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Development and validation of a measure to assess physician readiness to prescribe drug therapies for post-myocardial infarction patients

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Development and Validation of a Measure to Assess Physician Readiness to Prescribe Drug Therapies for Post Myocardial Infarction Patients

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ABSTRACT

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National guidelines recommend the use of beta-blockers, aspirin, and ACE-inhibitors in the management of post MI patients. These target drug classes continue to be under-prescribed; information on physicians' decision-making process requires attention and behavior change interventions have been proposed. This pilot study uses the Transtheoretical Model of Change; physicians' salience for the pros and cons of prescribing target drug classes constitutes the decisional balance measure, which can be used to predict their stage of readiness. A survey instrument was mailed to a sample of West Virginia physicians and 55 usable responses (34%) were received. Majority of the physicians self-reported in the action and maintenance stages of readiness; exhibiting a high salience for cons of prescribing beta-blocker therapy in patients with relative contraindications. Research can be guided towards increasing physicians' knowledge on use of target drug classes in the presence of relative contraindications. A larger sample size is required to validate the stage measure using the decisional balance construct.

To dad

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CHAPTER ONE

INTRODUCTION

Acute myocardial infarction (MI) or heart attack is a significant cause of morbidity, mortality, and healthcare expense in the United States (US) and West Virginia (WV). Acute myocardial infarction is the leading cause of death in the US; according to the American Heart Association, nearly 1.1 million Americans will suffer a new or recurrent coronary attack each year. The total direct and indirect costs for all cardiovascular diseases in the US in 2001 were an estimated $298 billion (American Heart Association Heart and Stroke Statistical Update, 2001). Cardiovascular disease accounts for approximately 900,000 deaths yearly in the US alone (Hennekens, Dyken, & Fuster, 1997).

MI is caused when a blood clot obstructs a coronary artery supplying blood to the heart. This obstruction causes an inadequate flow of oxygen- and nutrient-rich blood, and results in damage to a portion of the heart muscle. The part of the heart muscle receiving nutrient-and oxygen-rich blood from this artery is deprived of its blood supply and is at risk of damage unless the blockage is quickly removed. The term “infarction” literally means death of a tissue due to a blocked artery which stops blood from reaching the tissue. If one of the main coronary arteries is blocked, a large part of the heart muscle is affected. If a smaller branch artery is blocked, a smaller amount of heart muscle is affected. A MI without clinical presentation is referred to as silent MI. Collapse and

sudden death may occur with any type of MI. The usual symptom of MI is severe chest pain radiating to the upper jaw and down the left or both arms.

The risk of cardiovascular morbidity and mortality is two to nine times greater in patients experiencing MI (Rapaport & Gheoghiade, 1996; Spinler et al., 2001). Other risk factors for developing heart disease include smoking, obesity, physical inactivity, hypertension, diabetes, and high blood cholesterol levels. Coronary heart disease continues to be one of the most common causes of death in the US.

The burden of MI is more pronounced in the state of WV than the rest of the nation; the age-adjusted mortality from cardiovascular disease is 17% higher than the national average (West Virginia Bureau for Public Health, 2000). Due to the increase in awareness and advances in medical technology over the past 30 years, there has been a 44% decrease in the number of deaths from heart disease and stroke in the US, but only a 32% decrease in the state of WV (West Virginia Department of Health and Human Resources, 1993).

According to the West Virginia Bureau for Public Health (2000), the prevalence for smoking was 27.1%, 6^{th} highest among 52 states participating in the Behavioral Risk Factor Surveillance System (BRFSS) study. One in three adult West Virginians reported consuming some form of tobacco in 1999. The prevalence of hypertension also increased dramatically; the state's 1999 hypertension prevalence rose to 31% compared to the national average of 23.9%. Sedentary life style is a purported risk factor for development of heart disease. The 1998 BRFSS study reported the state of WV third highest in sedentary lifestyle among 52 states participating in the BRFSS study.

There is growing concern over the diet and eating habits of the WV population. The USFDA recommends a minimum of five servings of fruits and vegetables daily. The 1998 BRFSS data indicated that less than one fifth adults consume recommended amounts of fruits and vegetables everyday. The state prevalence of obesity is 25% higher than the national average of 19.7%. Diabetes is more prevalent in the state of WV (7.3%) as compared to the national average (5.6%). Thus, the high prevalence of risk factors in the population of WV has resulted in an increased burden of MI in the state.

MI occurs most frequently in persons older than 45 years. Sub-populations younger than 45 years, such as cocaine users, patients with insulin-dependent diabetes, patients with hypercholesterolemia, and those with a positive family history for early coronary disease, are also at a higher risk of developing MI. In addition, higher mortality rates are associated with patients after a first MI (Moss & Benhorin, 1990); this has raised concern regarding the management of patients after initial MI. Although the use of a variety of revascularization techniques such as stenting and coronary angioplasty have been effective in the reduction of infarct size and in-hospital mortality, post MI patients are vulnerable to an increased threat of reinfarction and sudden death. This has resulted in an increased dependency on secondary prevention to decrease mortality. This emphasizes the role played by pharmaceutical agents in the management of post MI patients.

Clinical trial results and evidence-based literature suggest a vast range of medications for the secondary prevention of MI to improve patient outcomes. Among these medications are beta-blockers, aspirin, angiotensin converting enzymes (ACE) inhibitors, lipid lowering agents (Spinler et al., 2001), and the recently introduced angiotensin receptor blockers. The American College of Cardiology/American Heart

Association Guidelines strongly recommend the use of beta-blockers, aspirin, ACE-inhibitors and lipid lowering agents in the chronic management of post MI patients. Research reports document the use and effectiveness of beta-blockers (Beta-Blocker Heart Attack Study Group, 1982; The Norwegian Multicenter Study Group, 1981; Yusef, Peto, Lewis, Collins, & Sleight, 1983), aspirin (Becker 1993), and ACE-inhibitors (Pfeffer, Braunwald, Moye, et al., 1992; Rutherford, Pfeffer, Moye, et al., 1994; The SOLVD investigators, 1992), in particular, to improve patient outcomes post MI.

Since research extensively documents the use of beta-blockers, aspirin, and ACE-inhibitors, more than other medications for post MI patients, the scope of this study will be restricted to these three target drug classes.

Problem Definition

Although the American College of Cardiology/ American Heart Association Guidelines for the management of patients post MI recommend the use of beta-blockers, aspirin, and ACE-inhibitors, research reports indicate the under-utilization of these therapies. Despite overwhelming clinical trial evidence and endorsement of beta-blocker, aspirin, and ACE-inhibitor use by widely respected professional organizations, several studies have shown a high prevalence of under-utilization of these life-saving therapies in post MI patients. The target drug classes have been under-prescribed in patients presenting as ideal candidates for receiving these medications. Research should be directed towards understanding reasons for under-prescribing of target drug classes for post MI patients.

Conceptual Framework

Since physicians are under-utilizing these evidenced-based therapies, interventions for changing prescribing behavior could have an impact on patient outcomes. Knowledge of the physician decision-making process in drug prescribing is essential in understanding the reasons for under-prescribing of recommended drug classes. A number of behavioral theories have been employed in trying to explain physician behavior in the clinical setting; some of these include the Social Cognitive theory, Awareness-to-Adherence model, and the Theory of Reasoned Action and Planned Behavior, and others. Standardized interventions designed to change physician behavior, without taking into consideration a physician's motivation to change the target behavior, have been unsuccessful. Research has indicated that most action-oriented strategies have failed to bring about a change in problem behavior because of the fact that action oriented interventions assume the subjects are willing and ready for change. Research has suggested that individuals possess different levels of motivation to change, and action-oriented interventions do not address this issue.

A study conducted by Moulding and colleagues (Moulding, Silagy, & Weller, 1999) suggested that knowledge on an individual's readiness to change and barriers to change can be used to design tailored interventions. This information can help classify individuals into different stages of readiness; different strategies can be used to intervene with individuals with different levels of readiness to change. Researchers purport that interventions designed after consideration of an individual's readiness and barriers to

change can be more effective than conventional action-oriented interventions. Avorn and colleagues (Avorn & Soumerai, 1983) used the concept of tailored interventions and motivational interviewing to improve drug therapy decision-making through educational strategies, or academic detailing. Further, studies suggest that a problem behavior can be altered when interventions are targeted to the specific level of motivation or readiness an individual exhibits (Prochaska & DiClemente, 1992). Behavioral interventions focus on bringing about a change in problem behaviors.

Using empathic and non-judgmental communication skills encourages the individual to think about changing behavior and to consider the benefits of change, as opposed to non-empathic and judgmental strategies which might result in the individual becoming defensive and unwilling to cooperate (Sullivan & Joseph, 1998).

Some researchers have proposed that a physician's prescribing behavior can be explained and predicted with the aid of the Transtheoretical Model (TTM) of change (Prochaska & DiClemente, 1992). The TTM has been applied in explaining and predicting an array of health behaviors such as smoking cessation (Prochaska, DiClemente, Velicer, & Rossi, 1993), exercise adoption (Marcus et al., 1998), dietary change (Greene et al., 1999), mammography screening (Rakowski et al., 1998), and many others.

The application of the TTM in understanding behavior of the health care provider in the clinical setting has also been documented. Levesque and colleagues (2001) used the TTM to guide the development of stage matched interventions to increase physicians' readiness to adopt continuous quality improvement in the health care setting. Another application of the TTM in explaining the behavior of professionals in the health care

setting was documented by Berger and Grimley (1997). Berger and Grimley used the TTM to classify pharmacists into varying stages of readiness of engaging in pharmaceutical care practices, concluding that stage matched interventions could be used to motivate pharmacists to engage in the target behavior. Taylor and colleagues (2000) also documented the use of the TTM in classifying pharmacists' readiness to counsel patients on over-the-counter medications.

According to the TTM, behavior change is a complex process in which individuals proceed through five sequential stages of motivational readiness to perform a particular behavior. Research has evidenced that behavior change is a complex process rather than an instantaneous one and that most individuals progress sequentially across increasing motivational levels before bringing about permanent behavior change. McConnaughy and colleagues (1987) refined the stage definition, in increasing levels of motivation, as precontemplation, contemplation, preparation, action and maintenance. Subjects in the precontemplation stage are not ready for behavior change and have the least motivational level, as compared to subjects in the maintenance stage who engage consistently in the modified behavior. Research has revealed that individuals progress through the stages of change in a cyclical manner and transition from one level of readiness to change to another. It has also been documented that an individual may experience a relapse and transition from a stage of higher motivation to one with a lower motivational before cycling back through (Prochaska & DiClemente, 1983).

Precontemplation is the "I WON'T" stage (Reed et al., 1997). Approximately 60% of the individuals needing change in a target behavior are in the precontemplation stage (Prochaska & Velicer, 1994). Individuals not aware of the benefits of change or the

harm of staying in the same stage and engaging in unhealthy behavior characterize this stage. These individuals might not value the change or might be under the impression that they cannot bring about the behavior change. Individuals in this stage might lack any motivation to change or might have decided not to change.

The second stage of change is classified as the contemplation stage. Individuals thinking about changing characterize it. For the purpose of making the stages of change mutually exclusive categories, researchers have defined each stage by the level of motivation and a time frame. In this regard, Prochaska and colleagues (1994) defined contemplation as the stage in which individuals are thinking about changing over the next six months. A 6-month period was chosen because it was assumed that six months is as far into the future as individuals can plan a change. The contemplation stage reflects the ambivalence some individuals may have regarding changing a particular behavior. This phenomenon is labeled as “behavioral procrastination”. Reed, Velicer and colleagues (1997) classify this stage as the “I MIGHT “stage. Research suggests that approximately 30-40% of those needing to change can be categorized as contemplators. The next stage of readiness is the “I WILL” stage as categorized by Reed, Velicer and colleagues (1997). This stage is known as the preparation stage and individuals in this stage are ready to change within the next 30 days (Prochaska et al., 1994). People in this stage are seeking information, gathering support, and making a plan to change their behavior. Studies indicate that approximately 20% of individuals needing to change are in the preparation stage. The action stage represents the individuals who have been consistently and actively engaging in the altered behavior for a period less than six months. It is referred to as the “I AM” stage. The last stage of change the individual can progress into is the

maintenance stage. This stage is labeled as the “I HAVE” stage in which individuals have been engaging in behavior change for more than a 6-month period. Interventions for candidates in the action and maintenance stage are targeted to prevent a relapse into an earlier stage of change.

The TTM integrates four theoretical concepts including stages of readiness, processes of change, self-efficacy and decisional balance (DB).

The processes of change include ten cognitive, affective, and behavioral coping activities that people engage in to facilitate change. Theoretical analysis and empirical studies by Prochaska and DiClemente (1983; 1984) have proposed ten fundamental processes by which people change behavior. These processes can be categorized as experiential and behavioral. Consciousness raising, dramatic relief, environmental reevaluation, self re-evaluation, and social liberation are experiential processes; self-liberation, reinforcement management, counter-conditioning, helping relationships, and stimulus control are behavioral processes. These processes are stage-specific; research indicates that the processes of change used in the early stages of readiness are cognitive and experiential in nature, in contrast to the ones used in the later stages which are behavioral in nature.

To exemplify how the processes of change are used, an individual in the precontemplation stage for a particular behavior will naturally use a cognitive or experiential process such as consciousness raising to gather information relevant to the target behavior that will result in a transition from the precontemplation to the contemplation stage. Thus an individual can be assisted in the use of the processes of change to transition from one stage to another.

The self-efficacy construct reflects one's confidence to make and sustain behavior change even under tempting situations. Self-efficacy is a behavior specific construct proposed by Bandura (1977). Bandura suggested that an individual's belief in his or her ability to change a target behavior would encourage him or her to engage in change. Thus self-efficacy can serve as a predictor of the future behavior of an individual and can be used effectively to validate the stage measure.

Another concept of the TTM is the decisional balance construct (DB). The DB construct consists of an individual's salience for the pros and cons of behavior change. Janis and Mann (1977) conceptualized the DB construct as a conflict model. A conflict model assumes that sound decision-making involves careful evaluation of all relevant issues that enter into a decisional "balance sheet" of comparative gains and losses (Mann, 1972).

Velicer, DiClemente, Prochaska, and Brandenburg (1985) constructed a 24-item DB measure to study the decision-making process across the stages of change for smoking cessation. More than 700 subjects completed the self-report DB measure by indicating their salience for the pros and cons of quitting smoking. Principal components analysis identified two orthogonal components that were classified as pros and cons of quitting smoking. Both pros and cons scales supported the comparative approach to balancing decisions as proposed by Janis and Mann (1977).

Salience of pros and cons has consistently been shown to have a relationship with stage of change; individuals in precontemplation weigh the cons of a problem behavior change higher than the pros, suggesting that the DB construct could be used in conjunction with the stage of change to explain behavior. Across several different

behavior change studies, salience of the pros and cons consistently crosses over in either the contemplation or the preparation stages of change. The relationship between the DB construct and stage of change is established across various problem behaviors (Kavookjian, 2001; Prochaska, Velicer, Rossi, Goldstein et. al., 1994).

An individual's salience for pros and cons of a target behavior constitutes the DB construct; thus, progressing between stages includes a shift in the salience of perceived pros and cons for performing the particular behavior. With the increase in salience for pros and decrease in salience for cons, internal motivation is generated to change problematic behavior and adapt to appropriate behavior. The DB construct represents the cognitive and motivational aspect of the decision-making process and influences readiness to change (Janis & Mann, 1968).

This study focuses on measuring physician salience of pros and cons for prescribing three target drugs, and examining its impact on physician self-report of prescribing behavior. It is observed that a person in the precontemplation stage will identify a higher number of cons and have a higher salience for the cons of altering a behavior. As a person progresses through the stages of change, the salience for pros increases and the salience for cons diminishes. If the DB has a direct relationship with the progression of an individual across the stages of change, it can be used to validate the stage measure.

Study Goals and Objectives

The study objective is developing and validating a measure to assess physician readiness to prescribe each of three recommended classes of drugs for the chronic management of MI patients. The measure will serve as a diagnostic tool for categorizing physicians into various stages of change and will provide information on the DB construct; this would be useful for designing specific tailored interventions to motivate physicians to prescribe according to clinical practice guidelines. Based on evidence in the literature and the goal of an efficient format, this study will evaluate physician prescribing behavior for three drug therapies, beta-blockers, aspirin, and ACE-inhibitors, as treatment strategies for post MI patients.

Physician salience for the pros and cons of prescribing beta-blockers, aspirin, and ACE-inhibitors should reflect the physician decision-making process, as in other studies, the DB measure could serve in the validation analysis for the stage measure, and could provide important information for designing interventions to motivate physicians to prescribe according to the clinical practice guidelines.

Research Questions

1. What percentage of physician respondents can be categorized into the precontemplation, contemplation, preparation, action and maintenance stages of readiness for prescribing each target drug class?
    a) Are there differences in the proportion of physicians per stage for each target drug class?
2. What are physician pros and cons (Decisional Balance) for prescribing beta-blockers, aspirin, and ACE-inhibitors?
    a) Do relationships exist between the mean pros score and stage of readiness for prescribing beta-blockers, aspirin, and ACE-inhibitors?
    b) Do relationships exist between the mean cons score and stage of readiness for prescribing beta-blockers, aspirin, and ACE-inhibitors?
3. Do relationships exist between the decisional balance and stage measure, as indicated in the literature?
4. Is there an association between decisional balance and physician characteristics across:
    a) Beta-blockers
    b) Aspirin
    c) ACE-inhibitors

Table 1. Hypotheses and statistical procedures

Hypothesis	Statistical test
H1: There are no significant differences in the proportion of respondents categorized to each stage of readiness for each target drug class.	Chi Square tests
H2a: There are no significant differences in mean pros scale scores across the stages of readiness for prescribing each target drug class.	ANOVA
H2b: There are no significant differences in mean cons scale scores across the stages of readiness for prescribing each target drug class.	ANOVA
H3: There are no significant differences in mean pros and cons scores across stage of readiness for each target drug class.	MANOVA

H4a: There are no significant differences in mean pros and cons scores of prescribing beta-blockers across physician characteristics (physician gender, physician specialty, physician primary practice site, number of years of practice, number of post MI patients seen).	MANOVA
H4b: There are no significant differences in mean pros and cons scores of prescribing aspirin across physician characteristics (physician gender, physician specialty, physician primary practice site, number of years of practice, number of post MI patients seen).	MANOVA
H4c: There are no significant differences in mean pros and cons scores of prescribing ACE-inhibitors across physician characteristics (physician gender, physician specialty, physician primary practice site, number of years of practice, number of post MI patients seen).	MANOVA

Hypotheses correspond to research questions

Significance of the Study

MI is a significant cause of death in the US. An increasing focus on reducing morbidity, mortality, and health care utilization has led to the development of strategies for disease management. Evidence-based literature and the joint American College of Cardiology/ American Heart Association Guidelines (Smith et al., 2001) for the management of post MI patients recommends the use of drug therapies such as beta-blockers, aspirin, and ACE-inhibitors and to improve patient outcomes. Despite numerous studies and clinical evidence supporting the beneficial effects of these drug therapies for post MI patients, studies have shown a prevalence of under-utilization of these drugs.

Using the TTM and DB construct, physicians can be categorized into stages of readiness to prescribe the target drug classes. The pros and cons measure will provide an insight into the physician decision-making process and may suggest reasons for under-prescribing behavior for the target drug classes. An instrument used to classify physicians into stages of change for prescribing target drugs for post MI patients could be useful. This instrument can serve as a platform for designing tailored interventions to motivate physicians to prescribe drugs based on evidence from the literature and according to national clinical practice guidelines (Moulding, Silagy, & Weller, 1999; Levesque et. al., 2001).

Stage-matched interventions have outperformed non-tailored interventions for many problem behaviors. Interventions can be individualized to the physician readiness for change and can be more effective in bringing about a behavior change; this could be

supported if a valid and reliable measure to assess physician readiness was available. Development of such a measure is the cardinal aspect of this study.

CHAPTER TWO

REVIEW OF LITERATURE

The ACC/AHA guidelines recommend the use of beta-blockers, aspirin, and ACE-inhibitors for the management of post MI patients. These target drugs have different mechanisms of action and contribute to improving patient outcomes post MI.

Beta-blockers

Beta-blockers play a major role in the reduction of mortality of post MI patients. The role of beta-blockers is more significant in patients with poor left ventricular systolic function or history of heart failure (Yusef et al., 1985). Beta blockers act to reduce myocardial workload by reducing heart rate due to its sympathetic action and thus reducing the oxygen demand of the heart muscle. Beta-blockers are also effective in reducing blood pressure and muscle contractility. Their effectiveness has also been established in elderly patients. The Norwegian Timolol Study (1981) and the U.S Beta Blocker Heart Attack Trials (1982) documented the positive effects of beta-blocker therapy in the reduction in morbidity and mortality following a heart attack.

The Norwegian Multicenter Study (1981) was a double-blind, randomized study comparing the effect of timolol versus placebo in post MI patients. Analysis performed on data from a 33-month follow up indicated a 39.4% lower mortality rate in the timolol group compared to placebo. A follow-up extension of 72 months from the time of randomization revealed a cumulative mortality rate of 32.3% in the placebo group versus 26.4 % in the timolol group ($p=0.0028$).

The BHAT study (1982), which was a randomized, multicenter, double-blinded study, was sponsored by the National Heart, Lung, and Blood Institute (NHLBI). The study was designed to investigate whether regular administration of propranolol hydrochloride, a beta-blocker, in post MI patients would result in a significant reduction in mortality. The total mortality during the 24-month period was 6.2% in the propranolol group versus 7.2% in the placebo group. It was also found that mortality on account of sudden cardiac death was 3.3% in the propranolol group versus 4.6 % in the placebo group. These hallmark studies led to further investigation of the effectiveness of beta-blocker therapy as a secondary prevention measure in post MI patients.

In the 1996 ACC/AHA Acute MI Guidelines (American College of Cardiology/ American Heart Association, 1996) , beta-blockers were contraindicated in conditions of chronic obstructive pulmonary disease (COPD), sinus bradycardia, atrioventricular block, cardiogenic shock, congestive heart failure (CHF), severe peripheral vascular disease, and diabetes. However, studies have shown that beta-blockers significantly reduce mortality in high-risk patients having diabetes, COPD and CHF (Jencks, Cueron, Burwen, et al., 2001). The new recommendations in the 1999 ACC/AHA Acute MI Guidelines (Spinler et al., 2001) recommend the use of beta-blockers even in patients with relative contraindications, but recommend for monitoring of patients for any adverse reactions. Thus, beta-blockers are considered as prophylactic agents in the treatment of most post MI patients because of their anti-ischemic, anti-arrhythmic, and anti-hypertensive effects (Frishman, Furberg, & Friedwald, 1984).

A review article by Mehta and Eagle (1998) indicated that controlled trials in more than 35,000 survivors of MI have demonstrated that the long term use of beta-

blockers reduced the risk of recurrent heart attack, sudden death and all-cause mortality. They are most beneficial in survivors having a large anterior infarction, ventricular arrhythmias, ischemia, and in patients with congestive heart failure. A recent study (Phillips, et al., 2000) using a Markov model simulation for coronary heart disease in the US population, suggests the epidemiological benefits and cost-effectiveness of increased beta-blocker usage in MI survivors between the ages of 35 to 84 years. The simulation projected a savings of $18 million and 72,000 fewer coronary heart disease deaths, 62,000 fewer MIs and a total of 447,000 life years gained over a span of 20 years.

Aspirin

Aspirin or acetylsalicylic acid has been available in the market since 1899 and is a proven therapy for pain relief; it is also used widely for of its anti-pyretic and anti-inflammatory actions. Over the years, aspirin's anti-platelet property has been effective in the management of patients after an acute attack of MI. Aspirin therapy is considered to be the most cost-effective therapy in the chronic management of patients who have suffered a MI. Aspirin therapy reduces the risk of vascular mortality by 13%, non-fatal reinfarction by 31%, and non-fatal stroke by 42 % (Antiplatelet Trialist Collaboration, 1994). Low to medium aspirin doses of 75mg-325mg/day seem to be as effective as high doses of 1200mg/day with fewer gastrointestinal side effects. Aspirin prevents the formation of a substance known as thromboxane A2, which is responsible for induction of platelet aggregation (Burch, Stanford, & Majerus, 1978; ICRF/BHF/MRC Clinical Trial Service Unit, 1994). In addition, aspirin also has an effect on endothelial cells by preventing the synthesis of a compound known as prostacyclin, which inhibits platelet

aggregation and thrombosis (Moncada, & Vane, 1979). Studies indicate that aspirin has a favorable benefit-to-risk profile ratio and should be used for the secondary prevention of cardiovascular events (Weisman & David, 2002)

In the Antiplatelet Trialists Collaboration (1994) study, 54,000 patients with a prior event of cardiovascular disease such as MI, stroke, transient ischemic attacks, angina, and valvular and vascular diseases were considered. Use of aspirin resulted in a decrease in subsequent vascular events in patients with all the conditions resulting in avoidance of approximately 40 events per 1000 patients who have previously experienced a MI. Studies indicate that aspirin prevents thrombotic recocclusion of the infarct-related artery thereby reducing the reinfarction rate.

The Antiplatelet Trialist Collaboration (1994) study prompted researchers to compare the effectiveness of aspirin with other antiplatelet agents. A study by Hass and colleagues (1989) comparing the effects of ticlopidine and aspirin in high risk patients, indicated that patients on ticlopidine had a 13% risk reduction in all types of stroke compared with 21% for patients taking aspirin. The occurrence of neutropenia in a small percentage of ticlopidine users, as well as its additional expense, yielded aspirin as the drug of choice. Results of similar studies with clopidogrel and aspirin favored aspirin therapy, further strengthening the case for aspirin use in post MI patients (CAPRIE Steering Committee, 1996).

ACE-inhibitors

The effectiveness of ACE-inhibitors in post MI patients was indicated almost a decade ago. The application of ACE-inhibitors in the long-term management of post MI patients has been documented through extensive clinical trials and follow-up studies. The ACC/AHA Guidelines recommend the use of ACE-inhibitors in all patients with MI and a left ventricular ejection fraction less than 40% or in patients with clinical heart failure on the basis of systolic pump dysfunction during and after convalescence from acute MI (Spinler et al., 2001). Clinical trials such as the SAVE trial (Pfeffer et al., 1992) and the SOLVD trial (The SOLVD investigators, 1992) suggest that ACE-inhibitors can be used effectively in patients with symptomatic congestive heart failure, resulting in a reduction in risk of development of severe CHF and of occurrence of sudden death. Other researchers affirm that ACE-inhibitors should also be considered for use in management of post MI patients with appropriate high-risk clinical factors such as diabetes and hypertension and in elderly patients greater than 55 years of age (Yusuf et al., 2000).

ACE-inhibitors have been found to slow the progression of heart failure and to reduce the incidence of severe left ventricular dysfunction. ACE-inhibitors have shown maximum benefit in patients with moderate or severe ventricular dysfunction, having a left ventricular ejection fraction less than 40%. ACE-inhibitors have shown to possess a plaque-stabilizing effect and reduce left ventricular enlargement after MI (Foly et al., 1996). Considering that other studies have indicated that heart size is the most important determinant of outcomes in patients with cardiovascular disease, the use of ACE-inhibitors towards prevention of left ventricular enlargement after MI strengthens the

case for its use in the post MI patient. (Warren, Royal, Markis, Grossman, & McKay, 1988).

In the SAVE trial (Pfeffer et al., 1992), patients with a decreased ejection fraction were randomized to receive the ACE-inhibitor captopril or placebo. Results indicated a dramatic decrease in cardiac events such as reinfarction and in outcome events such as hospitalizations and mortality. In the TRACE study (1995), patients with an earlier cardiac event were randomized to receive ramipril or placebo. This resulted in a decrease in mortality in the ACE-inhibitor group compared to placebo. Results from TRACE trial (1995) also suggested that long-term use of ACE-inhibitors could reduce the risk of cardiovascular mortality and sudden death. Thus, studies support that the use of ACE-inhibitors is effective in reducing ischemic effects in post MI patients, thereby reducing the reinfarction rate.

Synergistic Use of Beta-blockers, Aspirin, and ACE-inhibitors in the Secondary Prevention of Morbidity and Mortality post MI

As mentioned previously, national guidelines recommend the synergistic use of beta-blockers, aspirin, and ACE-inhibitors for reduction in risk of patient mortality and improved therapeutic outcomes. Although lipid-lowering agents also play an important role in reducing the risk of mortality from recurrent infarction, beta-blockers, aspirin, and ACE-inhibitors are more significantly evidenced in the literature for secondary prevention of MI.

There are several mechanisms that lead to the development of morbidity and mortality in post MI patients. Synergistic use of beta-blockers, aspirin, and ACE-inhibitors is targeted towards subduing remodeling, reinfarction and sudden death due to

arrthymias, thereby decreasing rates of morbidity and mortality in post MI patients. These medications have separate mechanisms of action and their synergistic use results in the reperfusion of the heart muscle.

A study conducted by Krumholz and colleagues (2001) evaluated the synergistic use of aspirin and ACE-inhibitors in the secondary prevention of MI in elderly patients. The cohort study consisted of a sample of 14,129 patients; one-year mortality for four treatment groups with adjustment for differences in demographic and clinical characteristics was calculated. The multivariate analyses indicated that patients receiving both aspirin and ACE-inhibitors alone at discharge had a significant reduction in 1-year mortality with adjusted risk ratio (ARR) of 0.86 (95% CI, 0.78.0.95), compared with patients receiving neither aspirin nor ACE-inhibitors, ARR of 0.85 (95% CI, 0.77-0.93). Patients on both aspirin and ACE-inhibitors had a lower risk of mortality (ARR, 0.81; 95% CI, 0.74-0.88) than aspirin-only or ACE-inhibitors-only groups. However this difference was not statistically significant.

A study reported by Vantrimpont and colleagues (Vantrimpont et al., 1997) suggested the additive effect of beta-blocker therapy and the ACE-inhibitor, captopril, in patients with asymptomatic left ventricular dysfunction after MI. The results of the study documented a significant reduction in cardiovascular death and development of heart failure, supporting the use of beta-blocker therapy in conjunction with ACE-inhibitor therapy in post MI patients.

Thus, research studies have endorsed the use of beta-blockers, aspirin, and ACE-inhibitors for post MI patients.

Under-utilization of Life Saving Drug Therapies

Numerous studies have been conducted documenting the routine under-use of beta-blockers, aspirin, and ACE-inhibitors in post MI patients presenting as ideal candidates for these therapies.

A study conducted by Krumholz and colleagues (2001) using medical records for obtaining patient prescription and clinical data observed that only one third of patients above the age of 65 received both aspirin and ACE-inhibitors and one in every six patients did not receive either therapy. Also, variations in prescriptions for medications post MI were observed across patient gender and age (McCormick et al., 1999). A four-state pilot study from the Cooperative Cardiovascular project used a retrospective medical record review to evaluate the quality of care for Medicare patients with principal diagnoses of MI. It was found that among the ideal candidates for medications, 77% received aspirin, 59% received a prescription for ACE-inhibitors and only 45% received beta-blockers at discharge from the hospital (Ellerbeck et al., 1995).

A recent study assessing the utilization of beta-blockers and aspirin in patients with coronary artery disease indicated that the use of these medications has been increasing steadily over the last decade but they continue to be under-utilized (Stafford & Radley, 2003). Among studies directed towards assessing the extent of under-utilization of target drug therapies, research on under-use of beta-blockers has received special attention. An important study evaluating the nationwide use of beta-blockers for post MI patients is noteworthy. The study conducted by Krumholz and colleagues (1998) described the national use of beta-blockers in the elderly at discharge from hospital. A

retrospective cohort design was used, and data was accumulated using medical charts and administrative files from acute care, non-government hospitals in the US. Results revealed that among 45,308 patients considered “ideal patients” for beta-blocker use, only 50% received a prescription for the drug. The study reported a significant variation in beta-blocker prescription rates by state, the lowest being Mississippi at 30.3% and the highest being Connecticut at 77.1 %. Thus, Krumholz and colleagues suggest nationwide under-use of beta-blocker therapy in patients for whom the therapy is indicated.

Another national study reported trends in the prescribing usage of beta-blockers, aspirin, and ACE-inhibitors. Comparing two time periods of 1994-1995 and 1998-1999 using national and state Medicare data as a part of the Centers for Medicare & Medicaid Services National AMI project, researchers reported an increase of usage in all three drug classes. Amongst patients without contraindications, beta-blockers prescribed at discharge increased from 50.3% to 70.7%, aspirin prescribed at discharge increased from 76.4% to 82.9%, and discharge ACE-inhibitor prescriptions increased from 62.8% to 70.8%. The increase in discharge prescription rates for all three target drugs was significant at the 0.001 level. The study results suggest the increase in utilization of life saving therapies and at the same time establishes the need for further improvement in prescribing rates and adherence to guideline recommended care (Burwen et al., 2003).

The target drug classes are also reported to be under-utilized in special populations, such as patients with diabetes and the elderly, even though their beneficial effects are pronounced in these populations. Other research indicates that the under-utilization of ACE-inhibitors in patients with left-ventricular systolic dysfunction is due to perceptions of side effects of the medication (e.g., cough and renal dysfunction) (Pitt,

1997). ACE-inhibitors are also under-utilized in patients having diabetes mellitus; studies suggest that a higher proportion of patients with left-ventricular failure without diabetes receive ACE-inhibitors compared to diabetic patients with left-ventricular failure (Chowdhury, Lasker, & Dyer, 1999). Although diabetes patients have an increased risk of developing vascular disease and are more vulnerable to morbidity and mortality following MI compared to non-diabetics, optimal therapy of ACE-inhibitors continues to be under-utilized in this population.

In addition, research suggests that the elderly constitute a population that is deprived of optimal measures of secondary prevention for MI. Studies have indicated age-related variability and under-utilization of target drug therapies in the elderly population (Smith et al., 1990; Malone et al., 1995). Other researchers also indicate that beta-blockers are under-utilized in the elderly, black American patients, patients with COPD, diabetes, heart failure and low blood pressure (Gottlieb et al., 1998). Although studies indicate (Gottlieb et al., 1998) that beta-blockers are beneficial for secondary prevention of MI in older patients, and patients with relative contraindications such as COPD, diabetes, pulmonary disease, congestive heart failure, and non-Q wave MI, beta-blockers continue to be under-utilized.

Beta-blocker under-utilization can be attributed to a large number of factors. These include the lack of awareness regarding the recommendations of the ACC/AHA Guidelines, and safety concerns in patients with relative contraindications to the drug (e.g., heart failure, COPD, and diabetes) (Gheorghiade & Goldstein, 2002). The latest guidelines suggest the use of beta-blockers in patients, even in the presence of previously published relative contraindications; however, the guidelines strongly recommend

monitoring these patients while on beta-blocker therapy. The 2001 update of the AHA/ACC Guidelines for Preventing Heart Attack and Death in Patients with Atherosclerotic Cardiovascular Disease (Smith et al., 2001) endorses the routine use of aspirin, ACE-inhibitors and beta-blockers in the management of post MI patients.

Under-utilization of Drug Therapies in the State of West Virginia

The extent of under-utilization of life-saving post MI medications is more pronounced in WV. In the state of WV, patients with MI were discharged with a beta-blocker prescription 65% of the time compared to the national average of 72 %. (Schade, Brehm, Stephens, & Rezek, 2002). Schade and colleagues also found that in WV hospitals, with an increase in patient's age, the patient's likelihood of receiving a beta-blocker prescription at discharge from a hospital decreases. A previous study conducted by Krumholz and colleagues, (1998) indicated that WV had a beta-blocker prescription rate upon hospital discharge of 44-52%. Evaluation of Medicare records indicated that in WV, discharge aspirin rate was 75.7%, ACE-inhibitors at discharge rate was at 53.0%, and beta-blocker discharge rate was 44.4% (Burwen et al., 2003). A recent study using a survey instrument to assess the utilization of beta-blocker therapy in post MI patients reported that 37% of eligible patients do not receive beta-blockers for the secondary prevention of MI. (Fernandes, 2003)

Although these studies project different values for utilization rates, they evidence the marked under-utilization of target drug therapies in the state of WV. It was also observed that patients whose attending physician was a cardiologist were significantly more likely to have received a beta-blocker prescription at discharge than patients of

internal medicine physicians, family medicine physicians and general practitioners (Lim, Heller, O'Connell, & D'Este, 2000).

In view of the under-utilization trends of the target drug therapies, it is suggested that efforts should be directed towards changing prescribing behavior among physicians who could be identified as those under-utilizing the target drug classes in post MI patients.

CHAPTER THREE

METHODOLOGY

This study involved two phases, questionnaire development and questionnaire implementation. Phase one involved development of the questionnaire; this included developing the staging algorithm and DB pros and cons scales for prescribing beta-blockers, aspirin and ACE-inhibitors for patients after first MI. Phase two consisted of administering the questionnaire to a group of physicians to assess their stage of readiness to prescribe the target drug classes and to obtain information on the salience of their perceived pros and cons for prescribing the target drug classes. The pros indicate perceived facilitators and cons represent perceived barriers for prescribing target drug classes for post MI patients. Information on relevant demographic and practice characteristics of physicians, such as age, gender, years in practice, specialty, and primary practice site was also obtained.

Phase One: Instrument Development

The development of the instrument was based on questionnaire construction recommendations from various sources in the literature (Boser & Clark, 1993; Comrey, 1988; Fowler, 1993; Lissitz & Green, 1975; Salant & Dillman, 1994). The constructs and specific items on the questionnaire were collected from the literature and through structured telephone interviews of physicians from internal medicine, family medicine and cardiology practices. The instrument was subject to review by an expert panel.

Interviews for instrument development were conducted with a convenience sample of physicians from the state of WV. Interview questions were intended to gather

perceived pros and cons (DB) affecting physician prescribing habits for beta-blockers, aspirin, and ACE-inhibitors for post MI patients. A physician list consisting of 20 physicians was generated from a "Yellow Pages search" and a letter was sent to physicians requesting their participation as consultants on the project. (See Appendix A for a copy of the advance letter). Appointments on the telephone were set up with physicians willing to participate in the project. The interviews took about 15-20 minutes each to complete. Interviews were conducted using a standardized script, probing questions, and simultaneous note taking. (Refer to Appendix C for the Interview protocol). A monetary incentive in the form of a $50 consulting fee was offered to the physicians to compensate for their time.

The next step in instrument development involved gathering input for content and face validity. Input from panels of persons with expertise in the TTM, and/or in scale development, and/or in myocardial infarction was obtained in order to assess the appropriateness of the content and the structure of the questions. The experts were asked to provide their input and suggest changes on any areas of confusion. Revisions were made to the questionnaire using the input from expert panel members.

Phase Two: Instrument Implementation

Phase two involved the actual implementation of the instrument with physicians treating post MI patients. The questionnaire, along with the cover letters, was sent to the West Virginia University Internal Review Board to seek their approval for the use of human subjects in research. As expected, the study was granted exempt status under the condition of maintaining confidentiality of the data. The questionnaire was sent to all of the approximately 300 physicians who treat patients admitted for MI to hospitals in five North/Central WV counties, namely, Marion, Harrison, Tyler, Monongalia and Preston. Other counties of WV were not targeted as the study would contaminate the physician sample all over the state. This precaution was taken as researchers expected to conduct a large scale intervention using results of this study targeting the entire WV physician sample in the near future. The mailing list was obtained from the West Virginia Office of Health Services Research and included the mailing addresses and demographic characteristics of licensed and practicing physicians of internal medicine, family medicine and cardiology specialty practices. Power and sample size analyses conducted in other studies (Johnson, Grimley, & Prochaska, 1998; Comrey, 1988) indicate that a sample size of 60 to 150 would be optimal to conduct the analyses needed to validate the measures in this questionnaire.

A modified version of the Total Design Method (Dillman, 1978) was used for questionnaire implementation; an announcement letter was sent, followed a few days later by the questionnaire and a cover letter. (See Appendix D for advance letter and Appendix E for the cover letter for first mailout). Responses were tracked so that a subsequent follow up questionnaire and non-response post cards could be sent to non-

respondents. The second mail out followed ten days later. (See Appendix F for the cover letter for second mailout). The non-response card with a cover letter was mailed two weeks after. (See Appendix H for the cover letter for non-response card and Appendix I for the non-response card). Postage paid return envelopes were included to facilitate responses.

Measurement of Stage of Change

In the study, two basic constructs of the TTM were measured, stage of change and decisional balance.

There are two primary measures found in the literature for operationalizing the stage of change, the first being the staging algorithm and the second, a continuous staging questionnaire. The first measure is categorical in nature allowing the individual to choose from a set of mutually exclusive questions indicating the appropriate stage of change. This type of measure is called the "staging algorithm" and can be used for research and / or interventions involving self-report or interviewing to assess stage of change. Each response choice indicates the level of motivation to change and thus is indicative of the stage of readiness for change.

The continuous measure, initially known as the University of Rhode Island Change Assessment (McConnaughy, Prochaska, & Velicer, 1983) produces separate sub-scales for each of the stages for a particular behavior. The continuous scale has similar results to the categorical scale but involves many more questions as compared to the staging algorithm and thus is not a convenient form of measuring the stage of change in

intervention research. In addition, the continuous measure allows subjects to appear partially in multiple stages making it difficult to individually tailor intervention strategies.

In this study, the discrete categorical measure was used to ascertain the stage of readiness physicians reported for current prescribing behavior and future intentions for prescribing the target drug classes. Well established reliability and validity for the staging algorithm make it the measurement tool of choice in intervention research.

A time frame was assigned to each stage of readiness. This time frame has been used in studies to differentiate between the stages of readiness (Grimley et al., 1993). Physicians not planning to prescribe target drugs in the foreseeable future (greater than 6 months) were categorized as precontemplators; those planning to prescribe target drugs within the next 6 months were considered as contemplators; and physicians planning to prescribe target drugs within the next thirty days were classified in the preparation stage. Respondents who reported that they were consistently prescribing the target drugs were considered in the action or maintenance stage. Individuals in the action and maintenance stage have typically high levels of internal motivation and so these stages were collapsed into a composite category for analysis purposes.

There are various forms of the discrete categorical staging algorithm. These are Ladder, Short6Ques-Likert, Short5Ques-Likert and a staging algorithm involving long definitions (Reed, Velicer, & Prochaska,1997). For this study, the Short5Ques-Likert format was used. The Short5Ques-Likert can categorize individuals into four stages instead of five as the action and maintenance stages of change are collapsed into one stage. This format was developed in the interest of brevity for screening multiple behaviors (Reed et el., 1997).

The staging algorithm for physician readiness for prescribing beta-blocker therapy for post MI patients developed in this study follows in Figure 1. (Refer to Appendix G for the entire questionnaire. Staging algorithms and decisional balance measures for beta-blockers, aspirin, and ACE-inhibitors comprise of a portion of the entire questionnaire. For the purpose of this study, only sections A, B and D of the questionnaire were analyzed since the other sections of the questionnaire pertain to research questions beyond the scope of this study).

If the physician marked ‘usually’ or ‘always’, he/she was categorized into the action/maintenance stage. Physicians who marked ‘I do not plan to start regularly prescribing beta-blockers to post MI patients’ were categorized to the precontemplation stage; those who marked ‘In the long run (next six months), I plan to start regularly prescribing beta-blockers to post MI patients’ were considered to be in the contemplation stage; and physicians who marked ‘In the short run (next 30 days), I plan to start regularly prescribing beta-blockers to post MI patients’ were categorized in the preparation stage.

Figure 1. Staging algorithm for readiness for prescribing beta-blocker therapy for post MI patients

Please indicate how often you prescribe the following medications for long-term management of post MI patients. Circle the letter that best describes your prescribing.

	Never	Rarely	Sometimes	Usually	Always
Beta-blockers	a	b	c	d	e

If you answered the question above with "a", "b", or "c" for Beta-blockers, please check the response that best describes your plans regarding prescribing Beta-blockers for post MI patients.

____I do not plan to start regularly prescribing beta-blockers to post MI patients.

____In the long run (next six months), I plan to start regularly prescribing beta-blockers to post MI patients.

____In the short run (next 30 days), I plan to start regularly prescribing beta-blockers to post MI patients.

Measurement of the Decisional Balance

DB is typically measured using five to eight pro statements and five to eight con statements. These are answered using five-point Likert scales measuring the salience for each pro and con of a target behavior. Salience is defined in how important each statement is to the subject in making his/her decision on whether or not to engage in the target behavior. Research has evidenced that the decisional balance measure has exhibited high internal consistency across multiple target behaviors with average Cronbach's alphas for pros and cons of approximately 0.88 and 0.89 respectively (DiClemente et al., 1991).

The raw pros and cons scores are typically converted into standardized scores and then to T-scores with a mean of 50 and a standard deviation of 10 to compare mean pros and cons scores across the different stages of change. An example of a decisional balance measure to assess the salience of pros and cons for prescribing beta-blocker therapy can be seen in Figure 2. (Refer to Appendix E for the entire questionnaire and DB measures for beta-blockers, aspirin, and ACE-inhibitors).

Literature reporting TTM research documents a consistent relationship between the stages of change and the DB pros and cons. Individuals in early stages typically have higher mean cons scores; those in the later stages have higher mean pros scores. There is an increase in the mean pros score and a decrease in the mean cons score as the individual progresses from the precontemplation stage to the action and maintenance stages.

A hallmark study using the DB pros and cons for the validation of stage measure was conducted by Prochaska and colleagues (1994). The study revealed that the salience

of pros and cons crosses over as the individual progresses through the stages of readiness for change. Graphic representation of the relationships between stages of change and DB revealed the cross over in pros and cons scores. A cross over in the mean pros and cons scores usually occurs between the contemplation and preparation stage indicating an increase in internal motivation to change problematic behavior (See Figure 3). If a similar relationship between DB and stage of change is replicated in this study, claims can be made for validating the stage measure using DB.

Figure 2. Decisional balance measure to assess salience for pros and cons for prescribing beta-blocker therapy

Regarding beta-blocker medications, please rate HOW IMPORTANT each statement is to you in your decision on <u>whether or not</u> to prescribe beta-blocker medications to post MI patients. If you feel a statement does not apply to your prescribing, rate it as Not Important.

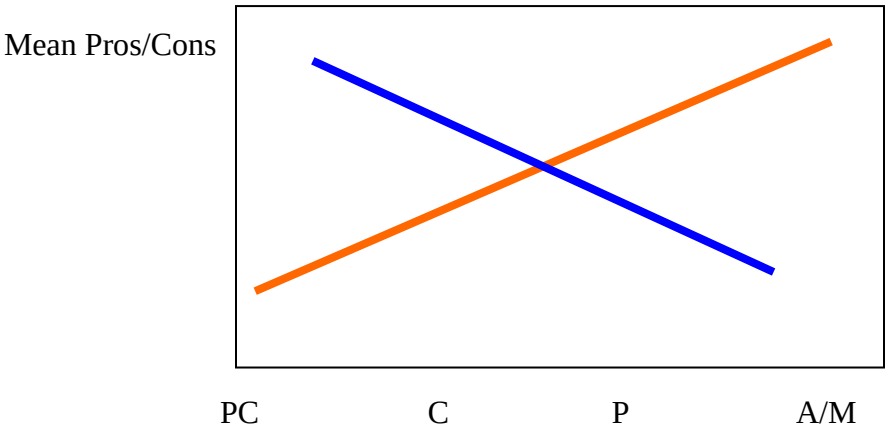
Please CIRCLE the letter that best shows your opinion using the following scale:

Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
a	b	c	d	e

How important is each statement to you in your decision about prescribing beta-blockers?

	Not Important		Moderately Important		Extremely Important
Beta-blockers:					
…increase chances of patient survival.	a	b	c	d	e
…exacerbate symptoms of COPD.	a	b	c	d	e

Figure 3. Relationship between mean pros and cons scores and the stage measure



(PC- Precontemplation, C- Contemplation, P- Preparation, A/M – Action and Maintenance, — Mean Pros Score, — Mean Cons Score)

Data Analyses

Descriptive statistics were generated for physicians' demographic and practice characteristic variables. Salience of pros and cons for prescribing beta-blockers, aspirin, and ACE-inhibitors were reported in mean scores and standard deviations. Items with most salient pros and cons and least salient pros and cons for the target drug classes were reported.

Factor analysis was used for item reduction of the pros and cons scales. In this study, a confirmatory factor analysis (CFA) with Varimax rotation was employed. A CFA seeks to determine if factors, and loadings of items on them, conform to established theory. In this type of factor analysis, the variables or items are selected on the basis of prior evidence or theory and CFA is used to confirm if these variables load on the factors as expected. According to Kim and Mueller (1978), one requirement of CFA is that the number of factors are hypothesized before hand as well as which item loads on which variable. Based on previous DB findings, two factors were decided a priori, pros and cons; specific items were expected to load on these factors. Thus, the use of CFA is justified.

Varimax rotation is the most common rotation option. It is an orthogonal rotation of the factor axes to maximize the variance of squared loadings of a factor on all the variables in a factor matrix. This results in minimizing the number of variables with high factor loadings on any one given factor (Kaiser, 1958). The Varimax rotation makes it easy to identify each item with its associated factor (pros or cons). Thus, Varimax rotation was used in this study to identify items with high loadings on the pros or cons factors.

The data was also tested for its adequacy for conducting a factor analysis. The Kaiser-Meyer-Olkin (KMO) statistic for sampling adequacy was used to predict if the data would factor well. The KMO statistic has a maximum value of 1 and a minimum of 0. The overall KMO should be 0.60 or higher to proceed with factor analysis. Cureton and Agostiono (1983) categorize a KMO value of 0.9 to 1 as marvelous, 0.8 to 0.89 as meritorious, 0.7 to 0.79 as middling, 0.6 to 0.69 as mediocre, and below 0.59 as unsuitable for factor analysis.

In addition, the Bartlett's test of sphericity was used to determine the extent of collinearity in the variables or items. It calculates the determinate of the matrix of the sums of products and cross-products (S) from which the intercorrelation matrix is derived. The determinant of the matrix S is converted to a chi-square statistic and tested for significance. The null hypothesis is that the intercorrelation matrix comes from a population in which the variables are noncollinear (i.e. an identity matrix). A significant result indicates that the items can be used for factor analyses (Kim and Mueller, 1978). If the variables are not correlated, then factor analysis will not reveal any factors and would not be the appropriate method of analysis.

Items from factor analysis were selected based on factor loadings, low shared loadings, and mean salience scores. These items were submitted into a second CFA and variance explained was reported. Internal consistency using the Cronbach's alpha was calculated for the pros and cons scale for each target drug class. Differences in salience or pros and cons across stages of readiness were evaluated by means of an ANOVA.

The use of the DB construct to validate stage of change measure is well documented in the literature and is used for stage validation for a large number of

problem behaviors (Kavookjian, 2001; Prochaska et al., 1994). Johnson, Grimley and Prochaska (1998) describe the use of factor analysis to reduce the number of items of decisional balance down to two latent variables, pros and cons. A principal components factor analysis, using a Varimax rotation (assuming the pros and cons are orthogonal) (Grimley et al., 1993) is appropriate for the purpose of deleting items with low (less than 0.60) factor loadings.

A similar approach was used in this study and variation in pros and cons score across stages of change was assessed using a multivariate analysis of variance (MANOVA). MANOVA was used to see the main effects of categorical variables on multiple dependent variables. MANOVA uses one or more categorical independents as predictors, like ANOVA, but unlike ANOVA, there is more than one dependent variable. Post hoc comparisons were conducted to see which values of a factor contribute most to explaining the variation in the dependent variables. The standardized pros and cons scores were submitted as the dependent variables and stage was submitted as the independent variable.

The Kolomogirov-Smirnov statistic was used to test the normality assumption of variables as normality of variables is an important assumption of the MANOVA. The Box's M test reports MANOVA's assumption of homoscedasticity using the F distribution. If p value is less than or equal to 0.05, then the covariances are significantly different. The objective is for Box’s M to be not significant, rejecting the null hypothesis that the covariances are not homogeneous. Thus, if Box’s M test is significant, Pillai’s Trace is used as the post-hoc test since it is most sensitive to violations of the MANOVA assumption (Stevens, 2002).

The variation in pros and cons scores across physician characteristics such as gender, years of practice, primary practice site, specialty, and number of new MI patients seen in a month was also assessed using separate MANOVAs for each practice characteristic. Finally, non-response bias was evaluated by comparing respondent characteristics with non-respondents.

An a priori value of alpha for each of these analyses was set at 0.05, except in the one-way ANOVAs where multiple comparisons were made. Statistical software used for the analyses was SPSS for Windows, version 9.0.

Sample Size and Power

Determining the required number of respondents was important not only to reducing the threat of sampling bias, but also generating power in the statistical tests. According to Cohen (Cohen, 1988), sample size should be determined by examining power (the probability that statistical significance will be indicated if it is present), significance criteria (alpha level), and estimated effect size between one or more of the independent variables and the dependent variable.

Cohen and Cohen (1983) have proposed standards for significance and power. Cohen suggests that just as alpha = 0.05 is used as a convention for significance, so should power of 1-B = 0.80. Because the power and significance levels reported here are generally accepted as standards, it is left to the researcher to determine effect sizes expected from the variables in question in order to determine appropriate sample size.

The effect size, Eta squared (η^2), assesses the overall strength of association between DB and stages of change. It is the percent of variance explained by stage

membership, identical to R squared in an ANOVA. Eta squared is used rather than R squared to indicate that stage is a categorical variable and cannot be translated into a correlation coefficient(r). Effect sizes can either be estimated based on research conventions, or determined directly by examining the literature for findings from previous studies involving the population and variables in question. Once determined, effect size, desired power, and significance level can be entered into sample size tables (Cohen, 1988) to determine adequate sample size for the proposed study. Cohen (1987) suggests that $\eta^2 = 0.01$ can be considered a small effect, $\eta^2 = 0.06$ can be considered a medium-sized effect, and $\eta^2 = 0.14$ a large effect. Effect size for stage of change in other research has been estimated to be moderate (0.30) (Cohen, 1987). While estimating a conservative small to moderate effect size (0.20), with a desired power of 0.80 and significance level of 0.05, Cohen and Cohen (1983) suggest that a sample size of 193 would be adequate.

For the Principal Components Analysis, Guadagnoli and Velicer (1988) suggest that a sample factor pattern becomes stable with respect to its population factor pattern with a sample size of 150. Thus, it was hoped that following the Total Design Method for implementation of a questionnaire would help to achieve a high response rate.

Controlling for Potential Bias

Bias can be introduced into the findings of survey research, particularly if the response rate achieved is low. The lower the response rate, the greater the risk that systematic non-response bias occurs. Using the Total Design Method and designing a questionnaire that is as brief as possible, it was hoped that this study would achieve at least a 50% response rate in order to give the 150 observations needed for analysis.

Attempts were made to control for non-response bias by comparing early responders with those who responded to the non-response card, using Chi square tests of independence. Once all responses were received, comparisons between respondents and non-respondents were made to assess the threat of non-response bias (Refer to Appendix G for non-response questionnaire). Since the pro and con scales were used to test for validation of the stage measure, it is important that the pros and cons were representative of the entire physician population. Thus sampling error is an important bias that requires attention.

Another potential source of bias may occur when a respondent, for whatever reason, does not answer some items on a questionnaire. According to Churchill (1987), if missing data are sporadic, as opposed to obvious non-response of sections, the reply can often be made usable by substitution of the mean. If large sections, or a large proportion of items within a section, were skipped, then the data should not be used as a bias may be introduced when the researcher attempts to draw inferences from that response. In the current study, sections with data missing are omitted in the analyses.

CHAPTER FOUR

RESULTS

Phase one of the study involved physician interviews for questionnaire item generation. Correspondence letters were sent to twenty physicians and twelve responded favorably within the time frame of the Phase I study.

Semi-structured telephone interviews were conducted with simultaneous note taking and physicians were offered a fifty dollar consulting fee for their time and input. Interviews, on an average, took 15 minutes to complete.

Phase two involved the questionnaire implementation component. A total of 309 physicians were identified from the mailing list provided by the West Virginia Office of Health Service Research. Out of 309 physicians, a total of 103 responses were received. Out of these 103 physicians, 15 were neither cardiologists, internal medicine physicians nor family physicians, 20 were retired and 11 responses were wrong mailings due to relocation or incorrect addresses. This resulted in a total of 46 (15 + 20 +11) responses from ineligible physicians. From the remaining 263 (309-46) physicians in the mailing list, a total of 57 responses were received from eligible physicians. Thus, a total of 206 (309-103) physicians who did not return the survey had unknown eligibility. Out of the 57 eligible responses, two were not usable due to large number of missing items.

Accounting for ineligible physicians from the received responses, a crude response rate of 20.97% (55/ 263) was obtained. The adjusted response rate was then calculated using standard techniques (Aday, 1989). Among the 103 physicians who

returned the surveys, 57(55.3%) were eligible. Applying the same rate to the 206 physicians with unknown eligibility, 113 were considered eligible. The total number of eligible physicians in the physician list was found to be 170 (113 eligible non-responders + 57 responders).Thus the adjusted response rate (usable surveys per estimated eligible patients) was 32.4 % (55/170).

Demographic and Practice Characteristics

A majority (85.5%) of the responses were from male physicians, compared to 14.5 % female respondents. The mean respondent age was 45.7 (SD=10.35) with the average years of practice being 19.4 (SD=11.49). Tables 2 through 5 indicate physician demographic and practice characteristics.

Regarding physician practice characteristics, 41.8% of the respondent physicians were general physicians or physicians specializing in family medicine, 36.4% were internal medicine physicians, and 10.9% were cardiologists (See Table 6). A majority (52.7%) of the respondents had either a solo, group, clinic, or office based practice, while 18.2% practiced at a hospital and 29.1% practiced at a university affiliated setting as indicated in Table 7.

Physician's readiness to prescribe the target drug therapies, assessed with the staging algorithm, indicated that a majority of physicians reported themselves in the preparation, action, or maintenance stages of readiness. Tables 8 through 10 report physicians' readiness for prescribing the target drugs for post MI patients.

Differences in proportion of physicians across stages were not evaluated by Chi-square tests due to unequal cell sizes and skewed distribution of respondent physicians towards the action/maintenance stages.

Table 2. Proportion of respondents by gender

Gender	Frequency	Percent
Male		
	47	85.5
Female	8	14.5
Total	55	100.0

Table 3. Number of new MI patients seen by the physician in a month

Category	Frequency	Percent
5 or less patients	36	65.5
more than 5	19	34.5
Total	55	100.0

Table 4. Physician age

Category	Frequency	Percent
25-34	7	12.7
35-44	19	34.5
45-54	24	43.6
55 and above	5	9.1
Total	55	100.0

Table 5. Physician years of practice

Category	Frequency	Percent
1-10	23	41.8
11-20	14	25.5
21 and above	18	32.7
Total	55	100.0

Table 6. Frequency of respondents across physician specialty

Physician specialty	Frequency	Percent
Cardiology	6	10.9
Family medicine/general physician	23	41.8
Internal medicine	20	36.4
other	6	10.9
Total	55	100.0

Table 7. Frequency of respondents across site of practice

Site of Practice	Frequency	Percent
Hospital	10	18.2
University affiliated	16	29.1
Solo/Group/Office based/Clinics	29	52.7
Total	55	100.0

Table 8. Frequency of physicians in each stage of readiness for prescribing beta-blockers

Stage of Readiness	Frequency	Percent
Precontemplation	2	3.6
Contemplation	1	1.8
Preparation	1	1.8
Action / Maintenance	51	92.7
Total	55	100.0

Table 9. Frequency of physicians in each stage of readiness for prescribing aspirin

Stage of Readiness	Frequency	Percent
Precontemplation	1	1.8
Contemplation	0	0
Preparation	0	0
Action / Maintenance	54	98.2
Total	55	100.0

Table 10. Frequency of physicians in each stage of readiness for prescribing ACE-inhibitors

Stage of Readiness	Frequency	Percent
Precontemplation	2	3.6
Contemplation	1	1.8
Preparation	1	1.8
Action / Maintenance	51	92.7
Total	55	100.0

Descriptive Statistics for the Decisional Balance Construct

The DB construct was measured using the pros and cons scales which indicated physician perceived salience for pros and cons of prescribing each of the target drug therapies. A Confirmatory Factor Analysis was performed to test if the variables loaded on the a priori factors of pros and cons. A Principal Components Analysis, using varimax rotation was used to reveal items with factor loading greater than 0.60 on any one factor. The salience for pros and cons represented by the mean scores on the Likert scale, factor loadings, and extent of common loading between factors was considered before reducing the number of items. The Kaiser-Meyer-Olkin (KMO) statistic and the Bartlett's test of sphericity was used to test sampling adequacy for factor analysis and non-collinearity of the data respectively.

Mean and Standard Deviation for Salience for Pros and Cons of Prescribing Beta-blocker Therapy

The most salient pro or the pro with highest mean score for beta-blocker therapy, was, "beta-blockers increase the chances of patient survival" (Mean = 4.76, SD=0.47) and the least salient pro was, "beta-blocker therapy plays a significant role in sympathetic heart drive" (Mean=4.11, SD=0.85). The most salient con was, "exacerbates symptoms of asthma (Mean=3.46, SD=1.06), and the least salient con was, "beta-blocker therapy can cause hypertension in the very old" (Mean=2.13, SD=1.09). See Table 11 for full results of mean pros and cons scores for beta-blocker therapy.

Principal Components Analysis for Pros and Cons for Prescribing Beta-blocker Therapy

The Principal Components Analysis (PCA) with Varimax rotation was used to identify items with high factor loadings on the a priori components of pros and cons. Initial PCA was run with 7 pros and 8 cons of beta-blocker therapy. The KMO statistic for sampling adequacy was 0.637, considered "mediocre" by Kaiser indicating that factor analysis will extract factors accounting for fair amount of variance but not a substantial amount.

The Bartlett's test of sphericity for the initial PCA resulted in a statistically significant test statistic (p=0.000) suggesting collinearity amongst the variables. The factor solution revealed two components with eigenvalues 3.864 and 3.310 explaining a cumulative variance of 44.84 percent in the correlation matrix.

An examination of the factor loadings in the rotated component matrix revealed that 6 of 8 pros and 7 of 8 cons for beta-blocker therapy had factor loadings greater than 0.60. Although the pro, "increase chances of patient survival," had a factor loading of 0.519, it was retained in the factor solution as it was the most salient pro for beta-blocker therapy.

A second PCA was run with 7 pros and 7 cons resulting in a two factor solution explaining 49.21 percent of the variance within the correlational matrix of pros and cons for beta-blocker therapy. The KMO test statistic increased to 0.718 indicating "meritorious" sampling adequacy as indicated by Kaiser criteria and the Bartlett's test statistic retained a p=0.000. The factor loadings for the retained items are indicated in Table 11.

Internal consistency was estimated with Cronbach's alpha. The 7-item pros scale had a Cronbach's alpha of 0.791, and the 7-item cons scale, 0.832.

Relationship between Decisional Balance and Stages of Change for Prescribing Beta-blocker Therapy for post MI patients

The relationship between the DB and the stages of change is conventionally assessed using a MANOVA with the pros and cons scores submitted as the dependent variables and the categorical stages of change as the independent variable. In this study, a majority of the physicians reported themselves as being in the preparation, action, or maintenance stages of readiness. This resulted in unequal cell sizes and a MANOVA model would not adequately represent variations in pros and cons across stages of change. For this reason, a descriptive approach was adopted and the relationship between the pros and cons scores and stage of change was demonstrated graphically. Table 12 indicates the mean pros and cons scores across stages of readiness. The relationship between the mean pros and cons scores and stage is demonstrated graphically in Figure 4.

Table 11. Frequency, minimum score, maximum score, mean, standard deviation for pros and cons of prescribing beta-blockers

PRO AND CON ITEM BETA-BLOCKER therapy…	N	Min Score	Max Score	Mean	Std. Deviation
PRO…increase chances of patient survival[a] (.555)	55	3.0	5.00	4.76	0.47
CON…have too many side effects[b] (.362)	54	1.0	5.0	2.65	0.87
PRO…can help prevent subsequent MI[a] (.596)	54	1.0	5.0	4.63	0.71
PRO…benefit patients with cardiac arrhythmia[a] (.626)	54	3.0	5.0	4.48	0.64
CON…produce fatigue in patients[a] (.777)	53	2.0	5.0	2.89	0.80
CON…can cause erectile dysfunction in men[a] (.772)	55	1.0	5.0	2.82	0.88
CON…exacerbate symptoms of COPD[a] (.699)	55	1.0	5.0	3.20	1.2
PRO…are generally cardioprotective[a] (.805)	55	3.0	5.0	4.56	0.57
PRO…can decrease hypertension[a] (.782)	55	3.0	5.0	4.33	0.75
PRO…are inexpensive[a] (.578)	55	1.0	5.0	3.96	0.92
PRO…reduce risk of CHF[a] (.633)	54	2.0	5.0	4.19	0.83
CON…contribute to patient depression[a] (.762)	53	1.0	5.0	2.94	0.95
PRO…play significant role in sympathetic heart drive[b] (.485)	53	2.0	5.0	4.11	0.85
CON…exacerbate symptoms of asthma (.688)	54	1.0	5.0	3.46	1.1
CON…can cause hypertension in the very old[a] (.599)	53	1.0	5.0	2.13	1.1
CON…can contribute to bradycardia (HR<60/min)[a] (.650)	55	1.0	5.0	3.36	1.2

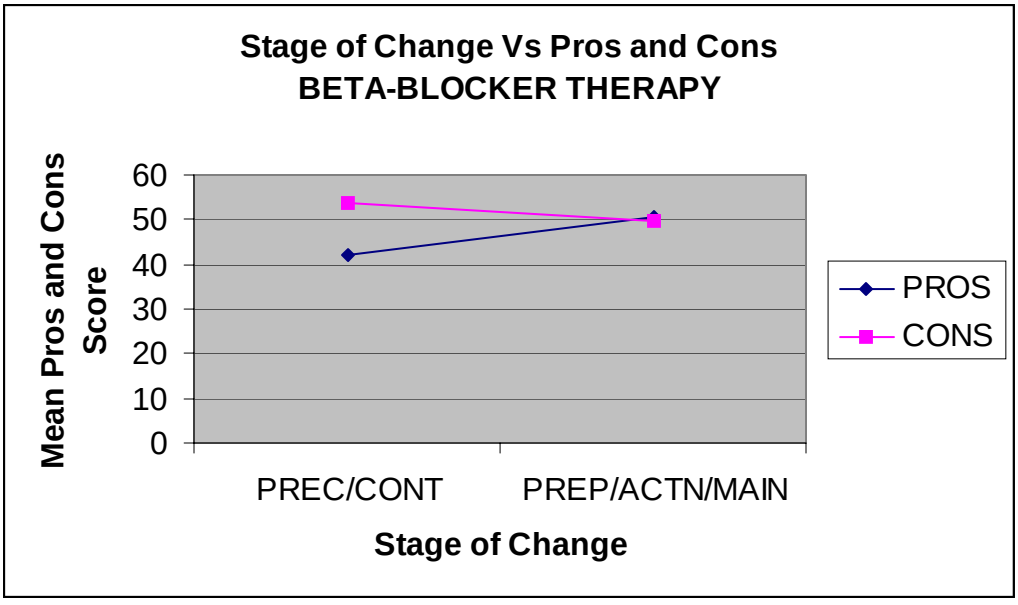
[a] Items retained after the final principal components analyses
[b] Items dropped in the final principal components analyses
[c] Mean pro score =4.37, Mean con score = 2.94

Table 12. Mean (SD) pros and cons scores across stages of readiness for beta-blocker therapy

Readiness to prescribe Beta-blockers		Mean PROS	Mean CONS
Precontemplation / Contemplation	Mean (SD)	41.96(1.9)	53.83(4.1)
	N	3	3
Preparation / Action / Maintenance	Mean (SD)	50.47(10.1)	49.76(10.2)
	N	51	47

Note. Raw PROS and CONS scores are standardized to T-scores and mean is calculated on T-scores

Figure 4. Relationship between the mean pros and cons scores and stage of readiness for prescribing beta-blocker therapy



For comparing pros scores, scores of three respondents in the precontemplation/contemplation stage were compared to scores of 51 respondents in the

preparation/action/maintenance. For comparing the cons scores, scores of three respondents in the precontemplation/contemplation stage were compared to scores of 47 respondents in the preparation/action/maintenance stage.

Relationship between Decisional Balance and Physician Practice Characteristics for Prescribing Beta-blocker Therapy for post MI patients

MANOVA for pros and cons of prescribing beta-blockers and physician years of practice

In order to compare the pros and cons for prescribing beta-blocker therapy, raw scores were converted to standardized T-scores (Mean =50, SD=10). The categorical variable of years of practice was submitted as the independent variable and the analyses were run.

To determine if the salience of pros and cons differed across categories of physician years of practice, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across years of practice categories (Box's M = 2.7, p=0.866), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros and cons scores were normally distributed (pros K-Sz=0.910, cons K-Sz=0.552).

The Pillai's Trace was used to test the significance of the model since it is the most rigorous of all tests and the most robust for detection of violation of MANOVA assumptions. The Pillai's Trace also has maximum power as compared to the popular Wilk's Lambda or the Hotelling's Trace.

The results of the MANOVA revealed that the main effect of years of practice on the mean pros and cons for prescribing beta-blockers was not statistically significant (Pillai's Trace=0.126, F=1.574, p=0.188, Eta-Squared= 0.063, observed power=0.469. Because of the statistically insignificant main effects, post hoc analyses using the Tukey's b test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing beta-blockers does not vary across physician years of practice.

Result of MANOVA: Fail to reject the null hypothesis.

MANOVA for pros and cons of prescribing beta-blockers and physician specialty

The categorical variable of physician specialty was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across physician specialty, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across physician specialty (Box's M = 12.422, p=.302), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros and cons scores were normally distributed (pros K-Sz=0.910, cons K-Sz=0.552).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician specialty on the mean pros and cons for prescribing beta-blockers were not statistically significant (Pillai's Trace= 0.234, F=2.032, p=0.069, Eta-Squared= 0.117, observed power=0.712).

Because of the statistically insignificant main effects, post hoc analyses using the Tukey's b test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing beta-blockers does not vary across physician specialty.

Result of MANOVA: Fail to reject the null hypothesis.

MANOVA for pros and cons of prescribing beta-blockers and physician practice site

The categorical variable of physician practice site was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across physician practice site, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across physician practice site (Box's M = 15.221, p=0.302), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros and cons scores were normally distributed (pros K-Sz=0.910, cons K-Sz=0.552).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician practice site on the mean pros and cons for prescribing beta-blockers were not statistically significant (Pillai's Trace=0.068, F=0.823, p=0.514, Eta-Squared= 0.034, observed power=0.254). Because of the statistically insignificant main effects, post hoc analyses using the Tukey's b test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing beta-blockers does not vary across physician practice site.

Result of MANOVA: Fail to reject the null hypothesis.

MANOVA for pros and cons of prescribing beta-blockers and number of new MI patients seen by the physician

The categorical variable of number of new MI patients seen by the physician was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across number of new MI patients seen by the physician, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across number of patients seen by the physician (Box's M = 7.289, p=0.075), indicating that the Tukey's-b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros and cons scores were normally distributed (pros K-Sz=0.910, cons K-Sz=0.552).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of number of patients seen by the physician on the mean pros and cons for prescribing beta-blockers were statistically significant (Pillai's Trace=0.143, F=3.936, p=0.026, Eta-Squared= 0.143, observed power=0.680). Post hoc tests were not conducted as the independent variable, number of patients seen by the physician, had less than three categories.

Hypothesis Tested: Salience for pros and cons for prescribing beta-blockers does not vary across number of patients seen by the physician.

Result of MANOVA: Reject the null hypothesis. Physicians seeing five or less post MI patients in a month rated the cons of prescribing beta-blocker therapy as more salient compared to physicians seeing more than five patients.

MANOVA for pros and cons of prescribing beta-blockers and physician gender

The variation in pros and cons across physician gender was not analyzed using a MANOVA due to the skewed distribution in the proportion of male and female respondents. The majority of the respondents (85.5 %) were male resulting in unequal cell sizes across two levels of the gender variable. The predictive power of the independent variable, gender, would be compromised due such differences across the proportion of males and females (Stevens, 2000). Due to this reason, variations in pros and cons scores were not assessed across gender using a MANOVA.

Mean and Standard Deviation for Salience for Pros and Cons of Prescribing Aspirin Therapy

For aspirin therapy, the most salient pro was, “decreases risk of subsequent MI” (Mean=4.80, SD=0.45) and the least salient pro was, “it can decrease hypertension” (Mean=2.22, SD=1.36). The most salient con was, “unsuitable for patients with hemorrhage problems” (Mean=3.78, SD=1.18) while, “causes increased bleeding” (Mean=2.17, SD=0.99) was the least salient con for aspirin therapy. See Table 13 for full results of mean pros and cons scores for aspirin therapy.

Principal Components Analysis for Pros and Cons for Prescribing Aspirin

The Principal Components Analysis (PCA) with Varimax rotation was used to identify items with high factor loadings on the a priori components of pros and cons. Initial PCA was run with 8 pros and 8 cons of aspirin therapy. The KMO statistic for sampling adequacy was 0.643, considered “mediocre” by Kaiser indicating that factor analysis will extract factors accounting for fair amount of variance but not a substantial amount.

The Bartlett’s test of sphericity for the initial PCA resulted in a statistically significant test statistic (p=0.000) suggesting collinearity amongst the variables. The factor solution revealed two components with eigenvalues 4.876 and 2.444 explaining a cumulative variance of 45.75 percent in the correlation matrix.

An examination of the factor loadings in the rotated component matrix revealed that 4 of 8 pros and 7 of 8 cons for aspirin therapy had factor loadings greater than 0.60. Although the con, “unsuitable for patients with hemorrhage problems,” had a factor

loading of 0.588, it was retained in the factor solution as it was the most salient con for aspirin therapy.

A second PCA was run with 4 pros and 8 cons resulting in a two factor solution explaining 53.875 percent of the variance within the correlational matrix of pros and cons for aspirin therapy. The KMO test statistic increased to 0.658 and the Bartlett's test statistic retained a significant p value (p=0.000). The factor loadings for the retained items are indicated in Table 13.

Internal consistency was estimated with Cronbach's alpha. The 4-item pros scale had a Cronbach's alpha of 0.791; and the 8-item cons scale, 0.839.

Relationship between Decisional Balance and Stages of Change for Prescribing Aspirin Therapy for post MI patients

The relationship between the DB and the stages of change is conventionally assessed using a MANOVA with the pros and cons scores submitted as the dependent variable and stages of change as the independent variable. In this study, a majority of the physicians self-reported themselves as being in the preparation, action, or maintenance stages of readiness. This resulted in unequal cell sizes and a MANOVA model would not adequately represent variations in pros and cons across stages of change. For this reason, a descriptive approach was adopted and the relationship between the pros and cons scores and stage of change was demonstrated graphically. Table 14 reports the mean pros and cons scores across stages of readiness.

The relationship between mean pros and cons scores and stage of readiness for prescribing aspirin is demonstrated graphically in Figure 5.

Table 13. Frequency, minimum score, maximum score, mean, standard deviation for pros and cons of prescribing aspirin

PRO AND CON ITEM ASPRIN therapy…	N	Min Score	Max Score	Mean	Std. Deviation
PRO…decreases risk of subsequent MI[a] (.788)	55	3.0	5.0	4.80	0.45
PRO…is inexpensive[b] (.499)	54	2.0	5.0	4.52	0.77
PRO…decreases platelet aggregation[a] (.727)	55	2.0	5.0	4.64	0.62
CON…causes bleeding and ulceration[a] (.643)	55	1.0	5.0	3.29	1.13
PRO…is beneficial to arthritic patients[b] (.407)	55	1.0	5.0	2.75	1.24
PRO…is tolerated in many patients[b] (.457)	55	2.0	5.0	4.26	0.76
PRO…reduces vascular mortality[a] (.749)	54	2.0	5.0	4.52	0.72
PRO…reduces risk of stroke[a] (.898)	53	3.0	5.0	4.70	0.54
PRO…can decrease hypertension[b] (.332)	54	1.0	5.0	2.22	1.36
CON…causes increased bleeding[a] (.626)	54	1.0	5.0	2.17	0.99
CON…cannot be used in patients with ulcers[a] (.634)	54	2.0	5.0	3.32	1.03
CON…is not suitable for older patients[a] (.730)	53	1.0	5.0	2.39	1.29
CON…unsuitable for patients susceptible to allergic reactions[a] (.630)	54	1.0	5.0	3.54	1.38
CON…cannot be used for patients with thrombocytopeni[a] (.750)	54	1.0	5.0	3.26	1.22
CON…not suitable for patients with asthma[a] (.790)	52	1.0	5.0	2.81	1.33
CON…unsuitable for patients with hemorrhage problems[a] (.757)	54	1.0	5.0	3.78	1.18

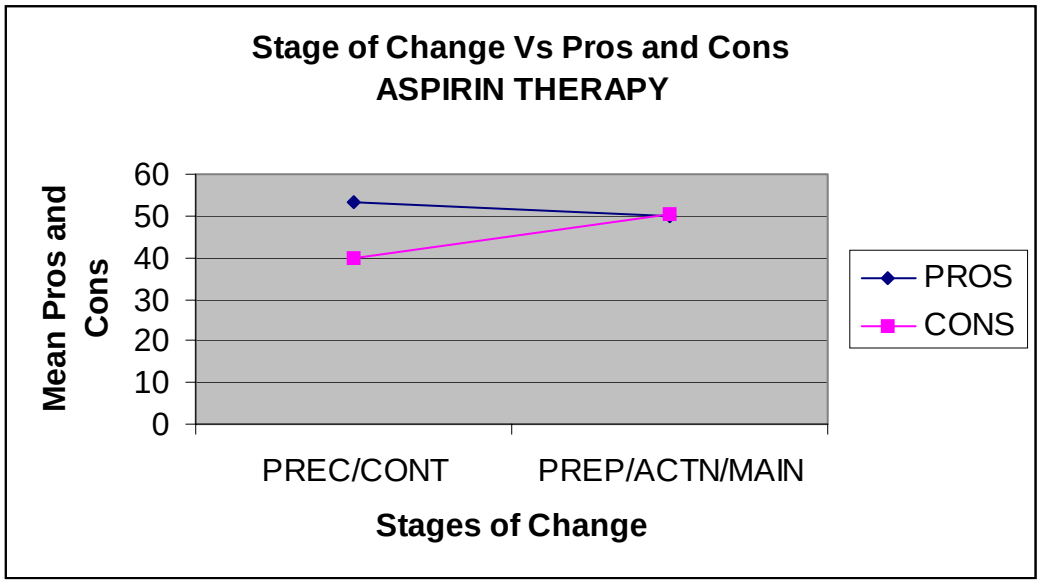
[a] Items retained in the final principal components analyses
[b] Items dropped in the final principal components analyses
[c] Mean pros score= 4.05, Mean cons score=3.07

Table 14. Mean (SD) pros and cons scores across stages of readiness for prescribing aspirin

Readiness to prescribe Aspirin		Mean PROS	Mean CONS
Precontemplation / Contemplation	Mean (SD)	53.29	39.89
	N	1	1
Preparation / Action / Maintenance	Mean (SD)	49.93 (10.1)	50.19 (9.9)
	N	50	51

Note. Raw PROS and CONS scores are standardized to T-scores and mean is calculated for T-scores

Figure 5. Relationship between the mean pros and cons scores and stage of readiness for prescribing aspirin



For comparing pros scores, score of one respondent in the precontemplation/contemplation stage were compared to scores of 50 respondents in the preparation/action/maintenance. For comparing the cons scores, score of one respondent in the precontemplation/contemplation stage were compared to scores of 51 respondents in the preparation/action/maintenance stage.

Relationship between Decisional Balance and Physician Practice Characteristics for Prescribing Aspirin Therapy for post MI patients

MANOVA for pros and cons of prescribing aspirin and physician years of practice

In order to compare the pros and cons for prescribing aspirin therapy, raw scores were converted to standardized T-scores (Mean =50, SD=10). The categorical variable of years of practice was submitted as the independent variable and the analyses were run.

To determine if the salience of pros and cons differed across categories of physician years of practice, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were unequal across years of practice categories (Box's M = 14.81, p=0.032), indicating that the Dunnett's T3 test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.461).

The Pillai's Trace was used to test the significance of the model since it is the most rigorous of all tests and the most robust for detection of violation of MANOVA assumptions. The Pillai's Trace also has maximum power as compared to the popular Wilk's Lambda or the Hotelling's Trace.

The results of the MANOVA revealed that the main effects of years of practice on the mean pros and cons for prescribing aspirin were statistically significant (Pillai's Trace= 0.346, F=4.81, p=0.001, Eta-Squared= 0.173, observed power=0.946).

Hypothesis Tested: Salience for pros and cons for prescribing aspirin does not vary across physician years of practice.

Result of MANOVA: Reject the null hypothesis. Physicians with 1 to 10 years in practice rated pros of aspirin as more salient compared to physicians with 21 or more years of practice. Also, physicians with more than 21 years in practice rated cons for aspirin therapy as more salient compared to physicians with 11 to 20 years of practice.

MANOVA for pros and cons of prescribing aspirin and physician specialty

The categorical variable of physician specialty was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable

To determine if the salience of pros and cons differed across physician specialty, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across physician specialty (Box's M = 4.76, p=0.655), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.461).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician specialty on the mean pros and cons for prescribing aspirin were not statistically significant (Pillai's Trace= 0.213, F=1.788, p=0.110, Eta-Squared= 0.107, observed power=0.645).

Because of the statistically insignificant main effects, post hoc analyses using the Tukey's b test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing aspirin does not vary across physician specialty

Result of MANOVA: Failed to reject the null hypothesis

MANOVA for pros and cons of prescribing aspirin and physician practice site

The categorical variable of physician practice site was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across physician practice site, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were unequal across physician practice site (Box's M = 12.232, p=0.082), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.461).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician practice site on the mean pros and cons for prescribing aspirin were not statistically significant (Pillai's Trace= 0.128, F=1.576, p=0.187, Eta-Squared= 0.064, observed power=0.469). Because of the statistically insignificant main effects, post hoc analyses using the Dunnett's T3 test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing aspirin does not vary across physician practice site

Result of MANOVA: Failed to reject the null hypothesis

MANOVA for pros and cons of prescribing aspirin and number of new MI patients seen by the physician

The categorical variable of new MI patients seen by the physician was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across number of new MI patients seen by the physician, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across number of patients seen by the physician (Box's M = 4.223, p=0.262), indicating that the Tukey's-b be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.461).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of number of patients seen by the physician on the mean pros and cons for prescribing aspirin were not statistically significant (Pillai's Trace=0.078, F=1.957, p=0.153, Eta-Squared=0.078, observed power=0.385). Post hoc tests were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing aspirin does not vary across number of new MI patients seen by the physician.

Result of MANOVA: Failed to reject the null hypothesis.

MANOVA for pros and cons of prescribing aspirin and physician gender

The variation in pros and cons across physician gender was not analyzed using a MANOVA due to the skewed distribution in the proportion of male and female respondents. The majority of the respondents (85.5 %) were male resulting in unequal cell sizes across two levels of the gender variable. The predictive power of the independent variable, gender, would be highly compromised due such differences across the proportion of males and females (Stevens, 2000). Due to this reason, variations in pros and cons scores were not assessed across gender using a MANOVA.

Mean and Standard Deviation for Salience for Pros and Cons of Prescribing ACE-inhibitor Therapy

For ACE-inhibitor therapy, the most salient pros were, “have favorable mortality risk reduction” (Mean=4.55, SD=0.69) and, “are effective in patients with LVD” (Mean=4.55, SD=0.64); “prevent stroke” was the least salient pro. The most salient con was, “cannot be used in patients with angiodema” (Mean=3.79, SD=1.15); the least salient con was, “cannot be used in patients with Type II diabetes” (Mean=1.65, SD=1.32). See table 15 for full results of mean pros and cons scores for ACE-inhibitor therapy.

Principal Components Analysis for Pros and Cons for Prescribing ACE-inhibitors

The Principal Components Analysis (PCA) with varimax rotation was used to identify items with high factor loadings on the a priori components of pros and cons. Initial PCA was run with 5 pros and 9 cons of ACE-inhibitor therapy. The KMO statistic for sampling adequacy was 0.649, considered “mediocre” by Kaiser indicating that factor analysis will extract factors accounting for fair amount of variance but not a substantial amount.

The Bartlett’s test of sphericity for the initial PCA resulted in a statistically significant test statistic (p=0.000) suggesting collinearity amongst the variables. The factor solution revealed two components with eigenvalues 3.937 and 2.622 explaining a cumulative variance of 46.85 percent in the correlation matrix.

An examination of the factor loadings in the rotated component matrix revealed that 4 of 5 pros and 4 of 9 cons for ACE-inhibitor therapy had factor loadings greater than 0.60. Although the pro, “have favorable mortality risk reduction” had a factor

loading of 0.408, it was retained in the factor solution as it was the most salient pro for ace-inhibitor therapy.

A second PCA was run with 5 pros and 4 cons resulting in a two factor solution explaining 57.524 percent of the variance within the correlational matrix of pros and cons for ACE-inhibitor therapy. The KMO test statistic indicated that sampling adequacy was "mediocre" and the Bartlett's test statistic retained a statistically significant (p=0.000). The factor loadings for the retained items are indicated in the Table 15

Internal consistency was estimated with Cronbach's alpha. The 5-item pros scale had a Cronbach's alpha of 0.712; the 4-item cons scale, 0.809.

Relationship between Decisional Balance and Stages of Change for Prescribing ACE-inhibitor Therapy for post MI patients

The relationship between the decisional balance and the stages of change is conventionally assessed using a MANOVA with the pros and cons scores submitted as the dependent variable and the categorical stages of change variable is used as the independent variable. In this study, a majority of the physicians self-reported themselves as being in the preparation, action, or maintenance stages of readiness. This resulted in unequal cell sizes and a MANOVA model would not adequately represent variations in pros and cons across stages of change. For this reason, a descriptive approach was adopted and the relationship between the pros and cons scales and stage of change was demonstrated graphically. Table 16 indicates the mean pros and cons scores across stages of readiness. The relationship between mean pros and cons score and stage of readiness for prescribing ACE-inhibitors is demonstrated graphically in Figure 6.

Table 15. Frequency, minimum score, maximum score, mean, standard deviation for pros and cons of prescribing ACE-inhibitors

PRO AND CON ITEM ACE-INHIBITOR therapy…	N	Min Score	Max Score	Mean	Std. Deviation
PRO…have favorable mortality risk reduction[a] (.491)	55	3.0	5.0	4.55	0.69
CON…result in significant number of patients developing cough[b] (.552)	55	1.0	5.0	2.87	1.00
CON…are expensive[a] (.588)	55	1.0	5.0	3.26	1.02
PRO…prevent stroke[a] (.660)	52	1.0	5.0	3.40	1.36
PRO…assist in good blood pressure control[a] (.718)	54	3.0	5.0	4.35	0.73
PRO…are effective in patients with LVD[a] (.789)	53	3.0	5.0	4.55	0.64
CON…increase risk of developing hypokalemia[a] (.873)	52	1.0	5.0	2.14	1.24
CON…increase risk of developing hypotension[a] (.851)	53	1.0	5.0	2.68	1.03
PRO…reduce risk of developing severe CHF[a] (.770)	53	1.0	5.0	4.47	0.79
CON…cannot be used in patients with renal artery stenosis[b] (common loadings)	53	1.0	5.0	3.38	1.15
CON…cannot be used in patients with previous renal failure[a] (.801)	52	1.0	5.0	3.17	1.15
CON…cannot be used in patients with angiodema[b] (.194)	52	1.0	5.0	3.79	1.29
CON…cannot be used in patients with Type II diabetes[b] (.486)	51	1.0	5.0	1.65	1.32
CON…cannot be used in patients with allergic responses[b] (.553)	53	1.0	5.0	3.57	1.39

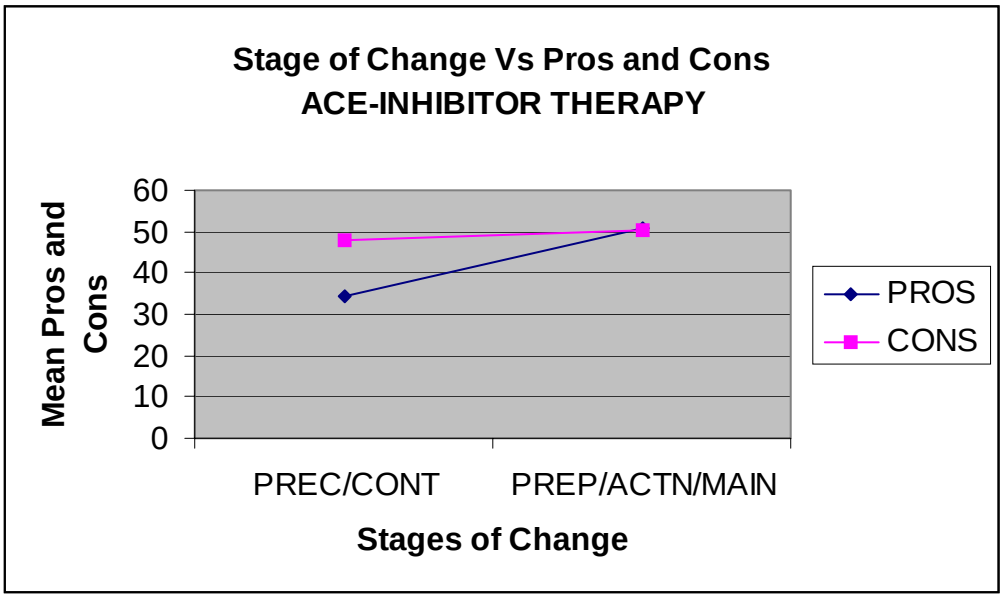
[a] Items retained after the final principal components analyses
[b] Items dropped in the final principal components analyses
[c] Mean pro score=4.26, Mean con score=2.95

Table 16. Mean (SD) pros and cons scores across stages of readiness for prescribing ACE-inhibitors

Readiness to prescribe ACE-inhibitors		Mean PROS	Mean CONS
Precontemplation / Contemplation	Mean (SD)	34.46(9.5)	47.71(14.6)
	N	3	2
Preparation / Action / Maintenance	Mean (SD)	50.95 (9.3)	50.10 (9.9)
	N	49	48

Note. Raw PROS and CONS scores are standardized to T-scores and mean is calculated on T-scores

Figure 6. Relationship between the mean pros and cons scores and stage of readiness for prescribing ACE-inhibitors.



For comparing pros scores, scores of three respondents in the precontemplation/contemplation stage were compared to scores of 48 respondents in the preparation/action/maintenance. For comparing the cons scores, scores of two

respondents in the precontemplation/contemplation stage were compared to scores of 49 respondents in the preparation/action/maintenance stage.

Relationship between Decisional Balance and Physician Practice Characteristics for ACE-inhibitor Therapy for post MI patients

MANOVA for pros and cons of prescribing ACE-inhibitors and physician years of practice

In order to compare the pros and cons for prescribing ACE-inhibitor therapy, raw scores were converted to standardized T-scores (Mean =50, SD=10). The categorical variable of years of practice was submitted as the independent variable and the analyses were run.

To determine if the salience of pros and cons differed across categories of physician years of practice, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were unequal across years of practice categories (Box's M = 12.99, p=0.059), indicating that the Tukey's b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.729).

The Pillai's Trace was used to test the significance of the model since it is the most rigorous of all tests and robust to violation of MANOVA assumptions. The Pillai's Trace also has maximum power as compared to the popular Wilk's Lambda or the Hotelling's Trace.

The results of the MANOVA revealed that the main effects of years of practice on the mean pros and cons for prescribing ACE-inhibitors were statistically significant (Pillai's Trace= 0.286, F=3.83, p=0.006, Eta-Squared= 0.143, observed power=0.881). Hypothesis Tested: Salience for pros and cons for prescribing ACE-inhibitors does not vary across physician year of practice

Result of MANOVA: Reject the null hypothesis. Salience for pros and cons scores varies across number of years of practice. Post hoc analyses reveal that physicians with 1 to 10 years in practice rate pros of ACE-inhibitor therapy as more salient compared to physicians with 21 years or more in practice.

MANOVA for pros and cons of prescribing ACE-inhibitors and physician specialty

The categorical variable of physician specialty was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across physician specialty, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across physician specialty (Box's M = 6.061, p=0.508), indicating that the Tukey's b test be used in post hoc analyses The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.729).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician specialty on the mean pros and cons for prescribing ACE-inhibitors were not statistically significant (Pillai's Trace= 0.165, F=1.351, p=0.243, Eta-Squared= 0.083, observed power=0.504). Because of the statistically insignificant main effects, post hoc analyses using the Tukey's b test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing ACE-inhibitor does not vary across physician specialty

Result of MANOVA: Failed to reject the null hypothesis

MANOVA for pros and cons of prescribing ACE-inhibitors and physician practice site

The categorical variable of physician practice site was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across physician practice site, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were unequal across physician practice site (Box's M = 16.744, p=0.018), indicating that the Dunnett's T3 test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.729).The Pillai's Trace was used to test the significance of the model.

The results of the MANOVA revealed that the main effects of physician practice site on the mean pros and cons for prescribing ACE-inhibitors were not statistically significant (Pillai's Trace= 0.107, F=1.305, p=0.274, Eta-Squared= 0.054, observed power=0.393). Because of the statistically insignificant main effects, post hoc analyses using the Dunnett's T3 test were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing ACE-inhibitor does not vary across physician practice site.

Result of MANOVA: Failed to reject the null hypothesis.

MANOVA for pros and cons of prescribing ACE-inhibitors and number of new MI patients seen by the physician

The categorical variable of number of new MI patients seen by the physician was submitted as the independent variable and analyses were run after submitting the standardized mean pros and cons score as the dependent variable.

To determine if the salience of pros and cons differed across number of patients seen by the physician, MANOVA was performed. Box's test revealed that observed covariance matrices of mean pros and cons were equal across number of patients seen by the physician (Box's M = 5.372, p=0.164), indicating that the Tukey's-b test be used in post hoc analyses. The Kolmogorov-Smirnov Test used for testing the normality assumption of the dependent variables indicated that the mean pros were not distributed normally (pros K-Sz= 2.13) while the cons scores were normally distributed (cons K-Sz=0.729).The Pillai's Trace will be used to test the significance of the model since it is the most rigorous of all tests and robust to violation of assumptions.

The results of the MANOVA revealed that the main effects of number of patients seen by the physician on the mean pros and cons for prescribing ACE-inhibitors were not statistically significant (Pillai's Trace= 0.027, F=0.649, p=0.527, Eta-Squared= 0.027, observed power=0.152). Post hoc tests were not conducted.

Hypothesis Tested: Salience for pros and cons for prescribing ACE-inhibitor does not vary across number of new MI patients seen by the physician.

Result of MANOVA: Failed to reject the null hypothesis.

MANOVA for pros and cons of prescribing ACE-inhibitors and physician gender

The variation in pros and cons across physician gender was not analyzed using a MANOVA due to the skewed distribution in the proportion of male and female respondents. The majority of the respondents (85.5 %) were male resulting in unequal cell sizes across two levels of the gender variable. The predictive power of the independent variable, gender, would be highly compromised due such differences across the proportion of males and females (Stevens, 2000). Due to this reason, variations in pros and cons scores were not assessed across gender using a MANOVA.

Non-response Bias

Non-response bias can be introduced into a study when the responders have characteristics that are different from those who did not respond. For the purpose of assessing the non-response bias, the non-responders are sent a brief questionnaire which typically contains items on respondent characteristics such as age, gender, other relevant characteristics and reasons for not responding to the entire questionnaire.

For the purpose of this study, a non-response card was mailed to all the non-respondent physicians to collect information on years of practice, gender, specialty, site of practice and reasons for non-response (See Appendix I for the non-response card used in this study). A total of 17 non-response cards were received resulting in 14 usable non-response cards. Comparisons between respondents and non-respondents were made using cross-tab Chi-square tests; Fisher's Exact tests were used when tables had a cell with an expected frequency of less than five.

The crosstabs indicated that the respondent population was not statistically different from the non-respondents population on years of practice (Pearson Chi-Square=5.91, p=0.241), gender (Fisher's Exact, p=0.245), specialty (Pearson Chi Square=1.297, p=0.730) and site of practice (Pearson Chi Square=2.665, p=0.264).

The most common reasons cited for not responding to the survey were lack of time, lengthy questionnaire and not responding to survey questionnaires in general.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

In general behavior change initiatives, stage-matched intervention research using the TTM has been proven to have better results in bringing about general behavior change in individuals compared to conventional action-oriented interventions. Prochaska (1979) reported that action-oriented strategies, which try to move individuals who are not ready for change directly to the action or maintenance stage, might produce more resistance to change. Further, stage-matched interventions allow all individuals to participate at some level in the behavior change process even if they are less motivated to bring about the behavior change. Studies specific to physician prescribing behavior also suggest that the success of interventions depends on physician readiness to change (Armstrong, Reyburn, & Jones, 1996; Cantillon, & Jones, 1999). The purpose of this study was to develop and validate a measure to assess physician readiness to prescribe target drug classes for post MI patients.

In this study, constructs of the TTM were used to categorize physicians into various stages of change for prescribing target drug classes for post MI patients. Results of this study indicated that salience for the pros and cons of prescribing target drug classes supports physicians' readiness for change in the direction expected. Results of this study report that salient pros for prescribing the target drugs for post MI patients were mainly focused on the overall improvement in patient outcomes such as increase in patient survival with beta-blockers, decrease in risk of subsequent MI with aspirin therapy, and favorable mortality risk reduction with ACE-inhibitors.

The salient cons for target drugs classes mainly reflected side effects or contraindications. This suggested that a possible under-utilization might exist as a result of physicians not prescribing target drug classes due to the perceived side-effects or contraindications in patients. This finding parallels results from previous studies indicating under-use of post MI life-saving drugs due to their perceived side effects and contraindications in patients (Krumholz, 1998; Pitt, 1997).

Previous studies have reported that beta-blockers have been under-utilized in high-risk patients presenting with conditions such as asthma and COPD. Although benefit of beta-blocker use in high risk patients has been documented, beta-blocker therapy continues to be under-utilized. Gottlieb and colleagues (1998) substantiated the benefit of beta-blocker use in post MI patients with asthma by reporting that risk of death at two years from hospital discharge for post MI asthmatic patients receiving beta-blockers was 11.9% as compared to 19.7% for a similar group of patients not receiving beta-blockers at discharge.

An interesting finding of this study draws attention to the most salient con for beta-blocker therapy. Respondents reported “beta-blockers exacerbate symptoms of asthma” as the most salient con even though the literature and national guidelines suggest benefits of beta-blocker usage in asthmatic patients. Having recognized the high salience for the “beta-blockers exacerbate symptoms of asthma” con, increasing knowledge on the benefits of beta-blocker use in high risk patients can serve as a focal point for intervention research.

High salience for cons suggested that respondents may be in the earlier stages of readiness for prescribing beta-blocker therapy. However, physicians self-reported in later

stages of readiness, indicating a possibility of social desirability bias on the part of respondents. This bias may have caused the physicians to self-report in action or maintenance stages when their salience for beta-blocker prescribing may have indicated an early stage of readiness for prescribing beta-blockers.

Since the purpose of this study was instrument development, reliability of the questionnaire was evaluated. Cronbach's alpha served as a measure to evaluate how consistently individual items on questionnaire measured the same underlying characteristic or concept (Huck, 2000). Cronbach's alpha, representing the internal consistency reliability for the pros and cons scales, indicated favorable scores across all the target drug class pros and cons scales. Previous studies (Prochaska et. al, 1994) using the TTM for various problem behaviors have reported internal consistency scores for decisional balance pros and cons scales varying from 0.75 to 0.95. In this study, the reliability estimates for the pros and cons scales for three target drugs varied from 0.712 to 0.839 indicating good internal consistencies similar to those found in other TTM studies.

Relationship between the DB and stage of change is conventionally presented by assessing the variation in pros and cons scores across the stage measure. The pros and cons scores are two dimensions of the DB construct and are submitted as the dependent variables in MANOVA; the independent variable is defined by the stage measure. In this study, the relationship between the DB and the stage measure could not be demonstrated statistically. MANOVA results are robust when the group sizes across the independent variable are equal. Since the majority of the physicians self-reported in the action and maintenance stages, a skewed distribution of group size across stages of change was

obtained. Thus variation in DB scores across stage could not be observed using MANOVA.

One of the study objectives was to evaluate variation in pros and cons scores across physician characteristics. Sample size in this study was adequate for this analysis; separate MANOVAs were run for each physician characteristic for each target drug class. Results indicated that physicians seeing five or fewer new post MI patients per month rated the cons of prescribing beta-blockers as more salient compared to physicians seeing more than five post MI patients per month. According to the TTM literature, this finding suggested that physicians seeing less than five new MI patients a month are more likely to be in the earlier stages of change for prescribing beta-blocker therapy as their salience for cons of beta-blocker therapy was significantly higher than physicians seeing more than five new MI patients a month. This result also suggested that physicians seeing few MI patients might be less aware of the benefits of beta-blocker therapy and are likely to under-utilize this therapy.

Statistically significant variance in salience for the pros of prescribing aspirin across physician years of practice was also observed. Physicians with 1 to 10 years of practice rated the salience for pros of prescribing aspirin therapy higher than physicians with 21 or more years of experience. Further investigation would be required to elucidate the reasons for such a difference since previous studies have not reported similar findings. Physicians with more than 21 years of experience rate cons of aspirin therapy more salient compared to physicians with 11 to 20 years of practice.

The MANOVA for effect of physician years of practice on pros and cons for ACE-inhibitor therapy resulted in a significant main effect. Physicians with 1 to 10 years

of practice rated the pros of prescribing ACE-inhibitors more salient compared to physicians with 21or more years of practice.

Variation in pros and cons across other physician characteristics, such as physician specialty and physician site of practice, was tested. It was expected that cardiologists would rated the pros of prescribing the target drug classes higher, and the cons of prescribing the target drug classes lower than family practitioners and internal medicine physicians. Although the literature documents a relationship between physician specialty and prescribing behavior for post MI patients, with specialists more likely to prescribe target drug classes to post MI patients than to family practitioners and general internists (Ayanian, et. al., 1994), the results of this study fail to demonstrate a similar finding.

Various reasons could be attributed to non significant results differences in variation for the pros and cons scores across physician specialty and practice site.

The small sample size resulted in low power, making it difficult to detect any significant differences when they actually could have existed; this may have contributed to the non significant results of the MANOVA. A low response rate reduced the power dramatically resulting in tests having a low probability of rejecting the null hypothesis when it could be false. Although a larger sample size would be required to establish a statistical relationship between stage and DB, this study reflects a trend in DB score and the stage of readiness as documented in the TTM literature.

Implications of the Methods used

Methods employed in this study were aimed at designing a valid and reliable measure to categorize physicians into various stages of change. The application of the TTM and the DB construct, in particular, to understanding and predicting physician prescribing behavior for post MI patients is justified in the literature. Physician decision-making involves weighing of the pros and cons of prescribing a particular drug class, and the salience attributed to pros and cons should predict a physician's stage of readiness. Although a larger sample size would be required to establish a statistical relationship between stage and DB, this study reflects a trend in DB score and the stage of readiness as documented in the TTM literature.

Instrument validity was evaluated based on content, construct, and criterion validity. An instrument's standing with respect to content validity is based on the subjective opinion of experts after comparing the content of the instrument to an outline of the domains sought to be measured in the questionnaire (Huck, 2000). Along these lines, the instrument analyzed in this study was subject to review by experts and modifications in the questionnaire were made based on recommendations by them. Claims for construct validity cannot be made on the basis of the analyses in this study as it would require replication of appropriate statistical results for the relationship between DB and the stage of change for prescribing medications for post MI patients.Claims for criterion validity could not be presented as the low sample size did not permit the statistical analyses required to establish a relationship between DB and the stage measures. Attempts to achieve face validity were made in the questionnaire development

stage through interviews, expert panel recommendations, and pre-testing. The instrument was tested for internal consistency and favorable Cronbach's alpha scores for the pros and cons scales indicated that items in the pros and cons scales consistently measured the same construct.

Limitations

Limitations of the study mainly concern the issue of small sample size and the practical significance of results obtained under reduced statistical power.

First, the reader is cautioned regarding decreased power of the statistical procedures due to low sample size. The power of a statistical test is the probability that, when the null hypothesis is false, the test will reject that hypothesis. A test capable of detecting small deviations from the null hypothesis is considered powerful. In this study, due to low sample size of respondents, power of statistical tests was reduced greatly, resulting in failure to detect the hypothesized relationships between physician practice characteristics and physician prescribing behavior as documented in the literature. Variable relationships with statistically significant results, even with reduced power, are particularly noteworthy.

Second, an important consideration in survey research is the potential for self-reporting bias. Self-reporting bias might have influenced the responses of physicians on the questionnaire. Physicians might have falsely reported themselves in the action or maintenance stages of change under the influence of marking the response options which are socially desirable, posing a threat to validity of study results. Instruments used to measure social desirability in respondents were not incorporated in this questionnaire; thus extent of socially desirable responses on the survey items was not assessed.

Third, the use of a convenience sample of physicians renders limited generalizability to the study results. The readers are cautioned before making generalizations of physician practice characteristics for secondary prevention of MI to the entire physician population in WV. It was observed that a large number of physicians on

the mailing list were not eligible respondents. Physicians were considered ineligible if they had retired, relocated or did not see MI patients. Due to inaccuracy in the mailing list, a significant proportion of the questionnaires were sent out to ineligible physicians. This resulted in a small number of eligible physicians responding to the survey.

Fourth, in the TTM literature, validation of the stage measure is also conducted with the use of the self-efficacy construct and the processes of change. The processes of change and the self-efficacy construct are excellent predictors of stage of change and are used in stage validation studies. Use of these constructs would require substantially more items in the questionnaire making it significantly longer. In the interest of questionnaire brevity, only the DB construct was used to validate the stage measure.

Fifth, the sampled physicians may exhibit prescribing characteristics different from those of physicians practicing in the rural areas of WV. Physicians from North/Central WV have proximity to universities and other major medical facilities, and their prescribing patterns might be different due to this fact. This may result in different knowledge, attitudes, and beliefs regarding post MI drug therapies and may have contributed to the skewed distribution in the respondent's stage of readiness of change for prescribing them. In addition, physicians receiving medical training from countries other than the U.S. could have prescribing patterns different from physicians receiving medical education within the U.S. health system and it would be interesting to address this question in future studies.

Future Research Direction

Future studies should be undertaken and designed to account for the limitations encountered in this study.

A method of validating physician responses with the use of medical charts and data on physician prescribing habits could be employed, serving as a check on self-reporting bias and response choices under the potential influence of social-desirability.

A large number of physicians on the mailing list were not eligible respondents. A checks on the mailing list should be conducted before mailing the questionnaires to ensure that only the eligible population of interest is included in the mailing list.

For the purpose of documenting the relationship between stage and DB, a larger mail out is recommended, incorporating physicians from urban and rural communities. A larger sample size would make the statistical tests more robust, and thus, main effects as well as interaction effects on the decisional balance measure could be studied.

Thus, future studies should be aimed at establishing statistical evidence for the relationship between DB and the stage measure for prescribing the target drug therapies for post MI patients.

Conclusion

This pilot study may be viewed as a stepping stone to further investigate the relationship between stages of readiness for prescribing beta-blockers, aspirin, and ACE-inhibitors for post MI patients and the DB construct. Based on study results, intervention researchers are directed towards designing interventions targeted to increasing physician knowledge of the benefits from use of post MI medications, even in high-risk patients. Increasing knowledge regarding national practice guidelines for management of post MI patients could also be targeted.

Categorizing physicians in stages of readiness can be useful in delivering tailored interventions of proven benefit instead of conventional, action-oriented interventions to change inappropriate physician prescribing habit. Keeping patient outcomes paramount, prescribing the target drug classes in accordance with national practice guidelines could result in significant savings due to reduced patient morbidity and mortality and could reduce societal expenditure.

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APPENDICES

APPENDIX A: PHASE ONE ADVANCE LETTER

October, 2002

This letter is being sent to request your professional consultation on a research project conducted through the School of Pharmacy at West Virginia University (WVU). You have been recommended to us as someone who is recognized as a prominent practitioner in the treatment of myocardial infarction (MI). I am an assistant professor in the School of Pharmacy, conducting research as partial fulfillment for a WVU research grant to study patterns of long-term medication therapy for patients who have had an MI. I and two of my graduate students will be conducting ten to fifteen minute telephone consultations with physicians to gain an understanding of perceptions and attitudes about prescribing medications for heart attack patients. You are one of only 40 physicians being invited to participate in this study. A $50 consulting fee will be sent from WVU as compensation for your valuable time.

If you decide to participate, your name will not appear on the notes we are taking, so all answers will remain confidential. You do not have to answer every question, and participation in the consultation is voluntary. You may choose not to participate at any time during the interview; however, after you have provided the information, it will become anonymous and you will be unable to withdraw your data since there will be no way to identify individual information. If you choose not to participate, this will not jeopardize in any way your relationship with West Virginia University and/or the School of Pharmacy.

We will call your receptionist/administrator to make an appointment to consult with you for about ten to fifteen minutes in the coming weeks; please let him/her know if you would like to participate so that he/she will be able to schedule an appointment for the telephone consultation when we call. If you have any questions, please contact me (Jan Kavookjian, Ph.D., 304-293-1453).

Thank you for your consideration.
Sincerely,

Jan Kavookjian, Ph.D.
Assistant Professor

APPENDIX B: PHASE ONE TELEPHONE SURVEY APPOINTMENT SCRIPT

Telephone Script to Ask Receptionist to Set up Telephone Appointment with the Physician

Hello, my name is _____. I am a graduate student/faculty member in the School of Pharmacy at West Virginia University. I am currently working on a research project with Dr. Jan Kavookjian, a faculty member in the School of Pharmacy/I am a faculty member in the School of Pharmacy, currently working on a research project. We recently sent you a letter describing our research project, and asking for time to consult with [your physician]. We are conducting a ten to fifteen minute telephone interview regarding physician perceptions and attitudes about prescribing long-term drug therapy to patients who've had a heart attack. As stated in the letter, there is a $50 consulting fee that will be sent from WVU as compensation for [your physician's] valuable time. Neither your name nor his/her name will appear on the notes we are taking, so all answers will remain confidential. The physician does not have to answer every question, and participation in the interview is voluntary. If your physician chooses not to participate, this will not jeopardize in any way his or your relationship with West Virginia University and/or the School of Pharmacy. May we make an appointment to consult with [your physician] for about ten to fifteen minutes in the coming weeks?

Telephone Script to Introduce the Study to the Physician before the Interview

Hello, my name is _____. I am a graduate student/faculty member in the School of Pharmacy at West Virginia University. I am currently working on a research project with Dr. Jan Kavookjian, a faculty member in the School of Pharmacy/I am a faculty member in the School of Pharmacy, currently working on a research project. We recently mailed you a letter describing our research project, and asking for time to consult with you. Your name will not appear on any of the notes we are taking, so all answers will remain confidential. You do not have to answer every question, and participation in the interview is voluntary. If you choose not to participate, this will not jeopardize in any way your relationship with West Virginia University and/or the School of Pharmacy.

APPENDIX C: PHASE ONE STANDARDIZED TELEPHONE INTERVIEW PROTOCOL

Current prescribing pattern

How many post-Myocardial Infarction (MI) patients do you see in a month?

What treatment options do you prescribe for long-term management of post-Myocardial Infarction patients?

PROBE: beta-blockers, aspirin, and ACE inhibitors

Under what indications do you prescribe beta-blockers for long-term management of post-MI patients?
PROBE: Heart Failure, Coronary Artery Disease

If you do not prescribe, what are those clinical conditions?
PROBE: Severe Asthma, Complete AV Block, Bradycardia (HR<60/min)

What are the pros for prescribing beta-blockers post-MI?
PROBE: Increases patients' life years

What are the cons for prescribing beta-blockers post-MI?

What are the indications for prescribing aspirin post-MI?

What are the pros for prescribing aspirin to post-MI?
PROBE: Inexpensive therapy

What are the cons for prescribing aspirin post-MI?
PROBE: Gastrointestinal bleeding and ulcer formation

Under what indications do you prescribe ACE-inhibitors?

What are the pros for prescribing ACE-inhibitors to post-MI?
PROBE: Safe use in diabetics, not harmful to the kidneys

What are the cons for prescribing ACE-inhibitors post-MI?
PROBE: Cost of branded products

Clinical Practice guidelines (CPG)

Are you aware of the American College of Cardiology/American Heart Association guidelines for prescribing drug therapy post-MI?

Indicate the frequency in percentage of time with which you prescribe medications in adherence to these guidelines: ____ %

What factors motivate you to adhere to the CPG?
PROBE: Protection against lawsuits

Occasions on which you do not adhere to CPG, what are the barriers you perceive for non-adherence?

PROBE: knowledge, attitudes and behaviors about adhering to guidelines.

Lack of awareness (Guideline accessibility, absolute and relative contraindications, class recommendations, time needed to keep updated with the guidelines)
Lack of familiarity (Guideline accessibility, absolute and relative contraindications, class recommendations time needed to keep updated with the guidelines)
Lack of agreement (disagreement with specific recommendations, applicability to patient, lack of confidence in the credibility of the guideline developers, too rigid to apply, not practical in terms of that certain type of patients require monitoring, threat to autonomy of the physician)
Lack of outcome expectancy (belief that guidelines may not lead to desired outcomes)
Lack of motivation (Inertia of previous practice, previous habit and routine)

Are you aware of the contraindications in which beta-blockers should not be prescribed for post-MI patients?

External barriers for not following guidelines:

PROBE: **Patient factors** –
Guidelines related – presence of contradictory guidelines, not easy to use, cumbersome, confusing.
Environmental factors- lack of time, resources, organizational constraints, lack of reimbursement, perceived increase in malpractice liability.

Demographic Information:

Gender
Year of graduation from medical school _____
Type of practice setting:
Specialty:
Which professional organizations are you associated with?

APPENDIX D: PHASE TWO ADVANCE LETTER

February, 2003

This letter is being sent to request your professional consultation on a research project conducted through the School of Pharmacy at West Virginia University (WVU). I am an assistant professor in the School of Pharmacy, conducting research as partial fulfillment for a WVU Faculty Senate Research Grant to study patterns of long-term medication therapy for patients who have had a myocardial infarction (MI). In a few days you will be receiving a questionnaire from me, asking questions to gain an understanding of physicians' perceptions and attitudes about prescribing medications for post-MI patients.

We understand that your time is valuable and limited. But, we hope that you will take a few minutes to provide the information; your input is critical to the success of this study. Your participation is voluntary; you do not have to answer all questions; responses will be confidential.

Issues addressed in the study will help in decision-making about how to train pharmacists to communicate with physicians about long-term drug therapy for MI patients. If you have any questions or comments about the study, please contact me (Jan Kavookjian, Ph.D., 304-293-1453).

Thank you in advance for your consideration.
Sincerely,

Jan Kavookjian, Ph.D.
Assistant Professor

APPENDIX E: PHASE TWO COVER LETTER FOR FIRST MAILOUT

February 2003

A few days ago, we sent you a letter telling you about a study that is being conducted with the WVU School of Pharmacy as partial fulfillment for a WVU Faculty Senate Research Grant. The project is being conducted to study patterns of long-term medication therapy for patients who have had a myocardial infarction (MI). Your input as a physician is critical to the success of the study. Issues addressed in the enclosed **5 to 10 minute** questionnaire will help in decision-making about how to train pharmacists to communicate with physicians about long-term drug therapy for post-MI patients.

The information that you provide in the questionnaire will be kept completely confidential. Your name will not be tied in any way to the answers you place on the questionnaire. The questionnaire has an identification number for mailing purposes only. This code does not in any way connect your name to your answers; it only allows us to remove your name from the mailing list after you have returned the questionnaire so that you will not receive a second copy.

Once we receive your questionnaire, your answers will be analyzed in combination with those of all other respondents. You do not have to answer every question and participation at any time while completing the questionnaire is voluntary; however, once we receive the questionnaire, your responses will become anonymous and you will be unable to withdraw your data since there will be no way to identify individual information. If you choose not to participate, this will not jeopardize in any way your relationship with West Virginia University and/or the School of Pharmacy.

Please take a few minutes to complete the questionnaire and place it in the enclosed reply envelope and mail it back to us by February 14. We thank you in advance for your time and your contribution to a greater understanding of the health concerns of post-MI patients. If you have any questions, please don't hesitate to contact me. (Jan Kavookjian, (304) 293-1453).

Sincerely,

Jan Kavookjian, Ph.D.
Assistant Professor

APPENDIX F: PHASE TWO COVER LETTER FOR SECOND MAILOUT

February 2003

Recently a questionnaire concerning an important issue was sent to you for a WVU School of Pharmacy Faculty Senate research project. The topic involved your perceptions about long-term medication options for post-MI patients. Knowing what you think about this issue is vital to making decisions about how to train pharmacists and other health care providers to communicate with physicians about long-term drug therapy for post-MI patients. The number of responses we have received so far is very encouraging. Unfortunately, we have not yet received your response. However, if it was just mailed, we thank you and request that you disregard this letter.

Since the size of this study is limited, your input is very important to its success. We understand that your time is valuable, but once again ask if you could take a few minutes to complete the enclosed questionnaire. These extra copies are included in the event that you did not receive them or they have been misplaced. Please return the questionnaire in the enclosed postage-paid reply envelope by Wednesday, February 26.

You may be assured that your responses will remain confidential; your participation is voluntary; you do not have to answer all questions. If you have any questions regarding this study, please contact me, Jan Kavookjian, at 304-293-1453.

Again, thank you for your assistance.

Sincerely,

Jan Kavookjian, Ph.D.
Assistant Professor

APPENDIX G: PHASE TWO SURVEY INSTRUMENT

WVU School of Pharmacy Myocardial Infarction (MI) Medication Questionnaire

A. CURRENT PRESCRIBING PATTERNS

How many new post-Myocardial Infarction (MI) patients do you see in a month? _____

Please indicate how often you prescribe the following medications for long-term management of post MI patients. Circle the letter that best describes your prescribing.

	Never	Rarely	Sometimes	Usually	Always
Beta-blockers	a	b	c	d	e
Aspirin	a	b	c	d	e
ACE-inhibitors	a	b	c	d	e

B. SPECIFIC MEDICATIONS

For Beta-blockers, if you answered question 2 above with "d" or "e" , skip to question 4.

- If you answered question 2 above with "a" , "b", or "c" for Beta-blockers, please check the response that best describes your plans regarding prescribing Beta-blockers for post MI patients.

____I do not plan to start regularly prescribing beta-blockers to post MI patients.

____In the short run (next 30 days), I plan to start regularly prescribing beta-blockers to post-MI patients.

____In the long run (next six months), I plan to start regularly prescribing beta-blockers to post MI patients.

For Aspirin, if you answered question 2 above with "d" or "e" , skip to question 5.

- If you answered question 2 above with "a", "b", or "c" for Aspirin, please check the response that best describes your plans regarding prescribing aspirin for post MI patients.

  ____I do not plan to start regularly prescribing aspirin to post MI patients.

  ____In the short run (next 30 days), I plan to start regularly prescribing aspirin to post MI patients.

  ____In the long run (next six months), I plan to start regularly prescribing aspirin to post MI patients.

For ACE-inhibitors, if you answered question 2 above with "d" or "e", skip to question 6.

- If you answered question 2 above with "a", "b", or "c" for ACE-inhibitors, please check the response that best describes your plans regarding prescribing ACE-inhibitors for post MI patients.

  ____I do not plan to start regularly prescribing ACE-inhibitors to post MI patients.

  ____In the short run (next 30 days), I plan to start regularly prescribing ACE-inhibitors to post MI patients.

  ____In the long run (next six months), I plan to start regularly prescribing ACE-inhibitors to post MI patients.

PLEASE CONTINUE ON THE BACK OF THIS PAGE

Regarding beta-blocker medications, please rate HOW IMPORTANT each statement is to you in your decision on whether or not to prescribe beta-blocker medications to post MI patients. If you feel a statement does not apply to your prescribing, rate it as Not Important. Please CIRCLE the letter that best shows **your** opinion using the following scale:

Not Important	**Slightly Important**	**Moderately Important**	**Very Important**	**Extremely Important**
a	b	c	d	e

How important is each statement to you in your decision about prescribing beta-blockers?

	Not Important		Moderately Important		Extremely Important
Beta-blockers:					
…increase chances of patient survival.	a	b	c	d	e
…have too many difficult side effects.	a	b	c	d	e
…can help prevent subsequent MI.	a	b	c	d	e
…benefit patients with cardiac arrhythmias.	a	b	c	d	e
…produce fatigue in patients.	a	b	c	d	e
…can contribute to erectile dysfunction in men.	a	b	c	d	e
…exacerbate symptoms of COPD.	a	b	c	d	e

…are generally cardio-protective.	a	b	c	d	e
…can decrease hypertension.	a	b	c	d	e
…are inexpensive.	a	b	c	d	e
…reduce risk of CHF.	a	b	c	d	e
…contribute to patient depression.	a	b	c	d	e
…play a favorable role in the sympathetic heart drive.	a	b	c	d	e
…exacerbate symptoms of asthma.	a	b	c	d	e
…can cause hypertension in the very old.	a	b	c	d	e
…can contribute to bradycardia (HR <60/min).	a	b	c	d	e

7. Regarding aspirin therapy post MI, please rate HOW IMPORTANT each statement is to you in your decision on <u>whether or not</u> to prescribe aspirin therapy to post MI patients. If you feel a statement does not apply to your prescribing, rate it as Not Important.

How important is each statement to you in your decision about prescribing aspirin therapy?

	Not Important		Moderately Important		Extremely Important
Aspirin therapy:					
…decreases risk of subsequent MI.	a	b	c	d	e
….is inexpensive.	a	b	c	d	e
…decreases platelet aggregation.	a	b	c	d	e
…causes bleeding and ulceration.	a	b	c	d	e
…is beneficial for arthritic patients.	a	b	c	d	e
…is tolerated by many patients.	a	b	c	d	e
…reduces vascular mortality.	a	b	c	d	e
…reduces risk of stroke.	a	b	c	d	e
…can decrease hypertension.	a	b	c	d	e
…causes increased bruising.	a	b	c	d	e
…cannot be used in patients with ulcers.	a	b	c	d	e
…is not suitable for older patients.	a	b	c	d	e
…is not suitable for patients susceptible to allergic reactions.	a	b	c	d	e
…cannot be used for patients with thrombocytopenia.	a	b	c	d	e
…is not suitable for patients with asthma.	a	b	c	d	e
…is unsuitable for patients with hemorrhage problems.	a	b	c	d	e

8. Regarding ACE-inhibitor medications, please rate HOW IMPORTANT each statement is to you in your decision on <u>whether or not</u> to prescribe ACE-inhibitor medications to post MI patients. If you feel a statement does not apply to your prescribing, rate it as Not Important.

How important is each statement to you in your decision about prescribing ACE-inhibitors?

	Not Important		Moderately Important		Extremely Important
ACE-inhibitors:					
…have favorable mortality risk reduction.	a	b	c	d	e
…result in a significant number of patients developing cough.	a	b	c	d	e

…are expensive.	a	b	c	d	e
…prevent stroke.	a	b	c	d	e
…assist in good blood pressure control.	a	b	c	d	e
…are effective in patients with LVD.	a	b	c	d	e
…increase risk of developing hypokalemia.	a	b	c	d	e
…increase risk of developing hypotension.	a	b	c	d	e
…reduce risk of developing severe CHF.	a	b	c	d	e
…cannot be used in patients with renal artery stenosis.	a	b	c	d	e
…cannot be used in patients with previous renal failure.	a	b	c	d	e
…cannot be used in patients with angiodema.	a	b	c	d	e
…cannot be used in patients with Type II diabetes.	a	b	c	d	e
…cannot be used in patients with allergic responses to therapy.	a	b	c	d	e

C. CLINICAL PRACTICE GUIDELINES FOR PRESCRIBING MEDICATIONS TO POST MI PATIENTS

Please indicate your level of familiarity, according to the following scale, with the 1999 American College of Cardiology/American Heart Association (ACC/AHA) Clinical Practice Guidelines for prescribing long-term drug therapy post MI?

Not at all familiar				Completely familiar
a	b	c	d	e

Please indicate how often you are able to prescribe long-term medications for post MI patients according to the Clinical Practice Guidelines (CPGs). Circle the letter that best describes the frequency of your prescribing according to CPGs.

Never	Rarely	Sometimes	Usually	Always
a	b	c	d	e

11. In thinking about the number of new MI patients that you see every month, estimate the percentage of patients with whom you get an opportunity to prescribe medications according to these CPGs? ____ %

PLEASE CONTINUE ON THE BACK OF THIS PAGE

For <u>prescribing according to CPGs</u>, if you answered question 10 above with <u>"d"</u> or <u>"e"</u>, skip to #13.

- If you answered question 10 above with "a", "b", or "c" for prescribing according to CPGs, please check the response that best describes your plans regarding prescribing according to CPGs for post MI patients.

____I do not plan to start regularly prescribing according to CPGs for post MI patients.

____In the short run (next 30 days), I plan to start regularly prescribing according to CPGs for post MI patients.

____In the long run (next six months), I plan to start regularly prescribing according to CPGs for post MI patients.

13. Regarding prescribing according to the Clinical Practice Guidelines (CPGs), please rate HOW IMPORTANT each statement is to you in your decision on whether or not to follow the CPGs in prescribing medications for post MI patients. If you feel a statement does not apply to your prescribing, rate it as Not Important. Please CIRCLE the letter that best shows **your** opinion using the following scale:

Not Important	**Slightly Important**	**Moderately Important**	**Very Important**	**Extremely Important**
a	b	c	d	e

How important is each statement to you in your decision about following Clinical Practice Guidelines (CPGs) for prescribing medications to post MI patients?

	Not Important		Moderately Important		Extremely Important
…CPGs are based on evidence from clinical trials.	a	b	c	d	e
…Benefits from following CPGs may not be greater than the risks	a	b	c	d	e
…CPGs produce effective patient outcomes.	a	b	c	d	e
…CPGs suggest drugs not always on the formulary.	a	b	c	d	e
…CPGs are based on recent evidence.	a	b	c	d	e
…CPGs suggest drugs that patients cannot tolerate.	a	b	c	d	e
…CPGs suggest multi-drug therapy which contributes to patient non-compliance.	a	b	c	d	e
…CPGs provide an optimal treatment protocol.	a	b	c	d	e
…CPGs suggest treatments that are not affordable to patients without insurance.	a	b	c	d	e
…CPGs suggest multi-drug therapy for which	a	b	c	d	e

benefits are not documented. …Often, weak patients cannot be put on the CPG-recommended drug regimen.	a	b	c	d	e
…Prescribing according to the CPGs can protect physicians from lawsuits.	a	b	c	d	e
…CPG developers are credible researchers.	a	b	c	d	e
…Following the CPGs contradicts my previous prescribing patterns.	a	b	c	d	e
…The "cookbook" approach of CPGs doesn't address patient individuality.	a	b	c	d	e
…I don't have time to update myself with CPG changes.	a	b	c	d	e

Research reports and physician interviews suggest potential barriers to following Clinical Practice Guidelines (CPGs). Listed below are reasons some physicians have indicated as to why they may not be able to follow the 1999 ACC/AHA CPGs to prescribe medications for post MI patients. Please use the rating scale below to indicate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree	**Somewhat Disagree**	**Neutral**	**Somewhat Agree**	**Strongly Agree**
a	b	c	d	e

When I am unable to follow CPGs to prescribe medications for post MI patients it is because:

	Strongly Disagree				Strongly Agree
…for beta-blockers, I am unfamiliar with the CPGs regarding their post MI use.	a	b	c	d	e
…CPGs are not applicable to my practice population.	a	b	c	d	e
…I believe that the benefits are not worth patients' risk.	a	b	c	d	e
…CPGs are oversimplified and have a "cookbook" approach.	a	b	c	d	e
…CPG developers lack credibility.	a	b	c	d	e
…using CPGs reduces physicians' autonomy.	a	b	c	d	e

…information about CPGs is not easily accessible.	a	b	c	d	e
…I don't have time to keep myself updated with changes in CPGs.	a	b	c	d	e
…CPG recommendations are confusing and cumbersome.	a	b	c	d	e
…for beta-blockers, absolute and relative contraindications to prescribing post MI are not clearly stated.	a	b	c	d	e
…CPGs are very specific in nature.	a	b	c	d	e
…CPGs are too rigid to apply in the clinical setting.	a	b	c	d	e
…CPG recommendations do not lead to desired outcomes.	a	b	c	d	e
…it makes the patient-physician relationship impersonal.	a	b	c	d	e
…for beta-blockers, it is difficult to recognize which patients may benefit from them post MI.	a	b	c	d	e
…for beta-blockers, it is difficult to recognize in which patient the therapy may be contraindicated.	a	b	c	d	e

In what form would you most prefer to receive clinical education and/or information about clinical practice guidelines? Please **RANK** your first (1), second (2), and third (3) preferences among the choices below.

____Continuing medical education meetings	____Patient chart reminders	____Pocket card/booklet
____CD-Rom (self-study)	____Audio CD or tape	____Wall charts
____Academic detailers (one-on-one)	____Letters/material via mail	____E-mail alerts/newsletters
____Continuing education (home-study)	____PDA format	____Other (please specify) ____

_____

PLEASE CONTINUE ON THE BACK OF THIS PAGE

Please indicate how often you prescribe any medications with generic substitution allowed, where appropriate. Circle the letter that best describes your prescribing.

	Never	Rarely	Sometimes	Usually	Always
Generic Substitution, where appropriate	a	b	c	d	e

For <u>generic substitution</u>, if you answered question 16 above with <u>"d"</u> or <u>"e"</u>, skip to question 18.

- If you answered question 16 above with "a", "b", or "c" for generic substitution, please check the response that best describes your plans regarding generic substitution where appropriate.

____I do not plan to start regularly prescribing to allow for generic substitution.

____In the short run (next 30 days), I plan to start regularly prescribing to allow for generic substitution.

____In the long run (next six months), I plan to start regularly prescribing to allow for generic substitution.

18. Would you describe your personal practice style as more **analytical** (practice guidelines used for care decisions, use of logic for diagnosis and prescribing decisions, strict formulary adherence, strict schedule adherence), or **emotional** (individualized patient-centered care, interpersonal communication, focus on patient preferences in decision-making, empathy).

Analytical				Emotional
a	b	c	d	e

D. PHYSICIAN AND PRACTICE INFORMATION

Your Age: ____Years

Your Gender: ____Male ____Female

How many years have you been practicing? ____Years ____Months

Specialties: Primary _____ Secondary_____

Your primary practice site is:

____Hospital based ____University-affiliated hospital ____Solo, office-based

____Group, office-based ____Other (please specify) _____

24. How many patients, in general, do you see in a typical day? _____

In the past year, have you been required to adopt and follow any practice guidelines for the treatment of post MI patients developed by a local institution/organization (e.g., an HMO/insurance payer, hospital, practice group, etc.) that has direct influence over your practice? _____ Yes _____ No

Which professional organizations are you a member of?

Additional comments regarding clinical practice guidelines and/or post MI medications (Beta-blockers, aspirin therapy, ACE-inhibitors, others) are welcome:

_____

_____

_____

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE!

APPENDIX H: PHASE TWO COVER LETTER FOR NON-RESPONSE CARD

February 2003

Several weeks ago, we sent a questionnaire seeking your opinions on long-term medications for post-MI patients for a WVU School of Pharmacy Faculty Senate research project. Unfortunately, we have not received your input. If you can find the time to do so, it would be appreciated. If we have made a mistake and you have already returned the questionnaire, please accept our apologies and ignore this mailing.

If you feel you will not be able to complete the questionnaire, it would be helpful to us to know your reason. Possible reasons have been listed on the enclosed post card. We also ask a few questions regarding characteristics of you and your practice. This information is simply to help describe (in very general terms) those who were unable to complete the survey. Please do not add your name to this card as we do not need to know your identity. You may be assured that your responses are confidential; your participation is voluntary; you do not have to answer all the questions.

Once completed, the post card can be dropped in the mail. It has already been addressed and stamped. Thank you for your help.

Sincerely,

Jan Kavookjian, Ph.D.
Assistant Professor

APPENDIX I: PHASE TWO NON-REPONSE CARD

Gender: __F __M Years in Practice:___ Type of practice setting:_____ Specialty:_____

- Please indicate how often you are able to prescribe long-term medications for post-MI patients according to the Clinical Practice Guidelines (CPGs). Circle the letter that best describes the frequency of your prescribing according to CPGs.

Never	Rarely	Sometimes	Usually	Always
a	b	c	d	e

- If you answered the previous question with "a", "b", or "c" for prescribing according to CPGs, please check the response that best describes your plans for post-MI patients.
  ____I do not plan to start regularly prescribing according to CPGs for post-MI patients.
  ____In the short run (next 30 days), I plan to start regularly prescribing according to CPGs.
  ____In the long run (next six months), I plan to start regularly prescribing according to CPGs.

- I did not respond to the questionnaire because (check the most appropriate response):
  ____I did not receive it
  ____I did not have time to complete it
  ____I wish to keep my views on this issue to myself
  ____I was on vacation
  ____I do not respond to mail surveys in general
  ____The topic did not interest me
  ____The survey was not well-written
  ____The topic did not apply to me
  ____Other reason or additional comments (please specify)_____