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The Effectiveness of Various Reminder Systems on Appointment-Keeping Adherence in a University-Based Primary-Care Setting

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THE EFFECTIVENESS OF VARIOUS REMINDER SYSTEMS ON APPOINTMENT-KEEPING ADHERENCE IN A UNIVERSITY-BASED PRIMARY-CARE SETTING

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This is to certify that the thesis presented to us by Frank M. Manachis on the 30th day of April, 2014, 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.

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Abstract

Treatment nonadherence is a significant problem that can affect not only the healthcare industry, but also more importantly, a patient’s health. Appointment-keeping adherence is expected to supersede all other types of adherence in terms of its importance and sequence. Various interventions have been used to treat nonadherence including appointment-keeping nonadherence within medical practices. Some of these interventions include different types of reminders (phone, letter, cards, etc.) and different types of therapy (motivational interviewing (MI) and cognitive behavioral therapy). Both reminders and MI have been effective in the past in treating appointment-keeping nonadherence. Therefore, will an MI-formatted letter reminder improve appointment-keeping adherence better than a non-MI-formatted letter reminder, phone reminder, and no reminder? Archival data from a university-based primary-care practice that implemented a protocol using varying reminder systems were examined and analyzed for this study. One hundred ninety four patients were randomly selected. The data displayed that MI-formatted reminders (80%) were not significantly better ($p = .239$) than non-MI-formatted letter reminders (75%), phone reminders (82%), or no reminders (66%). However, reminders as a whole (MI, non-MI and phone combined) were significantly better than no reminders ($p = .049$). Age was also indicated as a significant predictor ($r^2 = .048$, $p = .002$) for adherence, but gender was not. Therefore, one can conclude that adding MI to an existing intervention may not improve appointment-keeping adherence; however, the use of a letter format may have hindered its efficacy along with other issues inherent in the study. Overall, reminders are an effective means to improve appointment-keeping adherence.
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Chapter 1: Introduction

Problems with treatment adherence remain a primary issue undermining the effective delivery of healthcare today. Treatment adherence is defined as “a more active, voluntary collaborative involvement of the patient in a mutually acceptable course of behavior to produce a desired preventative or therapeutic result” (Meichenbaum & Turk, 1987, p. 20). Adherence simply refers to patients following the advice of their physicians and doing what they are asked to do. Adherence is manifested in one or more of the following ways: taking prescription medication, making necessary lifestyle changes, obtaining recommended medical screening procedures, and keeping scheduled appointments with physicians.

Nonadherence to treatment is both prevalent and pervasive. For example, nonadherence rates in older adults with medical issues range between 20-50% (Barat, Andreasen, & Damsgaard, 2001). In 2003, according to The World Health Organization (WHO), it was reported that as many as 50% of all patients did not follow their physicians’ treatment recommendations. More contemporary research suggests that 75% of adults are non-adherent in some fashion, whether it is medication nonadherence, appointment-keeping nonadherence, or not making recommended lifestyle changes (Pharmaceutical Manufacturers Association, 2011). More specifically, research has shown that only 58% of all appointments are kept (Macharia, Leon, Roewe, Stephenson, & Haynes, 1992), implying that 42% of all patients may be receiving inadequate health services.

Considering the many ways in which adherence may manifest itself, appointment keeping supersedes all other adherence behaviors by virtue of its critical importance. A
patient who fails to keep appointments may never have the opportunity to receive other
treatment recommendations related to medication, lifestyle change, medical screening,
diagnostic testing, or surgery. Nonadherence regarding appointment keeping may
preclude the assessment and treatment of medical problems. However, appointment
keeping is of such critical importance for many other reasons.

Nonadherence may create many potential risks and even worsen existing
problems. These medical complications occur because treatment and early interventions
are especially important in chronic but manageable illnesses, such as diabetes mellitus
type 2, hypertension, and metabolic syndrome (Hosseini-Esfahani, Jessri, Mirmiran,
Bastan, & Azizi, 2010; Schectman, Schorling, & Voss; 2008). Other research displayed
how nonadherence to heart medication can lead to an exacerbation of heart disease,
including myocardial infarction and death (Irvine et al., 1999). Recent research has
suggested that missed appointments are a significant predictor for poor diabetes control
and has led to increased A1c (3-month average of blood glucose readings) in patients
with type 2 diabetes (Schectman et al., 2008).

Many correlates have been identified that are related to fluctuations in adherence
rates. These correlates are organized into different classes of variables, such as patient,
cultural, financial, and medical variables. Correlates can include personal beliefs about
treatment, rapport with one’s physician, culture of the patient or physician, or lack of
financial resources. Other correlates related to adherence include physician, physician-
patient relationship, setting, and regimen factors. Examples of these factors include
complexity and duration of the treatment regimen, degree of communication/rapport with
one’s physician, physician turnover/continuity, a physician’s ability to individualize treatment, and a physician’s ability to perform home visits (Meichenbaum & Turk, 1987).

Overall, nonadherence to medical treatment may cause several adverse outcomes for patients. These outcomes can include patient-specific problems, such as declining health, lack of therapeutic help, and even increased mortality rates. Nonadherence also correlates with wasted resources and lost money for both healthcare companies and pharmacological companies (WHO, 2003). Grahl (1994) suggested nonadherence may be responsible for 100-150 billion dollars of additional healthcare costs annually. Due to these issues, it is important to examine and develop ways to increase patient adherence.

In order to increase adherence, researchers have explored many avenues. These avenues include different therapies, such as cognitive behavioral therapy or techniques like psychoeducation (Sperry, 2009). However, something as simple as reminders can also facilitate adherence (Parikh et al., 2010). Reminders have been helpful in increasing adherence behavior because sometimes people simply forget about their appointment (Wantanbe-Rose & Sturmey, 2008). Reminders help remind the client that an appointment is imminent. In addition, phone reminders can also increase commitment (Cialdini, 2009).

Although research suggests that phone reminders can be effective in improving treatment adherence, poor appointment keeping can still occur when phone reminders are implemented (Festinger, Lamb, Marlowe, & Kirby, 2002). In fact, one such study found that 30% of residency clinics that used reminders still had no-show rates as high as 20% (Hixon, Chapman, & Nuovo, 1999). In order to increase the effectiveness of reminders in improving appointment keeping, the coupling of reminders with a treatment intervention
that increases adherence may be beneficial. Motivational interviewing (MI) is one such therapeutic intervention that increases patient adherence by talking the client through the problem without coercion (Miller & Rollnick, 2002).

In fact, research has shown that MI is effective in increasing adherence behavior in various populations, including the medical population (Berg-Smith et al., 1999; Britt, Hudson, & Blampied, 2004). MI involves the utilization of empathy through reframing, reflective statements, and Socratic questioning to highlight the client’s ambivalence. MI aims to reinforce the change side of one’s internal dissonance and to remove the barriers associated with nonadherence (Miller & Rollnick, 2002). However, MI has not been widely used for appointment-keeping adherence. Nevertheless, evidence has shown that MI improved retention and appointment keeping for patients with HIV (Naar-King, Outlaw, Green-Jones, Wright, & Parsons, 2009).

Since both reminders and MI have been utilized to improve treatment adherence on their own, creating an MI-formatted reminder may have a greater effect on treatment adherence. The expectation that a greater effect may be observed is strengthened by the fact that printed communication interventions have been tailored using MI in the past to treat adherence, and they were effective (Sohl & Moyer, 2007). Therefore, can the synergy between letter reminders and MI foster even better appointment-keeping adherence than generic letter and phone reminders?

**Purpose of the Study**

The purpose of this study was to determine whether appointment-keeping adherence can be improved in a sample of individuals presenting for care at a university-affiliated primary-care center. More specifically, the purpose of the study was to compare
whether rates of appointment keeping differ significantly across four conditions: no reminder (control), phone reminders, non-MI letter reminders, and letter reminders utilizing an MI format.

**Literature Review**

**Adherence**

Treatment adherence is a prominent concern in healthcare today. Many different variants and definitions describe treatment adherence. One such accepted definition for adherence was proposed by Meichenbaum and Turk (1987), who defined treatment adherence as “a more active, voluntary collaborative involvement of the patient in a mutually acceptable course of behavior to produce a desired preventative or therapeutic result” (p. 20). The first portion of the definition highlights the patient’s involvement in the treatment process. In treatment adherence, the patient is expected to be “more active” and also to collaborate with the physician during the treatment process. The primary point is that patients have a choice whether to perform any behavior prescribed by their physician. These behaviors can include taking medication, agreeing to a surgical procedure, dieting restrictions, and even simply attending follow-up appointments. Patients can actively choose not to perform the behavior prescribed by their physicians, which creates complications (Meichenbaum & Turk, 1987).

In order to best manage these complications, collaboration between the physician and patient becomes important. The collaborative piece of adherence suggests that the patient and the physician work together to decide the appropriate course of action for treatment. In many instances, research examines patient issues associated with nonadherence, but physicians can impact adherence, as well. Meichenbaum and Turk’s
(1987) definition covers the possibility that poor collaboration by the physician can foster poor treatment adherence. For example, a patient may not be presented with options, or the physician may not explain necessary dietary changes effectively to the patient. If the physician is not listening to the patient, then why should the patient listen to the physician (Meichenbaum & Turk, 1987)?

In Meichenbaum and Turk’s (1987) definition, the course of action taken by the patient should be “mutually accepted” by both the patient and the physician. As in all major life decisions, the pros and cons of a situation should be examined, especially in regard to medical treatment in which major lifestyle changes are often recommended. In fact, research suggests that patient/therapist collaboration and mutual decision making increase treatment adherence, which only highlights the importance of collaboration between health professionals and patients (Miller & Rollnick, 2002; Moyers, Miller, & Hendrickson, 2005).

Overall, treatment adherence is considered a daunting task, because it often forces a patient to make many proposed lifestyle changes. From the patient’s perspective, these changes are anything but easy. Many of these changes include more exercise, reduced alcohol consumption, decreased sodium intake, and fewer sweets. Some of these changes might cause a patient to reroute more effort towards these changes than towards other daily life activities, such as work or family time.

**Nonadherence**

Because patients undergo significant changes to their lifestyle and exhaust more effort toward physician recommendations, treatment nonadherence is often impacted (Meichenbaum & Turk, 1987). Since medical treatment is extremely variable and can
include significant complications, examining one’s views regarding nonadherence is important. Nonadherence can be defined in a variety of ways. Nonadherence can be described as the inverse of Meichenbaum and Turk’s (1987) definition of adherence, in which the patient or physician is passive, unwilling to change, or be collaborative, thereby maintaining or exacerbating the patient’s medical condition. However, the problem with this definition is that it is difficult to measure. Therefore, when studying adherence, experimenters often observe or examine one of the behavioral components necessary for adherence. Some of these behavioral components have been previously mentioned and include taking prescribed medication, attending screening procedures (e.g., mammography, blood work), or even attending follow-up appointments. The absence of any of these behaviors would suggest that the patient is nonadherent in some fashion.

**Appointment-Keeping Adherence**

Of the behaviors previously listed that suggest nonadherence, only one behavior appears to supersede all others. This behavior is appointment keeping. Sequentially, keeping one’s appointment would supersede all other treatment adherence-related behaviors. Simply, a person must attend his or her appointment with a physician, before any other recommendations (e.g. medication or blood-work) can be suggested.

**Theories of Adherence**

Adherence/nonadherence can be defined in myriad ways, and there the theories suggesting how people form either adherent or non-adherent habits are numerous. Some of these theories include the health belief model, the theory of reasoned action, and the theory of planned behavior. The health belief model posits that individuals will choose to be adherent, or not, by weighing their desire to be healthy or avoid their perceived
propensity to become well/prevent illness (Strecher, Champion, & Rosenstock, 1997). More specifically, the Health Belief Model consists of four dimensions, which are *perceived susceptibility, perceived severity, perceived benefits*, and *perceived barriers*. Perceived susceptibility includes beliefs/cognitions about the potential risk of contracting an illness. Perceived severity includes beliefs/cognitions about the potential consequences of contracting an illness and how impactful those consequences might be. Perceived benefits include beliefs/cognitions about the potential effectiveness of a treatment recommendation once an individual has been diagnosed with either an illness or a precursor to contracting an illness. Finally, perceived barriers include beliefs/cognitions about potential impediments that inhibit an individual from following a treatment recommendation (Strecher et al., 1997).

The first two dimensions of the health belief model, perceived susceptibility and perceived severity impact, whether an individual is motivated to prevent or ameliorate an illness (Stretcher et al., 1997). If individuals perceive that they are at risk for an illness and that the consequences are serious, they will be motivated to engage in a behavior that is believed to help prevent or cure that illness. The treatment behavior that individuals choose is based on the perceived benefits and barriers of that treatment behavior. If the benefits of a treatment behavior outweigh the risks, individuals will engage/adhere to a treatment behavior (Strecher et al., 1997).

The health belief model is not the only theory that explains treatment adherence. The theory of reasoned action also explains how cognitive forces lead a person to behave in a certain manner (Fishbein & Ajzen, 1975). The theory of reasoned action suggests that behavior is impacted by one’s intention (*behavioral intention*). Furthermore,
intention is influenced by information and beliefs resulting from *subjective norms* and *attitudes*, which in turn lead to a particular outcome. Behavioral intention is the comparative strength of one’s intention to engage in a behavior. Attitudes are one’s beliefs about the consequence of a behavior multiplied by the weight of that consequence. Subjective norm consists of an individual’s perception of close others’ thoughts and beliefs (e.g. family, partner, friends) about whether that individual should engage in a behavior. The equation, behavioral intention (BI) = Attitudes (A) + Subjective Norms (SN), suggests that the combination of one’s attitudes and subjective norms aims to predict one’s behavioral intention, and therefore, lead to the intended behavior (Fishbein & Ajzen, 1975).

The theory of reasoned action states in regards to treatment adherence that individuals will or will not adhere to a treatment based on their perception of the consequence of the treatment, the value they give to that consequence, and what others who are important to them think about the treatment (Fishbein & Ajzen, 1975). If individuals believe that the treatment has a favorable consequence, they significantly value that consequence, and their families think highly of the treatment, they are expected to be adherent. However, the intention becomes muddled when an individual believes a treatment has a favorable consequence and significantly values that consequence, but his or her family views a treatment in an unfavorable light. Therefore, Fishbein and Ajzen (1975) suggested that attitudes and subjective norms are not valued equally and therefore, individuals will lean toward the side they value more, in order to break a virtual tie. Therefore, how individuals weigh their own attitudes with the beliefs of close others’ also affects their behavioral intention towards a treatment (Fishbein & Ajzen, 1975).
However, the subjective weight of attitudes and subjective norms is not the only potential issue impacting behavioral intention. Another issue inherent with the theory of reasoned action is that many individuals are not in complete control of whether or not they can engage in a behavior. For example, individuals from a low socioeconomic status background may not be able to engage in treatment because they cannot obtain transportation or may not have health insurance. Therefore, volitional control is a caveat of the theory of reasoned action so Ajzen (1985) modified his theory. An individual’s beliefs about whether he or she possesses the resources necessary to engage in behavior and whether that individual has the opportunity to engage in that behavior were variables added to the theory of reasoned action to create the theory of planned behavior. The combination of an individual opportunity to engage in treatment and perceived resources are grouped into what Ajzen calls *perceived behavioral control* (Ajzen, 1985).

Perceived behavioral control can have a large impact on whether a person engages in a treatment behavior and can even outweigh other variables such as attitudes and subjective norms. Fewer resources and poor opportunities for treatment access would likely lead to nonadherence (Ajzen, 1985).

Overall, various models, such as the health belief model, theory of reasoned action, and theory of planned behavior, aim to explain the mechanisms behind adherence (Ajzen, 1985; Fishbein & Ajzen, 1975; Strecher et al., 1997). However, explaining such a complex phenomenon as adherence through one model appears to be difficult. As stated earlier, adherence or nonadherence can be explained or defined in a variety of ways. Despite society’s efforts to explain adherence, adherence is still a prominent issue affecting a large contingent of people.
Nonadherence Rates

Taking into account the previously mentioned factors, how large is this contingent of people affected by nonadherence? Statistically, adherence rates vary greatly. Early research suggested 20-50% of patients were non-adherent to treatment (Barat et al., 2001). More recent research has suggested that 50-75% of all patients are nonadherent in some fashion (Pharmaceutical Manufacturers Association, 2011; World Health Organization, 2003). Adherence rates appear to be hovering around 50% with specific rates ranging between 30-70%.

The range of appointment-keeping nonadherence from study to study is great. Nonadherence to appointment-keeping has been suggested to range from 8-63% (Dunbar-Jacob et al., 2000), and appointment keeping can impact other factors, such as chronicity and long-term medication management (Haynes & Dantes, 1987). The more chronic the illness and the longer the term of use of one’s medication correspond to dropout rates of approximately 50% (Haynes & Dantes, 1987). Other research has indicated that 58% of all appointments are kept (Macharia et al., 1992; World Health Organization, 2003).

In summary, most no-show rates apparently hover around the 50% mark. Since many patients are not adhering to various treatment recommendations, the consequence is that resources, time, and money are being wasted. In terms of a dollar amount, how much is treatment nonadherence costing the healthcare sector?

Healthcare Costs

Research has indicated that nonadherence to medical treatment costs the healthcare industry a significant amount of money. In fact, Grah (1994) suggested that poor treatment adherence costs the healthcare industry nearly 100-150 billion dollars a
year. More recent research suggests that despite efforts to increase adherence rates, poor treatment adherence is still resulting in 100 billion dollars of healthcare costs (World Health Organization, 2003). Furthermore, nonadherence to medical treatment is likely responsible for 10% of all hospital admissions (World Health Organization, 2003). Therefore, healthcare costs are rising because patients are not attending their regularly scheduled appointments and instead are receiving treatment in emergency rooms.

Receiving treatment in this manner is often uneconomical. Furthermore, patients are not receiving treatment from specialists and instead are receiving treatment from emergency medical staff and interns. Overall, nonadherence leads to an inefficient use of resources and time by the healthcare system.

**Outcomes of Nonadherence**

The most significant costs of being nonadherent are the health risks and issues that potentially result from the by-products of nonadherence. More specifically, if patients are not attending their appointments, they are not receiving vital information relating to the treatment of their illnesses. Subsequently, if illnesses are not being treated properly, those illnesses will be allowed to proliferate; therefore, the patients’ conditions stay static or worsen. Various studies have examined the effects of nonadherence on patient illness.

One such study examined how nonadherence can affect patients with type 2 diabetes. Schectman et al. (2008) examined if poor appointment-keeping rates had an effect on the health of patients with type 2 diabetes. Specifically, did poor appointment-keeping rates cause an increase in the A1c levels of patients with type 2 diabetes? Greater than 4,200 patients with type 2 diabetes at a university hospital system in Virginia
participated in the study. The results displayed that those patients with type 2 diabetes who missed 20% or more of their scheduled appointments had at least a 1% increase in A1c levels versus those who only missed 5% or fewer of their scheduled appointments. Therefore, medical concerns arise even if patients attend 80% of their appointments, despite even lower estimates of appointment keeping in medical settings (Schectman et al., 2008).

In this instance, Schectman et al. (2008) did not suggest that poor appointment keeping causes poor A1c levels. The likelihood is that patients who miss their appointments are not getting the appropriate support, information, and guidance necessary to treat their type 2 diabetes. In fact, Karter et al. (2004) observed a relationship between poor adherence and self-monitoring of blood glucose. Therefore, patients who do not attend appointments are not being taught how to use a glucometer nor are they raising questions about testing their blood glucose, which leads to apprehension, confusion, and misuse of treatment measures (e.g. glucometer), which in turn, decreases the overall likelihood for self-monitoring (Schectman et al., 2008).

Other research indicated that poor treatment adherence can result in significant heart problems and even death (Irvine et al., 1999). This study indicated that failure to take prescribed heart medication leads to various possible consequences, which include a progression of one’s heart disease, myocardial infarction, and even sudden cardiac death. This study also indicated that patients who are more active and engaged in treatment are more likely to have better medication adherence and, therefore, less likely to have serious heart complications (Irvine et al., 1999).
Poor appointment-keeping adherence can have other impacts on physical health. Research indicates that complications can occur with those who are receiving an organ transplant and are nonadherent to their appointments. One specific study displayed that nonadherence can negatively impact patients receiving an organ transplant (Schweizer et. al., 1990). Complications that occurred for those receiving an organ transplant included higher mortality and organ rejection (Schweizer et al., 1990). This study displayed that simply not keeping one’s appointment impacts a patient on a large scale. Ultimately, when patients do not attend their appointments, they are not receiving the recommendations from their physician that are necessary for recovery (Schweizer et al., 1990).

**Primary Populations**

In order to examine the factors that may be associated with nonadherence, one must divide adherence into its component parts. Therefore, one must consider which populations have the greatest incidence and frequency of nonadherence. The elderly, those over the age of 65 years, often face more adherence-related issues because the likelihood of health issues in that population is greater than that in younger populations (Cummings, Cooper, & Cassie, 2009). These health issues are acute or chronic medical conditions that can be managed or even prevented through lifestyle changes (Beers, 2004). The increased propensity for medical illness, in addition to the lifestyle changes that are needed, often lead to increased stress and feelings of being overwhelmed (Cummings et al., 2009). Therefore, adherence becomes increasingly important during the later stages of life, especially since the elderly population is rapidly increasing, according to the U.S. Census Bureau (2008).
Despite the greater need for treatment adherence in older adults because of the increased frequency of medical issues, younger adults also display problems adhering to treatment recommendations (Catz et al., 1999). Research indicated that age was the most significant predictor for variance in adherence for patients with HIV (Catz et al., 1999). Specifically, subjects who were in the young-adult age range were less likely than older patients to attend scheduled appointments for HIV monitoring (Catz et al., 1999).

Further research indicates that age may be a predictor of appointment-keeping adherence, but gender may not be. A recent study examined appointment-keeping adherence at various outpatient practices in a university-based medical setting (Parikh et al., 2010). This study again displayed that age was a predictor of show rate. Specifically, elderly patients had the best attendance. Those who were in the age range of 69-100 years had an attendance rate of about 83%. Those who were in the age range of 18-44 years had an attendance rate of only 66%. Those in the age ranges of 45-56 years and 57-68 years age ranges had attendance rates of 72% and 78%, respectively.

In regards to gender, there was not a significant difference between the attendance rates of men and women when examining this variable through multivariate analysis; however, women did attend more appointments than men (Parikh et al., 2010). Penneys and Glaser (1999) observed similar results, in which women attended more than men, but the result was not significant. In fact, the difference in show rate (women = 84.3%, men = 83.7%) was negligible. Gender appears not to be a significant correlate and predictor for attendance rate.

Regardless of age or gender, ethnicity impacts patient treatment adherence (Catz et al., 1999). Ethnic minority status was a significant predictor for nonadherence in
patients with HIV (Catz et al., 1999). Specifically, African Americans have been noted as being less adherent than other ethnic/racial groups in various studies (Catz et al. 1999; Petri, Perez-Gutthann, Longenecker, & Hochberg, 1991). One study indicated that poor treatment adherence was more likely responsible for kidney issues in African American patients with systemic lupus erythematosus (SLE) versus Caucasian patients with SLE (Petri et al., 1991). This same study also reported that physicians rated African Americans as less adherent to treatment recommendations than Caucasians by slightly more than a 20% margin.

However, more recent research has suggested that there may be no difference between African Americans and Caucasians in regard to adherence (Mosley-Williams, Lumley, Gillis, Leisen, & Guice, 2002). In fact, Caucasians displayed appointment-keeping rates slightly fewer than those of African Americans. There was not a significant difference between medication adherence rates in African Americans patients with SLE versus Caucasian patients with SLE (Mosley-Williams et al., 2002).

In summary, some discrepancy exists as to whether the propensity for nonadherence is greater in certain populations. Based on the sheer likelihood of increased medical issues, elderly patients are more likely to suffer from nonadherence. However, adolescents and young adults are also likely to be nonadherent to treatment. Research has also displayed differences in adherence rates based on ethnicity; however, these differences are inconsistent. Other factors associated with minority population status, such as being of lower SES, may be more to blame for issues regarding adherence. More specifically, patients who are of lower SES may have trouble paying for medication or obtaining adequate transportation to hospital appointments. Overall, examining
nonadherence based on demographic factors is complex, in that various other factors and correlates are likely responsible for these medical issues (Catz et al., 1999; Cummings et al., 2009; Mosley-Williams et al., 2002).

Nonadherence Correlates

Although Meichenbaum and Turk’s (1987) definition covers the importance of physician-patient collaboration and active patient participation in treatment, this definition is not sufficient for examining treatment adherence. In order to study treatment adherence, it must be defined in behavioral terms. Many studies have defined treatment adherence in a variety of classifications, including compliance with prescribed medication, initiating lifestyle changes, and attending scheduled follow-up appointments with one’s primary-care physician. Each of these behaviors is a component of adherence and differs in importance based upon the illness being treated. Most research on chronic, preventable and manageable illnesses, such as type 2 diabetes, hypertension, high cholesterol, or bowel disease, is focused on the lifestyle changes that need to be made.

Lifestyle changes and appointment keeping are difficult for a variety of reasons. These reasons can include patient variables, physician variables, cultural variables, socioeconomic and demographic by-products, setting variables, and regimen variables. Patient variables are issues inherent in the patient that may impact adherence to medical treatment and recommendations. Patient variables include health beliefs, treatment appraisals, locus of control, self-esteem, and comorbid psychological issues, such as depression. Physician variables include bedside manner/rapport building ability, and expertise/experience. Regimen variables are factors associated with the treatment
recommendations, such as the difficulty of lifestyle changes made, access to resources necessary for the regimen, and knowledge of the regimen.

Socioeconomic and demographic proxy variables differ in that they are not potential causes of poor treatment adherence, but influence potential barriers to treatment. Lack of financial resources influences access to other resources, such as transportation, a nutritional diet, and medication. Those who are of lower SES are likely to be in areas with less immediate access to the resources necessary for treatment, such as being geographically distant from a major hospital.

**Patient factors.** Patient factors include treatment appraisals; treatment perceptions; health beliefs; psychological issues, such as depression; and course of illness. Treatment appraisals are patient perceptions of either the physician or the treatment recommendations. For example, does the physician appear to be competent, or will the treatment be effective? Treatment appraisals can significantly affect adherence to treatment, especially appointment keeping (Bishop, Yardley, and Lewith, 2008). Bishop et al. (2008) examined how treatment appraisals and beliefs affect treatment adherence to alternative treatments of physical illness. A patient’s positive appraisals of their therapist predicted adherence for follow-up sessions. If the patient viewed the therapist as competent and trustworthy, that patient was more likely to attend continuing sessions (Bishop et al., 2008).

Perceptions about not only the physician, but also the staff can affect adherence (Lacy, Paulman, Reuter, & Lovejoy, 2004). If a patient perceives a lack of respect, whether founded or not, that patient is less likely to attend appointments. For example, a patient with significant pain may call to get an appointment with his or her physician, but
the physician may not be able to see the patient in a week. Therefore, the patient feels that the physician’s office staff is not empathetic towards his or her situation and is downplaying the pain, which leads to the perception that the patient is being disrespected. The patient thinks, “Why should I attend my appointment if the doctor or his staff members are not justifying my pain?” Patients do not respect a system that does not respect them (Lacy et al., 2004).

Treatment beliefs differ from treatment appraisals, but they also affect treatment adherence. Treatment beliefs are preconceived notions about a specific treatment. For example, patients may not believe in alternative treatments, such as homeopathy (Bishop et al., 2008). They might believe that homeopathy is ineffective or not empirically sound. A primary treatment belief important in adherence is whether or not patients believe that they should take an active role in that treatment (Bishop et al., 2008). Patients diagnosed with chronic illnesses are often expected to take an active role in treatment. Many patients are expected to make dietary, activity level, and other lifestyle changes. If patients do not believe in taking an active role in their treatment, they are less likely to adhere to any of the lifestyle changes prescribed by their physicians (Bishop et al., 2008).

Clearly, treatment beliefs can affect adherence rates, but do adherence rates deteriorate when a person’s beliefs become distorted by psychological illness? Depression is one such psychological illness that can negatively affect a person’s belief system. Consequently, recent research has suggested that depression can have an effect on adherence (Mackin & Arean, 2007; Mosley-Williams et al., 2002). Patients who are depressed may display signs of being uninterested in their treatment and, therefore, are perceived by their physicians to be nonadherent. However, it is not that such patients do
not care about their treatment, but that depression causes specific symptoms that might foster nonadherence (Benner et al., 2002). Specific depressive symptoms include anhedonia (loss of pleasure in daily activities), poor concentration, memory difficulties, poor appetite, insomnia, and fatigue (American Psychological Association, 2000). For example, if patients are lethargic as a result of depression, they may be less likely to follow a recommended exercise regimen to treat their type 2 diabetes.

Furthermore, depressive symptoms and negatively charged affect appear to be more prevalent in the African American population (Mosley-Williams et al., 2002). These symptoms likely increase concerns about medication and physical symptoms associated with SLE, and in turn, reduce appointment keeping. Increased negative affect and depression did not affect the Caucasian population in the same manner. Therefore, factors associated with nonadherence may affect varying populations differently (Mosley-Williams et al., 2002).

**Illness factors.** Another primary correlate of treatment adherence is course of illness and its perceivable symptoms. Illnesses like hypertension may have less immediate effects after diagnosis, despite their potential long-term complications, such as significant heart disease (i.e. myocardial infarction) (Cooper, 2009). In Cooper (2009), a 41-year-old patient with hypertension described himself as feeling “pretty strong.” Patients who do not perceive symptoms therefore can be ambivalent about their health. Patients may ask themselves, “Am I really sick?”

Consequently, hypertension typically has fewer immediate or life-changing symptoms originally, and therefore, patients are less likely to adhere to treatment. Patients may feel hypertension is acute or that medication only is needed sporadically,
simply because of the asymptomatic nature of hypertension (Cooper, 2009). In fact, some individuals believe that home remedies may be more beneficial than treatment recommendations because of the asymptomatic nature of hypertension and patient misperceptions of the illness (Schlomann & Schmitke, 2007). Therefore, if a patient believes that home remedies are more beneficial than treatment recommendations, that patient may be less likely to attend follow-up appointments.

In reality, hypertension is a chronic illness that, if untreated, can cause serious complications later in life. With an illness such as hypertension, not only does its asymptomatic nature impact adherence, but its chronicity may impact adherence as well. Some research examined the effect of chronicity on illness and whether it had an effect on adherence (La Greca, 1988). The study indicated that patients are less adherent when an illness is chronic versus acute. What about chronic illness may potentially reduce treatment adherence?

**Regimen factors.** One potential reason those with chronic illness are less adherent than those with acute illness is that therapeutic regimens for chronic illness involve longer duration solutions and continuous care and maintenance (La Greca, 1988). Research also has suggested that other factors associated with an individual’s medical regimen can impact adherence. Some of these factors include if the prescribed medication has a quick impact, if a patient experiences negative medication side effects, if the regimen is future oriented/preventative in nature, and if the regimen requires the patient to make significant lifestyle changes. Therefore, numerous regimen-related factors can impact treatment adherence (La Greca, 1988).
Another study examined the impact of regimen complexity on adherence (Bamberger et al., 2000). If the medical regimen prescribed is complicated, a patient is less likely to adhere to it. Antiretroviral treatments, prescribed for HIV disease management, are considered to be complex regimens and often involve anywhere from 2-15 pills taken 2-3 times per day. The individual not only has to take a large number of pills, but also has to remember to take food each time the prescribed medication is ingested, because it can cause substantial nausea and vomiting. Additionally, access to storage for the multitude of necessary medications may be difficult, especially if the patient is of lower SES (Bamberger et al., 2000). In fact, Bamberger et al. (2000) suggested that being of lower SES compounds the complexity already inherent in more difficult drug regimens, such as antiretroviral therapy.

**Socioeconomic Variables.** SES may have an impact on treatment adherence. Various studies have reported that low SES is correlated with nonadherence to medical treatment (DiMatteo, 2004). Lower income families are more likely than higher income families to be affected by certain socio-structural factors that contribute to nonadherence, such as insufficient wages, lack of education, and lack of adequate medical insurance (DiMatteo, 2004; Ward et al., 2008). Although the correlation between SES and adherence was weak, interventions aimed at assisting those of lower SES and poorer educational levels significantly facilitated an increase in treatment adherence (DiMatteo, 2004).

Chernew et al. (2008) also established that adherence can be affected by SES. Adherence to prescribed medication was affected by SES in that patients of low SES were less likely than those of higher SES to take their prescribed medications. A potential
reason for this disparity is that copay amounts are not static. As the amount necessary to pay off insurance copays increases, those of lower SES have increased difficulty making these payments. Furthermore, if medication becomes an out-of-pocket expenditure, those of lower SES are less likely to be able to afford the medication, and therefore, less likely to adhere to the treatment. Although Chernew et al. (2008) did not examine health outcomes, they assumed that medication nonadherence is likely to facilitate poor health outcomes. Overall, patient SES clearly impacts treatment adherence (Chernew et al., 2008; DiMatteo, 2004).

**Physician factors and patient/physician relationship.** Most of the factors that have been discussed concern patients directly impacting their own adherence level, but in many instances, physicians can impact adherence as well. One primary factor that affects adherence is whether a physician meets the expectations of the patient (Bell, Kravitz, Thorn, Krupat, & Azari, 2002). Patients’ expectations were defined as “patients’ visit-specific value expectations concerning the process of care” (Bell et al., 2002, p. 818). Basically, did the physician complete what the patient thought was necessary for that appointment? If an appointment did not correlate with what patients thought was necessary for a specific appointment, patients were less likely to adhere to treatment. Patients may have felt that physicians were diagnostically inaccurate, careless in their approach, or did not address requests for help. In regards to requesting help, patients had ideas about the specifics of their illness or were worried about their condition before coming into the session and expected physicians to entertain their questions. If patients perceived that their physician did not address these concerns, patients did not feel
vindicated and, therefore, felt slighted. This finding suggested that patients react and adhere better when physicians are communicative and collaborative (Bell et al., 2002).

**Factors Increasing Adherence**

Although lack of physician/patient communication has been suggested to have a negative impact on adherence, proper communication can consequently have a positive impact. One factor that has facilitated adherence in the healthcare industry is the use of a biopsychosocial or integrated model (Peterson, Hutchings, Shrader, & Brake, 2011). An integrated healthcare model can involve the following components: reminders, self-monitoring, brief and intensive treatment interventions/therapies, and computerized feedback. Specific interventions and therapies that can be used in conjunction with health consultation include problem-solving approaches, stress management techniques, anger coping, biofeedback, and MI. By incorporating these other psychosocial interventions into healthcare, adherence and health outcomes were shown to improve. For example, Fernandez, Davidson, Griffiths, Juergens, and Salamonson (2010) displayed that integrated healthcare improved adherence to cardiac guidelines during rehabilitation and reduced repeated myocardial infarctions. Integrated healthcare can facilitate adherence possibly because it fosters improved communication between the patient and the healthcare system.

In fact, good physician communication was highly correlated to treatment adherence through a meta-analysis of greater than 125 studies (Zolnierek & DiMatteo, 2009). Zolnierek and DiMatteo (2009) also suggested that patient treatment adherence can be improved by educating physicians on becoming better communicators. Good
physician communication includes education about a patient’s disease and treatment, empathy, and use of problem solving strategies (Roter et al., 1997).

**Reminders**

Since good communication fosters better adherence, communication skills should be emphasized in interventions aimed to increase treatment adherence, especially appointment keeping. Interventions that have helped improve adherence and utilize good communication skills include psychoeducation and reminders.

Reminders are often used in medical settings to notify the patient that an appointment is imminent. Therefore, reminders aim to increase appointment keeping in various medical practices. Reminders can include business cards, phone calls, mailed letters, postcards, e-mails, and even text messages. A common reminder is a business card given by the receptionist after a finished appointment. Business cards typically include the following information: the physician’s name, office address, office phone number, and the time and date of the next appointment. Other information may include an e-mail address, fax number, and the physician’s personal cell phone number. The problem with business card reminders is that they are small, easily misplaced, and temporally removed from the next appointment. On the other hand, phone calls, another common reminder, occur prior to the appointment so that temporal conditioning occurs.

Reminders are often considered the most popular and effective way to increase appointment keeping (Macharia et al., 1992). Reminders notify patients that an appointment is imminent and the office is expecting their attendance. Although phone reminders mitigate for simple issues, like forgetting an appointment, nonadherence can
occur nonetheless (Festinger et al., 2002). Other factors can maintain nonadherence. One such factor is time effects.

Time effects include prospective memory or “the way cognitive representations and processes are involved in remembering to carry out a planned action” (Walbaum, 1997, p. 361). Based on previous research, Walbaum (1997) studied whether appointment reminders were more effective during scheduled/structured days during the work week versus an unstructured/unscheduled weekend. The results indicated that subjects were more likely to respond to appointment reminders quicker during weekdays versus weekends. A potential explanation was that weekdays involved more structure and scheduling, which prompted and primed better time structuring. Therefore, appointment reminders appeared more effective during weekdays because they primed not only better time structuring, but also better memory of the reminders (Walbaum, 1997).

Other variables associated with poor adherence include previously discussed correlates, such as personal health beliefs, problems with one’s physician, lack of motivation, and lack of agreement with prior treatment recommendations.

**Letter Reminders**

Besides phone and business card reminders, letter reminders are used to improve treatment and appointment-keeping nonadherence (Bigby, Giblin, Pappius, & Goldman, 1983; Sohl & Moyer, 2007). Letter reminders involve sending a letter or message to patients to remind them of their upcoming appointment. Past research has shown that letter reminders are just as effective as phone reminders in improving adherence. Bigby et al. (1983) displayed that letter and phone reminders were equally effective in reducing appointment-keeping nonadherence at an adult primary-care office in comparison to no
reminders. Although not significant, another study displayed that letter reminders were more effective (42% adherence rate) than phone reminders (33.7%) at improving adherence to primary-care procedures (i.e. vaccinations; Rosser, McDowell, & Newell, 1991).

A meta-analysis examining whether letter reminders improve adherence to cervical screenings displayed that letter reminders were an effective strategy to improve adherence (Tseng, Cox, Plane, & Hla, 2001). Cervical-screening adherence was increased by 64% when letter reminders were used. As part of the study, SES was observed to limit the effect of letter reminders on cervical screenings. Specifically, patients considered to be of a lower SES were less adherent than patients of mixed SES despite both receiving letter reminders (Odds Ratio [Low SES] = 1.16 vs. Odds Ratio [Mixed SES] = 2.02; Tseng et al., 2001).

Letter reminders can be generic, personalized, targeted, and tailored. Generic letter reminders do not use any personalized information within the format of the letter. Personalized letters utilize information such as addressing the letter to an individual within the format of the letter. Targeted letters involve directing a letter towards a specific patient population (e.g., patients with type 2 diabetes). Tailored letter reminders involve creating a letter that is more personally applicable by customizing the letter to the person’s age or gender or by using a specific health behavior/behavioral change model (transtheoretical, motivational interviewing, health belief) to format the letter (Sohl & Moyer, 2007).

Owing to the language and individualized nature of tailored letter reminders, they would be expected to be the most effective at improving treatment adherence. Research
supports this hypothesis. Research suggests there is a higher probability that a tailored letter reminder will be read, attended to, encoded in one’s memory, saved, and even shared with others. Therefore, tailored letter reminders are considered to be a more effective reminder format than generic, personalized, and even targeted reminders (Kreuter & Wray, 2003).

Not only are letter reminders a viable intervention for improving patient adherence, but also appear equally effective as the gold standard of improving appointment-keeping adherence, phone reminders.

Types of Therapy

Therapy is another means used to improve nonadherence. One such therapy considered effective in improving nonadherence is cognitive behavioral therapy (CBT). CBT has shown to be effective with treatment adherence (Sperry, 2009). CBT can be helpful in educating the patient about treatment options (Safren et al., 2009). CBT also uses various techniques such as cognitive restructuring to reduce anxiety and depression associated with medical issues. CBT also fosters sound decision making through utilizing Socratic questioning, pie charts, and cost benefit analyses (CBA; Beck, 1995).

However, CBT may not address readiness to change and motivation to change as well as other types of therapy. One such therapy that focuses on increasing motivation and change talk is MI (Miller & Rollnick, 2002). Change talk refers to the time when patients discussed their desire and ability to change a problem behavior, as well as their reason and need for changing that behavior. MI also utilizes some of the decisional techniques used in CBT. Overall, MI is often considered the most effective therapeutic
modality for increasing motivation and treating nonadherence to medical recommendations (Berg-Smith et al., 1999; Britt et al., 2004).

Motivational Interviewing (MI)

MI is effective in treating adherence because it utilizes empathy and increases self-efficacy in order to foster change talk (Miller & Rollnick, 2002). MI involves using in-session tactics, such as reframes, reflective statements, collaborative problem solving, and Socratic questioning. These tactics create increased dissonance in the patient about the problem behavior. For example, a therapist might use a double-sided reflection to express the client’s ambivalence about smoking cessation. By the therapist’s simply highlighting the client’s ambivalence in a nonconfrontational way, the client does not feel threatened and often aligns with the therapist. Secondly, the client likely will think hard about the problem behavior and the issues associated with it, thereby increasing dissonance (Miller & Rollnick, 2002).

MI also aims to remove the barriers associated with nonadherence (Miller & Rollnick, 2002). A CBA, or decisional-balance exercise, is a powerful facilitator for removing barriers in MI (Apocdaca & Longabaugh, 2009). A CBA is a therapeutic technique, in which a clinician asks the patient to express the pros and cons of his or her problem/change behavior and rate the confidence and motivation for changing that behavior (Botelho, 2004). For example, a person with type 2 diabetes might find moderate exercise (20 minutes per day) a difficult task. Potential benefits of 20 minutes of moderate exercise per day might include losing weight and experiencing fewer diabetic complications. However, potential costs might include reduced time for other
activities, increased exhaustion throughout the rest of the day, and reduced self-esteem if the patient has difficulty exercising.

However, some components or techniques are more effective than others. Apocdaca and Longabaugh (2009) found that two specific constructs were associated with better outcomes in MI. These outcomes were client change talk/intention and client experience of discrepancy. Specifically, patients who undergo MI are more likely to discuss changing their problem behavior and also to experience more dissonance related to their problem behavior. Both of these are important goals inherent in MI and are important in increasing adherence (Apocdaca & Longabaugh, 2009).

Another important factor that facilitates good therapeutic outcomes is therapist interpersonal skills (Moyers et al., 2005). If a therapist has good interpersonal skills, a patient is more likely to adhere to treatment as well as to be more involved in therapy. The term, interpersonal skills, has been broken down into five components: acceptance, egalitarianism, empathy, warmth, and spirit. Client involvement involved better collaboration, adherence, engagement in therapy, and expression of affect (Moyers et al., 2005). Therapists using MI and MI techniques, must realize the importance of utilizing elements (e.g. empathy and warmth) in order to get the best from the patient/client.

History of MI

The inception of MI began in 1983 when William Miller wrote an article about a brief intervention for those who battled with alcohol issues (Miller, 1983). Later, Miller paired with Stephen Rollnick to formulate the specifics of MI, including its concepts and approaches (Miller & Rollnick, 1995). Therefore, MI as it is known today did not really take shape until the mid-nineties.
Despite its recent inception, MI is rooted in even earlier theoretical models. These models include client-centered psychotherapy and humanistic psychology, as well as the social-psychology theories known as self-perception theory and reactance theory (Moyers, 2004). The impact of client-centered psychotherapy is evident in that MI is not a series of techniques, but instead is a process-oriented approach focusing on collaboration, acceptance, and empathy. Also, client-centered therapy utilized empiricism in order to foster the continual progression of the therapeutic process. MI also uses empirical exploration to guide its practice (Moyers, 2004).

Finally, the use of social psychology is important to how therapy is provided to patients. MI utilizes self-reflective statements, reframing, and summarizations in order to increase empathy and create a therapeutic alliance so as to reduce client resistance and reactance. Reactance theory suggests that individuals will emotionally react when they think that their freedom/choice is being endangered (Brehm & Brehm, 1981). MI is a therapeutic modality that aims not to endanger a patient’s choice but only to discuss a problem behavior once a patient is believed ready to change.

Transtheoretical therapy is a treatment modality that establishes readiness to change through a series of stages and is often associated with MI (Prochaska & Di Clemente, 1983). The transtheoretical model was proposed by James Prochaska and Carlo Di Clemente in 1982 in order treat problem behaviors through a more integrative change approach. Originally, the transtheoretical model was built on four stages: precontemplation, contemplation, action, and maintenance. However, by 1992, the stages of change included five distinct stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska, Di Clemente, & Norcross, 1992). The
precontemplation stage is when an individual sees no impetus to change his or her behavior. The contemplation stage is when an individual begins to think about changing a problem behavior. The preparation stage is when an individual is preparing to change and therefore determined to actively modify his or her behavior. The action stage is when an individual actively modifies his or her behavior. The maintenance stage is when an individual employs coping mechanisms that reduce the likelihood for relapse (Prochaska & DiClemente, 1982; Prochaska et al., 1992).

One of the basic tenets of the transtheoretical model is that an individual does not cycle through each stage in a succinct, orderly fashion. Instead, an individual can move from the maintenance stage to a state of relapse, or regress to the contemplation stage from a higher level stage, such as action or maintenance (Prochaska & DiClemente, 1982). Another basic tenet is that an individual must be in the contemplation stage, at least, in order to be ready for change. Therefore, readiness to change is an important determinant for whether or not therapy will be effective. Thus verifying one’s stage of change can be an important precursor to therapy. A person who is in the precontemplation stage is not ready for change and will likely be resistant to change and unwilling to adhere to a therapeutic intervention (Prochaska & DiClemente, 1982; Prochaska & DiClemente, 1992).

It eventually became apparent that Prochaska and Di Clemente’s stages of change was eventually considered insufficient in describing the full progression of change, so Arthur Freeman and Michael Dolan sought to develop a more comprehensive examination of change. In 2001, the stages of change was revised to include a total of 10 stages: noncontemplation, anticontemplation, precontemplation, contemplation, action
planning, action, prelapse, lapse, relapse, and maintenance (Freeman & Dolan, 2001). Noncontemplation is when an individual is not considering changing a problem behavior. Anticontemplation is when an individual is averse to changing a problem behavior and is often adamant about opposition to change. Precontemplation is when a person begins to think about changing and might wish to change, which is different from contemplation because the person is not actively thinking about how to change or is ready to change. Therefore, precontemplation was split into specific variants of non-change-related thought. An individual is not willing to change when noncontemplative, anticontemplative, or precontemplative and therefore is resistant to any intervention at this juncture (Freeman & Dolan, 2001).

Another modification of the Prochaska, Di Clemente, and Norcross (1992) stages of change was the rewording of preparation to action planning. Freeman and Dolan (2001) described action planning as collaboration between the patient and therapist to decide the plan of action (treatment plan). Action planning is a stage marked as goal oriented and collaborative in which preparation is more about being determined to change than about planning to change. Therefore, action planning seems like a more focused and organized way of changing (Freeman & Dolan, 2001).

The final modification was the addition of prelapse, lapse, and relapse to the stages of change. Prelapse is characterized by excessive rumination about reversing the course of action and engaging in the problem behavior once more. Lapse is when an individual begins to decrease, stop, or reconfigure actions that are expected to help change a problem behavior. Basically, patients do not want to engage in actions that
support change. Patients eventually engage in the problem behavior once again (e.g., begin smoking), and this stage is called relapse (Freeman & Dolan, 2001).

Overall, the stages of change act as a patient “change thermometer” by which a therapist can understand a person’s readiness to change in order to determine how to proceed with therapy. The transtheoretical model has been used in conjunction with MI because MI does not force people to change when they are unwilling to change, so the stages of change helps determine when to simply “roll with the resistance” (Miller & Rollnick, 2002).

**Motivational Interviewing and Adherence**

The foundation of MI is rooted in person-centered approaches and theories that examine patient ambivalence and reasons for nonadherence (Miller & Rollnick, 2002). Owing to the impact of MI on ambivalence resolution as well as increasing change talk, MI has shown to be effective in increasing adherence to medical treatment (Brodie & Inoue, 2005). However, some studies question the internal content validity of MI on improving treatment adherence in medical settings because of a lack of randomized control trials (Knight, McGowan, Dickens, & Bundy, 2006). Nevertheless, MI did display face validity. Also, a logistical basis exists for the use of MI because it is brief, easily transferable to medical settings, person-centered, and generalizable. This study suggested that more randomized control trials needed to be performed in order to examine whether treatment adherence can be improved in medical settings by using MI.

Consequently, more recent research has indicated that MI is an effective and valid intervention for treatment adherence in medical settings (Kreman et al., 2006; Martins & McNeil, 2009). One such study suggested that brief MI (30-to-45 minute phone session)
not only helped increase adherence to health-related behaviors, but also the likelihood that patients made their recommended lifestyles changes (Kreman et al., 2006). Furthermore, physiological outcomes were better for those who adhered to treatment recommendations. These physiological outcomes included better low-density lipid scores and high-density lipid scores, as well as an increase in maximal oxygen intake. These outcomes were conducive to better cardiovascular health (Kreman et al., 2006).

A meta-analysis examined if MI can increase adherence to health behaviors such as exercising, dieting, smoking cessation, and reduced alcohol consumption (Martins & McNeil, 2009). Twenty-four of the studies examined in the meta-analysis suggested that MI was effective in increasing an individual’s willingness and readiness to engage in dietary and/or exercise regimens. The meta-analysis also suggested that MI can improve adherence to diabetic regimens. By improving adherence, patients displayed more physical activity, reduced body mass index, and lead to better glucose control (Martins & McNeil, 2009).

The research just described indicated that MI can facilitate adherence and improve not only health behaviors but also health outcomes. However, what constructs are modified by MI in order to facilitate change and, therefore, better adherence? Rubak, Sandbaek, Lauritzen, Borch-Johnsen, and Christensen (2009) examined the factors that facilitate behavioral change in patients with type 2 diabetes who were receiving MI. MI was shown to improve three primary factors: patients’ understanding of their diabetes, treatment beliefs, and contemplation and motivation to change. MI uses psychoeducation and collaborative discussion in order to facilitate patient efficacy and help educate patients about not only their medical disorder, but also treatment regimens. It is clear that
MI facilitates better in-session collaboration and fosters patient education about his or her disease management (Rubak et al., 2009).

Much of the research discussed so far has involved the examination of the effect of MI on adherence to regimens for chronic and manageable diseases (type 2 diabetes and hypertension). In most cases, diseases like hypertension and type 2 diabetes affect those who are in middle to late adulthood. However, MI can be effective in treating adherence for younger individuals. Richards, Kattelmann, and Ren (2006) examined if MI coupled with a computer-based intervention could increase adherence to a dietary regimen among young adults. The MI-based intervention increased fruit and vegetable consumption in young adults who ranged in age from 18-24 years (Richards et al., 2006).

**Appointment Keeping and MI**

Previous research examined if MI only improved certain prescribed behaviors/lifestyle changes and not necessarily appointment keeping specifically. Nevertheless, MI has shown to improve appointment-keeping adherence (Naar-King et al., 2009).

One study showed that retention and appointment keeping were improved in patients with HIV when practitioners used MI (Naar-King et al., 2009). Naar-King et al. (2009) examined if MI strategies could help increase appointment keeping in primary-care settings by using MI strategies with young patients with HIV. The results indicated that MI clearly reduced gaps (3 months without attending an appointment) in keeping appointments for young patients with HIV (Naar-King et al. 2009).
Rationale for Brief MI Interventions

Most of the research discussed so far examined the effect of multiple sessions of MI on adherence. However, can MI be used as a short-term therapeutic intervention? A plethora of studies display that brief MI interventions can be just as effective as other interventions, including long-term therapy, according to a recent meta-analysis (Dunn, Derro, & Rivara, 2001). Of the 15 studies using brief MI interventions, 11 displayed significant effect sizes comparable to MI interventions of typical length that have shown to be effective in the past (Dunn et al., 2001). However, many of the brief interventions used in the examined studies lasted a few hours, not a few minutes. Although this research provides hope that MI can be reduced into a brief intervention, it does not provide enough evidence that MI can be broken down into a small message or even a 5-minute long technique capable of instilling change.

Despite the lack of evidence for a brief 5-minute MI intervention, Rollnick, Heathe, and Bell (1993) suggested that brief interventions would be useful in healthcare settings. Rollnick et al. (1993) proposed a brief MI intervention that would last between 5-15 minutes and would be used for health consultations in hospital and primary-care settings. The aim of these brief interventions would be to decrease maladaptive health behaviors (e.g. smoking) and increase adherence to lifestyle changes recommended by one’s physician. In order for the intervention to be brief yet individualized, Rollnick et al. (1993) proposed using a menu of strategies. The menu consisted of the following strategies: opening strategy: lifestyle changes, stresses, and substance use, opening strategy: health and substance use, a typical day/session, the good things and less good
things, providing information, the future and the present, exploring concerns, and helping with decision making.

The “opening strategy: lifestyle changes, stresses, and substance use” is slightly different from the “opening strategy: health and substance use.” The “opening strategy: lifestyle changes, stresses, and substance use” begins with a brief discussion about one’s current lifestyle and stressors in order to build rapport and then move towards open-ended questions about substance abuse. The “opening strategy: health and substance use” simply utilizes open-ended questions to discuss substance abuse. The “typical day” and “good things and less good things” strategies both aim to use less negatively charged words, such as problem or concern. However, the “typical day” strategy basically asks a patient to describe what happens during a normal day. The “good things and less good things” strategy engages an individual in a brief open discussion about the pros and cons of a problem behavior. The “providing information” strategy involves educating the patient about his or her disease or related issues in a nonconfrontational way. “The future and the present” strategy is used only when the patient already has concerns about his or her behavior, and it also examines how one’s ideal self might look. The “exploring concerns” strategy is about exploring all concerns before and after changing a problem behavior. Finally, the “helping with decision making” strategy examines how an individual will deal with his or her ambivalence about changing a problem behavior (Rollnick et al., 1993). Although evidence is lacking for the efficacy of 5-to-15-minute interventions, this menu of techniques provides a basis for configuring MI into a brief intervention capable of use for a telephone consultation or letter format.
Despite the lack of evidence, Kreman et al. (2006) suggested that a brief MI phone intervention is more “reality based” than long-term therapy. The thought is that brief MI interventions are much more palatable than long-term therapy in medical settings because various staff members can be trained in MI in order to administer MI-based phone reminders (Kreman et al., 2006).

**Brief MI Interventions**

Recent research has begun to apply brief MI techniques to treatment adherence in medical settings (Cummings et al., 2009). This study examined 15 studies using brief MI interventions. Of those 15 studies, 13 displayed significant results. These significant results suggest that MI was considered to be effective in increasing adherence to prescribed behaviors (Cummings et al., 2009). These prescribed behaviors included dieting, losing weight, increasing exercise, decreasing sodium intake, monitoring glucose levels, and reducing cigarette smoking. Furthermore, most of the studies employed brief MI interventions. These brief interventions involved contacting patients by phone and using MI interventions lasting anywhere from 18-45 minutes in duration. This meta-analysis provides support that brief MI interventions can facilitate therapeutic change.

**Phone Interventions using MI**

Recently, phone interventions have become increasingly popular in treating adherence behavior (Simon, Ludman, Tutty, Operskalski, & Von Korff, 2004). Simon et al. (2004) incorporated both CBT and MI techniques within their telephone-based psychotherapy model. Simon et al. (2004) suggested that telephone outreach addresses some of the substantial issues inherent in face-to-face therapy. Telephone outreach allows therapists to address patient issues without having to face potential barriers of typical in-
session treatment, such as travel, wait time, and cost of therapy. Session flexibility is also a major strength of phone interventions because a therapist or counselor can try to contact a patient on multiple occasions within a short time frame. For example, a patient might be contacted three times on the same day before he or she answers and engages in a therapy session or intervention. Such barriers as travel, schedule flexibility, and cost are often extremely common in urban and low SES environments, thereby, supporting phone interventions over face-to-face therapy in these environments (Simon et al., 2004).

Further supporting the use of phone interventions/therapy is that phone interventions have been just as effective as face-to-face therapy in treating patients (Simon et al., 2004). Subjects receiving telephone psychotherapy displayed better depression scores on a self-report measure than did those receiving usual care (therapy and medication in primary-care settings). Also, subjects were more likely to describe themselves as “much improved” or “very much improved” on that same self-report measure compared to those receiving usual care (Simon et al., 2004).

Tutty, Simon, and Ludman (2000) also displayed the effectiveness and impact of telephone therapy versus usual outpatient care on increasing adherence to psychotropic medications. Patients with depression who received a phone-based intervention were more likely to adhere to medication guidelines, displayed significantly lower depressive symptoms, and were less likely to meet diagnostic criteria for depression than were patients who received usual outpatient care. Overall, phone-based interventions appear to be effective in treating adherence-related issues (Simon et al. 2004; Tutty et al., 2000).

Kolt et al. (2006) also examined whether brief phone interventions could be effective in improving treatment adherence. Kolt et al. (2006) used a brief phone
intervention to increase physical activity in older adults. The brief phone interventions utilized both MI and CBT strategies to foster adherence to physical activity recommendations made by the primary-care physician. Typically, the phone calls lasted between 10 and 15 minutes and used preordained scripts to simply guide the conversation and not as a strict protocol. By using the script only as a guideline, the counseling sessions were more collaborative, idiographic, and conversational. The results indicated that brief phone counseling was an important component in improving motivation to engage in physical activity for older adults. Overall, this study provides support for brief phone interventions using MI to increase motivation and improve treatment adherence.

**Brief Phone Interventions**

Many of the phone interventions previously discussed involved multiple sessions, long-duration therapy, or a combination of MI plus another therapeutic modality, such as CBT (Simon et al., 2004; Tutty et al., 2000). However, short-duration phone interventions using MI-specific interventions have also been effective in treating adherence issues (Kolt et al., 2006; Lerman et al., 1992). Lerman et al. (1992) used a one-session, MI-inspired phone counseling intervention to increase adherence to colposcopy for patients suspected of having cervical intraepithelial neoplasia, a premalignant growth on the cervix. The 15-minute phone counseling intervention did increase adherence to a colposcopy (cervical diagnostic screening) procedure recommended by the patients’ physician (Lerman et al., 1992).

**Decisional Balance Technique**

Within many of the MI strategies discussed, problem-solving techniques are often employed to improve a patient’s decision-making capability (Gonzalez et al., 2010;
Miller & Rollnick, 2002). As stated earlier, a decisional balance technique is one such problem-solving technique that is used within the MI framework (Apocdaca & Longabaugh, 2009; Miller & Rollnick, 2002).

The aim of a decisional balance technique is for a patient and therapist to have an open discussion about the potential costs and benefits of a behavior in order to highlight and examine a patient’s ambivalence towards a problem behavior (e.g. poor appointment show rate; Passamore, 2011). By creating insight into the patient’s problem behavior, the decisional balance technique typically inspires greater confidence and increases motivation towards changing a target behavior. The decisional balance technique is also useful because it can be employed within other therapeutic models. Overall, the decisional balance technique is an excellent intervention because it is a quick and easy way to examine patient ambivalence, confidence, and motivation (Passamore, 2011).

How effective are decisional balance techniques in promoting therapeutic change? One study examined various factors that may or may not contribute to therapeutic change (Apocdaca & Longabaugh, 2009). One of the factors examined was specific techniques that were most associated with positive outcomes. This meta-analysis displayed that of all the therapist-specific techniques used, decisional balance techniques displayed the best outcomes, with effect sizes that ranged from medium to large. This study indicates that decisional balance techniques appear to be the most useful intervention for improving adherence-related behaviors (Apocdaca & Longabough, 2009).

Also, scaling methods can be used in conjunction with a decisional balance. Scaling methods can help assess a patient’s confidence and motivation in changing a problem behavior (Botelho, 2004). For example, in clinical practice, a scale, such as
“How motivated are you to make these changes on a scale of 0 through 10 where 0 indicates no motivation and 10 indicates being extremely motivated,” can be used. This type of scaling is common in both the MI and CBT modalities and helps to operationalize abstract and implicit concepts, such as mood, motivation, confidence, and likelihood to change (Botelho, 2004; Leahy, 2003).

Using Brief Interventions to Improve Appointment-Keeping Adherence

At this juncture, little to no research suggests that appointment-keeping adherence can be improved by a brief MI-based intervention/reminder. However, a plethora of research suggests that MI can be effective in treating adherence to medical recommendations (see Cummings et al., 2009; Dunn et al., 2001; Martin & McNeil, 2009; Safren et al., 2009). Further research suggests that brief MI-based and brief hybrid (CBT and MI) phone interventions can be effective in improving treatment adherence (see Kolt et al., 2006; Simon et al., 2004; Tutty et al., 2000). However, only Lerman et al. (1992) used a brief, 15-minute MI-based phone intervention to improve colonoscopy adherence. Also, Naar-King et al. (2009) displayed that MI strategies can improve appointment-keeping adherence in patients with HIV. Therefore, much of the research reinforces the use of brief MI-based interventions as treatment for poor adherence.

MI Letter Reminders

MI has also been utilized within a tailored print format in the past. In fact, van Keulen et al. (2011) displayed that tailored print communications (i.e., pamphlets and letters) were as equally effective as an MI-based phone intervention in improving treatment nonadherence. Specifically, MI-based tailored print communication, MI-based phone counseling, and combined interventions (both phone and print) were equally
effective in improving physical activity level and fruit/vegetable intake in patients. The interventions reported similar effect sizes ranging between .15 and .19.

Sohl and Moyer (2007) displayed that other studies utilized tailored MI interventions, including letters, to treat nonadherence to screening measures, appointments, and health behaviors. However, many of these letters were part of protocols that involved phone intervention/counselling and face-to-face therapy as well (Sohl and Moyer, 2007). Therefore, determining the effectiveness of the letter was difficult.

**Summary**

Nonadherence is a common problem. On average, 50% of all medical patients are nonadherent in some fashion to treatment recommendations (World Health Organization, 2003). In regards to appointment-keeping adherence specifically, only 58% of all appointments are kept (Macharia et al., 1992). At this juncture, treatment nonadherence is costing not only the healthcare industry billions of dollars each year in the United States, but also is fostering medical complications, including disability, comorbid illness, and even death (Grahl, 1994; Irvine et al., 1999; Schectman et al., 2008). A variety of correlates impact adherence. These correlates include the patient-physician relationship, health beliefs, perceptions, attitudes, lack of resources, patient dynamics, and course of illness. However, because of these numerous correlates that may be potentially responsible for a patient’s nonadherence, the intervention used must be tailored in some fashion to the patient by allowing the patient to raise his or her specific concerns. MI is one such therapy that is person centered and is considered an effective treatment for nonadherence (Brodie & Inoue, 2005). Another intervention that has shown to improve
adherence and appointment keeping specifically are phone reminders (Macharia et al., 1992). However, letter reminders are considered at least as equally effective as phone reminders in improving show rate (Rosser et al., 1991). Because MI has been used to format a letter in the past, of letter and phone reminders are equally effective, and the overall effectiveness of MI and reminders has been in treating nonadherence, the primary intervention used in this study will be an MI-formatted letter reminder.
Chapter 2: Hypotheses and Research Question

This study explores whether adding elements of MI to an already established intervention, letter reminders, is better than basic letter reminders and phone reminders in increasing appointment-keeping adherence in primary-care settings. Phone reminders are considered a popular and effective way to increase appointment-keeping (Macharia et al., 1992). In comparison to phone reminders, letter reminders are considered an equally effective reminder delivery system (Rosser et al., 1991). However, Festinger et al. (2002) has suggested that adherence is still an issue despite the use of reminders. Therefore, tailoring the letter reminder could create better appointment-keeping adherence at a university-based primary-care office. In fact, tailored letter reminders involving a specific health behavior/behavioral change model (transtheoretical, MI, health belief) to format the letter were seen as effective in improving adherence (Sohl & Moyer, 2007). Based on the observed effectiveness of MI in improving adherence (Kreman et al., 2006), MI was chosen as the format of a letter reminder. Also, MI was used in a letter reminder format instead of a phone reminder protocol because of past issues in implementing an MI-based phone reminder.

Hypothesis 1

Therefore, it is hypothesized that those receiving an MI-formatted letter reminder will display significantly better appointment-keeping adherence rates in a primary-care setting compared to those receiving just generic letter reminders (non-MI), phone reminders, and no reminders.
Hypothesis 2

It is also hypothesized that those receiving a phone reminder will be equal in show rate to those receiving non-MI-based letter reminders, but will display better appointment-keeping adherence rates in a primary-care setting compared to those receiving no reminder.

Hypothesis 3

It is hypothesized that gender will not be a significant correlate of appointment-keeping adherence.

Hypothesis 4

It is hypothesized that age will be a significant correlate of appointment-keeping adherence.
Chapter 3: Methods

Overview

Treatment adherence is a prominent issue in medical settings, especially in primary-care settings (World Health Organization, 2003). Specifically, poor adherence can negatively impact treatment outcomes in medical settings, such as fostering an increase in glucose levels (Schectman et al., 2008), among a variety of other medical problems. In order to examine treatment adherence, appointment keeping was examined because it supersedes all other types of adherence based on the typical sequence of health-related behaviors. In other words, a person must attend an appointment before he or she can receive any other medical attention or treatment, such as medication.

Various reasons or variables affect whether or not a patient attends an appointment. These variables include patient, physician, financial, medical, setting, regimen, and patient/physician relationship variables. In order to enhance appointment-keeping adherence, reminders are typically used to notify patients that an appointment is imminent, but reminders do not treat or address variables other than forgetting the appointment (Macharia et al., 1992). One therapeutic approach that has been effective in improving treatment adherence is MI (Miller & Rollnick, 2002). MI examines such variables as health beliefs and physician/patient relationship that impact treatment adherence (Miller & Rollnick, 2002). Therefore, this study aimed to couple techniques germane to MI with reminders to increase appointment-keeping adherence in a primary-care setting. The MI-formatted reminder was expected to improve appointment adherence better than non-tailored reminders (phone and letter) and no reminder.
Design and Design Justification

The design of the study is an archival, cross-sectional, between-groups, posttest-only control group design (Shadish, Cook, & Campbell, 2002). The study consisted of four groups of patients seen at a primary-care center: a no reminder group, a phone reminder group, a non-MI-formatted letter reminder group and a letter reminder written in an individualized MI-based format group. These patients had been part of an initiative and office protocol instituted by the Chairman and Director of Family Medicine at the Philadelphia College of Osteopathic Medicine in consultation with the Psychology Department Chair to determine methods that might be useful in enhancing appointment-keeping. As part of this initiative, designated office staff gave no reminder, a phone reminder, a non-MI-formatted letter reminder, or an MI-formatted letter reminder.

The use of this design offered many advantages in this archival study. One primary factor was that this design works well when one is comparing a novel or innovative treatment against a treatment that is considered robust or is the “gold standard.” Such was the case in this study because reminders are typically considered the primary intervention for increasing appointment-keeping nonadherence (Macharia et al., 1992). The pretest-only design was unavailable and in many ways unnecessary. Pretests often are used to mitigate for attrition, but attrition is unlikely since the study involves only reminders. Based on the design, the patients were exposed to an office-based message. The low likelihood for attrition explains why posttests designs are typically used in medical settings when only medical records are necessary to examine the outcome, which was the case in this study, when all that was necessary to was to examine if the patient showed for his or her appointment or not (Shadish et al., 2002).
The MI-format that was chosen for letter and phone intervention was based on feedback from local MI experts. Michael Dolan, Psy.D., James Jackson, Psy.D., and Scott Glassman, Psy.D., were involved in determining the feasibility and MI formatting of the letter and phone intervention prior to its implementation.

**Participants**

The study consisted of 194 patients who had attended a university-based outpatient practice from February through December of 2013. Originally, it was planned to obtain approximately 200 patients across three groups in order to field the necessary number of subjects required to achieve a medium effect size where the power = .9 and \( p = .05 \). The effect size was chosen because research using MI to treat adherence issues often involved medium effect sizes; however the effect sizes ranged from .2 (weak) to .7 (strong) (Dunn et al., 2001; Martins & McNeil, 2009). However, because of protocol changes, poor feasibility in regards to the original protocol, and time constraints, the groups had to be extended to four, and the protocol was stopped in December. The final tabulations were as follows: no reminder group (\( n = 183 \)), phone reminder group (\( n = 73 \)), non-MI letter reminder group (\( n = 48 \)), and MI-formatted letter (\( n = 46 \)). Fifty patients were randomly selected from the no reminder and phone reminder groups to have equality in group numbers. The participants were originally selected from a list of those who were scheduled to have an appointment at the outpatient practice.

The patients ranged in age from 18 – 81 years. Of the total group, 79 (40.7%) patients were male, and 115 (59.3%) were female. In terms of race/ethnicity, 137 patients (70.6%) were African American, 32 patients (16.5%) were Caucasian, three patients (1.5%) were Asian, two (1%) patients were Arabic, and one patient (0.5%) was Hispanic.
The remaining 19 (9.8%) patients were congregated into an unknown category, as their electronic medical records labeled them as either unknown or other.

**Inclusion Criteria**

- The patient was between the ages of 18-85 years.
- The patient had either a working cell phone or house phone.
- The patient had a valid address.
- The patient was on the patient appointment list provided for that month.
- The patient was scheduled for a follow-up appointment.

**Exclusion Criteria**

- The appointment scheduled for the patient was the initial intake appointment/new patient.
- The patient was deaf or hard of hearing.
- Problems with the phone connection occurred during the phone conversation.
- The phone number was no longer in service or temporarily disconnected.
- The patient did not answer the phone for the phone intervention.
- The staff left a voicemail message.
- The patient did not answer the phone by the third attempt for contact.
- The patient was not on the appointment list.
- The letter could not be sent back.
- The patient cancelled or rescheduled his or her appointment.
Procedure

As part of the in-office protocol established by the director of the center, the remaining eligible patients were randomly assigned to one of the groups using a random number generator. Each group consisted of patients from a university primary-care practice. Patients were given a reminder 4 days prior to the appointment scheduled for the patient for those in the phone and no reminder groups. Patients in the letter reminder groups were randomly assigned 8-10 days prior to their scheduled appointment, and the letters were sent 7 days prior to their appointment. Designated office staff assigned the patients to a no reminder, phone reminder, a letter reminder, or MI-based letter reminder group. For those assigned to the phone reminder group, the office staff simply told the patient the following message: “Hi, am I speaking to ________ (patient’s name)? This is the Philadelphia College of Osteopathic Medicine Family Medicine Office calling to remind you that you have an appointment scheduled with _________ (physician’s name) for ________(day and date of the appointment) at _____ (time the appointment is scheduled).”

If the patient did not answer the phone, the office staff left the following message: “This is the Philadelphia College of Osteopathic Medicine Family Medicine Office calling for ________ (patient’s name). We are calling because you have an appointment scheduled with _________ (physician’s name) for ______ (day and date of the appointment) at _______ (time the appointment is scheduled).”

Those assigned to the non-MI letter reminder group were sent the following letter a week in advance of their appointment: “Dear Ms./Mr.______, Just a friendly reminder that you are scheduled to see Dr. ________ at the Philadelphia College of Osteopathic
Medicine Family Medicine Office on _______ at _______ a.m./p.m. Please contact the Family Medicine Office at 215-871-6380 if you have any questions or cannot make your appointment. Thank you so much for your time and we hope to see you at your appointment. Sincerely, __________, D.O.”

Those assigned to the MI-formatted letter reminder group, they were sent the following letter a week in advance: “Dear Ms./Mr. _____, Just a friendly reminder that you are scheduled to see me, Dr. _______ , on _______ at _______ a.m./p.m. As you know I am happy to work with you as your primary care physician. Your health is very important to me and I encourage you to bring your most important concerns so that we can address them during this visit. I understand just how difficult it is at times to get in for an appointment. Please consider what may prevent you from keeping our visit as well as all of the benefits that may occur as a result of our working together as a team in keeping yourself healthy. If you are able to make your appointment, I am very much looking forward to helping you. If you cannot make it, please call the office at 215-871-6380 to reschedule. Thank you so much for taking the time to read this letter and please let us know how I can best serve you because I care about your input. Sincerely, ______, D.O.”

Following the conversation or letter, the office staff documented that a reminder was sent and in the case of the phone reminder whether the patient confirmed. The results were then pulled and analyzed by this study after the protocol was finished.

**Measures**

For this study, the primary-care office database was used to examine whether or not patients kept their following appointment and to determine the gender and age of the
patient. Attendance was coded as 1 (showed) or 2 (did not show). Gender was coded as 1 (male) and 2 (female). Reminder groups were coded as follows: no reminder (1), phone reminder (2), non-MI letter reminder (3), and MI-formatted letter reminder (4).

Recruitment

The patients were obtained from the list of patients scheduled to attend a follow-up appointment at the primary-care office during the months of February 2013 through December 2013.
Chapter 4: Results

Introduction

For this archival study, I examined whether different levels of treatment (independent variable) had a significant effect on rates of appointment-keeping adherence (dependent variable) in a primary-care setting. The four levels of a categorical independent variable (treatment) were no reminder (control), phone reminders, a non-MI letter reminder, and an MI-based letter reminder. It was hypothesized that letter reminders written in an MI format would improve rates of appointment-keeping adherence relative to just phone reminders and non-MI-based letter reminders. It was also hypothesized that phone reminders would improve rates of appointment-keeping adherence better than no reminders. Additionally, it was hypothesized that non-MI letter reminders would improve rates of appointment-keeping adherence better than no reminder, but equal to phone reminders. More specifically, letter reminders plus MI > phone reminders = non-MI letter reminders > no treatment. Therefore, the statistical analysis chosen was a 2 x 4 chi square test for independence, because this analysis would best examine the differences in appointment-keeping adherence rates across the four groups for categorical variables. However, further analysis of the data employed a 2 x 3 chi square to examine the differences among no reminders, basic reminders (phone and non-MI letter combined), and MI-formatted letters and 2 x 2 analyses to examine all reminders versus no reminders and MI-formatted letter reminders and no reminders.

A correlational analysis was also utilized to assess whether gender and/or age were significant correlates with appointment-keeping adherence. Age and gender were chosen based on the literature that these variables could impact adherence rates. Finally, a
logistic regression analysis was conducted to predict group membership (attended versus not attended appointment) from demographic variables and the message variable.

**Chi Square**

According to the initial chi square for independence, the results were not considered statistically significant \((p = .239)\). Therefore, the null hypothesis was not rejected, which states that all four groups (no reminder, phone reminder, non-MI letter reminder, and MI-based letter reminder) are equal. Based on the results, the show rate was as follows: 66% (no reminder), 82% (phone reminder), 75% (non-MI letter reminder), and 80.4% (MI-formatted letter reminder). Cramer’s phi for this analysis was reported as .147, which indicates a weak relationship between the variables. While these values differ on visual inspection, the differences between the groups did not reach significance. Therefore, one cannot reject the null hypothesis, which indicates that the groups are equal and there is no significant difference in show rate based on reminder type (See Table 1).

<table>
<thead>
<tr>
<th>Adherence</th>
<th>NR</th>
<th>PR</th>
<th>BLR</th>
<th>MILR</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Showed</td>
<td>17 (34%)</td>
<td>9 (18%)</td>
<td>12 (25%)</td>
<td>9 (19.6%)</td>
</tr>
<tr>
<td>Showed</td>
<td>33 (66%)</td>
<td>41 (82%)</td>
<td>36 (75%)</td>
<td>37 (80.4%)</td>
</tr>
</tbody>
</table>

*Note.* NR = no reminder; PR = phone reminder; BLR = basic letter reminder; MILR = motivational interviewing letter reminder.
However, when examining the results using three groups (no reminder, phone and non-MI reminder combined, and MI-formatted letter reminder), the MI-based letter reminder group attended their appointments at a higher rate than both the combined phone and non-MI letter reminder group and the no reminder group. Based on the results, 80.4% of those who received an MI-based letter reminder, 78.6% of those who received phone and non-MI letter reminder (combined), and 66% of those who received no reminder attended their appointments. Although the difference is slight when examining the MI-based reminder versus the combined reminder group (2%), there is a 14% difference between the MI-based reminder group and the no reminder group. The results however were still not significant according to Pearson’s chi square, but approached significance in comparison to the chi square examining four distinct groups ($p = .168$). Cramer’s phi for this analysis was reported as .136, which indicates that there is a weak relationship between the variables. In conclusion, one cannot reject the null hypothesis, which indicates that the groups are equal and there is no significant difference in show rate based on reminder type.

Table 2

*Chi Square between MI-formatted Letter and No Reminder Groups*

<table>
<thead>
<tr>
<th>Adherence</th>
<th>NR</th>
<th>CR</th>
<th>MILR</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Showed</td>
<td>17 (34%)</td>
<td>33 (21.4%)</td>
<td>9 (19.6%)</td>
</tr>
<tr>
<td>Showed</td>
<td>33 (66%)</td>
<td>77 (78.6%)</td>
<td>37 (80.4%)</td>
</tr>
</tbody>
</table>
Note. NR = no reminder; CR = combined reminder (phone reminder and basic letter reminder); MILR = motivational interviewing letter reminder.

When comparing the reminder groups (phone, basic letter, and MI-formatted letter) and the no reminder, the chi square is further approaching significance ($p = .061$). However, it was expected that adherence would improve when using a reminder and therefore used Fisher’s exact test since it is a one tailed test. Fishers exact test (one-sided) is often used when comparing 2 x 2 contingency tables. The chi square is significant according to Fisher’s Exact Test (one-sided) ($p = .049$). The show rates for the two groups are as follows: the no reminder group = 66%, and the all reminder group (phone, basic letter, and MI-formatted letter) = 79.1%. Cramer’s phi for this analysis was reported as .134, which indicates a weak relationship between the variables. Because the results are significant, the null hypothesis can be rejected. In conclusion, receiving a reminder likely impacts appointment-keeping adherence.

Table 3

*Chi Square between the All Reminder (MI Letter, No MI Letter, and Phone) and No Reminder Groups*

<table>
<thead>
<tr>
<th>Adherence</th>
<th>NR</th>
<th>AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Showed</td>
<td>17 (34%)</td>
<td>30 (20.9%)</td>
</tr>
<tr>
<td>Showed</td>
<td>33 (66%)</td>
<td>114 (79.1%)</td>
</tr>
</tbody>
</table>

Note. NR = no reminder, AR = all reminder (phone reminder, non-MI letter reminder, MI-formatted letter).
A final chi square was completed to examine the difference between the no reminder group and MI-formatted letter group. The results also were not significant according to Pearson’s test for significance ($p = .112$). However, Fisher’s exact test is approaching significance ($p = .086$). Cramer’s phi for this analysis was reported as .162, which indicates a weak relationship between the variables. Nevertheless, the null hypothesis cannot be rejected, which suggests that there is no significant difference between the groups in regards to show rate.

Table 4

<table>
<thead>
<tr>
<th>Adherence</th>
<th>NR</th>
<th>MILR</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Showed</td>
<td>17 (34%)</td>
<td>9 (19.6%)</td>
</tr>
<tr>
<td>Showed</td>
<td>33 (66%)</td>
<td>37 (80.4%)</td>
</tr>
</tbody>
</table>

*Note. NR = no reminder, MILR = MI letter reminder*

**Correlation**

Correlational analysis demonstrated gender ($r = .046, p = .528$) is not significantly associated with show rate, but age ($r = .221, p = .002$) is. Specifically, age is positively correlated with attendance. This relationship is considered weak ($r = .221$). The coefficient of determination for age ($R^2$) is .048, which indicates that 4.8% of variance observed for show rate is attributable to age.
Table 5

*Correlations, Means, and Standard Deviations between Attendance, Gender and Age*

<table>
<thead>
<tr>
<th>Measure</th>
<th>R</th>
<th>(R^2)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>.05</td>
<td>.025</td>
<td>1.76</td>
<td>.43</td>
</tr>
<tr>
<td>Gender</td>
<td>.05</td>
<td>.025</td>
<td>1.59</td>
<td>.49</td>
</tr>
<tr>
<td>Age</td>
<td>.22**</td>
<td>.048</td>
<td>50.50</td>
<td>14.29</td>
</tr>
</tbody>
</table>

\*\(p < .01\).

**Logistic Regression**

When analyzing age using a logistic regression, age is a statistically significant predictor of attendance (Exp (B) = .1038, \(p = .003\), CI (95%) = 1.013 – 1.063). Since the odds ratio (Exp. (B) = 1.038) is greater than 1, the probability is higher. Therefore, the older a patient, the more likely that patient will attend an upcoming appointment than will a younger patient. Specifically, for every additional year of age, there is a 3.8% greater chance that the patient will attend his or her upcoming appointment.

Table 6

*Logistic Regression Predicting the Probability of Attendance Based on Age*

<table>
<thead>
<tr>
<th>Probability</th>
<th>B</th>
<th>SE</th>
<th>Exp(B)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.037</td>
<td>.012</td>
<td>1.038</td>
<td>.003</td>
</tr>
</tbody>
</table>

*Note. B = beta; SE = Standard Error; Exp (B) = odds ratio*
Chapter 5: Discussion

Based on the impact of MI on adherence and the use of tailored letter reminders in the past, it was expected that subjects receiving MI-based letter reminders would keep their appointments at a higher rate than those who received phone reminders, non-MI-based letter reminders, or no reminders. Those who received only a phone reminder or non-MI-based letter reminder were predicted to attend their next scheduled appointment at a rate equal to each other, but at a higher rate than the no reminder group. The appointment-keeping rates of all four groups were expected to mirror already established rates.

Typical show rates were expected to be in the 50-60% range (Macharia et al., 1992). When using a phone reminder, appointment-keeping adherence was expected to be in the 70-80% range (Festinger et al., 2002; Hixon, Chapman, & Nuovo, 1999). Letter reminders were shown to be just as effective as phone reminders in improving adherence (Bigby et al., 1983). However, when reminders/interventions were tailored in some fashion, whether individualized or formatted using a theoretical framework, patients displayed better appointment-keeping adherence rates (Sohl & Moyer, 2007). Therefore, adherence rates for the group receiving an MI-based letter reminder were expected to be higher than 80%.

The initial chi square closely mirrored the expected rates of adherence. Those who received no reminder showed the worst show rate (66%), which was a little higher than expected. Those receiving the phone reminders attended their appointment at a rate of 82.0%. Those receiving a non-MI-formatted letter reminder attended their appointment at a rate of 75%. However, the show rate of the MI-based group (80.4%) was only
marginally better than that often non-MI letter reminder group. Nevertheless, those who received the MI-based letter did attend their appointments not only at a rate higher than the non-MI letter reminder group, but also at a rate higher than 80%, which is what was expected. However, the MI-formatted letter group did not attend their appointments at a higher rate than that of the phone reminder group. The results of the chi square examining all four groups were not statistically significant.

In analyzing the data by combining the non-MI letter and phone reminder groups, the chi square began to approach significance, but was still not statistically significant. When analyzing patients receiving no reminder in comparison to those receiving the MI-formatted reminder, the results further approached significance.

Finally, the chi square results were significant according to a one-tailed test of significance (Fisher’s) when all reminders (phone, non-MI letter, and MI-formatted letter) were combined. Therefore, reminders clearly impacted appointment-keeping adherence. Appointment-keeping nonadherence was 33% in the no reminder group in comparison to the combined reminder group (20.9%). The difference in show rate between the groups was more than 12%.

Significance of Reminders Combined

The results when examining the reminders as a whole were consistent with past research suggesting that reminders significantly improve appointment-keeping adherence (Bigby et al., 1983; Macharia et al., 1992; Parikh et al., 2010). Reminders are typically seen as effective because they mitigate the impact of forgetting/memory decay. Reminders are generally seen as potentially helpful for this reason (Parikh et al., 2010). Further research indicated that time between reminders is impactful on show rates.
Wantanbe-Rose and Sturmey (2008) displayed that the longer the time between appointments, the greater the no-show rate. However, the effect of memory decay was potentially mitigated when the patients received a phone reminder the day prior to their appointment. If the patients were not reminded a day prior to their appointment, the only reminder of the upcoming appointment had occurred more than 2 weeks prior. Specifically, with a delay of 15 days between appointments and when given no reminder, appointments were kept at a rate of 33%; however, when reminded the day before appointments were kept at a rate of 88% (Wantanbe-Rose & Sturmey, 2008). Reducing the impact of forgetting is the general reason why reminders are effective in improving appointment-keeping adherence, but other reasons explain not only why reminders are effective but also why some types of reminders are better than others.

Parikh et al. (2010) displayed that appointment-keeping nonadherence was 23.1% for the no reminder group at an academic medical outpatient practice. In this study, reminders facilitated better show rates and the type of reminder used also made a difference. Those who received phone reminders by automated message displayed a no-show rate of 17.3% and those who received a reminder by office staff had a no-show rate of 13.6%. Staff reminders were significantly more impactful in reducing appointment-keeping nonadherence than were automated reminders. Therefore, staff phone reminders are significantly more effective in improving appointment-keeping adherence than are automated phone reminders. At PCOM, only phone reminders during which staff spoke to the patient and confirmed the appointment were examined and analyzed, and these reminders displayed the best results, which corresponds with Parikh et al. (2010).
In examining why staff reminders may be more powerful than automated reminders, Parikh et al. (2010) cited Lacy et al. (2004). Lacy et al. (2004) stated that three issues were indicated by patients as reasons for appointment-keeping nonadherence: “emotional barriers, perceived disrespect of the patient’s time by healthcare system, and distrust/lack of understanding of the scheduling system” (p. 543). At PCOM, the patients analyzed were established patients who received reminders. These patients likely had not only a better relationship with their physician, but also a clearer understanding of the scheduling system. Parikh et al. (2010) reinforced this idea because visit type (new vs. established) was shown to be significant predictor of show rate in that the established patient displayed better appointment-keeping adherence.

In regard to both the MI-formatted letter reminder and the phone reminders, there is a greater degree of personalization and effort by staff, which conveys that the primary care office staff and physicians are mindful and respectful of the patient’s time.

When examining the MI-formatted letter alone, MI is typically considered effective according to Moyers et al. (2005), because the practitioner has good interpersonal skills. When a practitioner has good interpersonal skills, a patient is more likely to adhere to treatment, as well as to be more involved in therapy. Interpersonal skills consist of five components: acceptance, egalitarianism, empathy, warmth, and spirit. The format of the MI letter includes egalitarianism by reinforcing patient/physician collaboration and by asking for patient input. Empathy is also inherent in the format of the letter by validating the difficulty of keeping one’s appointment. Warmth is the other component inherent in the letter format based on the language used within the body of the letter. Therefore, the increased personalization and MI-based structure of the letter are
expected to potentially mitigate or reduce the disrespect or distrust felt by patients and are potential mechanisms for the effect observed (Parikh et al., 2010).

From a social psychology perspective, consistency is a powerful human condition (Cialdini, 2009). Generally, individuals tend to behave in a way that is consistent with what they say. For example, if a car salesman asks, “Would you buy a car today if you got it for the right price?” and an individual says, “Yes,” that individual is more likely to buy a car because he or she wants to stay consistent with the response. Phone reminders given by office staff in which the patient answers the phone and confirms the appointment likely activate that same drive to be consistent. That patient has verbally committed to attending an upcoming appointment, which likely increases the drive to behave consistently and actually attend the appointment. Therefore, the notion of commitment and consistency, according to Cialdini (2009), is a potential reason why phone reminders were the most effective reminder.

**Predictors of Appointment Keeping Adherence**

The composition of the reminders might not be the only element to impact show rate. Age was also established as a significant predictor for attendance. Based on research, gender was not expected to discriminate but age was. Parikh et al. (2010) displayed, through multivariate analysis, that age, but not gender, was a significant predictor of appointment-keeping adherence in an outpatient setting. In regards to gender, Penneys and Glaser (1999) also observed no significant difference in nonattendance rates at a dermatology outpatient practice. Although not significant, both studies observed that women often had better show rates than men. In examining the patient population
through multivariate analysis at PCOM’s Family Medicine practice, gender did not discriminate upon analysis, but age did.

 Typically, the primary-care office would be expected to consist of an older population, which held true. The mean age of the patients was 50.50 years with a standard deviation of 14.29. In total, 54% of patients were older than 50 years and nearly 20% of the patients were older than 65 years. The primary reason one would expect to observe an older population in primary-care settings is that older patients have more chronic and acute health-related issues that require constant follow-up and treatment that do younger patients (Cummings et al., 2009).

 Based on previous research, age was considered a significant predictor of adherence (Catz et al., 1999; Parikh et al., 2010). In examining age in the current study, a weak positive correlation (.221) with a coefficient of determination of .048 indicated that about 4.8% of the variance observed with appointment-keeping adherence was attributable to age. Regression analyses indicated that younger adults showed the poorest show rate and that elderly patients showed the best adherence rates (Catz et al. 1999; Parikh et al., 2010). According to the results, for each year older a patient is, that patient is 3.8% more likely to attend his or her appointment.

 The following are potential explanations for older patients being more likely than younger patients to attend their appointment: older patients have more chronic conditions that require consistent treatment and follow-up, they are more mindful of their healthcare, they have greater time flexibility, and they are established patients at the healthcare center who already have built rapport with the physicians (Catz et al. 1999; Parikh et al., 2010).
Limitations

Although many potential confounding variables are controlled based on the use of a no treatment group, random assignment, and scripting the intervention, other issues that are unaccounted for still remain. There are some substantial limitations to the study, especially in regard to the letter reminders. First, the letter reminders were assumed to have been received by the patients. Unless the letter reminders were returned to the office, whether or not the patient received the letter is unknown. The patient may or may not have lived at that residence. The patient may have chosen not to open the envelope. The patient may have not even been the one to read the letter. The letter could have been discarded after a quick glance, but not entirely read. The letter reminders needed to be opened and read in their entirety in order to truly analyze the effect. Therefore, there is uncertainty for whether the letter was an effective reminder is uncertain based on its faulty method of delivery.

In fact, a letter format was not the initial version of the MI reminder to be used. The MI-based reminder was supposed to be a phone intervention, which involved a decisional balance and rating scales. The staff quickly determined that a phone protocol lasting 3-5 minutes was likely not feasible. The patients had difficulty agreeing to the length of time to talk on the phone because many were quite busy at the time of the reminder. Also, the reminder was unexpected. Patients of the primary-care office had been primed to expect a typical reminder based on past experiences, which required them to simply answer “yes” or “no” and hang up. Further conversation was not an expectation. Also, in many instances, the person of interest did not answer the phone, which was necessary for implementation of the protocol. Various issues arose with trying
to implement the MI phone reminder, which left a miniscule sample size \( n = 1 \). Therefore, the MI phone intervention was discarded in favor of an MI-formatted letter.

Because the MI-formatted letter was not used until later in the protocol administration, the reminder delivery systems were not all occurring at the same time. Specifically, the letter reminders were not disseminated until the fall/winter months (September through December). The no reminder and phone reminder portion of the protocol occurred from February through June. Thus, seasonal changes may have impacted adherence. Parikh et al. (2010) discussed how the winter season and colder temperatures can negatively impact adherence rates. Those receiving letter reminders could have been impacted by the colder temperatures especially because of the harsh weather during the 2013-2014 fall and winter seasons. The 2013-2014 winter was uncharacteristically colder and snowier than past winters. In fact, multiple significant snowfalls in December likely impacted show rate, especially for the older patients.

Some of the other potential confounds inherent in this study impact its internal validity or the extent to which the intervention was effective in comparison to other extraneous variables. Random assignment would typically mitigate for these internal validity threats; however, since the four groups were not randomly assigned at the same time, threats to internal validity still likely exist.

One such threat to internal validity is maturation, which is when biological or psychological change within a subject leads to an effect on the variable being examined. Course of illness, chronicity, and the asymptomatic nature of certain chronic illnesses (e.g. hypertension) can impact adherence (Cooper, 2009; La Greca, 1988). For example,
based on the research, someone who has a cold may be more likely to show for his or her appointment than someone who has asymptomatic hypertension (La Greca, 1988).

Another potential threat to internal validity is the reaction of controls or special treatment threat in which the control group and reminder group receive the MI-based intervention or some form of an intervention. This threat is quite possible because some physicians may take it upon themselves to fix their patient’s poor appointment keeping, especially since staff and students were receiving MI training during the letter reminder dissemination period. A physician or D.O. student may have used or even misused MI-based techniques to improve patient adherence during the study. Based on experience in the healthcare sector, some physicians use psychotherapeutic techniques as a single dose panacea without understanding the other variables (e.g. alliance, collaboration) that make therapy effective. Therefore, MI misuse could significantly impact the study and cloud or hinder the effectiveness of the intervention.

Another limitation of this study is that some patients could have received one of the reminders multiple times or received a different reminder from the one originally received. This limitation was especially possible because of the time disparity between phases in the protocol when half the protocol was completed between February and June and the other half between September and December. Another reason for this likely receiving multiple parts of the protocol was because the pool of patients during the letter reminder phase of the protocol was limited/small. Specifically, very few patients were on the schedule for an appointment nearly 2 weeks before the appointment was scheduled. These patients were the same chronic-care patients (e.g. type 2 diabetes, heart disease)
who continually came and often were older patients. Therefore, selecting from the appointment list without selecting a patient more than once was difficult.

Many of the limitations just stated deal with issues pertaining to when and how the reminders were delivered. However, limitations are also associated with the formatting of the letter. Although tailored letters have been effective in the past, the MI-based letter might not have been able to strengthen the alliance enough to impact adherence, which is extremely important for MI to be effective. If the alliance, communication, and collaboration are not sufficient, the treatment will not be as effective as it potentially could be and, therefore, may impact the results (Bell et al., 2002; Bennett, Fuertes, Keitel, & Phillips, 2011). Similarly, the alliance of the patient and physician may be hard to impact with a short letter reminder because the existing alliance has been built over many prior encounters.

Sohl and Moyer (2007) showed in the meta-analysis of 28 studies involving tailored phone, letter, and in-person interventions/reminders that these interventions significantly increased mammography adherence. However, the mean-weighted aggregate odds ratio was quite small at 1.42. The interventions were tailored using age, ethnicity, barriers to care, risk factors, the transtheoretical model (stages of change), health belief model, and MI. The meta-analysis examined two predictors of success for tailored interventions. The first predictor was that the more individualized the intervention, the better the adherence. This predictor was only partially supported though. The second predictor was that those interventions tailored using the health belief model were considered the most effective in improving mammography adherence. The health belief model involves tailoring the letter to the patient’s perceptions of risk, barriers,
severity of illness, cues to action, and self-efficacy. Those interventions using MI were not considered as effective as those using health belief model. The MI interventions tried to establish the motivational level ahead of time and tailored the intervention based on preconceived patient motivational level (Sohl & Moyer, 2007).

The MI intervention in the current study was not tailored by perceived patient motivational level. Although barriers and facilitators for adherence are mentioned in the letter, as was the physician’s commitment to address them, the letter was not individualized based on the actual barriers that exist for the patient. The letter used in the PCOM study is more general, although considered MI-adherent by expert opinion. The letter tried to facilitate patients’ insight into their adherence-related issues by fostering the patients to think about what may or may not inhibit the patients from attending their appointment and also to validate the patients. Potentially, the letter could be further individualized by type of illness has or by examining which patients are chronically nonadherent, especially if their barriers/motivational level are more salient.

Finally, various environmental variables were not being controlled. The office worker may have engaged the patient in a phone conversation while the patient was in an environment that may have impacted his or her appointment-keeping adherence. For instance, the patient may have answered the phone while at another physician’s office or after they just watched a physician-related television show and therefore may have been primed to be adherent. Prior to the intervention, a patient may have just engaged in phone conversation with a family member or friend who suggested that they be more or less adherent. Typically, random assignment would mitigate this issue, but the format of the reminder protocol might have allowed these issues to still exist. Various environmental
factors can impact the way a patient reacts to the treatment intervention and, therefore, can impact the results.

In conclusion, potential confounds and threats to this study include the following: uncertainty of intervention delivery, biological change in illness presentation, physician’s giving a dose of the intervention prior to the intervention, intervention brevity, lack of impact on alliance resulting from MI-based intervention format, greater salience of illness, and being previously primed to be nonadherent. Each of these confounds is a potential reason for explaining the results and, therefore, can spawn future considerations.

**Implications**

Despite the limitations of this study, positive implications abound. First, reminders in some form improve appointment-keeping adherence, which is based not only on the results of this study but also on previous research (Parikh et al., 2010). Based on the typical sequences of events in medical settings, appointment-keeping adherence should be the most important form of adherence. Specifically, a patient must show for his or her appointment before any other recommendations can be made. Therefore, missing an appointment has a trickle-down effect on other forms of adherence (e.g. medication, health behaviors). When a patient does not attend their upcoming appointment, the impact is often much larger than just having an open appointment slot.

The primary implication is that by improving appointment-keeping adherence, overall patient health would also be improved. Although health was not measured in this study, various studies have indicated the impact of nonadherence on health (Irvine et al., 1999; Schectman et al., 2008). Schectman et al. (2008) displayed that patients with type 2 diabetes who missed 20% or more of their scheduled appointments had at least a 1%
increase in A1c levels versus those who missed only 5% or fewer of their scheduled appointments. The broader impact of missing appointments is that patients do not receive the appropriate support, information, and guidance necessary to treat their type 2 diabetes (Schectman et al., 2008). Future research could potentially examine whether this study improved health outcomes by increasing appointment-keeping adherence.

The other primary implication of reducing appointment-keeping nonadherence is improving the economy of healthcare. Nonadherence, generally speaking, is costing the healthcare industry more than 100 billion dollars a year (World Health Organization, 2003). Nonadherence also leads to the utilization of services in a non-economical manner (i.e., more emergency room visits). Since better show rate can lead to improved health outcomes and overall treatment adherence (e.g., glucose self-monitoring), improved show rate would be expected to reduce costs and mitigate emergency room misuse. Although this effect was not measured, future use of the data set could be used to examine if improved show rate led to reduced costs in the primary-care center.

**Future Considerations**

Based on potential implications of better health outcome and reduced healthcare costs, future research could potentially examine patient health post reminder. Depending upon the patient, A1C, blood pressure, and cholesterol, which are charted on the patients’ electronic medical records, could be examined using the same data set. Health costs could be determined post reminder, as well. Therefore, one could determine if reminders have a significant effect on patient health and healthcare costs.

Another issue with this study was the lack of certainty regarding whether the patient received their letter reminder. The delivery system/protocol for the letter
reminders could be varied in order to mitigate for any letter reminder confounds. Tracking forms or having patients sign for the letter could abate the issue of whether or not the patient definitely received the letter. Another possibility would involve the receptionist calling the patients to confirm if they received the letter. Patients who supposedly received a reminder could be given short surveys upon their arrival to complete in the waiting room. The survey could involve questions asking if they received the reminder and then questions about patient satisfaction and alliance.

E-mails or e-reminders may be an even better delivery system for the letter reminder. The e-mails could be set to notify the primary-care office that they had been read. E-mails could be delivered at the same time as the phone reminders and not a week earlier as was the case in this study. A survey or link to a survey could be connected to the e-mail reminder to ask not only potential demographic questions, such as age, gender, illness, severity of the present illness, and type of upcoming visit, but also questions about patient satisfaction and alliance. However, when using surveys, patients would have to be provided an informed consent form.

Informed consent could be used if one wanted to use a phone reminder delivery system for an MI intervention. Therefore, patients who agreed beforehand could expect the MI intervention and hopefully would be more likely to go through with the protocol.

Finally, another possible variant of the study might be to follow the patients over a longer period of time (e.g., 6 months, 1 year) to test appointment-keeping adherence post intervention. The patients would receive treatment only on one occasion and then be followed for a predetermined period of time to examine if the treatment had a lasting effect.
Conclusion

Although the results did not prove significant in regards to whether an MI-formatted letter would improve appointment-keeping adherence in a university-based primary care setting better than other reminder formats, the results did indicate that reminders in general are a significantly effective means of improving show rate.

When examining the results further, increased personalization, verbal confirmation, perceived warmth, empathy, and collaboration all may be factors related to the effectiveness of reminders, especially those given by staff or involving more individualized language. Although these factors were not specifically observed in this study, they have been previous indicated and can be researched in the future to explore whether they are potential mechanisms of change.

One factor that was indicated as a correlate and predictor of appointment-keeping adherence was age. As previously indicated in the research, older patients were considered to have better show rates than younger patients for a variety of reasons. Some of those reasons include greater need for medical care, increased rapport with their physician, and more time flexibility. Gender was not a significant predictor of appointment-keeping adherence.

In future research, the feasibility of the delivery system may be considered based on the means of the population being served. Phone and letter reminders may be the most effective means in lower SES settings because of the accessibility of these means. However, email may be an effective delivery system with a higher SES population because of access, ability to receive confirmation, and lack of issues inherent with using a mailing protocol, to was a potential limitation of this study. With emails, surveys can be
attached, which assess the factors believed to be associated with appointment-keeping adherence, such as patient/physician relationship and perception of warmth/empathy.

Overall, reminders are considered the “gold standard” for improving appointment keeping adherence; however, much still must be learned about the mechanism of change for why some reminders may be more effective than others. Owing to the high degree of appointment-keeping nonadherence, which not only can cause a decline in patient health but also can negatively impact healthcare from a fiscal standpoint, reminders become a crucial intervention that needs further study to maximize the positive effect they often produce.
References


