavior Inventory (HABIT) and the Inventory for Cognitive Distortions (ICD), and the Health Adherence Behavior Survey was utilized to obtain demographic information. Results indicated participants who had a thinking style characterized by the use of cognitive distortions tended to engage in fewer health promoting behaviors. This finding was consistent with the predicted hypothesis. In fact, a significant correlation at the .05 level of $-.173$ was found between the ICD and the HABIT. These findings suggest that cognitive theory may have utility in understanding and improving health adherence. These findings have implications for primary care, as health care providers will be better able to manage and understand factors related to nonadherence, opening the door for collaboration among medical and mental health care providers.

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Chapter 1

Introduction

The Biopsychosocial Model

George Engel (1977) developed the “biopsychosocial model” in response to the prevailing disease model of the times, which he referred to as the “biomedical model.” Engel recognized the contributions that the biomedical model had made to the development of contemporary medical care. Engel rejected this biomedical model on the grounds that it was reductionistic, mechanistic, and dualistic. Alternatively, he proposed the biopsychosocial model, which assumes that all human problems are biopsychosocial system problems; each biological problem has psychosocial consequences, and each psychosocial problem has its biological correlates (McDaniel, 1995). In other words, any particular disorder is viewed as the result of a dynamic interaction among physiological, psychological, and social factors, which perpetuates, and may worsen, the clinical presentation. Further, Engel suggested that “conditions of life constitute significant variables in influencing a disease process” (Leigh, 1997, p. 137). Hence, a range of psychological and socioeconomic factors can interact with physical pathology to modulate a patient’s report of symptoms and subsequent disability (Gatchel, 2004).

A strength of the biopsychosocial model is that it takes on a more holistic approach that enables both the health care and mental health providers to conceptualize problems in an integrative manner. This is important notion, as physical and psychological problems tend to occur and increase together, making collaboration among professionals necessary (Gatchel, 2004). This is often the case in chronic medical illness.

Patients with chronic medical illness are expected to take on an active role in their own health care over an extended period of time and therefore have a different relationship with their illness and with their health care providers. Patients with acute illness, on the other hand, subsume more of a passive role, talking only to answer the doctors' questions and complying with examinations, procedures, and treatments. In contrast, patients with chronic illness learn about the nature of their illness over the course of many years, either by way of instruction from their health care professional or life -experience. Chronic illness patients must assume more responsibility for the ongoing management of their particular illness (Leigh, 1997). The complexity of chronic illness and the associated psychological sequelae make treatment adherence a difficult endeavor. This is a problematic and costly scenario. Patients who fail to adhere to treatment recommendations make inefficient use of the health care system, which contributes substantially to higher health care costs, not only through poorer health outcomes, morbidity, and death, but also indirectly in reduced quality of life and lost productivity. As such, a treatment approach which espouses a biopsychosocial perspective is well suited to manage the intricacies involved in the management of chronic illness.

Cost of Nonadherence in Chronic Illness: Statement of the Problem

It has been estimated that as many as 45% of the general population, and 88% of persons over the age of 65, have at least one chronic condition and 75% of health care dollars are spent on patients with chronic illness (Williams, 2003). Much of this cost is a direct result of nonadherence. Daniel Gerner, chairman of the Health Care Compliance Packaging Council in Washington, D.C., notes the problem of patient noncompliance is astounding (McCarthy, 1998). He notes that somewhere between \$60 billion and \$100 billion are spent each year to treat

problems caused by noncompliance. Further, it is the direct cause of 10% of all hospital admissions (McCarthy, 1998). The high monetary cost of nonadherence is not the only consideration. Nonadherence is also associated with poor health outcomes (McDermott, 1997; McCarthy, 1998). The corollary of non-adherence is significant, yet the solution remains unclear.

The terms *adherence* and *compliance* are often used interchangeably in the literature. The most cited description of compliance was provided by Haynes (1979), who defined it as the extent to which a person's behavior coincides with medical advice. The term *adherence* implies a more active and collaborative involvement of the patient, working together in a collaborative manner with the clinician in planning and implementing the treatment regimen. Adherence places a greater emphasis on the patient's role in deciding to implement a particular treatment recommendation (Myers & Midence, 1998). *Nonadherence*, then, will be defined here as an absence of voluntary participation by a patient in a mutually acceptable course of behavior to produce a desired preventative or therapeutic result (Meichenbaum & Turk, 1987).

The nature of chronic conditions often necessitates adherence to medication regimens over extended periods of time. However, nonadherence with long term medication regimens has been estimated to fall somewhere between 42% and 60%, converging at an average of 30% to 50% for chronic illness (Haynes, 1985; Meichenbaum & Turk, 1987; Dean & King, 1999). In fact, it has been estimated that 10% of hospital admissions in the United States each year may be due exclusively to nonadherence with prescribed medications (Sanz, Constable, Lopez-Ibor, Kemp, & David, 1998). Adherence with asthma medications, for example, has been found to be as high as 60% and as low as 15% (Kendrick, Higgs, Whitfield, & Lazo 1993; Rubinfeld & Pain, 1976).

The problem is just as significant with respect to cardiovascular disease. Cardiovascular disease is the major cause of mortality in developed countries (Jenkins, 1988). Its most prevalent form is coronary heart disease, in which nonadherence to regimens results in 125,000 avoidable deaths every year (McCarthy, 1998). A major but modifiable risk factor for developing coronary heart disease is elevated blood pressure or hypertension. It has been estimated that 24% of American adults have hypertension. In 2004, the American Heart Association (AHA) reported that hypertension alone killed almost 55,000 Americans and was implicated in the deaths of many others. Despite the morbidity known to be associated with hypertension and coronary heart disease, nonadherence rates approach 50% (Burt et al., 1995; Conn, Taylor, & Hayes, 1992). The cost of cardiovascular diseases and strokes in the United States in 2005 is projected in excess of \$390 billion. Hypertension alone was estimated to be nearly \$ 60 billion in 2002. These figures include both direct health care expenditures as well as lost productivity resulting from morbidity and mortality (AHA, 2004).

Diabetes mellitus is one of the most psychologically and behaviorally demanding of the chronic medical diseases. Diabetes is unique both in the degree to which patients must assume responsibility for their treatment and the degree to which it imposes on the lives of those afflicted (Cox & Gonder-Frederick, 1992; Milton, 1989). In the United States an estimated 14 million people are afflicted with diabetes. It should be noted that prevalence rates increase with age, as 6% of the population in the over 65 age group are affected. More deaths are caused by diabetes than by lung cancer, breast cancer, motor accidents, or infant mortality (Shillitoe & Miles, 1989; Molitch, 1991; Kelleher, 1988). The problem is equally problematic overseas, where it is estimated that 3% of the adult British population is afflicted which accounts for 8% of the total health care expenditure in the U.K. (Marks, 1996; British Diabetic Association (BDA), 1996).

The Global Health Council *UNAIDS 2007 AIDS Epidemic Update* indicated that 25 million people have died in the past quarter century, and that there are over 33 million presently living with HIV/AIDS (Global Health Council, 2007). Early on in the epidemic, AIDS was thought of as a highly fatal acute illness. However, advances in contemporary medicine and treatment have helped define HIV/AIDS as more of a chronic illness. Antiretroviral (ARV) combination therapies have led to significant reductions in morbidity and mortality among individuals with HIV. Notwithstanding, strict adherence to ARV regimens is required for their long-term effectiveness. ARV combination therapies are highly complex, require significant lifestyle accommodations, often have unpleasant side effects, and must be taken consistently over long periods of time (Tucker et al., 2004; Siegel & Lekas, 2002). The progression of the disease and associated infections often complicate treatment and make these patients high utilizers of health care (Camic & Knight, 1997).

Scalera and associates (2002) looked at the clinical implications of nonadherence to HAART (Highly Active Antiretroviral Therapy) in HIV infection. They found that when they defined adherence as the proportion of prescribed doses taken correctly and at the prescribed frequency, the adherence rates fell between 55% and 76%. Among patients reporting less than 80% adherence, no antiviral effect or immune restoration was observed. Finally, they found that adherence to HAART was associated with improved long-term clinical outcomes and quality of life. The total economic implications of nonadherence was difficult to determine exactly, given the entwinement of the direct and indirect costs.

Arthritis and associated conditions are chronic conditions that exact a heavy burden on the individuals afflicted, their families, and the health care system. Arthritis results in excess of 39 million physician visits and hundreds of thousands of hospital visits, resulting in an estimated

cost of \$15 billion. Experts have projected that by the year 2020, nearly 60 million adults, or approximately 20% of the population in the United States, will be affected, with some 11 million disabled as a result (Centers for Disease Control and Prevention, 1998).

Obesity is quickly becoming a national epidemic. According to recent data, the number of annual deaths attributed to obesity in the United States alone is estimated to be in excess of 112,000. Obesity is a common thread associated with a number of chronic illnesses. The morbidity associated with obesity includes diabetes, heart disease, arthritis and some cancers, and obesity reduces a patient's overall quality of life and contributes to escalating medical costs. In 2000, the estimated total cost of obesity, including medical costs and the value of lost wages due to illness, disability, and premature death was approximately \$117 billion (Rohrich, 2006).

The effects of many of these chronic conditions can be moderated by making lifestyle changes and following physician advice. Haynes (1985) found that 50% of patients did not follow referral advice, 7% did not keep follow-up appointments, and as many as 50% of people suffering from chronic conditions dropped out of treatment within 1 year. Exercise is often a lifestyle change prescribed for a number of medical conditions. There is mounting evidence that lack of physical fitness is a major factor in heart disease and other illness, and increasing exercise significantly reduces risks (Blar et al., 1989; Blar et al., 1992). Unfortunately, studies have shown that 70% of the population does not take enough exercise to ensure optimal health benefits (Health Education Authority, 1992).

As has been demonstrated, the prevalence of chronic illness is quite high and tends to increase with age. The management of chronic illness is long term, requiring ongoing medical treatment that is very expensive, comprising a large portion of all health care expenditures. total health care dollars spent in the treatment of chronic illness is confounded by the cost

directly attributable to non-adherence. Perhaps the problem of non-adherence is made more complicated by the associated psychological sequelae that often accompany chronic conditions.

Nonadherence and Related Clinical and Psychological Variables

Managed care has ushered in a new era in health care. As such, health care professionals and administrators have sought ways to increase patient compliance and appropriate utilization of services. A study by Moore-Greene (2000) focused on the development and standardization of social indicators to identify biopsychosocial problems that cause medical noncompliance and inappropriate utilization of medical services. The result of the investigation was the development of “life indicators,” which she conceptualized as biopsychosocial problems that encompass the following: (a) diagnosis of illness; (b) level of physical functioning; (c) availability of social support; (d) availability of psychological support; and (e) availability of financial support. The researchers theorize that such a classification helps to increase the fit between patient characteristics and specific psychosocial interventions. These “life indicators” were found to be moderately correlated with poor compliance and other negative health measures. The conclusion was that these “life indicators” can be integrated into a case management model to better manage noncompliance and inappropriate health care utilization. For example, a client with diabetes may become depressed and hopeless because of their level of physical disability. The client’s level of depression and physical disability may compromise both their treatment adherence and clinical outcome. An accurate assessment of these “life indicators” in this case may allow for an appropriate referral to a mental health professional to help alleviate the patient’s depression. The mental health professional can work in concert with a social worker to help the patient access community, social and other available resources. In this way, the

patient will be making a more efficient use of health care and will be more likely to comply with treatment recommendations.

Other studies have investigated social and psychosocial variables and how they relate to patient adherence. Findings from a recent meta-analysis study by DiMatteo (2004) revealed a significant relationship between structural (e.g., marital status, living arrangement) or functional (e.g., practical/instrumental, emotional, family cohesion) social support and patient adherence to prescribed medical regimens. Other factors such as practical, emotional, and unidimensional social support; family conflict and cohesiveness; marital status; and living arrangements were investigated. Results indicated that practical support had the highest correlation with adherence, with marital status and living arrangements having more modest relationships. Practical support is defined as a more direct kind of support relating specifically to treatment regimen.

Similarly, a study by Tucker and associates (2004) examined psychosocial mediators of antiretroviral nonadherence in HIV-positive adults with substance use and mental health problems. The study included data from 1,889 HIV-positive patients on antiretroviral medications who participated in the HIV Cost and Services Utilization Study. The aim of the study was to explore whether or not nonadherence to ARV could be explained by difficulty in getting treatment and/or negative attitudes towards ARV medication. Findings suggest that difficulty in getting medications and poor fit with lifestyle were cited as the two most significant mediators. Poor fit with lifestyle referred to heavy use of alcohol and narcotics, which results in compromised memory, motivation, and social support.

Alternative approaches have focused more on specific patient characteristics, such as age and level of education. Huyser and associates (1997) investigated adherence to rehabilitation programs in patients with fibromyalgia. The patients who participated in the study were followed

through a 6 week program in which subjects were to fill out questionnaires and undergo physical examinations. The researchers concluded that the best model for predicting adherence suggested that a subject's given age and level of education were the strongest influences. In other words, greater years of age and level of education were significantly related to adherence behaviors.

Other studies have attempted to study compliance by examining health care provider attributes. Haynes (1985) found that adherence to treatment regimens was positively associated with the physician's ability to make the patient feel understood. Further, there was also a positive relationship with the patient's perceived support and ability to negotiate and feeling as if he or she were engaged in a collaborative relationship with the physician. The physician-patient relationship has gained credence in other studies. In several studies involving patients with cancer, schizophrenia, and diabetes, the patient-physician relationship has been recognized as a significant variable in therapeutic outcomes (Smith & Thompson, 1993).

Similarly, Steiner (1988) studied communication factors in nonadherence behavior. They point out that the nature of interactions within health care settings make miscommunication more likely to occur. The researchers indicated that essential factors influencing compliance included patient-provider interaction, and a detailed discussion of medication and associated advantages and side effects.

Sanz, Constable, Lopez-Ibor, Kemp, & David (1998) examined insight and its relationship to psychopathological, social, and clinical variables. The researchers discuss insight as it refers to patients' ability to recognize themselves as having a mental illness, their capacity for self-observation, self-knowledge about their psychopathological experiences, and awareness of the kind, severity, and consequences of their mental disorder. The researchers note that various dimensions of insight into illness have been correlated with clinical, sociodemographic,

and neuropsychological variables. In this way, insight has been related to treatment compliance. Their findings indicate that psychopathology and clinical variables, specifically those related to insight, are related to attitudes towards treatment and subsequent compliance.

Other research has examined psychological variables and their relation to treatment adherence. DiMatteo (2000) investigated the association between anxiety and noncompliance and depression and noncompliance, as independent factors. The relation between anxiety and noncompliance proved to be insignificant. However, the relationship between depression and noncompliance was found to be significant. In fact, when compared with nondepressed patients, the odds are three times greater that depressed patients will be noncompliant with medical treatment recommendations. A similar study by Delgado (2000) noted that the complex nature of noncompliance includes rational and intentional decisions based on patient beliefs which may be related to depression.

Other investigations have explored chronic illness and its relation to depression. Simon, Von Korff, and Lin (2005) have looked at the clinical outcomes of depression treatments in patients with chronic illness. The researchers note that depression is common among those with chronic medical illness. Among patients treated for ischemic heart disease, prevalence of current depressive disorder is nearly 20%. The prevalence of depression among outpatients with diabetes is twice as high as in the general population. Similar or higher depression prevalence rates are seen in patients with chronic obstructive lung disease. Comorbid medical illness has been associated with poorer outcomes of depression treatment.

Simon, Von Korff, and Lin (2005) indicate that all groups reported marked impairment in emotional and social functioning at baseline. The treatment group showed significant improvement in severity of depression and emotional functioning after starting treatment for

depression. In addition, improvement in depression was associated with some improvement in scales related to physical functioning. Analyses of disability measures (restricted activity days and work loss days) suggest that depression may have a greater influence on disability and lost productivity than does a comorbid chronic medical condition (Simon, Von Korff, & Lin, 2005).

Buselli and Stuart (1999) investigated the influence of psychosocial factors and biopsychosocial interventions in myocardial infarction. The researchers hold that psychosocial factors such as depression, coronary-prone behavior pattern or hostility, social isolation, anxiety, and anger have been linked to increased morbidity, and mortality and poorer outcomes. Findings indicate that a variety of biopsychosocial interventions, such as cognitive-behavior therapy, elicitation of the relaxation response, and increasing social networks, have been shown to improve health outcomes in these patients.

Holm, Frank, and Curtain (1999), in an effort to understand the factors that influence women's mammography behavior, explored the relation between health beliefs, locus of control, and women's mammography behavior. Findings indicated that women who participated in mammography screening were significantly more likely to perceive greater benefits, greater health motivation, and fewer barriers to screening than those who did not participate. It was also found that perceived benefits and health motivation were significantly correlated with shorter duration since the last mammogram. The researchers note that although health locus of control was not associated with mammography screening in this study, others have found a strong positive relation between health locus of control and intent to undergo mammography (Holm, Frank, & Curtain, 1999).

Other research has attempted to understand the problem of noncompliance from a cognitive standpoint by examining the role of illness cognition and health beliefs (Leventhal,

Diefenbach, & Leventhal, 1992; Eraker, Kirscht, & Becker, 1984). Of particular interest is a study by Christensen, Moran, and Weibe (1999) that examined irrational health beliefs and its relation to health practices and medical regimen adherence. Cognitive theorists typically describe distorted cognitions as appraisals or conclusions that reflect a bias in the processing of information or that are inconsistent with some commonly accepted view of reality.

Research has shown that distorted thinking may result in increased behavioral disability or dysfunction among physically ill individuals, as well as in dysphoric mood. As such, the possibility exists that a similar tendency to engage in cognitive distortion may influence health-related behavior. Findings from the study confirmed this hypothesis. They found that irrational health beliefs were strongly associated with negative affectivity and a less positive pattern of health practices in both clinical and healthy populations (Christensen, Moran, & Wiebe, 1999).

Research has established a number of psychological and social and other variables that are related to treatment adherence. This is initiative largely driven by managed care as health care professionals and administrators have sought to increase compliance and ensure proper utilization of health care services. Still other researchers and theorists have focused on drawing together variables associated with adherence into an integrated whole by conceptualizing the problem through the lens of a theoretical model.

Health Behavior Theories of Non-adherence

A number of theorists have attempted to understand the problem of non-adherence through the development of various theorems and models. One of the earliest, and perhaps the most cited, is the health belief model (HBM) which was developed in the early 1950s to explain

the failure of people to accept disease preventatives or screening instruments for the early detection of asymptomatic diseases (Clark & Becker, 1998). The health belief model is based on the following precepts: (1) perceived susceptibility, or one's perceived risk of contracting a certain condition; (2) perceived severity, one's feelings about the seriousness of contracting a certain illness; (3) perceived benefits, one's belief concerning the perceived benefits of effectiveness of the actions taken to reduce the disease threat; (4) perceived barriers, or the negative aspects of a particular health intervention that may function as a hindrance to complying with the recommended behavior; and (5) cues to action, which are the stimuli that trigger the decision making process (Clark & Becker, 1998). Essentially, the health belief model proposes that individuals are more likely to comply with treatment recommendations if they believe that (1) there is a threat to one's health, (2) one is susceptible to negative consequences, (3) one has some control in averting a negative health consequence, and (4) there are no perceived barriers to performing the desired behavior (Wiebe & Christensen, 1997; Tiedje & Kingry, 1992).

Expanding on the health belief model, Rosenstock (1990) made a distinction between intrinsic and extrinsic motivations for change. Further, self-efficacy is theorized to be a stronger predictor of behavioral change among individuals with a strong perception of threat and recognition of the benefits of complying with recommended health actions. People who tend to deny their medical conditions will fail to realistically appraise the severity of the situation, which will impact their readiness for change.

Other research in line with the HBM has identified that a multitude of factors can influence compliance with a specific treatment regimen. Creer and Levstek (1996) have found that medication adherence tends to decrease under certain circumstances. These include the

presence of side effects, perceived efficacy, duration of medication use, complexity of the regimen, and relative cost of medications. Additionally, poor interaction (e.g., incomplete/inadequate instruction, poor communication) between the medical staff and/or the physician and the patient can result in insufficient medical instruction, which then results in a failure to understand sideeffects or other misapprehensions that foster nonadherence. Other factors having a negative impact on adherence include a lack of social support, memory decay, previous experience, social stigmas, apathy, comorbid psychiatric issues including depression, lack of perceived benefits, and lack of reinforcing stimuli.

DiMatteo and associates (1993) attempted to develop a scale to address patient adherence, based on research including elements of the HBM. The Adherence Determinants Questionnaire (ADQ) evaluated seven elements of patient adherence to medical treatment and prevention: including perceptions of interpersonal care, beliefs about susceptibility, beliefs about severity, perceived utility of adhering, perceived social norms concerning adherence, intention to adhere, perception of available support, and absence of barriers to adhere. Findings indicate that intention to adhere was most highly correlated with the perceived utility of adhering. Self-reported and objective measures of adherence were most strongly correlated with the presence of supports and the absence of barriers.

Similarly, Fink and associates (2004) studied a population of women with early stage breast cancer and found that 17% of the patients stopped taking medication during the 2 -year follow up period. Of these, 68% stopped taking the medication within the first year. The researchers concluded that the ways in which the women perceived the risks and the benefits of therapy were crucial for sustaining adherence.

The Self-Regulation Model proposes that self-regulation is a function of the representation of health threats and the targets of ongoing coping (symptom reduction, temporal expectancies for change) set by the representation, the procedures to regulate these targets, and the appraisal of coping outcomes. The underlying cognitive mechanism is assumed to function at both a concrete (symptom-based schema) and an abstract (disease labels) level, and individuals often engage in biased testing while attempting to establish a coherent representation of the health threat. In other words, patients' illness representations are based around distinct components which in turn determine coping. Therefore, each patient will have their own ideas about the identity, cause, time-line, and consequences of their illness (Leventhal, 1984; Leventhal, Diefenbach, & Leventhal, 1992; Weinman, Petrie, Moss-Morris, & Home, 1996).

To illustrate, Siegal and Greenstein (1998) studied a population of kidney transplant patients and found that the patients most likely to adhere to treatment regimens were certain that their medications must never be delayed or missed, that the medication lasts in the body for less than 1 day, and that their physical symptoms interfered with things that they needed to do. In contrast patients identified as "low" or "partial compliers" did not believe that the medication was essential, that the medication lasted in the body, and they perceived their physical symptoms to be milder than the patients in the "compliance" group.

Fogarty (1997) attempted to conceptualize nonadherence according to reactance theory, which explains a patient's noncompliance with medical treatment as a function of psychological reactance. A perceived threat to an individual's freedom produces a state of motivation intended to resecure the affected freedom and prevent the loss of additional freedoms. Therefore, according to this theory, a patient's perception of threats to their freedom or control may provoke noncompliance. Fogarty put forth three macro-level noncompliance patterns: length, complexity,

and type of medical regimen. She theorized that high rate of non-compliance with complex and/or lengthy regimens may be partially explained by reactance theory.

Social cognitive theory is based on Bandura's discussion of the social learning process, which attempts to explain and predict behavior using several chief concepts including incentives, outcome expectations, and efficacy expectations within the social environment (Clark & Becker, 1998). Proponents of social cognitive theory propose that a patient will not actively pursue change or positive health behaviors if she/he can not reasonably expect the behavior or action to be successful. Hence, the notion of self-efficacy is an important construct with regard to predictive change. Smoking is a negative health behavior that illustrates this concept in that many people become discouraged after failed attempts to quit, which in turn decreases the likelihood of future attempts (Glanz, Lewis, & Rimer, 1990).

A similar model is the protection motivation theory developed by Rogers in 1975, which also draws on social variables to understand noncompliance. This model highlights the persuasive value of fear communications that together with perceived self-efficacy may lead to cognitions and motivation for coping mechanisms and decisions to engage in health promoting behavior. A useful illustration comes from compliance study research with HIV patients. In developed nations, persuasive mass communications related to prevention and treatment, combined with the fear of HIV, were believed at one time to contribute to greater use of condoms in high risk populations and with better treatment compliance among those already diagnosed (Catz, Kelly, Bogart, Benotsch, & McAuliffe, 2000).

Theories of personality have also been proposed in an attempt to conceptualize nonadherence. One such attempt is the five-factor model incorporated in the NEO Personality Inventory. This instrument supposes to identify five dimensions of personality that include

Neuroticism, Conscientiousness, Agreeableness, Extraversion, and Openness to Experience. Although only speculative, the dimension of Conscientiousness appears to offer potential as a precursor of health related behaviors. Other research has attempted to evaluate adherence using other personality measures such as the Sixteen Personality Factor Questionnaire (16PF) (Wiebe & Christensen, 1997). In all, research utilizing personality measures to understand adherence is limited.

Attribution theory, developed by Weiner in 1988, focuses on the human need or desire to understand or explain adverse events. Essentially, this theory proposes that people desire to make sense of their world and attempt to do so by looking for causal relationships. Byrns (2000) examined attributions and lower back pain in a population of workers. He found that those workers who attributed their pain to internal causes, i.e., knowledge of back safety, tended to feel less subjective distress compared to those who believed the job itself was difficult (external attribution). According to Byrns, the internal attribution or the belief that their pain could be reduced through their own actions reinforced the workers' motivation to adopt healthier behaviors based on perception of perceived control over their particular circumstances.

The transtheoretical model was originally developed by DiClemente and Prochaska to conceptualize the process of change in addictive behavior. In recent times, this model has gained widespread acclaim in the health care industry through its application to a number of health-related behaviors. They conceptualize change as a sequential process whereby they propose stages based on a person's readiness for change. These dimensions of change are delineated in five stages: precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage, the person has no intention to change in the foreseeable future. In the contemplation stage, an individual's awareness is raised and they begin to consider the

possibility of change. In the next stage, preparation, individuals are planning to take action in the near future and may have made an unsuccessful attempt in the past year. The action phase is characterized by the individual taking actual steps to modify their behavior, experiences, or environment in an effort to overcome their problems. Finally, maintenance is concerned with the consolidation and maintenance of positive change (Prochaska, DiClemente, & Norcross, 1992).

This model has profound implications with regard to negative health behaviors as smoking and drinking that are associated with a number of serious illnesses and conditions. However, research has attempted to understand readiness to change in other domains of health behavior. A study by O'Connor and associates (2004) hypothesized that patient readiness to change predicts future changes in glycemic control in an adult population with diabetes. Results indicated that patient readiness for change as an independent predictor of change in HbA_{1c} for patients with a high functional status, but not for patients with low functional status. The model is yet to be substantiated as controversy exists regarding the lack of standardization of measures to assess change and the predictive value of the model.

The multiattribute utility theory maintains that a person's actions depend upon subjective values of specific outcomes. The individual evaluates the probabilities and consequences of alternative decisions, along with the relative importance of each consequence relative to the final decision. With respect to health-related behaviors, it is theorized that the multiattribute utility theory has the ability to differentiate adherent patients from nonadherent behavior (Carter, 1990). Consider a person contemplating becoming a member of a new, more expensive gymnasium with state-of-the-art equipment. The consumer must consider the probability and consequences of deciding to pay more or stay with their current gym.

A similar model, consumer information processing theory (Rudd & Glanz, 1990) focuses on consumer choice and availability of relevant information. Assumed in this model is the idea that consumers' decisions are related to each individual's ability to process information, in combination with motivation, attention, and decision processes and rules. The quality of the information and the consumer's private cost-benefit analysis is tied to other constraints such as time, difficulty, and other factors in the decision making process. With regards to health care decisions, however, patients do not always take the time necessary to make a properly informed decision. This responsibility befalls the physician, whose role is to properly educate his/her patient.

Ajzen and Fishbein (1980) theorize that intention to perform a specific behavior can be understood by a combination of attitudes about a given action and perceptions of likely normative reactions to that action. Essentially, the theory of reasoned action focuses on an individual's attitude towards the given behavior and their evaluations of these outcomes and of the subjective norms. Sociodemographic variables operate only through their influences on the determinants of behavioral intention. Intention will result in behavior if there is an opportunity to act. Therefore, this model subsumes a cultural component in the prediction of behavior. Closely allied with this theory is the theory of planned behavior. This model supposes that performance of a behavior is a function of the strength of a person's attempt to perform the behavior and the degree of control the person has over that behavior.

Behavioral modification has also been applied to understand adherence, apart from the cognitive themes discussed thus far. This model emphasizes the roles played by habit and skill in attempts to modify undesirable personal or lifestyle behaviors and brings to bear a variety of techniques such as contingency management, self-monitoring, counter-conditioning, relaxation,

and reinforcement and punishment just to name a few. This model attempts to modify behavior in the following manner: (a) identify the problem and describe it in behavioral terms; (b) select a target behavior that is measurable; (c) identify the antecedents and consequences; (d) set behavioral objectives; (e) devise and implement a behavior-change based on information acquired in the previous steps and (f) evaluate the program and make any necessary modifications (Clark & Becker, 1998).

The cognitive model has received much less attention with respect to adherence. Aaron Beck (1976; Beck, Rush, Shaw, & Emery, 1979) viewed cognition as an individual's subjective view of the world and that affect and behavior were the result of what he called verbal or pictorial events occurring within the individual. In his view, cognitions are not only based on sensory input, but arise from a person's underlying assumptions, attitudes and beliefs, or schema that are developed from previous experiences in the world, including one's past, present, and future. Beck viewed perception and experience as dynamic processes based on one's interpretations of both internal and external stimuli. Over time, an individual is said to develop certain characteristic trait-like cognitive patterns that may subject one to emotional distress. In other words, one's cognitions may become distorted and may not necessarily correspond to reality, but may be based on one's previous attitudes or assumptions or schema.

Beck and associates (1979) developed the following theoretical assumptions that underlie and form the basis for cognitive theory.

1. Perception and experience are dynamic processes that involve both introspective and inspective information.
2. Cognitions comprise a synthesis of both internal and external stimuli.
3. Cognitions shape the manner in which an individual views an event.

4. Cognitions stemming from ones representation of their past, present, and future view of themselves, others and the world constitute ones stream of consciousness.
5. Variations in cognitions will have direct bearing on affect, mood, and behavior.
6. Psychotherapy from a cognitive orientation allows a patient to become aware of his/her cognitive distortions.
7. Correcting these cognitive distortions can bring about clinical improvement.

Research and the evolution of contemporary thought in cognitive theory during the past 25 years have prompted the modification of cognitive theory to include 10 “formal axioms” (Alford & Beck, 1997, p.15):

1. The bases of psychological functioning or adaptation are schemas which are conceptualized as meaning making structures. This “meaning” includes the person’s interpretation of a given context’s relationship to the self.
2. How one ascribes meaning occurs at both automatic and deliberative that has the function of controlling various aspects of (e.g., behavioral, emotional, attention, and memory) psychological functioning. Therefore meaning activates strategies for adaptation.
3. The influences between cognitive systems and other systems are reciprocal.
4. “Cognitive content specificity” occurs when meaning is categorized and then translated into specific patterns of emotion, attention, memory, and behavior.
5. Meaning for each individual rather than being based in reality, their accuracy is judged in relation to a given context or goal. Cognitive distortions or biases occur when these meanings we create are dysfunctional or maladaptive. Cognitive distortions may include

both errors in cognitive content (meaning) and cognitive processing (meaning elaboration).

6. Individuals are predisposed to particular cognitive distortions. This predisposition or “cognitive vulnerability” leaves one subject to the development of specific syndromes.
7. Psychopathology results from the maladaptive meanings constructed regarding the self, the environmental context (experience), and the future, which is known as the cognitive triad. Each clinical syndrome has characteristic maladaptive meanings associated with corresponding areas of the cognitive triad.
8. Individuals interpret meaning on two levels, a public or objective level and a private or personal level. The public meaning has few implications for the person, whereas the private meaning includes implications, significance, or generalizations construed from the occurrence of a particular event.
9. Cognitions occur on three distinct levels, which is termed as “Three Cognitive Systems.” These are: (a) the preconscious or unintentional automatic level; (b) the conscious level, and (c) the metacognitive level which includes rational and adaptive responses.
10. An individual’s schema represents an evolution to facilitate adaptations with the person’s given environmental demands. Therefore, a person’s given psychological state is judged in relation to the individual’s context.

Cognitive distortions are theorized to play an integral role in the creation and maintenance of psychological syndromes. Further, these cognitive distortions are said to have more “trait” rather than “state” dependent characteristics. These axioms are interrelated, evolving principles that can be utilized to generate specific hypothesis to form the basis of a working theory (Alford & Beck,

1997). Cognitive therapy, for the most part, has always included a behavioral component as it pertains to conceptualization and interventions. Cognitive behavioral therapists (CBT) theorists put forward that interventions should be aimed at the modification of conscious beliefs and representations rather than focusing on the unconscious domain.

Beck (1967) defined cognitive distortions as a bias in thinking or processing information that predictably result in identifiable errors in thinking. In his work, Beck noted that his patients engaged in patterns of thinking that were systematic but were ill informed. He found that such faulty ways of processing information result in maladaptive emotions and behavior.

Beck (1967) originally proposed six cognitive distortions: (a) arbitrary inference, (b) selective abstraction, (c) overgeneralization, (d) magnification and minimization (e) personalization, and (f) absolutistic, dichotomous thinking. Burns (1980, 1990, 1999) expanded on Beck's original formulation by including 10 cognitive distortions: (a) all or nothing thinking, (b) over-generalization, (c) emotional reasoning, (d) mental filter, (e) labeling, (f) jumping to conclusions, (g) discounting the positive, (h) magnification, (i) personalization and blame, and (j) should-statements.

Research and advancement of cognitive theory lead to the additional cognitive distortions that include: (a) comparison, (b) externalization of self-worth, (c) and perfectionism (Freeman & DeWolf, 1990; Freeman & Oster, 1999). Later, Gilson and Freeman (1999) examined cognitive distortions from a different perspective as fallacies in thinking which include: (a) fallacy of fairness, (b) fallacy of change, (c) fallacy of worrying, (d) fallacy of control, (e) fallacy of being right, (f) fallacy of attachment, (g) ignoring, and (h) heaven's reward.

The discussion of cognitive distortions is by no means an exhaustive review, but does represent the principal errors in cognition. The distorted cognitions discussed above are often

described as appraisals or conclusions that reflect a bias in the processing of information or that are inconsistent with some commonly accepted views of reality. Recent research suggests that distorted appraisals may result in increased behavioral disability or dysfunction among physically ill individuals, as well as in dysphoric mood (Christensen, Moran, & Wiebe, 1999). As such, the possibility exists that a similar tendency to engage in cognitive distortions may influence health-related behaviors.

As has been reviewed above, a number of theories have been proposed in an attempt to conceptualize treatment adherence. Among the first and most extensively researched is the health belief model which was developed in the early 1950s. Later, other theories began to emerge, such as the self-regulation model, social cognitive theory, transtheoretical model among many others. The cognitive model, developed by Aaron T. Beck has received much less attention with respect to treatment adherence. Since its inception the cognitive model has been well researched and established in the treatment of a number of psychological conditions.

Cognitive Therapy for Depression and Other Conditions

Cognitive therapy rests on the notion that one's behavior and emotion are heavily influenced by the manner in which one thinks, or rather, one's cognitions. Cognitive therapy suggests that clinical and personality pathology are related to cognitive distortions (Beck, 1976; Beck & Freeman, 1990; Beck, Freeman, Davis, et al., 2004). The concept of cognitive distortions originated in the study of patients suffering from depression. Since then, cognitive therapy has received much acclaim for its efficacy in treating many frequently occurring psychological disorders in a wide array of populations, e.g., individual, couples, group, and family in both inpatient and outpatient settings (Beck, 1993). In fact, Butler and Beck (2001) investigated 14

meta-analyses examining the efficacy of cognitive therapy in 325 studies with a total of 9,138 participants. Findings from this review indicated that cognitive therapy is substantially superior to no treatment, wait-list, and placebo controls for unipolar depression, generalized anxiety disorder, social phobia, and childhood depressive and anxiety disorders. Moreover, cognitive therapy had moderate effect sizes for marital distress, anger, childhood somatic disorders, and chronic pain.

Cognitive therapy (CT) is particularly well regarded in the treatment of depression. The review conducted by Butler and Beck (2000), discussed above, indicated that 79% of adult patients with unipolar depression responded to CT with an average effect size of .82. Results in the adolescent population were even better, with 87% responding to CT with an average effect size of 1.11. Further, results from this review indicated that CT was superior to antidepressant medication, with an average effect size of .38 for adult unipolar depression. Astonishingly, patients who received CT experienced less than half the relapse rate of medicated patients at 1 year follow up, 30% versus 60%, respectively. Additional research has also supported the notion that CT is effective for reducing the incidence of relapse and recurrence of depressive episodes. A number of studies have found that outpatients who recovered from major depression following CT experienced less subsequent relapse or perceived need for treatment than patients receiving pharmacotherapy (Blackburn, Eunson, & Bishop, 1986; Shea, Elkin, Imber, Sotsky, Watkins, Collins, et al., 1992; Evans, Hollon, DeRubeis, Piasecki, Grove, Garvey, et al., 1992; Simons, Murphy, Levine, & Wetzel, 1986). CT has also shown efficacy in reducing relapse and recurrence following initial recovery with pharmacotherapy (Fava, Rafanelli, Grandi, Conti, & Belluardo, 1998). For patients who responded partially to antidepressant medication, the addition

of CT to clinical management and continuing antidepressant medication significantly reduced rates of relapse (Paykel, Scott, Teasdale, Garland, Moore, Jenaway, et al., 1999).

Other empirical studies have demonstrated the relationship between positive CT outcome and cognition. Oei and Sullivan (1999) found that participants who had recovered from depression, identified as BDI scores below 10, engaged in less frequent negative automatic thoughts and reported higher levels of activity than their non-recovered counterparts. Similarly, Teasdale, Moore, Hayurst, Pope, Williams, and Seigal (2000) investigated thinking style and relapse from depression. The researchers noted that the prevention of relapse from depression was mediated through changes in all-or-nothing, absolutistic thinking style, operationalized as an extreme dichotomous negative or positive response set to a number of self-report instruments, including the Attributional Style Questionnaire (Peterson et al., 1982), Dysfunctional Attitude Scale (Weissman & Beck, 1978), and the Beck Depression Inventory (Beck et al., 1979). Dichotomous distortions were inferred when questions received responses such as causes of negative outcomes “will never again be present.”

Cognitive distortions are well recognized and studied in other psychological disorders and psychopathology. Wells (1997) examined the role of cognitive distortions in patients with various anxiety disorders. He was able to identify thinking errors such as mental filtering, dichotomous thinking, catastrophizing, and personalization with most forms of anxiety disorders. Further, DiTomasso, Martin, and Kovnat (2000) identified the importance of identifying and treating cognitive distortions in patients in an acute medical crisis.

Cognitive distortions have been described in the literature on high arousal patients (Freeman & Fusco, 2000), eating disorders (Shafran, Teachman, Kerry & rachman, 1999), sexual dysfunction (Leiblum & Rosen, 1998), sex offenders (McGrath, Cann & Konopasky, 1998), and

gambling addictions (Delfabbro & Winefield, 2000). Finally, cognitive distortions have also been identified in many axis II disorders, such as dependent personality disorder, borderline personality disorder, histrionic personality disorder, narcissistic personality disorder, and obsessive personality disorder (Freeman et al., 1990; Layden et al., 1993).

To review, cognitive therapy has received much acclaim for its efficacy in treating many frequently occurring psychological disorders in a diversity of patients in both inpatient, and outpatient settings (Beck, 1993). The efficacy of cognitive therapy is particularly well regarded in the treatment of depression (Butler & Beck, 2000). According to cognitive theory, such pathology is said to be related to cognitive distortions.

Chronic Illness and Depression

The nature of chronic illness is one that exerts a heavy physical and psychological toll on the patient. People with chronic illness have to endure various degrees of physical distress over long periods of time and thus assume a greater responsibility for the ongoing management of their particular illness (Lehigh, 1997). This is an important consideration, as physical and psychological problems tend to occur and increase together (Gatchel, 2004). Depression is often a comorbid condition complicating treatment in chronic illness. In fact, among such chronic illnesses as ischemic heart disease, prevalence of current depressive disorder is nearly 20%. The prevalence of depression in outpatients with diabetes is twice as high as seen in the general population. Similar or higher depression prevalence rates are seen in patients with chronic obstructive lung disease and other chronic conditions (Von Korff & Lin, 2005).

Primary care facilities are often the first line of defense in the fight against depression because of the comorbidity with many chronic illnesses. In primary care settings that have not

adopted practice approaches to screen for depression, it is estimated that 30 to 50% of depressed patients are not recognized. Even when recognized, only approximately 20% of patients receive adequate treatment in primary care. As many as 50% of those committing suicide have seen their primary care physician within the previous 6 months, often for somatic complaints. The economic impact of major depression is considerable: \$43 billion in direct health care use and monetary costs and \$17 billion in lost work annually (Culpepper, 2002).

Lyketsos and associates (1996) sought to determine whether rates of depressive symptoms change from early to late stage HIV-1 infection and to determine the predictors of depressive symptomology as AIDS develops. The researchers note this is an important piece because depressed patients have “worse physical, social, and role functioning, worse perceived current health and greater bodily pain than other patients” (Lyketsos et al., 1996, p. 1430). They further maintain that depressive disorders are associated with substantial mental suffering, considerable physical morbidity, disability, and excess mortality from unnatural causes. Depression is likely to underlie the elevated rates of suicidal ideation observed in patients with HIV and AIDS (Lyketsos et al., 1996).

The study included 911 HIV positive-seropositive men, community volunteers from four U.S. cities who entered the 10 year Multicenter AIDS Cohort Study without a diagnosis of AIDS and subsequently developed AIDS. The participants underwent semiannual follow ups throughout the duration of the study. Results indicated that depressive symptoms were stable over time before AIDS developed. However, beginning 12 to 18 months before AIDS diagnosis, there was a significant rise in all measures of depression. An elevated CES-D (Center for Epidemiologic Studies Depression Scale) in the earlier stages of infection, a self-report of AIDS-related symptoms, concurrent unemployment, cigarette smoking, and limited social supports

were consistent predictors of higher rates of depression as AIDS developed (Lyketsos, et al., 1996).

Depression is also a confounding factor in the treatment of diabetes. Culpepper (2002) examined the relationship between depression and chronic illness, specifically looking at diabetes. The researcher notes that there is an interesting relationship between depression and diabetes, as the presence of depression substantially increases the risk of diabetes. To illustrate, it is noted that in a meta-analysis using 42 studies, the prevalence of comorbid depression was significantly higher in diabetic women (28%) than in diabetic men (18%) and in clinical (32%) compared to community (20%) samples. In controlled studies, the odds of depression in the diabetic group are twice that of the nondiabetic comparison group. Further, the presence of comorbid depression results in increased diabetic symptoms, decreased adherence to the treatment plan prescribed for diabetes, worsened glucose control, increased likelihood of the emergence of diabetic complications, and decreased overall function and well being (Culpepper, 2002).

Similarly, Kilbourne and associates (2005) examined the influence of depression on diabetes medication adherence in older patients. They found a significant association between depression and inadequate medication adherence in older patients. Specifically, they maintain that depressed patients face barriers to both acquiring (i.e., pharmacy refills) and taking their diabetes medications. They conclude that barriers to adherence affecting depressed elderly patients, such as cognitive impairment, unstable living situations, and health literacy, need to be explored in greater detail in order to better tailor adherence intervention strategies to this group. Finally, they note that future research should focus on the role of depression treatment in improving medication adherence among older patients with diabetes and other chronic illnesses.

Buselli and Stuart (1999) examined the influence of psychosocial factors and biopsychosocial interventions on outcomes after myocardial infarction. They note that psychosocial factors such as depression, hostility, social isolation, anxiety, and anger have been linked to increased mortality and morbidity in cardiovascular patients. In particular, they highlight the significance of depressive symptoms in cardiovascular disease. They note that the prevalence of major depression seen in persons with newly diagnosed coronary artery disease is estimated to be as high as 18%. The researchers go on to review empirical literature related to depression and myocardial infarction. Results indicated that depression significantly predicted quality life and self-care behaviors. They conclude that depressed patients are unable to make behavior changes commensurate with cardiac risk reduction; thus treating the underlying depressive symptoms seen in most cardiac patients may increase the likelihood of their participation in heart health behavior changes (Buselli & Stuart, 1999).

Rheumatoid arthritis (RA) is another common and often disabling chronic disease. Dickens, Jackson, Tomenson, and Creed (2003) examined the relative strength of the association of physical characteristics and social stresses with a diagnosis of depression in patients with rheumatoid arthritis. They note that anxiety and depression occur in 20 to 25% of patients with RA. Further, these psychological problems are likely, at least in part, to be the result of having chronic physical symptoms such as pain and disability. In particular, factors such as social stresses and social isolation are associated with RA.

Other studies attempted to understand the relation of depression and RA by examining cognitive distortions and helplessness (Smith, Christensen, Peck, & Ward, 1994). The researchers had 72 patients with RA complete the Beck Depression Inventory, the Cognitive Errors Questionnaire, and the Arthritis Helplessness Index during an initial assessment and again

4 years later. Results found the initial levels of cognitive distortion were significantly related to follow-up levels of depressed mood, controlling for initial depression levels. Specifically, patients initially endorsing the tendency towards overgeneralization, selective abstraction, personalization, and catastrophizing were more prone to symptoms of depression over the follow-up period than were patients without this cognitive style.

An investigation by Patten and associates (2005) examined the prevalence of major depression in the general population in relation to various long-term medical conditions. The investigators used a dataset from a large scale Canadian national health survey, the Canadian Community Health Survey (CCHS). The sample consisted of 115,071 subjects aged 18 and over, randomly sampled from the Canadian population. The survey interview recorded self-reported diagnosis of various long-term medical conditions and employed a brief predictive interview for major depression. Results indicated that the conditions most strongly associated with major depression were chronic fatigue syndrome and fibromyalgia. Strong associations were also observed for gastrointestinal, neurological, and respiratory conditions and also for conditions associated with pain. Less strong associations were found with diabetes, heart disease, and thyroid disease.

The prevalence of depression in chronic pain is well recognized. Burns and associates (2003) investigated the effect of cognitive factors on outcome in chronic pain. Of particular interest is the role of depression alleviation in chronic pain. The researchers found that early treatment changes in pain helplessness did not significantly predict late treatment changes in depression, whereas early treatment depression changes predicted late treatment pain helplessness changes. The alleviation of early treatment depression may play an important role. For instance, lifting one's affect early in treatment may allow patients to more fully benefit from

CBT and thus facilitate a more complete fruition of cognitive change, improvements that, in turn, partially affect favorable outcomes. In addition, a change in early treatment depression predicted late treatment activity change (Burns et al., 2003). This process can enable a patient to more fully benefit from physical and occupational therapies, which employ an active approach to combat physical deconditioning and activity limitation.

The same investigation by Burns and associates (2003) examined whether specific cognitive factors influence outcome in the treatment of chronic pain. Before the study began, the researchers tested the validity of two therapeutic process factors in the cognitive-behavioral treatment of chronic pain, catastrophizing and helplessness towards pain. They found that both catastrophizing and pain helplessness have been shown to be powerful predictors of adjustment to chronic pain. More specifically, they found that early treatment reductions in catastrophizing were significantly associated with late treatment reductions in pain interference and that early-treatment reductions in pain helplessness were associated with late-treatment reductions in pain severity and interference, thus supporting the researcher's hypothesis. This study is important in that it supports the notion that the treatment of depression can improve clinical outcome.

The treatment recommendations prescribed to patients with chronic illness are often very demanding. These patients must assume greater responsibility in the management of their chronic condition while simultaneously coping with a high degree of disability. Therefore, chronic conditions often exact a strong psychological toll. Given the co-morbidity of depression in patients with chronic illness it is expected as reviewed, that people who do not adhere to treatment recommendations will have a thinking style characterized by the use of cognitive distortions.

Rationale for the Proposed Study

Nonadherence with treatment recommendations is a significant problem in the primary care setting. Nonadherence is more of a problem in patients with chronic illness where their physical dysfunction is exacerbated by psychological sequelae. However, the problem of nonadherence is often underestimated and not directly addressed by physicians in primary care. Nonadherence is a complex issue, and there are any number of contributing factors that make it difficult to identify precisely which factors are operating at a given point in time (Claydon, Efron, & Woods, 1997). Despite this, a number of theories and researchers have attempted to conceptualize nonadherence.

The conception that cognitive factors have bearing on health-related behaviors has held a prominent place in health behavior research and theory for the past several decades and is now well established. A number of models with a strong cognitive perspective have been applied in an attempt to understand and predict health and adherence related behavior. Among the models espousing a cognitive perspective are social cognitive theory, self-regulation model and the health belief model (Bandura, 1977; Rosenstock, 1966; Leventhal, 1984). A major limitation of the HBM and other such theories is that they function under the assumption that health -relevant information is appraised in a rational manor (Christensen, Moran, & Weibe, 1999). With this in mind, when an individual is prone to appraising a situation in a distorted manner, conventional definitions of rational health beliefs are less likely to predict health related -behaviors.

Cognitive theories of depression maintain that the tendency to appraise stressful life events in an irrational or distorted manner predispose an individual to emotional and behavioral dysfunction. Cognitive theorists describe distorted cognitions as appraisals or conclusions that reflect a bias in information processing that are inconsistent with some commonly accepted view

of reality (Beck, 1967). Recent research suggests that distorted appraisals may result in increased behavioral disability or dysfunction among physically ill individuals as well as in dysphoric mood (Christensen et al., in press). The possibility that a similar tendency to engage in cognitive distortions may influence health-related behavior has received little consideration.

If it is supported that distortions cause emotional and behavioral dysfunctions, then perhaps the opposing view may be true. People with chronic conditions are, generally speaking, more likely to be experiencing a higher degree of physical and psychological distress and thus are more likely to have distorted appraisals regarding their overall condition and subsequent health-related decisions. For example, a patient whose information processing is characterized by the use of minimization may have a tendency to underestimate (minimize) the negative consequences of risky health behaviors such as smoking or drinking. A patient operating under the distortion of “fortune-telling” may make a prediction about their own outcome based on a past relative in a similar health predicament. In other words, if Uncle Tom never took his cholesterol medication and lived until the ripe old age of 95, then perhaps the same holds true for them.

Purpose of the Study

The purpose of the proposed study is to explore the relationship between cognitive distortions and health adherence behaviors in patients with chronic illness.

The nature of chronic conditions necessitates long-term adherence to medication and treatment regimens. In fact, Williams (2006) estimates that as much as 75% of health care dollars are spent on patients with chronic illness. Further, much of this cost is a direct result of spending related to nonadherence. This becomes more clear considering that nonadherence with long -

term medication regimens in patients with chronic illness has been estimated to lie somewhere between 30% and 50% (Dean & King, 1999). As such, the medical community, health maintenance organizations and payers have called for improved methods to help patients adhere to prescribed regimens and behavior changes (Guico-Pabia, Murray, Teutsch, Wertheimer, & Berger, 2001).

To date, numerous attempts have been made to develop methods to enhance adherence compliance with prescribed treatment recommendations. Unfortunately, nonadherence only begins to be suspected by the physician when the patient returns because their condition has not improved or has worsened (McCarthy, 1998). Little consideration has been given to the idea that distorted cognitions may be related to health adherence behaviors. Even when nonadherence is identified by the treating physician, they lack the necessary training to adequately manage the psychological aspects related to nonadherence.

The proposed study will attempt to investigate the relationship of cognitive distortions and health adherence behaviors in patients with chronic illness. The major contribution of the proposed study will bring to light the importance of active collaboration between medical and mental health care professionals. In the fast-paced health care delivery system nonadherence is regularly overlooked and even underestimated. Perhaps this is due to the fact that adherence is a complex phenomenon with many contributing factors. Without building in interventions directly and targeting noncompliance, treatment and therapy become diffuse and much less effective.

Research Hypothesis and Questions

The research question for the proposed study is based on health related research and theory from the past several decades (e.g., Bandura, 1977; Rosenstock, 1966; Leventhal, 1984)

that has established the notion that cognitive factors have bearing on health-related behaviors. The hypotheses for the proposed study presume that individuals who routinely fail to engage in health promoting behaviors are more likely to possess a thinking style characterized by the use of cognitive distortions.

The following research hypotheses are proposed:

1a. There will be a negative correlation between total scores on the ICD and the HABIT.

We expect the higher the total score on the ICD, the lower the total score on the HABIT will be.

Beck (1976) aptly noted that human thought is subject to a number of errors in logic termed as “cognitive distortions.” These distortions represent deviations from the logical processes of thinking typically used by people. As such, it seems plausible that these errors in thinking or distortions can easily lead one to draw erroneous conclusions pertaining to their health.

1b. The rates of nonadherence as determined by total scores on the HABIT, will fall

Below 50%. We expect that on average participants, will endorse fewer than 50% of the items on the HABIT.

The nature of chronic conditions often necessitates adherence to medication regimens over extended periods of time. However, nonadherence with long-term medication regimens has been estimated to fall somewhere between 42% and 60%, converging at an average of 30% to 50% for chronic illness (Haynes, 1985; Meichenbaum & Turk, 1987; Dean & King, 1999). As such, we expect the rates of nonadherence in this investigation be consistent with the prevailing literature.

The second area of investigation poses the question: Are the cognitive distortions more typically associated with depression more strongly related to health adherence than others?

- 2a. There will be a negative correlation between the ICD subscales (cognitive distortions) of arbitrary inference, magnification, and minimization and total score on the HABIT. We expect the higher the subscale scores of arbitrary inference, magnification, and minimization, the lower the total score on the HABIT will be.

Depression is often a comorbid condition complicating treatment of chronic illness. This finding is not surprising, as physical and psychological problems tend to occur and increase together (Gatchel, 2004). In fact, across chronic illnesses prevalence of a current depressive disorder approaches nearly 20% (Von Korff & Lin, 2005). According to Beck (1979), depressed people consistently distort their interpretations of events so that they maintain a negative view of themselves. Among the distortions that characterize depression are arbitrary inference, magnification, and minimization. Beck (1979) describes additional cognitive distortions specific to depression, but these are not quantified by the ICD.

The third area of investigation poses the question: Are certain demographic characteristics (as determined by the Health Adherence Behavior Survey) related to greater use of cognitive distortions and/or lower frequency of health adherence behaviors?

- 3a. There will be a negative correlation between total scores on the ICD and the HABIT in those who endorse a history of mental illness on the Health Adherence Behavior Survey. We expect those individuals who endorse a history of mental illness will

have higher total scores on the ICD and lower total scores on the HABIT than those who do not endorse a history of mental illness.

Cognitive therapy rests on the notion that one's behavior and emotion are heavily influenced by the manner in which one thinks, or rather, one's cognition. Beck (1967) theorized that faulty ways of processing information result in maladaptive emotions and behavior. Since that time, cognitive distortions are well recognized and studied in a number of psychological disorders and other forms of psychopathology, thus supporting the this hypothesis.

3b. There will be a positive correlation between total scores on the ICD and those who are diagnosed with obesity according to participant self-report obtained from the Health Adherence Behavior Survey. We expect those individuals who are obese will have higher total scores on the ICD than those who are not obese.

Obesity is a common thread associated with a number of illnesses. The morbidity associated with obesity includes diabetes, heart disease, arthritis, some cancers; and reduces a patient's overall quality of life and contributes to escalating medical costs (Rohrich, 2006). In light of this research, we expect a strong relationship between self-reported obesity and health adherence behaviors and cognitive distortions.

The forth and final area of investigation poses the following question: Are certain types of health adherence behaviors, as determined by scores on the HABIT more likely to be prevalent in those with chronic illness?

- 4a. The average percentage of participants who positively endorsed individual items related to alcohol and tobacco exposure/use, i.e., items 1, 2, 24, 25, 26, and 42 on the HABIT, will fall below 50%.
- 4b. The average percentage of participants who positively endorsed individual items related to diet and exercise, i.e., items 5, 6, 8, 12, 13, 19, 21, 22, 23, 27, 29, 32, 36, 40, 41, 43, 45, 46, and 47 on the HABIT, will fall below 50%.
- 4c. The average percentage of participants who positively endorsed individual items related to following the advice/recommendations of their doctors, i.e., items 9, 14, 18, 28, 30, 31, 34, 35, 38, 44, and 48 on the HABIT, will fall below 50%.

Making lifestyle changes and following physician advice can moderate the effects of many of these chronic conditions. Haynes (1985) found that 50% of patients did not follow referral advice, 7% did not keep follow-up appointments, and as many as 50% of people suffering from chronic conditions dropped out of treatment within 1 year. Exercise is often a lifestyle change prescribed for a number of medical conditions. There is mounting evidence that lack of physical fitness is a major factor in heart disease and other illness, and increasing exercise significantly reduces risks (Blair et al., 1987; Blair et al., 1997). Unfortunately, studies have shown that 70% of the population does not take enough exercise to ensure optimal health benefits (HEA, 1992). It was expected that findings from this investigation corroborate this body of research.

Chapter 2 *Methods*

Participants

The participants for this study were selected from a population of eligible volunteers who presented for care at the health care clinics associated with the Philadelphia College of Osteopathic Medicine (PCOM). Qualified subjects were cognitively intact and male or female patients with chronic illness between the ages of 18 and 90.

A total of 111 subjects with completed surveys and screenings were required in order to complete this study as designed. Only subjects with the diagnosis of a chronic illness, which included, but was not limited to diabetes, cardiovascular disease, AIDS, arthritis, or obesity were included. The participants were diagnosed with a chronic condition at least 1 year prior to the date of inclusion in the study.

Subjects may have met criteria for an acute medical condition(s) in addition to a chronic illness, provided these conditions did not preclude the participant from voluntary participation. Participation in this study was on a voluntary basis. Participants in the study were free to withdraw from the study for any reason at any time and were treated in accordance with the American Psychological Association (APA) code of conduct, under the permission of the Institutional Review Board (IRB) of the Philadelphia College of Osteopathic Medicine. Interested prospective volunteers who were participating in other studies or clinical investigations were excluded from this study. In addition, participants who were had severe acute medical or psychiatric illness were excluded.

Research Design

The present investigation used survey research in which the responses were recorded in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. This study utilized a correlational research design to assess the relationship of health adherence behaviors, as assessed by the Health Adherence Behavior Inventory (HABIT), cognitive distortions, as assessed by the Inventory of Cognitive Distortions (ICD), and certain demographic information gathered from participants using the Health Adherence Behavior Survey (see Appendix D).

Description of Instruments and Measures

The Health Adherence Behavior Inventory (*HABIT*) (DiTomasso, 1997) is a 50- item dichotomous questionnaire, developed for use in primary care settings (see Appendix A). The *HABIT* includes items that describe ordinary health-related behaviors (i.e., habits, such as following a physician's advice, filling prescriptions, exercise behavior, limiting fatty foods, alcohol, and smoking). Respondents are asked if the described behavior in the inventory is true or not true of their own behavior. Responses on the *HABIT* correspond with a numerical value (True = 1, False = 0). A total score is then calculated by adding response values from all completed items. These items are then reverse scored. The individuals who endorse greater numbers of positive health behaviors have lower individual overall health risks.

Content validity of the *HABIT* was established by a panel of four physician and psychology experts with over 20 years of experience each in their respective fields. The panel examined the items for relevance, clarity, and ease of understanding. All panel members agreed

that the items adequately represent the domain of content related to adherence and health risk behaviors (Parke, 2004).

Construct validity was established by administering the HABIT concurrently with a well documented and validated health risk assessment. A significant correlation at the 0.01 significance level was found between the health risk score and the HABIT. This finding suggests that the HABIT measures what it purports to measure and that the instruments have similar utility (Parke, 2004).

Internal consistency of the HABIT was assessed using the Chronbach's coefficient alpha, which yielded a coefficient alpha of .705 for the entire scale (Parke, 2004).

The Inventory for Cognitive Distortions (*ICD*) (Yurica & DiTomasso, 2002) is a self-report inventory designed to measure the frequency of distorted cognitions in an outpatient clinical population (Appendix B). It consists of 69 single sentence items, answered on a 5 point Likert scale closely matching the 10 theory driven distortions. A total of 10 factors have been identified: Externalization of Self-worth, Fortune-Telling, Magnification, Labeling, Perfectionism, Comparison to Others, Emotional Reasoning, Arbitrary Inference/Jumping to Conclusion, Minimization, and Mind-Reading. Yurica (2002) also derived another factor, Emotional Reasoning and Decision Making, in the development of the instrument.

Content validity of the ICD was established by a panel of three cognitive therapy experts and factor analysis and was deemed good. The panel of cognitive therapy experts came to 100% independent agreement on the original 69 items. Finally, the cognitive distortions identified by the ICD have been demonstrated to span diagnostic categories, rather than being restricted to a particular diagnosis (Yurica, 2002).

The ICD is significantly and positively correlated with widely accepted measures of depression Beck Depression Inventory-II (BDI-II), anxiety Beck Anxiety Inventory (BAI), and dysfunctional attitudes Dysfunctional Attitudes Scale (DAS). In a comparison of scores of outpatient psychiatric patients ($n = 122$) with a comparison control group ($n = 66$), the ICD demonstrated good internal consistency, having a total scale estimate of internal reliability measuring a coefficient alpha of .998 ($n=28$). Further, the ICD total scale scores produced a test-retest reliability of $r = .98$. Patterns of cognitive distortions on the ICD appeared to be stable and enduring (Yurica, 2002).

This reliability is consistent with Alford and Beck's (1997) revised cognitive theory. In this view, cognitive distortion is postulated to include both errors in content/meaning on the one hand and cognitive processing/meaning elaboration on the other. It was proposed that a predisposition to specific cognitive distortions leaves one vulnerable to specific disorders. This idea is supported by research on the interaction of parenting and children's coping styles, as well as developmental theories relating to cognitive distortions (Yurica, 2002).

Overall, Yurica (2002) found a robust and significant correlation between cognitive distortions on one hand and depressive and anxiety symptoms and dysfunctional attitudes on the other.

The Health Adherence Behavior Survey (see Appendix D) is a self-report questionnaire designed to obtain demographic characteristics from research participants. Information was gathered across seven domains: physical health, race, education level, work history, medical history, mental health, and medical advice. Participants are asked to respond to specific questions within each of these domains by providing brief answers or placing check marks next to the particular items that best describes their status with in the particular domain.

Procedure

Packets. Measures and forms were assembled into packets consisting of the following materials: (a) Letter of Solicitation (Appendix C), (b) Demographic Information Sheet, (c) Health Adherence Behavior Inventory (HABIT), and (d) Inventory for Cognitive Distortions (ICD). The packets were collected and recorded in a manner consistent with the APA Code of Conduct. All data and information within the packets was kept secure and confidential.

Site selection. The study was carried out in the health care centers associated with Philadelphia College of Osteopathic Medicine. The sites offered semiprivate screening areas where participants completed their packets. The principal investigator developed a poster to solicit participation, and an instructional sheet explaining the requirements (see Appendix E). To increase participation, the investigator offered \$10 as incentive to those who participated in the study. The principal investigator was available for 5 hours on Tuesday and Thursday each week, during which participants partook in the study. IRB approval from the Philadelphia College of Osteopathic Medicine was obtained on September 12, 2007 (Protocol #H07-035X).

Subject recruitment. The investigator met with staff at the medical clinics in order to brief them on the study. A recruitment notice was placed in each clinic indicating nature, requirements, and approximate length of the study. A description of the incentive to participate was given. A total of 111 packets were prepared and administered by the principal investigator. Once the study began, interested participants meeting inclusion criteria were recruited and allowed to participate.

Subject testing. Participants were allowed to participate contingent upon meeting inclusion criteria. The eligible participants were administered a packet with a letter of solicitation explaining the study, a Health Adherence Behavior Survey, a Health Adherence Behavior Inventory (HABIT), and a Inventory for Cognitive Distortions (ICD). Persons who agreed to participate in the study were required to complete the HABIT, ICD, and the Health Adherence Behavior Survey. The principal investigator was responsible for ensuring that all items of the inventories are completed.

Data reporting and entry. the HABIT, ICD, and Health Adherence Behavior Survey were numbered to correspond with each other. All data from completed questionnaires were entered into a database for final analysis.

Plan for statistical analysis. Data from this study were collected and entered into an SPSS database (Version 14.0). Descriptive statistics were examined, including frequency, distribution, mean, median, standard deviation, and standard error. Of principal importance was the correlation analysis using the Pearson product moment correlation. A correlational analysis was the preferred means to determine the relationship between health adherence behaviors as measured by the HABIT, and cognitive distortions, as measured by the ICD. There was also analysis of certain demographic information using the Health Adherence Behavior Survey, looking for correlation with the ICD and the HABIT.

Chapter 3

*Results**Demographic Information on the Study Sample*

Demographic information was gathered from participants using the Health Adherence Behavior Survey (Appendix D). The survey obtained additional information related to participants' medical and mental health conditions and inquired as to whether participants followed the advice of their health care professional.

A total of 111 subjects chose to participate in the study. Study participants ranged in height from 53 to 78 inches, with a mean height in inches of 65.88, while weight ranged from 65 to 458 lbs., with a mean of 196.61 lbs. Study participants ranged in age from 18 to 83 years, with a mean of 47.48 years. The study sample was comprised of 33.3% males and 66.7% females from 6 race categories i.e., American Indian, African American, which comprised the majority of the sample at 70.3%, Caucasian, Asian, Hispanic, & Other. Three participants chose not to designate their race. See Table 1.

Participants' educational background was represented using eight categories i.e., grade school or less, some high school, high school graduate, some college, college graduate, graduate school, post graduate school, and trade school. High school graduates and individuals designating having some college comprised the majority, at 32.4% and 22.5%, respectively.

Information regarding work history was also collected using six employment designations: unemployed, student, employed full time, employed part time, retired, and on disability. The majority of study participants either worked full time (27.9%) or were on disability (35.1%).

Table 1

Demographic Characteristics of the Sample

Demographic	Frequency	Percent
Gender		
Male	37	33.3
Female	74	66.7
Ethnicity		
American Indian	4	3.6
Black	78	70.3
White	12	10.8
Asian	0	0.0
Hispanic	1	0.9
Other	13	11.7
Education		
Grade school or less	9	8.1
Some high school	15	13.5
High school graduate	36	32.4
Some college	25	22.5
College graduate	13	11.7
Graduate school	3	2.7
Post graduate school	1	0.9
Trade school	9	8.1
Work History		
Unemployed	15	13.5
Student	6	5.4
Employed full time	31	27.9
Employed part time	7	6.3
Retired	13	11.7
Disability	39	35.1

Data describing participant's chronic conditions included the following: HIV/AIDS, arthritis, asthma, back pain, cancer, diabetes, COPD/emphysema, heart attack, heart disease, heart failure, hepatitis, hypertension, high cholesterol, kidney disease, liver disease, migraines, obese, Osteoporosis, stroke, seizures, thyroid disease, and physical disability. The majority of participants suffered from hypertension (60.4%), followed by asthma (52.3%) and back pain (46.8%). See Table 2. It should be noted that many participants indicated they were diagnosed with more than one chronic condition. Participants on average visited the doctors 9.25 times, were confined or missed work/school 14.91 times, and spent 2.04 days in the hospital for their illness.

Table 2

Demographic Characteristics of the Sample

Chronic Illness	Frequency	Percent
HIV/AIDS	3	2.7
Arthritis	28	25.2
Asthma	58	52.3
Back Pain	52	46.8
Cancer	6	5.4
Diabetes	25	22.5
COPD/ emphysema	12	10.8
Heart attack	9	8.1
Heart disease	14	12.6
Heart failure	7	6.3
Hepatitis	5	4.5
Hypertension	67	60.4
High cholesterol	32	28.8
Kidney disease	1	0.9
Liver disease	5	4.5
Migraines	11	9.9
Obese	19	17.1
Osteoporosis	8	7.2
Stroke	4	3.6
Seizures	5	4.4
Thyroid disease	11	9.9
Physical disability	17	15.3

Information regarding mental health was gathered across the following psychiatric diagnosis: anxiety, depression, alcohol abuse, substance abuse, schizophrenia, cognitive disorder or learning disability, and other. A total of 72% of study participants indicated they suffered from a psychiatric diagnosis. The majority of participants indicated they had either depression (29.7%) or anxiety (22.5%). See table 3. Participants on average visited a mental health professional 1.83 times and spent 1.72 days confined due to their mental health condition in the past 12 months. A total of 4 participants indicated that they had been hospitalized in the past 12 months.

Finally, information regarding positive health practices was gathered and indicated that 96.4% of participants listened to their doctor about their medical condition, 92.8% endorsed listening to their mental health professional, 82.8% listen to advice concerning tobacco use, 72% listen to advice concerning proper diet and nutrition, and 64% listen to medical advice concerning exercise.

Table 3

Demographic Characteristics of the Sample

Mental Illness	Frequency	Percent
Anxiety	25	22.5
Depression	33	29.7
Alcohol abuse	7	6.3
Personality disorder	0	0.0
Substance abuse	2	1.8
Schizophrenia	6	5.4
Cognitive/Learning disability	1	0.9
Other	6	5.4

Results of Hypotheses Testing

Hypothesis 1 stated there would be a negative correlation between total scores on the ICD and the HABIT. We expected the higher the total score on the ICD, the lower the total score on the HABIT would be. As predicted, results supported this hypothesis as a significant ($p < 0.05$) negative correlation ($r = -.173$) was found.

Hypothesis 2 stated the rates of nonadherence as determined by total scores on the HABIT would fall below 50%. We expected that on average, participants would endorse fewer than 50% of the items on the HABIT. This hypothesis was not supported, as the mean number of items endorsed was 31.28, indicating that participants responded positively to 62.6% of the items.

Hypothesis 3 stated there would be a negative correlation between the ICD subscales (cognitive distortions) of Arbitrary Inference, Magnification, and Minimization and total score on the HABIT. We expected the higher the subscale scores of Arbitrary Inference, Magnification, and Minimization, the lower the total score on the HABIT would be. Results indicated a significant ($p < 0.05$) negative correlation on the ICD subscale of Magnification ($r = -.213$) and Arbitrary Inference ($r = -.191$). A small, nonsignificant negative correlation was found on the ICD subscale of Minimization ($r = -.30$).

Hypothesis 4 stated there would be a negative correlation between total scores on the ICD and the HABIT in those who endorsed a history of mental illness on the Health Adherence Behavior Survey. We expected those individuals who endorsed a history of mental illness would have higher total scores on the ICD and lower total scores on the HABIT than those who did not endorse a history of mental illness. As predicted, results indicated significant correlation

($p < 0.05$) between total scores on the ICD and Anxiety ($r = .399$), Depression ($r = .215$), and Other ($r = .203$).

Hypothesis 5 stated there would be a positive correlation between total scores on the ICD and those who are diagnosed with obesity according to participant self-report obtained from the Health Adherence Behavior Survey. We expected those individuals who are obese would have higher total scores on the ICD than those who are not obese. As predicted a significant correlation ($p < 0.05$) was found between obesity and total scores on the ICD ($r = .284$).

Hypothesis 6 stated the average percentage of participants who positively endorsed individual items related to alcohol and tobacco exposure/use i.e., items 1, 2, 24, 25, 26, and 42 on the HABIT, would fall below 50%. This hypothesis was not supported, as an average of 75.55% of participants endorsed these items.

Hypothesis 7 stated the average percentage of participants who positively endorsed individual items related to diet and exercise, i.e., items 5, 6, 8, 12, 13, 19, 21, 22, 23, 27, 29, 32, 36, 40, 41, 43, 45, 46, and 47 on the HABIT, would fall below 50%. As predicted, this hypothesis was supported as an average of 48.13% of participants endorsed these items.

Hypothesis 8 stated the average percentage of participants who positively endorsed individual items related to following the advice/recommendations of their doctors, i.e., items 9, 14, 18, 28, 30, 31, 34, 35, 38, 44, and 48 on the HABIT, would fall below 50%. This hypothesis was not supported, as an average of 81.17% of participants endorsed these items.

Chapter 4

*Discussion**Summary of the Study Rationale*

The current study investigated the relationship between cognitive distortions and health adherence behaviors in patients with chronic illness. The rationale is rooted in the biopsychosocial model proposed by George Engel (1977), which assumes that all human problems are biopsychosocial system problems, each biological problem has psychosocial consequences, and each psychosocial problem has its biological correlates (McDaniel, 1995). In other words, any particular disorder is viewed as the result of a dynamic interaction among physiological, psychological, and social factors, which perpetuates, and may worsen, the clinical presentation. A strength of this perspective is that it takes on a more holistic approach that enables both the health care and mental health providers to conceptualize problems in an integrative manner.

The premise of the study is in accordance with the biopsychosocial model and is based on the notion that cognitive factors mediate adherence to medical treatment and other health-related behaviors. Research from the past few decades (e.g., Bandura, 1977; Rosenstock, 1966; Leventhal, 1984) has well substantiated the conception that cognition has relevance to health-related behaviors and treatment adherence.

Poor adherence with treatment recommendations is a deleterious health care problem. This is particularly true in primary care, with respect to the estimated number of people who fail to adhere to treatment recommendations and the associated cost of managing this problem. It has been estimated that as many as 45% of the general population, and 88% of persons over the age of 65, have at least one chronic condition, and 75% of health care dollars are spent on patients

with chronic illness (Williams, 2003). Much of this cost is a direct result of nonadherence. In fact, it is estimated that somewhere between \$60 and \$100 billion are spent each year to treat problems caused by noncompliance. Further, it is the direct cause of 10% of all hospital admissions (McCarthy, 1998).

The associated psychological sequelae observed in patients suffering from chronic conditions complicates treatment adherence, as regimens are continually being adjusted to manage the course of the illness. Accordingly, nonadherence is a complex phenomenon with innumerable contributory factors that make it difficult to identify precisely which factors are operating at a given point in time (Claydon, Efron, & Woods, 1997).

The unique contribution of this research project attempts to build on and clarify the existing body of literature that identifies cognitive factors in health adherence by examining the role of a more specific construct, that of cognitive distortions. The research method utilized in this project evaluated these constructs in a sample of adult chronic illness patients from the PCOM outpatient healthcare centers and allowed: (a) the examination of cognitive distortions and health promoting behaviors, (b) the examination of those cognitive distortions characteristic of depression and health adherence and, (c) the investigation of certain demographic characteristics related to cognitive distortions and health adherence behaviors.

The cognitive model has received little attention with regard to health adherence, despite its strong empirical support. Cognitive therapy has received much acclaim for its efficacy in treating many frequently occurring psychological disorders in a wide array of populations, e.g., individual, couples, group, and family in both inpatient and outpatient settings (Beck, 1993). In a large-scale study, Butler and Beck (2001) investigated 14 meta-analyses, and found efficacy for cognitive therapy in the treatment of unipolar depression, generalized anxiety disorder, social

phobia, and childhood depressive and anxiety disorders. Moreover, cognitive therapy had moderate effect sizes for marital distress, anger, childhood somatic disorders, and chronic pain.

Central to this model is the fundamental role of cognitive distortions in the etiology and maintenance psychological disorders. Despite the substantial empirical and theoretical evidence of the role of cognitive distortions, there are few psychometric instruments in existence that serve to identify cognitive distortions in clinical practice. The Inventory of Cognitive Distortions (Yurica & Di Tomasso, 2002) is a structured, comprehensive, self-report instrument for measuring cognitive distortions. This measure was psychometrically validated in a heterogeneous, adult, clinical, outpatient population with varying DSM axis I and axis II mental disorders.

Although the study population for the present study was comprised of 72% indicating they suffered from a psychiatric diagnosis (22.5% indicating they had a diagnosis of anxiety, 29.7% had depression, 6.3% had alcohol abuse, 1.8% had substance abuse, 5.4% had schizophrenia, 0.9% had cognitive disorder or learning disability) the present study was conducted on patients with a primary diagnosis of a chronic illness in two outpatient urban health care clinics. Therefore, the assessment of cognitive distortions in a largely medical population to determine their role in health adherence rather than psychological disorders is a novel proposal. This of course may call into question the validity of this measure with such a population. However, the proposal to examine the role of cognitive distortions is based on strong theoretic grounds as discussed earlier.

Although the primary focus of this research project is on health-adherence behaviors, as the title implies, *health adherence* is a broad term that encompasses a complexity of aspects. The term *adherence* implies a more active and collaborative involvement of the patient, working

together in a collaborative manner with the clinician in planning and implementing the treatment regimen. Adherence places a greater emphasis on the patient's role in deciding to implement a particular treatment recommendation (Myers & Midence, 1998). *Nonadherence* was defined here as an absence of voluntary participation by a patient in a mutually acceptable course of behavior to produce a desired preventative or therapeutic result (Meichenbaum & Turk, 1987).

Considerable time and effort has been invested across professional disciplines in the study of treatment adherence and the development of an instrument that can estimate the likelihood of a patient following recommendations. The Health Adherence Behavior Inventory (HABIT) used here is an instrument that attempts to highlight those behaviors that are related to overall health. Findings suggest that healthier patients engage in a pattern of health-related behaviors that correlate significantly with their degree of health risk (Parke, 2004). Based on this, it was expected that an individual's risk of poor health would be correlated significantly with medication adherence, yet, the researchers found no such relationship between health risk and medication compliance (Parke, 2004).

The HABIT was found to be significantly correlated with the widely used and psychometrically reliable Health Risk Assessment, used by Lifestyle Directions, Inc. (Parke, 2004). Based on these observations, it appears that there is some qualitative difference between those behaviors that constitute health risk and adherence. In acknowledgement of the great complexity of adherence, the present study chose to focus on a broader range of health adherence behaviors (as assessed using the HABIT) rather than adherence, recognizing the two are interwoven.

Interpretation of Standardized Measurement of Cognitive Distortions and Health Adherence Behaviors

In the current study, participants who had a thinking style characterized by the use of cognitive distortions tended to engage in fewer health promoting behaviors. This finding was consistent with the predicted hypothesis. In fact a significant correlation ($r = -.173, p = 0.05$) was found between the ICD and the HABIT. The basis of this hypothesis originates in cognitive theory. Beck (1967) defined cognitive distortions as a bias in thinking or processing information that predictably result in identifiable errors in thinking. In his work, Beck noted that his patients engaged in patterns of thinking that were systematic but were ill informed. He found that such faulty ways of processing information result in maladaptive emotions and behavior. Based on the findings here and consistent with cognitive theory, the use of cognitive distortions appears to have bearing on health related decisions and behavior.

A patient with chronic back pain will be used in the following example to demonstrate how cognitive distortions can influence health-related behaviors. After some time with limited success with traditional medical approaches and adherence difficulties, the patient is referred for psychotherapy to assist and facilitate pain management treatment. In the course of therapy two cognitive distortions become evident, catastrophizing and magnification. These distortions serve a negative function, as the patient will likely dwell on the most extreme negative consequence while overemphasizing its impact. As such, this patient will likely dwell on the subjective level of pain and associated disability while amplifying its severity. Such a patient may typically rate their pain as being a 10 on a 1 to 10 scale, where 1 is minimum level of pain, and 10 is the maximum level of pain. This magnification may be an artifact that they have habituated to the level of pain, and have trouble recalling a time that they felt a lower degree of pain. These

distortions will likely pervade their thinking about the condition to the point of viewing themselves as helpless and incapable of engaging in a course of action that may help control their pain, i.e., medication and treatment compliance.

The preceding discussion highlights the role of the primary health care provider in facilitating treatment adherence. The quality relationship between health care provider and patient can be a principal point of intervention in the assessment of possible roadblocks to adherence and allow for effective problem solving to mitigate such difficulties. Ley (1988) and other researchers have documented the close link between satisfaction, understanding, recall, and adherence. Adherence with respect to treatment plans is considered a crucial indicator of the efficacy of the communication between the patient and the doctor. The establishment of a sound doctor-patient alliance has a number of documented benefits, including improved medication compliance and patient satisfaction, while both the clinical decision-making process and disclosure of psychosocial problems are facilitated (Kearley, Freeman, Heath, 2001). Therefore, the doctor-patient interaction itself can be therapeutic.

The discovery of psychosocial difficulties within the context of the doctor-patient relationship as well as distortions discussed here can be very powerful in improving treatment compliance and overall clinical outcome. Acumen within the context of this relationship in identifying the various cognitive distortions may help primary health care physicians in adherence assessment, allowing one to quickly identify and target possible difficulties for intervention. This brings to light the importance of interdisciplinary collaboration in improving outcome. For example, once cognitive distortions are correctly identified by the primary care physician as being a potential threat to treatment adherence, a referral can be made to a clinical

health psychologist, who can work with the patient to understand how such distortions impede proper adherence and ultimately can affect course and outcome of their condition.

As discussed previously, patients with chronic illness learn about the nature of their illness over the course of many years, either by way of instruction from their health care professional or life experience. Chronic illness patients must assume more responsibility for the ongoing management of their particular illness (Leigh, 1997). The complexity of chronic illness and the associated psychological sequelae make treatment adherence a difficult endeavor. It comes as little surprise that nonadherence with long-term medication regimens has been estimated to fall somewhere between 42% and 60%, converging at an average of 30% to 50% for chronic illness (Haynes, 1985; Meichenbaum & Turk, 1987; Dean & King, 1999). As such, it was expected that rates of nonadherence in this investigation would be consistent with the prevailing literature. However, this was not the case, as results indicated that the mean number of items endorsed was 31.28, indicating that participants responded positively to 62.6% of the items. It should be noted that the HABIT is an instrument that assesses a broader range of health-related behaviors consistent with one's overall level of health risk and does not purport a relationship between health risk and medication compliance alone (Parke, 2004). It also may be plausible that the presence of certain cognitive distortions may lead one to misrepresent their subjective compliance. The patient may minimize the severity of their medical condition or magnify their efforts to manage the condition, both of which would influence one's subjective report of compliance. For example, effective self-management of diabetes requires significant behavioral changes consistently over time. Since self-monitoring of blood sugar levels, diet, and maintenance of an exercise routine require conscious effort, such treatment recommendations

may be perceived as being aversive. As such, a patient may intentionally misrepresent their compliance to such a program, so long as they can avoid significant medical complications.

Ineffective management of a chronic medical condition can precipitate many deleterious mental and physical effects. Among the mental health effects is depression, which is often a comorbid condition complicating treatment of chronic illness. This finding is not surprising, as physical and psychological problems tend to occur and increase together (Gatchel, 2004). In fact, across chronic illnesses the prevalence of a current depressive disorder approaches nearly 20% (Von Korff & Lin, 2005). According to Beck (1979), depressed people consistently distort their interpretations of events so that they maintain a negative view of themselves. Among the distortions that characterize depression are arbitrary inference, magnification, and minimization. Beck (1979) describes additional cognitive distortions specific to depression, but these are not quantified by the ICD.

The results of this investigation found a higher frequency of depression, as 29.7% of the study subjects indicated they had a diagnosis of depression. Because of the relatively high incidence of depression and chronic health conditions in the literature and the even higher rates of depression in the study samples it was hypothesized that the relationship between arbitrary inference, magnification, and minimization and health adherence behaviors would reach significance. Results supported this in two out of three cognitive distortions, magnification and arbitrary inference, but not minimization. This is a curious finding in light of the literature, but it should be noted that a small, nonsignificant relationship was indeed found.

The presence and frequency of the cognitive distortions of magnification, and arbitrary inference can have a reciprocal relationship between depression and adherence behaviors. Take for example the patient with a pulmonary condition, e.g., COPD or asthma who frequently

engages in magnification. It should be noted that cognitive distortions may affect thinking and may function in a number of different ways making, it difficult to predict exactly how a particular distortion may influence behavior. However, one possibility is that a patient may magnify the severity of their condition to the point that they feel overwhelmed and incapable of appropriately managing their condition. This may lead one to become hopeless and less likely adhere to medical advice. The combination of hopelessness and increased deterioration of their condition will likely create a cycle of poor adherence and increased feelings of depression. This situation is a frustrating one for the primary care physician who lacks the time and training to manage such a complexity of mental health issues. Once again, this speaks to the importance of collaboration across disciplines, as a clinical health psychologist may be well suited to help manage these difficulties improve mental functioning while increasing engagement in their medical treatment and positively affect outcome.

Analogously, significant correlations were found between the ICD and the HABIT in those subjects who indicated they had diagnoses of anxiety, depression, or *Other*. This finding is consistent with cognitive theory, which rests on the notion that one's behavior and emotion are heavily influenced by the manner in which one thinks, or rather, one's cognition. Beck (1967) theorized that faulty ways of processing information result in maladaptive emotions and behavior. Since that time, cognitive distortions are well recognized and studied in a number of psychological disorders and other forms of psychopathology. What is less clear is the exact nature of the relationship between cognitive distortions, psychological disorders, and health adherence behaviors. Given that approximately 72% of the study participants indicated having a psychiatric diagnosis and the inherent limitations of cross-sectional data, it is difficult to discern the effects of premorbid psychological factors on health adherence behaviors. For the purposes

of research, personality measures such as the Million Clinical Multi-axial Inventory--III or the Minnesota Multiphasic Personality Inventory--2 may be helpful in differentiating psychological aspects that also may be related to adherence, but are far less practical in an applied setting. Other quick, reliable psychological screenings are the Patient Health Questionnaire (PHQ) and the Primary Care Evaluation of Mental Disorders (PRIME-MD). The PRIME-MD was designed specifically for use in primary care to screen for mood disorders, anxiety disorders, substance abuse, eating disorders, and somatoform disorders. The Symptom Checklist 90-Revised (SCL--90R) is a similar measure that is frequently used (Hass, 2004). Finally, the Brief Symptom Inventory is a self-report measure designed to reflect psychological symptom patterns in psychiatric and medical patients and nonpatients. Such measures may be helpful in identifying psychological difficulties and potential detriments to adherence and allow for efficacious treatment interventions.

Clearly, psychological syndromes have a significant impact in health adherence. As discussed above, a significant correlation was found between total scores on the ICD and those participants who acknowledged that they have a diagnosis of an anxiety disorder. This is an important finding, as the biopsychosocial model underscores the importance of recognition that many chronic physical conditions are exacerbated or maintained by high levels of anxiety. For example, gastric ulcers, hypertension, migraines, coronary artery disease, asthma, and many pain conditions often co-occur with anxiety disorders (White & Barlow, 2001). A number of cognitive distortions are common in anxiety disorders: catastrophizing, personalization, magnification/minimization, selective abstraction, arbitrary inference, and overgeneralization (Freeman, Pretzer, Fleming, & Simon, 2004).

In the cognitive distortion of catastrophizing, patients will tend to dwell on the most extreme negative consequences, where any situation where there is any possibility of danger constitutes a high probability of danger (Freeman, Pretzer, Fleming, & Simon, 2004). As discussed above, chronic physical conditions can be exacerbated or maintained by high levels of anxiety. Let's use the same example of the patient suffering from a pulmonary condition, e.g., asthma or COPD, whose thinking about their condition is characterized by a high frequency of catastrophizing. This patient may respond to the slightest fluctuation in their breathing as a catastrophic life-and-death event, which may trigger a panic attack and may be misinterpreted as directly related to their medical condition. Many of these distortions are assessed in the ICD and implicate its utility in the primary care setting. The ability to identify such distortions that are a detriment to course of treatment, outcome, and adherence is a powerful intercession in improving health care delivery.

Obesity is a common thread associated with a number of chronic illnesses. The morbidity associated with obesity includes diabetes, heart disease, arthritis, some cancers, and reduction in overall quality of life; obesity contributes to escalating medical costs (Rohrich, 2006). In the present study just over 17% of the participants indicated a diagnosis of obesity. The results from the present study, found a significant relationship between obesity and a thinking style characterized by the use of cognitive distortions. This finding brings to light the importance of certain lifestyle changes, such as diet, exercise etc., in chronic conditions. The conception that one's thinking style or cognitive distortions may be related to obesity represents an important finding in terms of behavior modification and the lifestyle changes that are associated with a healthy weight.

Making lifestyle changes and following physician advice can moderate the effects of many of these chronic conditions. Other lifestyle changes have also been found to be helpful. Haynes (1985) found that 50% of patients did not follow referral advice, 7% did not keep follow-up appointments, and as many as 50% of people suffering from chronic conditions dropped out of treatment within 1 year. Exercise is often a lifestyle change prescribed for a number of medical conditions. There is mounting evidence that lack of physical fitness is a major factor in heart disease and other illness, and increasing exercise significantly reduces risks (Blair et al., 1987; Blair et al., 1997). Unfortunately, studies have shown that 70% of the population does not take enough exercise to ensure optimal health benefits (HEA, 1992).

Interestingly enough, the findings of the present study only supported this notion with health adherence behaviors related to diet and exercise, and not others, such as alcohol and tobacco use, and following the advice of their physician, as assessed by the HABIT. Societal pressure and social policy may be one reason that people are more aware of the dangers of alcohol and tobacco use, and thus more reluctant to engage in these behaviors. The individual questions on the HABIT that address compliance with the advice/recommendations of their health care providers are dichotomous items that force one to choose *true* or *false* and do not acknowledge the categorical nature of the construct.

The notion of motivation is an important construct with respect to making behavior changes related to diet, exercise and alcohol and tobacco use important in many chronic conditions such as obesity, hypertension, high cholesterol, diabetes, and others. This has been articulated in the work of DiClemente and Prochaska, who attempted to conceptualize the process of change in addictive behavior in the Transtheoretical Model. They conceptualize change as a sequential process whereby they propose stages based on a person's readiness for

change. In recent times, this model has gained widespread acclaim in the health care industry through its application to a number of health-related behaviors. One's level of motivation may well be closely related to their cognitive appraisal of the particular condition and therefore subject to cognitive distortions and hinder their ability to successfully move along the stages of change to the action and maintenance stages. For example, if one minimizes the impact of their lack of exercise and their poor nutrition habits in the management of their chronic illness, they will likely be less motivated to change their behavior in any way or even think it is a confounding problem.

It is noteworthy that the composition of the study sample in the present study was represented by a relative majority of Black and female subjects. A total of 74% of the sample was female representing approximately 67% of the total sample while a total 78 participants were Black, comprising just over 70% of the sample. Issues of culture and diversity play an important role, as such differences affect whether an experience is labeled as an illness, the type of illness it is considered to be, and which, if any, treatment is appropriate. Further, there are cultural differences in whether "mood" symptoms are expressed as a particular emotion or by somatic complaints (Hass, 2004).

The anticipated demographic changes over the next few decades has prompted the Centers for Disease Control and Prevention (CDC) (2008) to launch an initiative aimed at eliminating racial and ethnic health disparities. Ethnic disparities in illness and disability have been well documented for both physical illness and psychological illness. Blacks experience more chronic illness and more restriction in daily activities due to illness than do Whites. In particular, special attention needs to be paid to cardiovascular disease, such as hypertension,

diabetes and associated kidney function decline, and cancer (Pedersen, Draguns, Lonner, & Trimble, 2002).

The CDC (2008) notes the following health disparities with regard to the Black population: Black women are more than twice as likely to die of cervical cancer than are White women and are more likely to die of breast cancer than are women of any other racial or ethnic group. Overall, Blacks have more malignant tumors and are less likely to survive cancer than the general population. Compared to Whites, Blacks are more than twice as likely to have diabetes. Heart disease and stroke are the leading causes of death for all racial and ethnic minorities in the United States. Although Blacks and Hispanics represented 26% of the U.S. population in 2001, they accounted for 66% of all adult AIDS cases. A number of factors influence the occurrence of disparities, including unequal access to health care, discrimination, and language and cultural barriers (CDC, 2008).

A complete understanding of patients' illness, their response to the advice of their health care provider, and their adherence to treatment regimens depends on an understanding of the social and cultural influences on human behavior with respect to health and illness (Haas, 2004). Therefore, the identification of cognitive factors related to race and diversity may help elucidate the complicated dynamics involved in health adherence among the culturally diverse and help to reduce the significant disparities present in contemporary health care practice.

Implications for Future Research

Future research may attempt to identify and understand cognitive patterns particular to a chronic condition. For example, do cardiac patients have a particular cognitive distortion profile that characterizes their thinking style and impacts subsequent health related decisions? Given the

increasing specialization of medicine, it can be prudent for physicians to learn how to identify such errors in thinking so that potential complications resulting from nonadherence can be averted.

With the widespread recognition of cultural competence and diversity, future research may want to explore thinking styles in a culturally diverse population to better understand the factors that influence health-related decisions. This would be an important contribution, given that there is a dearth of research on treatment adherence in culturally diverse populations.

Finally, given the support for the role of cognitive distortions in health adherence behaviors found in the present study, an awareness of these cognitive factors bears significance in primary care. The ICD in its current form is a 69-item self-report measure consisting of single-sentence items, answered on a 5 point Likert scale. The time it takes to read each item and discern how often they tend to think or feel in a certain way makes this measure less practical in a primary care setting. Perhaps the 69 items can be distilled down and a shorter screening version created that would lend itself to use in primary care.

Methodological Limitations

It is worthy to note that the ICD, HABIT, and Health Adherence Behavior Survey are self-report surveys. As such, these types of measures are subject to response bias. Questions on all the surveys are asked in a straightforward manner, which makes it easy for participants to discern the content and manipulate their respective answers to “fake good” or “fake bad.” As noted above, the items included in the HABIT are true/false questions that force subjects to make a decision as to whether they engage in a particular health-related behavior. During the administration, subjects would often note that they engage in a behavior sometimes and it was

difficult for them to make a decision that was representative of their behavior pertaining to a particular item. Behavior is rarely an all-or-nothing construct and may be better represented on a continuum. Some of the questions on the HABIT included health-related behaviors, e.g., weight lifting, that may in fact be against medical advice for a particular condition like COPD and other cardiopulmonary disease. Lastly, participants' responses represent a sample of behavior at one point in time and do not account for normal fluctuations in behavior and thinking.

Although the sample size of 111 in the present investigation was respectable, a larger sample would have provided the study more statistical power. The study sample was nearly 67% female and 70% African American and is not as representative as it could have been. The study was conducted at two college-affiliated medical centers located in Philadelphia that provide medical care to a largely underserved population, and the demographics and study findings may not generalize to other populations. Finally, subjects were offered \$10 cash for their participation, which may call into question motivation for participating in the study and accuracy of information gathered.

Finally, the extensive body of literature on health adherence stands as a testament to how complicated and problematic an issue it is in contemporary health care. As such, focusing on one small piece of the puzzle in our examination of cognitive distortions in the present study may not fully address the issues involved in non-adherence. For example, the presence of a cognitive distortion such as minimization may lead one to downplay the significance of their medical condition, which may lead to nonadherence with the recommendations made by their health care provider, whereas in other instances, practical concerns or lack of access to adequate health care coverage may prevent proper adherence.

Conclusions

The problem of adherence is an enormous health care burden that exacts a heavy financial toll, as nearly three quarters of health care dollars are spent on patients with chronic illness (Williams, 2006). On a personal level, the management of chronic illness is often associated with long-term disability, pain, and permanent compromise to one's lifestyle. Because of the complexity of both the physical debilitation and interplay of cognitive factors, treatment of chronic illness stands to gain much with active collaboration of mental health professionals. An improved understanding of cognitive factors in health related behaviors may provide researchers with a better appreciation for the role of cognitive distortions in making such decisions, improve the quality of health care delivery, and help clinicians target and intervene in these errors in thinking to help individuals become better advocates for their own health and quality of life.

The cognitive model appears to be well suited for this because it is collaborative, problem oriented, and educational in its approach, teaching self-management skills, problem solving, and other cognitive and behavioral techniques. There is an emphasis on cognitive reconceptualization of the patient's view of the problem and view of themselves, allowing them to be more active in their own treatment, rather than passive participants held captive by their perceptions of their illness and their ability to manage it effectively.

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APPENDIX A**HABIT**

(Copyright, 1997, Robert A. DiTomasso, Ph.D., ABPP)

Directions: This form describes a number of health-related behaviors that you may or may not do. For example, it describes many behaviors including things like eating, exercising, and sleeping among others. Please read each question carefully. If the item describes something that is *true* about how you typically act, please circle "true". If the item describes something that is typically *not true* about how you act, please circle "false". Please be as honest as possible. There are no right or wrong answers. Please be sure to answer each item.

- | | | |
|--|------|-------|
| 1. I try to avoid being around people who are smoking near me..... | True | False |
| 2. I try to sleep 8 hours each night..... | True | False |
| 3. I avoid cigarette smoke..... | True | False |
| 4. I avoid napping during the day if I can help it..... | True | False |
| 5. I watch my calories pretty carefully..... | True | False |
| 6. I eat my meals while doing other things..... | True | False |
| 7. I test the smoke alarms in my house regularly..... | True | False |
| 8. I lift weights..... | True | False |
| 9. I obtain tests when instructed by my physician to do so..... | True | False |
| 10. I take a logical approach to solving problems in my life..... | True | False |
| 11. I practice formal relaxation or meditation exercises..... | True | False |
| 12. I avoid fast food restaurants, when hungry | True | False |
| 13. I avoid snacking between meals..... | True | False |
| 14. I examine my skin for any unusual markings..... | True | False |
| 15. I take the stairs rather than an elevator or escalator, whenever possible. | True | False |
| 16. When outside on sunny days for long periods, I wear sun screen..... | True | False |
| 17. When driving in a car, I wear a seat belt..... | True | False |
| 18. I take all medications as they are directed by my doctor..... | True | False |
| 19. I eat enough fruits and vegetables..... | True | False |
| 20. I get enough emotional support when I am feeling too stressed..... | True | False |
| 21. I limit the amount of caffeine I consume..... | True | False |
| 22. I usually eat three meals a day..... | True | False |
| 23. I exercise on a regular basis..... | True | False |
| 24. I avoid excessive use of alcohol..... | True | False |
| 25. I ask friends not to smoke in my presence..... | True | False |
| 26. I don't chew tobacco..... | True | False |
| 27. I limit the amount of sugar I consume..... | True | False |
| 28. When I get a prescription from my physician, I fill it promptly..... | True | False |
| 29. I drink low fat or skimmed milk..... | True | False |
| 30. I examine my breasts or testicles for lumps..... | True | False |
| 31. I get routine physical exams from my physician..... | True | False |

- | | | |
|--|------|-------|
| 32. I jog..... | True | False |
| 33. I successfully cope with most stresses in my life..... | True | False |
| 34. I keep the doctor's appointments I make..... | True | False |
| 35. I follow the advice of physicians..... | True | False |
| 36. I limit the amount of fat in my diet..... | True | False |
| 37. I am able to keep a realistic view of the stresses in my life..... | True | False |
| 38. I am on time for doctor appointments..... | True | False |
| 39. I take prescribed medication for the recommended period of time..... | True | False |
| 40. I weigh myself on a regular basis..... | True | False |
| 41. I prefer to walk rather than drive to places, when possible..... | True | False |
| 42. In public places like restaurants I sit in nonsmoking areas..... | True | False |
| 43. I try to eat low cholesterol foods as much as possible..... | True | False |
| 44. I follow my doctor's advice on matters related to my health..... | True | False |
| 45. I limit the amount of salt I use on my food..... | True | False |
| 46. I am physically active..... | True | False |
| 47. People tell me I am a "couch potato"..... | True | False |
| 48. I don't take prescribed medicines for the recommended time..... | True | False |
| 49. I go to bed at a regular time each night..... | True | False |
| 50. I get enough rest each night..... | True | False |

APPENDIX B

ICD

Date: _____

C.L.Yurica, Psy.D. and R.A. DiTomasso, Ph.D., ABPP Copyright 2001

ICD Form A

Name: _____

Age: _____

Sex: _____

Instructions: Below you will find a list of 69 statements that represent the ways people think or feel about themselves, others or situations. Please read each statement carefully and **rate how often you tend to think or feel this way. Circle the corresponding response that most accurately reflects your answer.** There are no right or wrong answers. Please respond to each statement as honestly as possible. **Please mark every item.**

Circle **N** if you **never** think or feel this way.
 Circle **R** if you **rarely** think or feel this way.
 Circle **S** if you **sometimes** think or feel this way.
 Circle **O** if you **often** think or feel this way. Circle
A if you **always** think or feel this way.

How to Mark Your Responses

Be certain to **circle** the letter you choose **completely**, like this: N
 R S O A
 If you wish to change a response, mark an X through it and circle
 your new choice, like this: N R S O A

- | | |
|--|-----------|
| 1. I need others to approve of me in order to feel that I am worth something..... | N R S O A |
| 2. I feel like a fortuneteller, predicting bad things will happen to me..... | N R S O A |
| 3. I believe others think about me in a negative way..... | N R S O A |
| 4. I tend to discount the good things about me..... | N R S O A |
| 5. I either like a person or do not, there is no in-between for me..... | N R S O A |
| 6. I minimize the importance of even serious situations..... | N R S O A |
| 7. I compare myself to others all the time..... | N R S O A |
| 8. I amplify things well beyond their real importance in life..... | N R S O A |
| 9. I act as if I have a crystal ball, forecasting negative events in my life..... | N R S O A |
| 10. What others think about me is more important than what I think about myself..... | N R S O A |
| 11. Regrets in my life stem from things I should have done, but did not do..... | N R S O A |
| 12. I make decisions on the basis of my feelings..... | N R S O A |
| 13. I draw conclusions without carefully reviewing necessary details..... | N R S O A |
| 14. If a problem develops in my life, you can bet it has something to do with the
. way I am..... | N R S O A |
| 15. To feel good, I need others to recognize me..... | N R S O A |
| 16. I motivate myself according to how I should be..... | N R S O A |

ICD Form A

17. I have a tendency to blame myself for bad things.....	N	R	S	O	A
18. Without even asking, I think other people see me in a negative light.....	N	R	S	O	A
19. I do few things as well as others.....	N	R	S	O	A
20. I hold myself responsible for things that are beyond my control.....	N	R	S	O	A
21. I tend to disqualify the positive traits I have.....	N	R	S	O	A
22. Things seem to go all right or all wrong in my world.....	N	R	S	O	A
23. I tend to pick out negative details in a situation and dwell on them.....	N	R	S	O	A
24. I have a tendency to exaggerate the importance of minor events.....	N	R	S	O	A
25. I attempt to achieve perfection in all areas of my life.....	N	R	S	O	A
26. I have a habit of predicting that things will go wrong in any given situation.....	N	R	S	O	A
27. I have a lot of shoulds, oughts, and musts in my life.....	N	R	S	O	A
28. I downplay my accomplishments.....	N	R	S	O	A
29. I call myself negative names.....	N	R	S	O	A
30. I have been known to make a mountain out of a mole hill.....	N	R	S	O	A
31. Most people are better at things than I am.....	N	R	S	O	A
32. I have a tendency to exaggerate the importance of even small events.....	N	R	S	O	A
33. When a new rule comes out at work, school, or home, I think it must have been made because of something I did.....	N	R	S	O	A
34. When faced with several possible outcomes, I tend to think the worst is going to happen.....	N	R	S	O	A
35. Compared to other people like me, I find myself lacking.....	N	R	S	O	A
36. I believe my negative forecasts about my future will come to pass.....	N	R	S	O	A
37. Things ought to be a certain way.....	N	R	S	O	A
38. I typically imagine terrible consequences from my mistakes.....	N	R	S	O	A
39. When I think about it, I am quite perfectionistic.....	N	R	S	O	A
40. If I feel a certain way about something, I am usually right.....	N	R	S	O	A
41. I need a lot of praise from others to feel good about myself.....	N	R	S	O	A
42. In my mind, things are either black or white, there are no grey areas.....	N	R	S	O	A
43. I typically make judgments without checking out all of the facts beforehand.....	N	R	S	O	A

ICD Form A

44. People only say nice things to me because they want something or because they are trying to flatter me..... N R S O A
45. I find I have a tendency to minimize the consequences of my actions, especially if they result in negative outcomes..... N R S O A
46. I find that I frequently need feedback from others to obtain a sense of comfort about myself..... N R S O A
47. I jump to conclusions without considering alternative points of view..... N R S O A
48. As far as my life goes, things are either great or horrible..... N R S O A
49. I label myself with negative words..... N R S O A
50. I find myself assuming blame for things.....;..... N R S O A
51. I tend to dwell on the dark lining of a silver cloud..... N R S O A
52. The positive things in my life just do not count for much at all..... N R S O A
53. I must have things a given way in my life..... N R S O A
54. I believe I know how someone feels about me without him/her ever saying so..... N R S O A
55. My negative predictions usually come true..... N R S O A
56. My feelings reflect the way things are..... N R S O A
57. It is important to strive for perfection in everything I do..... N R S O A
58. I tend to downplay compliments..... N R S O A
59. When something negative happens, it is just terrible..... N R S O A
60. My feelings are an accurate reflection of the way things really are..... N R S O A
61. Even small events can bring on catastrophic consequences..... N R S O A
62. When I compare myself to others, I come up short..... N R S O A
63. I put myself down..... N R S O A
64. There are a right way and a wrong way to do things..... N R S O A
65. I tend to dwell on things I do not like about myself..... N R S O A
66. I go with my gut feeling when deciding something..... N R S O A
67. If people ignore me, I think they have negative thoughts about me..... N R S O A
68. I underestimate the seriousness of situations..... N R S O A
69. I blow things out of proportion..... N R S O A

APPENDIX C

Dear Volunteer:

My name is Clint C. Stankiewicz, I am a Doctoral Candidate in the Department of Psychology at the Philadelphia College of Osteopathic Medicine (PCOM). I am doing a research study looking at the ways people with chronic illness think about the advice their doctors give them. By participating you may feel some personal satisfaction having taken part in research that may improve the quality of health care for patients with chronic illness.

I would be thankful if you would complete the attached questionnaires. Completion of the Health Adherence Behavior Inventory, Inventory for Cognitive Distortion and Demographic Questionnaire is expected to take about 45 minutes. These surveys have been used in past research in primary care with no ill effects. While there are no known or expected risks to participating in this study, there may be some emotional discomfort. This discomfort is expected to be minimal and brief from completing the questionnaires about personal thoughts, feelings and physical and psychological symptoms.

Participation in this project is voluntary and you are not asked to put your name on any of the questionnaires. Further, all information you provide will be confidential. If you choose to participate and you become concerned by your level of emotional discomfort, or by your physical symptoms, you should contact your mental health provider or physician with your concerns.

If you would like to take part in this study, please return the completed questionnaire and keep this letter. If after receiving this letter, you have any questions about this study, or would like more information to assist you in reaching a decision about participation, please feel free to contact Dr. Barbara A. Golden at (215) 871-6459. However, please know the final decision about participation is yours. Should you have any comments or concerns resulting from your participation in this study, you can also contact PCOM's Research Compliance Specialist at 215-871-6782.

Thank you for your interest in this project.

Respectfully,

Clint C. Stankiewicz, M.S, M.Ed.

Responsible Investigator

APPENDIX D

Health Adherence Behavior Survey

Your Physical Health

Height: _____' _____"

Weight: _____ lbs.

Age: _____ yrs.

Gender: _____ Male _____ Female

How would you describe your race?

_____ American Indian or Alaskan Native

_____ African American

_____ Caucasian

_____ Asian or Pacific Islander

_____ Hispanic or Latino

_____ Other or multiracial

Highest level of school you have completed:

_____ Grade School or Less

_____ Some High School

_____ High School Graduate

_____ Some College

_____ College Graduate

_____ Graduate School

_____ Post Graduate School

_____ Trade or Technical School

Work History

_____ Unemployed

_____ Student

_____ Employed

_____ Full-time

_____ Part-time

_____ Retired

_____ Disability

Type of Employment: _____

Medical History

Have you been diagnosed with any of these conditions? If so, please indicate your age of initial diagnosis next to the checked conditions.

_____ AIDS/HIV	_____ High Cholesterol
_____ Alzheimer's	_____ Kidney Disease
_____ Arthritis	_____ Liver Disease
_____ Asthma	_____ Migraine
_____ Back Pain	_____ Obesity
_____ Cancer (any type)	_____ Osteoporosis
_____ Diabetes	_____ Parkinson's Disease
_____ Emphysema	_____ Past Stroke
_____ Heart Attack	_____ Seizures
_____ Heart Disease	_____ Thyroid Disease
_____ Heart Failure	_____ Traumatic Brain Injury
_____ Hepatitis	_____ Physical Disability
_____ High Blood Pressure	

In the past 12 months, how many times have you been to the doctor for your illness? _____

In the past 12 months, how many days have you been confined to home or missed work/school due to illness: _____

In the past 12 months, how many days have you been hospitalized due to your illness? _____

Are you currently taking medication for those conditions marked above? _____

Please list these medications:

_____	_____
_____	_____

Mental Health

Have you been diagnosed with any of these conditions? If so, please indicate your age of initial diagnosis next to the checked conditions.

- _____ Anxiety
- _____ Depression
- _____ Alcohol abuse
- _____ Substance Abuse
- _____ Personality disorder (please specify: _____)
- _____ Schizophrenia or other psychotic disorder
- _____ Cognitive or learning disability
- _____ Other (please specify: _____)

In the past 12 months, how many times have you been to a mental health professional? _____

In the past 12 months, how many days have you been confined to home or missed work/school due to your condition? _____

In the past 6 months, have you been hospitalized due to your mental health condition? _____

Are you currently taking medication for those conditions marked above? _____

Please list these medications:

Medical Advice

Please indicate by answering Yes or NO next to each question.

In general, do you listen to the advice your doctor give you regarding your medical condition? _____

In general, do you listen to the advice your mental health care provider gives you regarding your condition? _____

Do you listen to your doctors advice regarding smoking and tobacco use? _____

Do you listen to your doctors advice regarding proper diet and nutrition? _____

Do you follow your doctors advice regarding regular exercise? _____

APPENDIX E**PCOM****Philadelphia College of Osteopathic Medicine**

We are conducting a research study looking at the ways people with chronic illness think about the advice their doctors give them. If you are interested in participating, please speak to one of the health care staff available here at the center.

- Upon completion of the questionnaires, making sure you have answered each and every question thoroughly, leaving NO question unanswered you will be given **\$10 cash**
- All that is required is approximately 45 minutes of your time to complete a few short questionnaires.
- This research study may help physicians better understand and treat those suffering with chronic illness.

Your time is very valuable, and I thank you for your participation.

Barbara A. Golden, Psy.D., ABPP, Principle Investigator

Clint C. Stankiewicz, M.Ed., M.S.

Responsible Investigator