FACTORS INFLUENCING MEDICATION ADHERENCE AMONG PERSONS WITH POST-ACUTE MYOCARDIAL INFARCTION

Police Captain Rapin Polsook

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ปัจจัยที่มีอิทธิพลต่อพฤติกรรมความร่วมมือในการรับประทานยา ของผู้ป่วยภายหลังเกิดกล้ามเนื้อหัวใจตายเฉียบพลัน

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ระพิณ ผลสุข : ปัจจัยที่มีอิทธิพลต่อพฤติกรรมความร่วมมือในการรับประทานยาของผู้ป่วยภายหลังเกิดกล้ามเนื้อหัวใจตายเฉียบพลัน (FACTORS INFLUENCING MEDICATION ADHERENCE AMONG PERSONS WITH POST-ACUTE MYOCARDIAL INFARCTION) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: รศ.ร.ต.อ.หญิง ดร.ยุพิน อังสุโรจน์, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: รศ.ดร. สุรีพร ธนศิลป์, 336 หน้า.

การศึกษาภาคตัดขวางเชิงบรรยายนี้ มีวัตถุประสงค์ เพื่อทดสอบโมเดลที่อธิบายอิทธิพลของแรงสนับสนุนทางสังคม สถานะทางการเงิน ระดับการศึกษา ความรุนแรงของโรค ภาวะซึมเศร้า อุปสรรคในการรับประทานยา ความรู้ และการรับรู้สมรรถนะแห่งตน ต่อการรับประทานยาของผู้ป่วยภายหลังเกิดกล้ามเนื้อหัวใจตายเฉียบพลัน โดยใช้รูปแบบความหลากหลายมิติของความร่วมมือขององค์การอนามัยโลก เป็นกรอบแนวคิดในการศึกษา ตัวอย่างคือผู้ป่วยภายหลังเกิดโรคกล้ามเนื้อหัวใจตาย เฉียบพลัน จำนวน 348 คน ที่มารับการรักษาที่ห้องตรวจผู้ป่วยนอก แผนกโรคหัวใจและหลอดเลือด จากโรงพยาบาลศูนย์ 9 แห่ง ของประเทศไทย คัดเลือกโดยการสุ่มแบบหลายขั้นตอน เก็บรวบรวมข้อมูลโดยการสัมภาษณ์อย่างมีโครงสร้าง เครื่องมือวิจัยคือ แบบสอบถามข้อมูลส่วนบุคคล แบบสอบถามแรงสนับสนุนทางสังคม แบบสอบถามภาวะซึมเศร้า แบบสอบถามอุปสรรคในการรับประทานยา แบบสอบถามเกี่ยวกับความรู้เรื่องโรคหลอดเลือดหัวใจ แบบสอบถามการรับรู้สมรรถนะแห่งตน และแบบสอบถามความร่วมมือในการรับประทานยา และค่าความเที่ยงของเครื่องมือเท่ากับ .92 , .72, .87, .87, .91 และ .65 ตามลำดับ และ ทดสอบเส้นทางอิทธิพลของสมมติฐานการวิจัยโดยใช้โปรแกรมลิสเรล 8.72

ผลการวิจัยพบว่า โมเดลที่สร้างขึ้นมีความสอดคล้องกับข้อมูลเชิงประจักษ์ และสามารถอธิบายความผันแปรของพฤติกรรมความร่วมมือในการรับประทานยาได้ 20 เปอร์เซ็นต์ (χ^2 = 5.87, df = 5, p < .43, Chi-square/df = 0.97, GIF = 0.99, RMSEA = 0.065, SRMR = 0.041, AGFI = 0.97) ภาวะซึมเศร้ามีอิทธิพลทางตรงด้านลบ ต่อพฤติกรรมความร่วมมือในการรับประทานยามากที่สุด (-.40, p < .05) และมีอิทธิพลทางอ้อมด้านลบผ่านการรับรู้สมรรถนะแห่งตน (-.77, p < .05) การรับรู้สมรรถนะแห่งตน และความรู้มีอิทธิพลทางตรงด้านบวกต่อพฤติกรรมความร่วมมือในการรับประทานยา (.17 และ .05, p < .05 ตามลำดับ) อุปสรรคในการรับประทานยามีอิทธิพลทางตรง (.10, p < .05) และมีอิทธิพลทางอ้อมด้านลบผ่านการรับรู้สมรรถนะแห่งตน(-.07, p < .05) ส่วนความรุนแรงของโรค สถานะทางด้านการเงิน และการสนับสนุนทางสังคม มีอิทธิพลทางตรงด้านลบต่อพฤติกรรมความร่วมมือในการรับประทานยา (-.06, -.05, และ -.05, p < .05 ตามลำดับ) และการสนับสนุนทางสังคม และความรู้มีอิทธิพลทางอ้อมด้านบวกผ่านการรับรู้สมรรถนะแห่งตน (.21 และ .08, p < .05 ตามลำดับ) และมีอิทธิพลทางอ้อมด้านลบผ่านภาวะซึมเศร้าและการรับรู้สมรรถนะแห่งตน (-.27 และ -.11, p < .05 ตามลำดับ) ส่วนระดับการศึกษา มีอิทธิพลทางตรงด้านบวกต่อพฤติกรรมความร่วมมือในการรับประทานยา (.03, p < .05) มีอิทธิพลทางอ้อมด้านบวก ผ่านความรู้ และการรับรู้สมรรถนะแห่งตน (.10, p < .05) และมีอิทธิทางอ้อมด้านลบผ่านภาวะซึมเศร้าและการรับรู้สมรรถนะแห่งตน (-0.01, p < .05)

ผลการวิจัยแสดงให้เห็นว่า ปัจจัยที่มีอิทธิพลมากที่สุดต่อพฤติกรรมความร่วมมือในการรับประทานยาคือ ภาวะซึมเศร้า รองลงมาคือ การรับรู้สมรรถนะแห่งตน และ อุปสรรค ตามลำดับ ดังนั้น พยาบาลจึงควรตระหนักถึงอุปสรรคและการประเมินภาวะซึมเศร้าพร้อมสนับสนุนให้ผู้ป่วยมีความเชื่อมั่นในการรับประทานยา เพื่อส่งเสริมความร่วมมือในการรับประทานยาและมีคุณภาพชีวิตที่ดีของผู้ป่วยภายหลังเกิดกล้ามเนื้อหัวใจตายเฉียบพลัน

สาขาวิชา พยาบาลศาสตร์ ลายมือชื่อนิสิต .....

ปีการศึกษา 2555 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก .....

ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม .....

5177973936 : MAJOR NURSING SCIENCE

KEYWORDS : MEDICATION ADHERENCE/ SOCIAL SUPPORT/ EDUCATION/ FINANCIAL STATUS/ SYMPTOM SEVERITY/ DEPRESSION/ BARRIERS/ KNOWLEDGE/ SELF-EFFICACY/ POST-ACUTE MYOCARDIAL INFARCTION

RAPIN POLSOOK: FACTORS INFLUENCING MEDICATION ADHERENCE AMONG PERSONS WITH POST-ACUTE MYOCARDIAL INARCTION ADVISOR: ASSOC. PROF. POL.CAPT. YUPIN AUNGSUROCH, Ph.D., R.N CO-ADVISOR: ASSOC. PROF. SUREEPORN THANASILP, D.N.S., A.P.N., R.N., 336 pp.

The purpose of this cross-sectional, descriptive correlation study was to test a model that explains the influence of financial status, education, social support, symptom severity, barriers, knowledge, depression, and self-efficacy on medication adherence in post-myocardial infarction patients (MI). The conceptual framework was World Health Organization's multidimensional adherence model (MAM). A cluster sampling using multi-stage process of 348 post-MI patients was recruited from nine regional hospitals of Thailand. All participants responded to a set of nine questionnaires in a structured interview format. Research instruments were the Demographic Characteristics Questionnaire, Modified ENRICHD Social Support Instrument, Cardiovascular Society Classification, Center for Epidemiologic Studies Depression Scale, Barriers to Medication Adherence, Coronary Heart Disease Awareness and Knowledge Questionnaire, Self-efficacy for Appropriate Medication Use Scale, and Morisky's Self-reported Measure of Medication Adherence. The reliability of instruments were .92, .72, .87, .87, .91 and .65, respectively. A linear structural relationship (LISREL) 8.72 was used to test the hypothesized path model.

The study findings revealed that the hypothesized model fit the empirical data and explained 20% of the variance of medication adherence (χ^2 = 5.87, df = 5, p < .43, Chi-square/df = 0.97, GIF = 0.99, RMSEA = 0.065, SRMR = 0.041, AGFI = 0.97). Depression was the most influential factor affecting medication adherence which it had negative direct effect (-.40, p < .05) and had negative indirect effect on medication adherence through self-efficacy (-.77, p < .05). Self-efficacy and knowledge had positive direct effect on medication adherence (.17 and .05, p < .05, respectively). Barriers had positive direct effect on medication (.10, p < .05) and negative indirect effect on medication adherence through self-efficacy (-.07, p < .05). Symptom severity, financial status, and social support had negative direct effect on medication adherence (-.06, -.05, and -.05, p < .05, respectively). Social support and knowledge had positive indirect effect through self-efficacy (.21 and .08, p < .05, respectively) and had negative indirect effect through depression and self-efficacy (-.27 and -.11, p < .05, respectively). Moreover, education had positive direct effect on medication adherence (.03, p < .05), positive indirect effect through knowledge and self-efficacy (.10, p < .05), and negative indirect effect on medication adherence through depression and self-efficacy (-0.01, p < .05).

These findings demonstrated that the highest impact factors influencing medication adherence was depression followed by self-efficacy and barriers, respectively. Therefore, nurse should identify or aware of barriers and depression on medication adherence. Further nursing interventions should promote self-efficacy to enhance medication adherence and improve quality of life among persons with post-acute MI.

Field of Study: Nursing Science Student's Signature .....

Academic Year: 2012 Advisor's Signature .....

Co-advisor's Signature .....

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INTRODUCTION

Background and significance of study

Myocardial infarction (MI) is one of the most prevalent causes of death in developed countries (Van der Elst et al., 2007). In 2008, the World Health Organization (WHO) reported that there were 17 million deaths from coronary artery disease (CAD) globally. This number is projected to rise to 6 million over the next 20 years (WHO, 2010). In Thailand, CAD is rated the third cause of death after cancer and accidents (Bureau of Policy and strategy, 2009).

MI impacts national and international economics. Taylor et al. (2007) estimated healthcare costs for patients suffering from acute coronary syndrome in 2004 in five European countries. They found that total cost of acute coronary syndrome were €7,009 in the UK, €1,2086 in Italy, €8,447 in France, €8,280 in Germany, and €9717 in Spain. For Sweden, Zethraeus et al. (1999) estimated the attributable of cost of coronary heart disease to be 41,000 Swedish kronor (SEK) per patient per year. In United States, coronary heart disease has the highest in direct cost and is expected to continue to account for 40% of all cardiovascular disease in direct costs. The direct and indirect costs of cardiovascular disease will exceed $1 trillion in 2030. In fact, direct costs for all cardiovascular disease are estimated to increase from $171.7 billion in 2010 to $275.8 billion in 2030 (Berben et al., 2012; Heidenreich et al., 2011).

In Thailand, the estimating cost of MI care is 22,310 to 203,139 baht/patient and MI is the leading cause of death and morbidity according to statistics from the

year 2002 in a total of 15,362 people per hundred thousand populations, representing 24.5 percent of the population (Public Health Statistics, 2008; Moleerergpoomet al., 2007).

After receiving acute treatment, post-MI patients must adhere to specific medication regimens because they play a crucial role in treating MI and maintaining health. There are multiple definitions of medication adherence. First, it has been defined as taking 80% or more of the prescribed pills (Smith et al., 2008). Another definition includes the extent to which a person's medication administration corresponds with recommendations from a health care provider (WHO, 2003). Additionally, medication adherence is defined as the extent to which the patient's medication-taking behavior corresponds with an agreed medication regimen from a health care provider while the patient is under treatment (Osterberg and Blaschke, 2005; Vlasnik, Aliotta, and DeLor, 2005; Wu et al., 2008). Similarly, Maddox and Ho (2009) define medication adherence is the extent to which a patient follows the instructions that are given for prescribed treatment, and focuses on the regularity with which patients take their medications as prescribed while they are in treatment.

Effective medication adherence reduces cardiac events, morbidity, mortality, rehospitalization rates, healthcare costs, and enhances well-being among patients with MI (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius, Li, and Tu, 2008; Perreault et al., 2009; Timmins et al., 2005). In contrast, poor medication adherence leads to several adverse outcomes among post-MI patients (Albert, 2008; Choudhry et al., 2008; Polack, Jorgenson, and Robertson, 2008). Poor medication adherence has been confirmed as a cause of poor blood pressure control, pathologic changes, worsening cardiac function, deterioration in various signs and

symptoms, rehospitalization, and increase in healthcare costs (Albert, 2008; Choudhry et al., 2008; Daugerty et al., 2008; Dragomir et al., 2010; Gehi et al., 2007; Ho et al., 2008; Jackevicius, Li, & Tu, 2008; Maddox and Ho, 2009; Polack et al., 2008; Smith et al., 2008; Willich et al., 2001).

Despite the fact that medication adherence is a positive treatment for MI patients, prior studies have found that as few as 8% take their medication exactly as prescribed (Albert, 2008; Choudhry et al., 2008; Jackevicius et al., 2008; Polack et al., 2008). The literature shows significantly low rates of medication adherence in post-MI patients in the first three months after hospital discharge because clinical symptoms have improved (Butler et al., 2002; Kramer et al., 2006). According to Ho et al. (2006) and Shah et al. (2009) who studied the impact of medication therapy discontinuation on mortality one year after MI, post-MI patients were no longer taking medication at three months after hospital discharge.

Various reasons are given for not adhering to prescription medications, such as the complexity of drugs and their dosages, lack of understanding of the purpose of the medication, poor communication and education at discharge about the importance of medication, and concerning about the possibility of adverse effects and medication costs (Jackevicius et al., 2008; Ho et al., 2006; Mann et al., 2007; Taepaiboon, 2003). Thus, medication adherence remains an important health problem which it is often overlooked and has been linked to increased adverse outcomes (Albert, 2008; Choudhry et al., 2008; Polack et al., 2008).

Bosworth, Oddone, & Weinberger (2006) indicated that medication adherence can be characterized by five factors which were 1) patient characteristics (demographic factors, cognitive factors, psychiatric and mental factors, attitude and

adherence, knowledge, risk perception, and adherence), 2) clinical characteristics (medication adherence trends, side effects, and asymptomatic disease, 3) provider characteristics, 4) social environment (barriers to care such as a lack of transportation or physical disabilities), and 5) policy (financial coverage of medication and drug benefits). Of these, several have been linked empirically to medication adherence. These factors are gender, age, attitudes, knowledge, symptom severity, co-morbidity, depression, complexity of medication, barriers, patient-provider relationship, education, ethnicity, financial status, social support, health literacy, medication knowledge, number of medications before myocardial infarction, in-hospital care (attending cardiologist, discharge medication counseling), and early physician follow-up (Shah et al., 2009; Vlasnik et al., 2005; Wu et al., 2008).

In Thailand, some research has been conducted on medication adherence in CAD patients. One study examined medication self-care practice in patients with CAD. It reported that 16.7% of patients stopped taking medicine because they believed only patients who had symptoms took medication, patients did not know the purpose of the medication, and patients were concerned about the possibility of adverse effects from the medication (Taepaiboon; 2003). Khuwatsamrit (2006) studied adherence to a self-care requirements model and did an empirical test among patients with CAD. Medication was one of the subscales of self-care requirements. According to the study findings, CAD patients had knowledge about medication at a low level and self-efficacy in medication management at a high level (Khuwatsamrit, 2006).

Most studies on medication adherence have been conducted in the United States and factors related to medication adherence had been found. In Thailand, a

little research had conducted on factors related to medication adherence among post-MI patients. So, factors related to medication adherence among post-MI patients had been confirmed in the United States. Since Thai cultural characteristics are different from the U.S., it is reasonable to suspect that research findings may also differ because cultural characteristics such as income and education were factors related to medication adherence (Wu et al., 2008; Berben et al., 2012). For example, differences exist in education (Upper Secondary Education, Thai = 13.27%; the U.S. = 50%), and income (Thai = $2,057.76 - $6,790.68/year; the U.S. = $19,000 - $70,000$/year) (Aud and Hannes, 2011; Ministry of Education, 2010; National Statistics Office, 2010; Office of the Civil Service Commission, 2010; U.S. Census Bureau, 2010). Additionally, differences can be seen in family structure and marital status. The Thai family context consists mostly of an extended family (94.5%) with fewer nuclear families (5.5%). In contrast, the U.S. has mostly nuclear families (66.4%) or small family households (33.6). In Thailand, 29.6% of individuals are married and 25.4% divorced (National Statistics Office, 2010), while in the U.S., 64.6% of individuals are married and 21.7% divorced (U.S. Census Bureau, 2010).

Because of these variances between the U.S. and Thai culture, factors relevant to medication adherence may be different. Therefore, for the reason that Thai cultural characteristics are different from the U.S., it is logical to suspect that research findings may also differ. In view of these variances between the U.S. and Thai culture, factors relevant to medication adherence are important to understand. Thus, there is needed to conduct this study to better understand those factors that impact medication adherence among post-MI Thai patients. These findings may inform the development of an

intervention to enhance medication adherence among post-MI patients in a Thai context.

The relationships among variables can be explained by the World Health Organization's multidimensional adherence model (MAM) (WHO, 2003). The World health Organization (WHO) (2003) proposed that medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors: 1) socioeconomic factors (social support, education, and financial status), 2) health care system-related factors, 3) condition-related factors (symptom severity, depression), 4) therapy-related factors (barriers), and 5) patient-related factors (knowledge, and self-efficacy). The common belief that patients are solely responsible for taking their medication is misleading and most often reflects a misunderstanding of how various factors affect people's behavior and capacity to adhere to their treatment.

Most effort to understand the remarkably high rates of medication adherence have focused on patients' related factors which were socioeconomic factors, condition-related factors, therapy-related factors, and patient-related factors. Similarly to the following factors, they have been documented to be related to medication adherence among post-MI patients. These factors were financial status, education, social support, symptom severity, depression, barriers, knowledge, and self-efficacy (Albert, 2008; Alm-Roijer et al., 2004; Bosworth et al., 2006; Byrne, Walsh, and Murphy, 2005; Chiou et al., 2009; Gehi et al., 2005; Gerber et al., 2010; Horne and Weinman, 1999; Jackevicius et al., 2008; Kayaniyil et al., 2009; Kison, 1992; Lehane et al., 2008; Lynch et al., 2006; Molloy et al., 2008).

Research questions

The following research questions were proposed for this study:

1. What are the relationships among social support, financial status, education, symptom severity, depression, barriers, knowledge, self-efficacy, and medication adherence of Thai persons living with MI?

2. Does the hypothesized model explain medication adherence of Thai persons living with MI and does it adequately fit the data?

Purpose of the study

1. To explore the relationships among social support, financial status, education, symptom severity, depression, barriers, knowledge, self-efficacy, and medication adherence in post-MI Thai patients.

2. To test a model that explains the influence of social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy on medication adherence in post-MI Thai patients.

Hypotheses with rational

The WHO (2003) defines medication adherence as the extent to which a person's medication-taking behavior corresponds with recommendations from a health care provider. Medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors: 1) socioeconomic factors (social support, education, and financial status), 2) health care system-related factors, 3) condition-related factors (symptom severity and depression), 4) therapy-related factors (barriers), and 5) patient-related factors (knowledge and self-efficacy).

The relationships among variables to medication adherence in post-MI Thai patients can be explained by multidimensional adherence model (MAM) (WHO, 2003). From literature reviews, factors related to medication adherence have been documented as follows:

Social support has a significant effect on medication adherence and a marked impact on the progression of MI and has been positively linked with medication adherence across different chronic illnesses (Molloy et al., 2008; Simoni, Frick, and Huang, 2006). Lack of social support was one of the most common factors in poor medication adherence which meant that patient low social support linked to poor medication adherence (Wu et al., 2008). Additionally, Khuwatsamrit (2006) studied adherence to a self-care requirements model using an empirical test among patients with CAD to show that social support had a positive direct effect on self-efficacy. Similarly, Simoni et al. (2006) conducted a longitudinal evaluation of a social support model of medication adherence among HIV-positive men and women on antiretroviral therapy. According to the study, social support is thought to increase self-efficacy and then increase medication adherence. Therefore, social support is not only have a positive direct effect on self-efficacy and an indirect effect on medication adherence but also have a negative direct effect on depression and a positive indirect effect through self-efficacy on medication adherence as well.

Social support not only enhances self-efficacy but also affects adherence through physiological mechanisms by improving patient adherence through reduced depression as well (Glanz, Rimer, and Viswanath, 2008; DiMatteo, 2004). Therefore, social support has positive direct effect on medication adherence. It also has a

negative direct effect on depression and a positive indirect effect through self-efficacy on medication adherence.

Financial status was a predictor of medication adherence in heart failure patients (Wu et al., 2008). In MI patients, income levels demonstrate significant associations with medication adherence, that is, MI patients had high income linked to higher medication adherence because they can pay for fill medication as prescribed (Jackevicius et al., 2008). Similarly, Armstrong (2010) and Bosworth et al. (2006) showed that patients who have a low income level are more likely to have poor adherence with their medication regimen. Among patients with low income, medication often becomes a low priority because of competing needs and limited sources which is they have to pay for medication. Financial burden is a crucial issue in medication adherence. Thus, financial status is likely to has a positive direct effect on medication adherence in post-MI patients.

Another factor is education. Low levels of education are more likely to be associated with poor medication adherence (Bosworth et al., 2006). High levels of education give patients a deeper knowledge of risk factors for coronary heart disease (CAD), which can lead to improvement in medication adherence (Alm-Roijer et al., 2004). Similarly, Ho, Bryson, and Rumsfeld (2009) and Gehi et al. (2007) found that lower education levels correlated with poor medication adherence among cardiovascular patients. Gehi et al. (2007) and Ho et al. (2009) found that in coronary heart disease (CHD) patients, poor adherence to their medications was related to lower educations because they ignore how much medication were important for their health and decrease severity of disease.

Additionally, Wu et al. (2008) studied medication adherence in patients who have heart failure and found that heart failure patients with more education were more likely to have good medication adherence that education may be related to medication adherence through knowledge. High levels of education give patients a deeper knowledge of risk factors for CHD, which can lead to improvement of medication adherence (Alm-Roijer et al., 2004). Kayaniyil et al. (2009) showed that a greater level of education in cardiac patients contributed to a higher level of knowledge and related to high medication adherence. Similarly, Baker et al. (2007) found that low education level was associated with poor health literacy, which resulted in less knowledge and linked to poor medication adherence among elderly persons.

Moreover, Naewbood (2005) studied factors related to medication adherence among essential hypertension patients. In accordance with the study's finding, education level could increase knowledge of hypertension and predict medication adherence (19.7%), which meant that high level of education increase knowledge among hypertensive patients. Fisher et al. (2001) found that low level of education associated with depression is that type 2 diabetes patients who had low level of education because they did not know the way to confronted with the situation. Similarly, Boger et al. (2012) found that low level of education associated with depression and lead to poor medication adherence. Thus, education is not only likely to have a positive direct effect on medication adherence and a positive indirect effect through knowledge but also negative direct effect on depression.

Symptom severity was consistently related to medication adherence, and higher severity of symptoms related to high medication adherence. Physical symptoms reminded patients to take medication because they perceived negative

physical symptoms if they did not take medication and they were motivated to take medication to feel better (Wu et al., 2008). Symptom severity as physical discomfort might be an important internal cue to action. In all of the studies in which investigators examined the relationship between symptom severity and medication adherence, symptom severity was consistently related to medication adherence which is patients had high symptom severity related to high medication adherence to decrease severity of disease (Wu et al., 2008). Sud et al. (2005) found that symptoms severity is an important variable associated with medication adherence of patients after acute coronary syndromes. Patients had high symptom severity trend to be high medication adherence. Similarly, Ho et al. (2009) studied the importance of medication adherence in cardiovascular outcomes and demonstrated that asymptomatic and chronic illness that requires long-term therapy has been associated with poor adherence this meant that patients had low symptom severity related to poor medication adherence because of absence clinical symptom. Therefore, symptom severity is likely to have a positive direct effect on medication adherence.

Depression has been associated with failure to adhere to medication prescription (Molloy et al., 2008). In CAD patients, depression was associated with poor medication adherence and a 70% increased rate of CAD event, including nonfatal myocardial infarction compared with those who are not depressed (Gehi et al., 2005). Cardiovascular patients who were depressed are less likely to have good medication adherence and more likely to have increased morbidity and mortality in this group (Bane, Hughes, and McElnay, 2006). Patients with depression frequently have feelings of hopelessness toward themselves and their future and may not fully appreciate the association of medication adherence to improved health outcomes

(Simoni et al., 2006). Similarly, Rieckmann et al. (2006) found that depression has been associated with poor medication adherence in CAD patients after acute coronary syndrome. Moreover, Bane et al., (2006) studied the impact of depressive symptoms and psychosocial factors on medication adherence in cardiovascular disease. The study demonstrated that patients with cardiovascular disease who are depressed are less likely to adhere to prescribed medical regimens, which may account for poorer outcomes. Likewise, Cohen (2009) investigated adherence in the context of cardiovascular risk reduction and demonstrated that poor adherence occurs when patients do not take their medication correctly due to depression. Similarly, Ziegelstein and Howard (2010) examined depression and poor adherence to lipid-lowering medications among patients with CAD**.** The study showed that cardiovascular patients who were depressed were less likely to adhere to medication.

Depressive symptoms affecting medication adherence also leads to difficulties in self-management. Depressed individuals experience self-doubt in the form of lower self-efficacy and often decrease their efforts, subsequently leading to an inability to carry out recommended health-related behaviors such as adherence to medication (Schoenthaler, Ogedegbe, and Allegrante, 2009). Additionally, Maguire, Hughes, and McElnay (2008) found that depressive symptoms related to low self-efficacy and then decreased medication adherence in hypertension patients. Chao et al. (2005) studied the mediating role of health beliefs in the relationship between depressive symptoms and medication adherence in persons with diabetes. The studied showed that depression was associated with lower self-efficacy and depressive symptoms had an indirect effect on medication adherence through self-efficacy. Similarly, Cha et al. (2008) demonstrated that depressive symptoms associated with low self-efficacy and

then decreased medication adherence in persons with HIV. Furthermore, Schoenthaler et al., (2009) found that self-efficacy mediated the relationship between depression and medication adherence in hypertension patients. So, in this study, it is hypothesized that depression will have a negative direct effect on self-efficacy and a negative indirect effect through self-efficacy on medication adherence.

Barriers influence poor medication adherence with cardiovascular disease management. Albert (2008) showed barriers to medication adherence included forgetting time to take medication, cost, too many pills taken per day, and too frequent medication schedule. Patients who had any of these barriers were less likely to adhere to medication. Similarly, Wu et al. (2008) found that barriers to enhanced medication adherence included forgetting time to take daily medication, characteristics of medication (difficult schedule, frequent dosing, side effects, and difficulty swallowing), and cost of medication. Additionally, Wu et al. (2008) reported that barriers to medication adherence predict medication adherence in patients with heart failure which is patients had low barriers linked to higher level of medication adherence. Modifiable barriers to medication adherence by encourage patients have high self-efficacy. In other word, if patients had several barriers, it will lead to low self-efficacy. So, patients have high medication adherence by increasing self-efficacy (Apter et al., 2003).

Self-efficacy is especially important when the task to be faced is more difficult. In other word, self-efficacy is crucial to taking on a challenging to overcome barriers to medication adherence (Aljasem et al., 2001). Similarly, Grindley, Zizzi, and Nasypany (2008) found that barriers can overcome, if patients have high self-

efficacy. Therefore, barriers are likely to have a negative direct effect on self-efficacy and negative direct effect on medication adherence.

The last two factors are knowledge and self-efficacy. A low level of knowledge related to poor medication adherence (Wu et al., 2008). Kayaniyil et al. (2009) demonstrated that general knowledge about coronary artery disease showed a significant relationship with high medication adherence. Similarly, Alm-Roijer et al. (2004) found significant correlations between general knowledge about coronary artery disease and high taking medication. Moreover, Albert (2008) found that knowledge about medication and adverse effects influence medication adherence.

Knowledge is a prerequisite to understanding disease and how to manage health (Wu et al., 2008). Cohen (2009) found that knowledge is a factor related to medication adherence in the cardiovascular patient which meant that cardiovascular patients had high knowledge linked to high level of medication adherence because they known the important of medication regimen is crucial for decrease severity of disease. Lack of knowledge is a factor in poor medication. Similarly, Naewbood (2005) reported that knowledge had a positive significant in hypertension patients to taking medication.

Self-efficacy is a well-known predictor of health-related behavior. Individuals with chronic diseases who have high levels of self-efficacy are more likely to perform health-related behaviors in future situations (Schoenthaler et al., 2009). Additionally, Kang, Yang, and Kim (2010) and Chiou et al. (2009) found that self-efficacy was the strongest predictor of taking medication. It had the greatest single effect on medication regimen in coronary artery disease patients. These results revealed that coronary artery disease patients with having self-efficacy had better medication

adherence. Additionally, self-efficacy had a positive direct effect on adherence to self-care requirements including medication adherence among patients with coronary artery disease (Khuwatsamrit, 2006). The study of the relationship of personal characteristics, behavioral capability, environmental factors, and medication adherence found that self-efficacy was one of the strongest predictors of high medication adherence in that chronic illness (Armstrong, 2010). Similarly, Kang et al. (2010) studied correlates of health behaviors in patients with coronary artery disease. According to the study, self-efficacy related to health behaviors and cardiac self-efficacy had the greatest effect on health behaviors. So, self-efficacy is likely to have a positive direct effect on medication adherence.

Self-efficacy has also been proposed as a mediating factor between knowledge attainment and health behaviors (Wolf et al., 2007). Ngamvitroj and Kang (2007) studied effects of self-efficacy, social support, and knowledge on adherence to peak expiratory flow rate (PEFR) self-monitoring among adults with asthma in a prospective repeated measures study. The study found that asthma knowledge was associated with self-efficacy and had a positive effect on adherence to PEFR self-monitoring among adults with asthma which is asthma patients had high knowledge trend to high self-efficacy and linked to high medication adherence.

Additionally, Boulet (1998) found that self-efficacy and knowledge were significant predictors of adherence behaviors in varying groups of people diagnosed with other chronic illnesses; that is, knowledge can increase self-efficacy and lead to greater adherence in a variety of diseases. Similarly Wolf et al. (2007) examined literacy, self-efficacy, and medication adherence and found that patients who were more likely to possess poorer knowledge of their treatment reported lower self-

efficacy for taking their medications as prescribed. Low knowledge resulted in low self-efficacy and continuity of poor medication adherence. So, knowledge is likely to have a positive direct effect on self-efficacy and a positive indirect effect through self-efficacy on medication adherence.

These relationships among variables can be explained by the World Health Organization's multidimensional adherence model (MAM). The World health Organization (WHO, 2003) proposed that medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors. The common belief that patients are solely responsible for taking their medication is misleading and most often reflects a misunderstanding of how various factors affect people's behavior and capacity to adhere to their treatment.

Research hypotheses

1. Financial status had a positive direct effect on medication adherence.

2. Education had a positive direct effect on medication adherence, positive indirect effect on medication adherence through knowledge, positive indirect effect on medication adherence through knowledge and self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy.

3. Social support had a positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, negative indirect effect on medication adherence through depression and self-efficacy.

4. Symptom severity had a positive direct effect on medication adherence.

5. Barriers had negative direct effect on medication and negative indirect effect on medication adherence through self-efficacy.

6. Knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy.

7. Depression had negative direct effect on medication adherence and negative effect on medication adherence through self-efficacy.

8. Self-efficacy had a positive direct effect on medication adherence.

Conceptual of the study

This study conducted based on a modified version of the World Health Organization's multidimensional adherence model (MAM). The World health Organization (WHO) (2003) defined medication adherence as the extent to which a person's behavior–taking medication–corresponds with recommendations from a health care provider. Medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors. The common belief that patients are solely responsible for taking their medication is misleading and most often reflects a misunderstanding of how various factors affect people's behavior and capacity to adhere to their treatment. The five dimensions are socioeconomic factors, health care system-related factors, condition-related factors, therapy-related factors, and patient-related factors. However, this study investigated four dimensions because previous studied show that the dimension of health care system related factors was non predictive of medication adherence (Wu et al., 2008). Additionally, Berben et al. (2012) found that most attempt to understand the remarkably high rates of factors related to medication adherence have focused on patients level which includes the dimension of socioeconomic factors, condition-related factors, therapy-related factors,

and patient-related factors. Medication adherence was regarded as an outcome since the literature review supports that these dimensions are most relevant to post-MI patients and can be manipulated. These factors were social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy (Albert, 2008; Alm-Roijer et al., 2004; Bosworth et al., 2006; Byrne et al., 2005; Chiou et al., 2009; Gehi et al., 2005; Gerber et al., 2010; Horne and Weinman, 1999; Jackevicius et al., 2008; Kayaniyil et al., 2009; Kison, 1992; Lehane et al., 2008; Lynch et al., 2006; Molloy et al., 2008).

The multidimensional adherence model and literature review shows the relationships among variables and medication adherence as follows:

(1) Socioeconomic factors

The multidimensional adherence model (MAM) includes multiple factors under the category of socioeconomic factors such as social support, socioeconomic status, level of education, and distance from treatment center. Only, social support, financial status, and education will be investigated as potential factors related to medication adherence in post-MI patients in this study.

(2) Condition-related factors

The multidimensional adherence model (MAM) includes multiple items; for instance, level of disability, symptom severity, depression, and drug and alcohol abuse. Only symptom severity and depression will be investigated as potential factors related to medication adherence in post-MI patient.

(2) Therapy-related factors

The multidimensional adherence model (MAM) includes multiple therapy-related factors, such as complexity of medical regimen, side effects, previous treatment failure, and frequent change in treatment. These factors can describe as barriers to medication adherence (Wu et al., 2008). So, barriers will be investigated as potential factors related to medication adherence in post-MI Thai patients.

(4) Patient-related factors

The multidimensional adherence model (MAM) includes patients' knowledge, confidence (self-efficacy) in their ability to engage in illness management behavior, and motivation to manage under the category of patient-related factors. Only knowledge and self-efficacy will be investigated as potential factors related to medication adherence in post-MI Thai patients.

Scope of the study

This study described and explored the model relationships of medication adherence among post- myocardial infarction patients. The potential factors were financial status, education, social support, symptom severity, depression, barriers, knowledge, and self-efficacy, while medication adherence was the outcome of the study. The study was carried out at the cardiology outpatient department of regional hospital in Thailand.

Definition of terms

Medication adherence is defined as the extent to which of post-MI patients taking medication corresponds with agreed upon recommendations from a healthcare provider during the first three month after discharge. The self- reported measure of medication adherence instrument by Morisky et al. (1986) that was modified by Bosworth et al. (2006) will be used to measure adherence to medication.

Social support refers to the post-MI patient's provision of help regarding medication adherence in respect to emotional, instrumental, informational, and appraisal support that they receive from family, caregivers or health professions. Social support for medication adherence will be measured by a modified ENRICHD Social Support Instrument (ESSI) (Vaglio et al., 2004). The ESSI assesses the four defining attributes of social support: emotional, instrumental, informational, and appraisal support.

Emotional support refers to the provision of caring, empathy, love, and trust.

Instrumental support refers to the provision of help in tangible form such as finance, labor, or time and service forms.

Informational support refers to the information useful for problem solving provided to another during a time of stress.

Appraisal support refers to the communication of information that is relevant to self-evaluation.

Financial status defines as income of post-MI patients per month. Financial status will be determined by patient's structured interview developed by researcher.

Education defines as level of education of post-MI patients. Level of education will be determined by patient's structured interview developed by researcher.

Symptom severity defines as the post-MI patient's expressed symptom of chest pain. Symptom severity will be used the Canadian Cardiovascular Society Classification (CCSC) (Sangareddi et al., 2004).

Depression is defined as post-MI patients having depressive symptomatology which its major components of depressive symptomatology were depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. The Center for Epidemiologic Studies Depression Scale (CES-D) developed by Radloff (1977) will be used to measure depression in patients with post-MI. The specific instrument that will be used is the CES-D Thai version translated by Worapong, Pundee, and Traumchaisree (1990).

Barriers are defined as what post-MI Thai patients perceive as obstacles to taking medication. In this study, barriers defines as forgetting the time of medication, not carrying any medication, cost of medication, amount of pill per day, and frequent schedule to take medication. Barriers to medication adherence will be measured by questions from the barriers to medication (Wu et al., 2008).

Knowledge is defined as the post-MI Thai patient's information and understanding about pathophysiology, risk factors, symptoms, and treatment of MI. Knowledge will be measured by the Coronary Heart Disease Knowledge Questionnaire (Kayaniyil et al., 2009).

Self- Efficacy was defined as the confidence of post-MI Thai patients in their ability to perform medication-taking according to prescription. Self-efficacy will be measured by the Self-efficacy for Appropriate Medication Use Scale (SEAMS) (Risser, Jacobson, and Kripalani, 2007).

Expected outcomes and benefits of the study

To help Thai MI patients maintain stability of their chronic condition, nurses should take an active role in assessment, education, care planning, and strategic implementation efforts to promote medication adherence. Effective medication adherence in MI patients is associated with reduced cardiac events, morbidity, mortality, and rehospitalization, a lower health-care cost, and enhanced well-being (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius et al., 2008; Perreault et al., 2009; Timmins et al, 2005). Thus, knowledge about the factors influencing medication adherence in patients' post-MI is needed before developing interventions to retard the progression of disease and improve quality of life.

CHAPTER II

LITERATURE REVIEW

This chapter presents an integrative review of the theoretical and empirical literature describing the concepts and interrelationships among factors influencing medication adherence among post-myocardial infarction (MI) patients. The review covers the following topics:

1. Myocardial Infarction
    - 1.1 Definition of myocardial infarction
    - 1.2 Management of myocardial infarction
    - 1.3 Impact of myocardial infarction on patients health's problems
    - 1.4 Nursing care for myocardial infarction patients
    - 1.5 Myocardial infarction in Thailand
    - 1.6 Research by nurses among myocardial infarction patients in Thailand
2. Medication adherence
    - 2.1 Definition of medication adherence
    - 2.2 Medication adherence in myocardial infarction patients
    - 2.3 Role of nurses for increasing medication adherence
    - 2.4 Measurement of medication adherence
3. Multidimensional adherence model (MAM)
4. Factors related to medication adherence in myocardial infarction patients.

5. The relationships among socioeconomic factors, condition-related factors, treatment-related factors, patient-related factors, and medication adherence in myocardial infarction patients**.**

1. Myocardial Infarction

1.1 Definition of myocardial infarction

Myocardial Infarction (MI), a form of coronary artery disease (CAD), is a prevalent cause of death in developed countries (Van der Elst et al., 2007). From literature review, there were several definitions of MI as follow: MI is the commonest cause of heart disease and is significantly the most common single cause of death in the affluent countries of the world. In the overwhelming majority of cases, disease of the coronary arteries is due to atherosclerosis (O'Grady, 2007). Additionally, Antman et al. (2000) and Griffin and Topol (2004) defined MI is any one following criteria satisfies the diagnosis for established MI; 1) development of new pathologic Q wave on serial ECG. The patient may or may not remember previous symptoms. Biochemical markers of myocardial necrosis may have normalized, depending on the length of time that has passed since the infarct developed, 2) pathologic finding of a healed or healing MI. Moreover, MI is primarily the result of plaque accumulation in the innermost layer of the artery wall and changes have also been noted in the media of the artery underlying the lesion. The more advanced lesion may occlude the lumen, and lead to a decrease in blood flow (Rose, 1994 cited in Tammatisthan, 2000; Urden, Staey, and Lough (2008).

World Health Organization defined MI as the combination two of three characteristics typical symptoms (i.e., chest discomfort), enzyme rise and a typical

ECG pattern involving the development of Q wave (Antman et al., 2000). Furthermore, Baird, Keen, and Swearingen (2005) defined MI refer to chest pain with ST segment elevation or without ST segment elevation and lasting for 30 minutes and/or is unrelieved by nitroglycerine. Therefore, this study myocardial infarction is defined as primarily the result of plaque accumulation in the innermost layer of the artery wall and changes have also been noted in the media of the artery underlying the lesion. More advanced lesions may occlude the lumen, and lead to a decrease in blood flow and linked to the combination two of three characteristics typical symptoms (i.e., chest discomfort) chest pain with ST segment elevation or without ST segment elevation and lasting for 30 minutes and/or is unrelieved by nitroglycerine, enzyme rise and a typical ECG pattern involving the development of Q wave (Antman et al., 2000; Baird et al., 2005; Griffin and Topol, 2004; O'Grady, 2007; Rose, 1994 cited in Tammatisthan, 2000; Urden et al., 2008).

1.2 Management of myocardial infarction

The main treatment of MI composed of advanced medication, percutaneous coronary intervention (PCI), coronary artery bypass graft (CABG), and long-term lifestyle changes, including regular medication administration (Bamroongsuk, 2005; O'Grady, 2007; Wood et al., 2005). In generally, PCI were used to dilate coronary artery in order to remodeling a blood vessel through the introduction of a balloon catheter, expandable stent or another specialized tool for treating a disease artery. These specialized tools include laser angioplasty, atherectomy, and rotablation. CABG was the method that usually uses the latest option when the doctor used medication and PCI method. Usually these two methods were done by physicians (Bamroongsuk, 2005; O'Grady, 2007; Wood et al., 2005). For post-MI patients who

had to long term care, they must continuous taking medication to decrease progression of disease and improve quality of life.

Medication is an important role to maintain their health. After the acute phase, a multitude of medications, from beta blockers to calcium channel blockers and aspirin are recommended to protect recurrent cardiac events for the long-term. Good medication adherence reduces cardiac events, morbidity, mortality, rehospitalization rates, healthcare costs, and enhances well-being among patients with MI (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius et al., 2008; Perreault et al., 2009; Timmins et al., 2005).

After receiving acute treatment, MI patients benefit from lifestyle modification, including taking multiple medications. However, the sheer number of medications together with other lifestyle changes recommended for post-MI patients often leads to problems with medication adherence. Poor medication adherence leads to several adverse outcomes (Albert, 2008; Choudhry et al., 2008; Polack et al., 2008), including a 3.8-fold increased risk in mortality (Albert, 2008). Additionally, poor medication adherence has been confirmed as a cause of poor blood pressure control, pathologic changes, worsening cardiac function, deterioration in various signs and symptoms, rehospitalization, and increased healthcare costs (Albert, 2008; Choudhry et al., 2008; Daugerty et al., 2008; Dragomir et al., 2010; Gehi et al., 2007; Ho et al., 2008; Jackevicius, Li, & Tu, 2008; Maddox et al., 2009; Polack et al., 2008; Smith et al., 2008; Willich et al., 2001).

As mention above, nurses are important health care team to encourage post-MI patient's continuous taking medication in order to retard the progression of disease. Nursing care is focused on medication adherence for long term health care is vital for

post-MI patients. It requires understanding the conditions of illness, guidelines for treatment, how to conduct the appropriate action to be correct, and can survive in society was very happy as it should be. Nurses are in a position to promote medication adherence better because nurses have the opportunities closer to patients other staffs in the health care team by teaching, guidance, and help resolve problems that are obstacles to the patient can take care themselves. Providing information about diseases and treatment plans is important to promote medication adherence. Thus, encouraging MI patients' medication adherence is an important nursing responsibility.

1.3 Impact of myocardial infarction on patients health's problems

Despite recent advances in treatment of MI, this disease is still characterized by frequent hospitalization and high mortality rates (Polsook, 2005; Public Health Statistics, 2008). When diagnosed with MI, patients suffer from limited physical function and psychological alterations (Brink, Karlson, and Hallberg, 2006). For example, MI patients are faced with stress, fear, anxiety, hopelessness, and uncertainty in their lives. In addition, patients must changes their lifestyles and suffer from many limitations such as physical activity, diet, and so on. Finally, MI can affect the family, adding economic and psychological burdens (Polsook, 2005). In addition, MI can make an impact on nation and international economic.

Moreover, MI impacts national and international economics. For instance, Taylor et al. (2007) estimated healthcare costs for patients suffering from acute coronary syndrome in 2004 in five European countries. They found that total cost of acute coronary syndrome were € 7,009 in the UK, € 12086 in Italy, € 8,447 in France, € 8,280 in Germany, and € 9717 in Spain. In United States, coronary heart disease has the highest in direct cost and is expected to continue to account for 40% of all

cardiovascular disease in direct costs. The direct and indirect costs of cardiovascular disease will exceed $1 trillion in 2030. In fact, direct costs for all cardiovascular disease are estimated to increase from $171.7 billion in 2010 to $275.8 billion in 2030 (Heidenreich et al., 2011).

In Thailand, MI is the leading cause of death and morbidity according to statistics from the year 2002 in a total of 15,362 people per hundred thousand populations, representing 24.5 percent of the population and estimating cost of MI care 22,310 to 203,139 baht/patient (Office of the permanent Secretary, 2011; Moleerergpoom et al., 2007). Thus, MI is still health care problem in the world. The impact of MI not only results in physical health but including mental health also. In addition, MI is bringing about not only family burden but national and international burden also.

1.4 Nursing care for myocardial infarction (MI) patients

Nursing care is focused on achieving a balance among myocardial oxygen supply and demand, preventing complications, and providing patient and family education. In the acute period, myocardial oxygen supply is increased by the administration of supplemental oxygen to prevent tissue hypoxia. Drugs play an increasingly important role in balancing supply and demand, and it is the nurse who both administers and monitors the effectiveness of these agents. Myocardial oxygen supply can be further enhanced by the use of coronary artery vasodilators. The nursing interventions used to decrease cardiac work and myocardial oxygen consumption include bed rest with beside commode privileges when the patient is clinically stable (Urden et al., 2006).

Patient education will be provided when the acute phase has passed. Education for the patient and family is focused on risk factor reduction, manifestations of angina, when to call a physician or emergency services, medication, and resumption of physical and sexual activity (Urden et al., 2006). The nurse must detect early, reduce or eliminate, and prevent specific knowledge deficits and help patients maintain heart healthy behaviors. Development of a teaching plan enables all nurses to provide standardized content to each patient. Such a plan may include: teaching patients to decrease activity and take NTG as prescribed during periods of angina, seek medical attention immediately if relief of chest discomfort has not occurred within 30 minutes, contact the physician if there is a change in the pattern of angina, encourage the use of guidelines for modifying lifestyle, including modification of risk factors, and advise the patient to adhere to the prescribed therapeutic regimen such as medication, diet, and activity level. To prevent myocardial ischemia from progressing to infarction or reinfarction, the patient must be aware of physiologic and psychological (such as angry or grief) precipitating factors (Wood et al., 2009).

Therefore, in order to decrease the enormous impact of clinical and cost burden related to MI, nurses must take an active role in retaining MI patient's health. The literature review consistently shows significantly lower rates of medication adherence in patients with MI in the first 3 months post hospital discharge, an area in which nurses can intervene (Butler et al., 2002; Ho et al., 2006; Kramer et al., 2006; Shah et al., 2009). Encouraging medication adherence in MI patients is vital to prolonging the patient's life, reducing recurrent cardiac events, reducing morbidity and mortality, rehospitalizations , and reducing health-care costs (Choudhry et al.,

2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius et al., 2008; Perreault et al., 2009).

1.5 Myocardial infarction in Thailand

Myocardial infarction (MI) is still leading cause of death not only in western countries but also in Thailand. The mortality rate in Thai patients was higher than documents from western countries (Maraprasertsak, 2008). The occurrence of MI linked to various adverse outcomes such as lifestyle change, health care problem, family burden, and so on. At the present time, MI occur in patients younger than 46 year of age (5-15%) (Tungsubutra et al., 2007). The occurrence of MI linked to various adverse outcomes. Patients suffer from limited physical function and psychological alterations. For instance, MI patients are faced with stress, fear, anxiety, hopelessness, and uncertainty in their lives. Patients must changes their lifestyles and suffer from many limitations such as physical activity, diet including medication adherence for decrease severity of disease. Moreover, MI can affect the family, adding economic and psychological burdens both on nation and international economic (Brink et al., 2006; Polsook, 2005). Therefore, MI remains a major health problem in Thailand. Nurse as a health care team who caring MI patients should take an action role to promote MI patients adhere to health recommendation especially medication adherence to decrease severity of disease and improve quality of life.

1.6 Research by nurses among myocardial infarction patients in Thailand

Previous studies conducted by nurses on medication adherence of post-MI patients in Thailand are few. Titaya Taepaiboon (2003) conducted descriptive research to investigate medication knowledge and medication self-care practice in patients with coronary artery disease (CAD) based on the self-care agency concept of

Orem (1959). The participants were 162 outpatient and clinic patients who were followed up at the Rajavithi Hospital. According to the study findings, most of the patients (> 90%) got the right answers on dosage, frequency/day, and time related to meals, and correct responses to side effects. Knowledge of the name and purpose of medications were shown in 45.6% and 33.5% of the patients, respectively. A small number recognized the possible side effects (6.5%) and what should be done while taking the medication (1.2%). Many participants had a self-care deficit in medication; 14.2% took medication at the wrong time, 43.8% forgot to take medicine, 16.7% stopped taking medication, 6.2% took a lower dose than the prescription, 11.1% took more than the prescription, 28.4% took over- the –counter drugs, and 6.2% took all medication at one time. It was also shown that there was a significant relationship between age of the patients and discontinuation of the medication as well as a significant relationship between times per day recommended for taking medication and forgetting to take it ($p =< .05$).

Another researcher, Kusuma Khuwatsamrit (2006) studied adherence to self-care requirements model: an empirical test among patients with coronary artery disease (CAD) based on Orem's self-care deficit (1985) and Bandura's self-efficacy theory (1986). The sample consisted of 285 CAD patients who attended a follow up visit at Ramathibodi Hospital's out-patient department. The results indicated that self-efficacy had a positive direct effect on adherence to self care requirements ($\beta = 0.72$, $p =< .001$). Social support had a positive direct effect on self-efficacy ($\gamma = 0.41$, $p =< .001$) and positive indirect effect on adherence to self care requirement ($\gamma = 0.12$, $p =< .001$). In addition, previous experience had a direct effect on knowledge ($\gamma = 0.71$, $p =< .05$). Moreover, medication was one of the subscales of self-care requirements and the

researcher found that CAD patients had low level knowledge about medication, high self-efficacy in medication management, and high adherence to medication.

According to the available research by nurses caring for MI patients, the focus was on assisting patients to live with the losses and some debilitating effects, and improved medication adherence in order to decrease cardiac events and progressive of disease. Nevertheless, the strategies to increase medication adherence among Thai MI patients were limited. This may have been because the experience of MI patients often reflects complex problems that affect medication adherence. Therefore, there is a need to gain better understanding of the contribution of several factors affecting medication adherence. It is anticipated that a clear understanding of this relationship will facilitate the design of optimally effective nursing interventions to improve medication adherence in MI patients.

2. **Medication adherence**

2.1 Definition of medication adherence

Previously, the definition of medication adherence was referred to as compliance with medication and was defined as the extent to which the patient's medication-taking behavior coincides with the prescribed medication regimen (Osterberg and Blaschke, 2005). This definition is not patient-centered and emphasizes the paternalistic role of health care providers. In addition, ‘‘compliance’’ suggests that the patient is passively following the doctor's order and that the treatment plan is not based on a therapeutic alliance or contract established between the patient and the physician. Therefore, recent literature suggests using the term ‘‘adherence’’ instead of compliance (Osterberg and Blaschke, 2005; Wu et al., 2008).

Medication adherence is the extent to which patients follow the instructions that are prescribed and focuses on the regularity with which patients take their medication as prescribed while they are on treatment (Maddox and Ho, 2009; Osterberg and Blaschke, 2005). Medication adherence is associated with reduced recurrent cardiac events, reduced morbidity and mortality, rehospitalizations, and reduced health-care costs (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius et al., 2008; Perreault et al., 2009). Thus, medication adherence is a crucial component in nursing care for MI patients. There are many definitions of medication adherence as follow:

Medical adherence as the extent to which patients follow the instructions that is given for prescribed treatments (Maddox and Ho, 2009).

Medication adherence refers to whether patients take their medications as prescribed, as well as whether they continue to take a prescribed medication (Ho et al., 2008).

Medication adherence was defined as the extent to which the patient's medication-taking behavior corresponded with the medication regimen prescribed by their health care provider (Wu et al., 2008).

Medical adherence is the extent to which patients take medications as prescribed by their health care providers (Osterberg and Blaschke, 2005).

Medication adherence is as individuals' ability to follow medical instructions of a health care provider continuously (WHO, 2001).

Medication adherence refers to the extent to which patients taking medication corresponds with agreed recommendations from healthcare provider (WHO, 2003).

Thus, WHO's (2003) definition is the most meaningful in this study which is medication adherence refers to the extent to which patients taking medication corresponds with agreed upon recommendations from a healthcare provider.

2.2 Medication adherence of myocardial infarction patients

In this study, medication adherence refers to the extent to which patients taking medication corresponds with agreed upon recommendations from a health care provider during 1-3 month after diagnosis with MI. Among MI patients taking medication, continuous used is important because medication significantly reduces risk for MI, reduces recurrent cardiac events, reduces morbidity and mortality, rehospitalizations , and reduce health-care cost (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius et al., 2008; Perreault et al., 2009). In contrast, poor medication adherence can result in many problems, including poor blood pressure control, pathologic changes, and signs and symptoms associated with worsening cardiac function, hospitalization, revascularization procedures, and mortality. Medication nonadherence is significantly associated with increased hospitalization costs (Dragomir et al., 2010; Maddox and Ho, 2009; Albert, 2008; Choudhry et al., 2008; Daugherty et al., 2008; Jackevicius et al., 2008; Ho et al., 2008; Polack et al., 2008; Smith et al., 2008; Gehi et al., 2007; Willich et al., 2001). Thus, medication adherence remains a significant problem, which is often overlooked and tied to increased adverse outcomes (Albert, 2008; Choudhry et al., 2008; Polack et al., 2008).

The literature also shows lower rates of medication adherence in post-MI patients in the first three months after hospital discharge because clinical symptoms have improved. For instance, Butler et al. (2002) studied outpatient adherence to beta-

blocker therapy after acute MI and found that poor adherence occurs more frequently within the first three months. Kramer et al. (2006) studied adherence to beta-blocker therapy one year after acute MI. The results demonstrated that for the first three months post-MI patient adherence to beta-blocker therapy was poor. Similarly, Ho et al. (2006) and Shah et al. (2009) studied the impact of medication therapy discontinuation on mortality one year after MI and long-term medication adherence after MI. According to these studies, post-MI patients were no longer taking medication at three months after hospital discharge. Various reasons are given for not adhering to prescription medications, such as the complexity of drugs and their dosages. For example, patients often do not know the purpose of the medication or experience poor communication and education at discharge about the importance of medication. Additionally, some patients are concerned about the possibility of adverse effects and medication costs (Charmati, 2001 cited in Taepaiboon; Jackevicius et al., 2008; Ho et al., 2006; Mann et al., 2007; Taepaiboon, 2003). Thus, medication adherence remains an important health problem, which is often overlooked and leads to increased adverse outcomes (Albert, 2008; Choudhry, Patrick et al., 2008; Polack et al., 2008).

Smith et al. (2008) used a randomized trial of direct-to-patient communication to enhance adherence to beta-blocker therapy following MI. The intervention consisted of two mailings two months apart that described the importance of beta-blocker use. Nine months after the first mailing, 64.8% of the patients receiving the intervention were adherent to beta-blockers, defined as taking 80% or more of their prescribed pills (i.e., a proportion-of-days-covered (PDC) 80%), in comparison with 58.5% of control patients. Thus, for every 16 patients receiving the

intervention, one additional patient would become adherent, compared with usual care.

Polack et al. (2008) studied different methods of providing medication-related education to patients following MI. The result indicated that providing medication education in a community setting after hospital discharge may improve medication knowledge and medication adherence in MI patients compared with usual care. Wood et al. (2008) sought to determine if a nurse-coordinated, multidisciplinary, family-based preventive cardiology program could improve secondary prevention practices, including medication use among patients with coronary artery disease (CAD) or at high risk for developing CAD. The trial took place in eight European countries and matched six pairs of hospitals and six pairs of general practices for enrollment in the preventive care program vs. usual care. Among the hospitals, those receiving the intervention had higher rates of statin prescription compared with those receiving usual care (86% vs. 80%). Among the general practices, those receiving the intervention had higher rates of statin and ACEI prescription compared with those receiving usual care (22% vs. 14.6% for statins, 29% vs. 20% for ACEI), though absolute rates of prescription remained low. Furthermore, Choudhry et al. (2008) described a trial designed to improve adherence to secondary prevention medications by affecting costs. The trial will evaluate the effect of providing all secondary prevention medications for post-MI patients without cost to the patient. Elderly patients covered through a private health plan will be randomized to a group which will receive secondary prevention medications without cost for one year or to a group which will use their usual benefit plan. The primary outcome of the trial will be a

combined clinical outcome for adverse cardiac events, but a specified secondary outcome will be medication adherence.

However, these studies were done in the United Stated of America (U.S.). Because Thai cultural characteristics are different from the U.S., it is reasonable to suspect that research findings may also differ. The factors were differ from Thai culture composed of social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy (Albert, 2008; Alm-Roijer et al., 2004; Bosworth et al., 2006; Byrne et al., 2005; Chiou et al., 2009; Gehi et al.,2005; Gerber et al., 2010; Horne and Weinman, 1999; Jackevicius et al., 2008; Kayaniyil et al., 2009; Kison, 1992; Khuwatsamrit, 2006; Lehane et al., 2008; Lynch et al., 2006; Molloy et al., 2008 ; Taepaiboon, 2003). Thus, medication adherence is a crucial component in nursing care for Thai MI patients.

2.3 Role of nurses for increasing medication adherence

Patients with MI must receive healthcare for the rest of their lives. They require understanding their illness, guidelines for treatment, how to conduct the appropriate actions to maintain health, and how to survive in society as happy as possible. Nurses are in a position to promote medication adherence because they have more opportunities for interacting with patients by teaching, guidance, and resolving problems that present obstacles to patient self-care. In addition, nurses should be aware of factors that may influence medication adherence. This information can then be used to teach, advice, counsel, and provide treatment planning.

A key component in the management of post-MI is medication regimen. The effectiveness of medication adherence depended on the prescriber’s teaching. From literature reviews have been documented support that evidence-based intervention can

improve medication adherence. Molly et al. (2012) found that nursing intervention to enhance medication adherence could be classified into the four main categories identified in a recent review of interventions to improve medication adherence including:

1. Patient's education and information is one kind of intervention can lead to medication adherence. Evidence found that education and information provision intervention can lead to improve medication adherence. It is importance to note that this intervention also incorporated intensified patient care and simplification of medication adherence.

2. Intensified patient care was direct patient contact intervention such as telephone program led to improve medication adherence.

3. Complex behavior approaches intervention to improve medication adherence which is the intervention included a range of behavior change technique led to improve medication adherence.

4. Simplification of the drug regimen or consolidation of the medication regimen to enhance taking medication.

Moreover, Molly et al. (2012) documented that list of intervention techniques specified where were patient education both individual and in group, family education, self-monitoring of symptom and medication adherence, enhancing motivation to take medication knowledge and skill assessment, medication dispensing, verbal instruction, environmental restructuring, eliciting social support in the community, cognitive restructuring, relaxation, barriers identification, and coping planning-planning to overcome barriers.

Similar to Haynes et al. (2008) and Williams et al. (2008) found that nurses role to improve medication adherence in long term including combination of more thorough patient instruction and counseling, reminders, close follow-up, supervised self-monitoring, reward for success, family therapy such as partners can provide hands-on help with obtaining fill prescriptions and medication taking including encourage the attitude, motivation, coping, and psychological wellbeing. Thus, efforts to enhance medication adherence must be maintained as long as the treatment is needed.

In addition, nurses can be manipulate or enhance medication adherence by considering the factors that related to medication adherence as follow:

Social support is an important factor related to medication adherence among post-MI patients. Nurses should conduct intervention supporting the patients to adhere medication such as identifying patients receiving low social support, enhancing social support service, providing medication specific support, and attendance of support group (Lehavot et al., 2011; Luszczynska, Sakar, and Knoll, 2007). Nurses should use effective communication technique to establish a positive relationship with the patient, show facilitative body language, and realize the important of social support from both family and friends (Bontempi, Burleson, & Lopez, 2004). Moreover, nurses as educator, so the educational intervention to enhancing medication adherence is vital for the patients to insight knowledge of medication adherence consistently Greer (2011) and Hacihasanoglu & Gozum (2011) studied effect of education on medication adherence among hypertension patients and found that intervention of education affect significantly on blood pressure control among hypertension patients.

Barriers are the other important factor related to medication adherence. Nurses should assess barriers that lead to poor medication adherence such as cost of medication, schedule of taking medication, side effect, and so on. Then conduct the intervention to decrease barriers and facilitate adherence could improve medication adherence (Kumarasamy et al., 2005; Wu et al., 2008). For self-efficacy, as we already know that self-efficacy was a strongest predictor to medication adherence. Poor medication adherence is a major problem in the long-term management of conditions related to cardiovascular disease. Self-efficacy can provide behavioral science evidence based which can be used in this endeavor to enhance adherence to medication because self-efficacy is a potentially modifiable variable. It is important to consider the practical significance of small effects when simple behavioral change interventions to enhance adherence (Bolman, Arwert, and Vollink, 2011; Liang et al., 2008; Molloy et al., 2012).

2.4 Measurement of medication adherence

There are many different methods for assessing adherence to medications. The methods available for measuring adherence can be broken down into direct and indirect methods of measurement. Each method has advantages and disadvantages. No method is considered the gold standard (Ho et al., 2009; Osterberg and Blaschke, 2005).

Directly observed therapy, measurement of concentrations of a drug or its metabolite in blood or urine, and detection or measurement in blood of a biologic marker added to the drug formulation are examples of direct methods of measures of adherence. However, direct approaches are expensive, burdensome to the health care provider, and susceptible to distortion by the patient. Measuring these levels for some

drugs is a good and commonly used as means of assessing adherence. For instance, the serum concentration of antiepileptic drugs such as phenytoin or valproic acid will probably reflect adherence to regimens with these medications and subtherapeutic levels will probably reflect poor adherence or suboptimal dose strengths (Osterberg and Blaschke, 2005).

Indirect methods of measurement of adherence include asking the patient about how easy it is for him or her to take prescribed medication, assessing clinical response, performing pill counts, ascertaining rates of refilling prescriptions, collecting patient questionnaires, using electronic medication monitors, measuring physiologic markers, and asking the patient to keep a medication diary. Although questioning the patient (or using a questionnaire), patient diaries, and assessment of clinical response are all methods that are relatively easy to use, but also can be susceptible to misrepresentation and tends to result in the health care provider's overestimating the patient's adherence. Table 1 shows methods of measuring adherence.

Table 1 Summary of method for measure medication adherence

Test	Information source	Advantages	Disadvantages
Direct methods			
Directly observed therapy	Blood or urine test	Most accurate	Patients can hide pills in the mouth and then discard them; impractical for routine use.
Measurement of the level of medicine or metabolite in blood	Blood test	Objective	Variations in metabolism and "white-coat adherence" can give a false impression of

			adherence; expensive
Measurement of the biologic marker in blood	Blood test	Objective in clinical trials can also be used to measure placebo	Requires expensive quantitative assays and collection of bodily fluids

Table 1 (Cont)

Test	Information source	Advantages	Disadvantages
Indirect methods			
Patient questionnaires, patient self-reports	Questionnaires	Simple, inexpensive, the most useful method in the clinical setting	Susceptible to error with increases in time between visits, results are easily distorted by the patient
Pill counts	Nurse could count the pills remaining in the bottle	Objective, quantifiable, and easy to perform	Data easily altered by the patient (e.g., pill

			dumping)
Rate of prescription refills	Pharmacy record	Objective, easy to obtain data	A prescription refill is not equivalent to ingestion of medication, requires a closed pharmacy system

Table 1 (Cont)

Test	Information source	Advantages	Disadvantages
Indirect methods			
Assessment of the patient's clinical response	Assess clinical response	Simple, generally easy to perform	Factors other than medication adherence can affect clinical response
Electronic medication monitors	Patient's drug-specific data file by recording coded dates and times of bottle opening.	Precise, results are easily quantified, tracks patterns of taking medication	Expensive, requires return visits and downloading data from medication vials
Measurement of physiologic markers (e.g., heart rate in	Measuring physiological maker	Often easy to perform	Marker may be absent for other reasons (e.g., increased

patients taking beta-blockers)			metabolism, poor absorption, lack of response)
Patient diaries	Asking the patients to keep a medication diary	Help to correct for poor recall	Easily altered by the patient

In summary, each of these methods has advantages and disadvantages, and the use of a specific method to measure adherence will depend on the clinical scenario and availability of the data medications (Ho et al., 2009). There are several instruments to measure medication adherence as follow:

1) Morisky's Self-reported Measure of Medication Adherence (MSMMA) was developed based on intentional and unintentional to medication adherence (Morisky, Green and Levine, 1986). This instrument designed to assess adherence to medication regimens in patients with hypertension and has also been used to measure adherence to antiretroviral therapy in patients who are HIV-positive (Tzeng et al., 2008). MSMMA is commonly used and adapted measure of self-report adherence. Score for each of the five items are summed to give a scale score ranging from 5 to 20. Higher score indicate higher levels of reported adherence (Bosworth et al., 2006).

2) Hill-Bone Scale was designed to measure medication adherence for hypertension (Koschack et al., 2010). Hill-Bone assesses patient behavior for three behavioral domains of hypertension treatment and comprises of summed up to subscales: ''reduced sodium intake'' (three items), ''appointment keeping'' (two

items), and ‘‘medication taking’’ (nine items). Hill-Bone Scale consisted of 14 items. Each item could be answered on a four-point scale 1 (None of the time) to 4 (All of the time). Resulting in a score ranging from 9 (perfect adherence) to 36 points (imperfect adherence) which higher score indicate lower levels of reported medication adherence (Koschack et al., 2010).

3) Medication Event Monitoring System (MEMS) is a microelectronic monitoring device in the caps of medication containers that records each time that the cap is removed from the medication bottle. Real-time data are collected on the device and later transferred to a computer. The MEMS is a valid instrument that has been used to measure medication adherence with high sensitivity in patients with cardiovascular disease or HF. Two indicators of medication adherence were assessed: (1) dose count, defined as the percentage of prescribed doses taken during the 3-month monitoring period, and (2) dose time, defined as the percentage of doses taken within 6 hours of prescribed time for a drug taken once per day or within 3 hours of the prescribed time for a drug taken twice per day (Wu et al., 2008).

This study use the Morisky’s Self-reported Measure of Medication Adherence to measure medication adherence because this instrument used to assess medication adherence in many chronic diseases include cardiovascular disease. Additionally, the instrument specific, high validity and reliability, appropriate number of questions and format were reported (Bosworth et al., 2006). Moreover, this tool is not costly, is relatively easy to administer compared to other methods, and is usable in a variety of clinical and research settings (Nieuwkek and Oort, 2005).

3. Multidimensional adherence model (MAM)

This study conducted based on a modified version of the World Health Organization's multidimensional adherence model (MAM). The World health Organization (WHO) (2003) defined medication adherence as the extent to which a person's behavior–taking medication–corresponds with recommendations from a health care provider. Furthermore, medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors. The common belief that patients are solely responsible for taking their medication is misleading and most often reflects a misunderstanding of how various factors affect people's behavior and capacity to adhere to their treatment. The five dimensions are socioeconomic factors, health care system-related factors, condition-related factors, therapy-related factors, and patient-related factors. Figure 1 shows multidimensional adherence model (MAM) by WHO (2003).

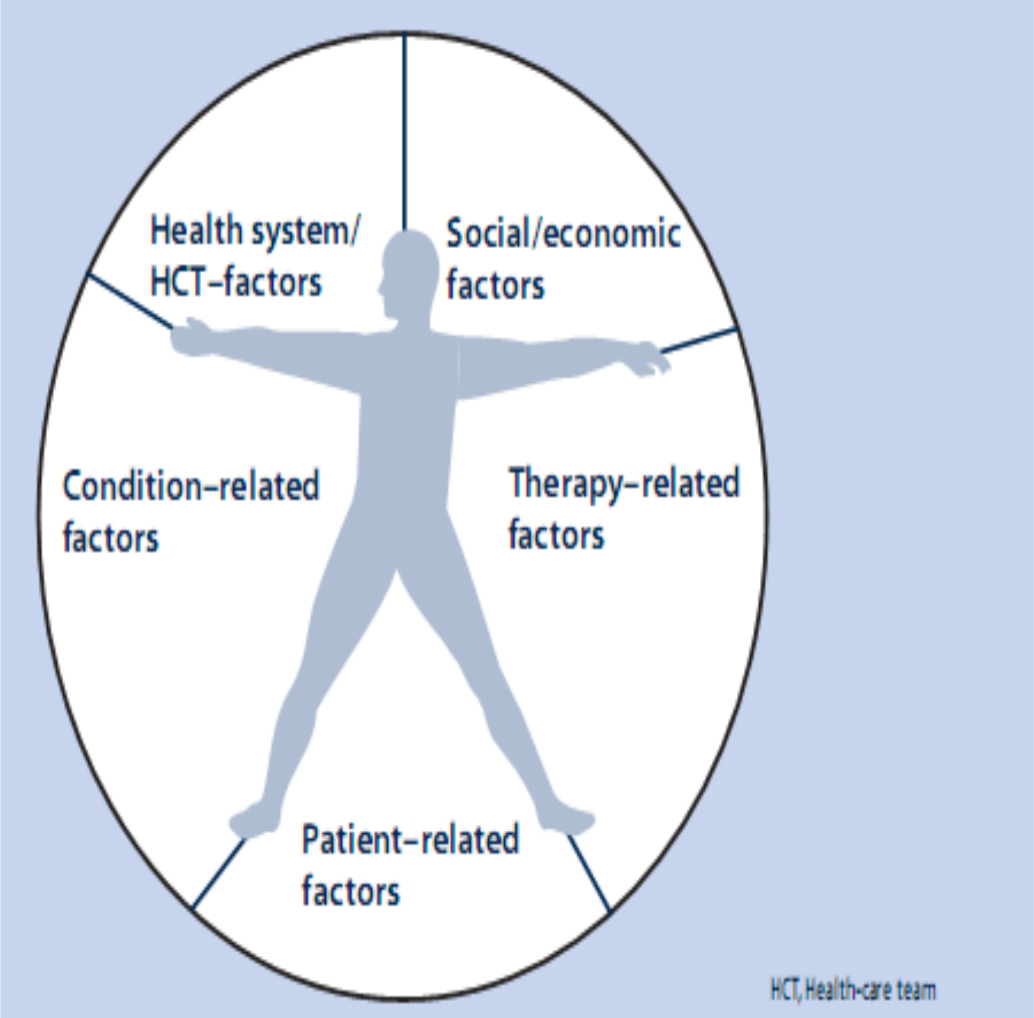

Figure 1 the five dimensions of Multidimensional Adherence Model (MAM) (2003).

The details of five dimensions of Multidimensional Adherence Model (MAM) (2003) are as follows:

1. Socioeconomic factors

In developing countries or in patients with low socioeconomic status, they may be put in the position of having to choose between competing priorities. Such priorities frequently include demands to direct the limited resources available to meet the needs of other family members, such as children or parents for whom they care.

Some socioeconomic factors that have a significant effect on adherence include poor income, poverty, illiteracy, low level of education, unemployment, and so on. Poor adherence to prescribed regimens affects all age groups. However, the prevalence of cognitive and functional impairments in elderly patients increases their risk of poor adherence. Multiple co-morbidities and complex medical regimens further compromise adherence.

2. Health care system factors

There are many system factors that have a negative effect on adherence. These include poorly developed health services with inadequate or non-existent reimbursement by health insurance plans, poor medication distribution systems, lack of knowledge and training for health care providers on managing chronic diseases, lack of knowledge on adherence and of effective interventions for improving it, and so on.

3. Condition-related factors

Condition-related factors represent particular illness-related demands faced by the patient. Some strong determinants of adherence are those related to the severity of symptoms, level of disability (physical, psychological, social and vocational), rates of progression and so on. Their impact depends on how they influence patients' risk perception, the importance of following treatment, and the priority placed on adherence. Co-morbidities, such as depression (in diabetes or HIV/AIDS) and drug and alcohol abuse, are important modifiers of adherence behavior.

4. Therapy-related factors

There are many therapy-related factors that affect adherence. Most notable are those related to the complexity of the medical regimen, duration of treatment, previous treatment failures, frequent changes in treatment, the immediacy of beneficial effects ,side-effects, and the availability of medical support to deal with them.

5. Patient-related factors

Patient-related factors represent the resources, knowledge, attitudes, beliefs, perceptions and expectations of the patient. Patients' knowledge and beliefs about their illness, motivation to manage it, confidence (self-efficacy) in their ability to engage in illness-management behaviors, and expectations regarding the outcome of treatment and its consequences, interact in ways not yet fully understood.

Previous studies attempted to account for these relationships and medication adherence. One example of such a study is that of Wu et al. (2008) who examined the predictors of medication adherence using the Multidimensional Adherence Model in patients with heart failure. This study explored 1) socioeconomic factors-education, ethnicity, financial status, and social support, 2) health care system-related factors-patient-provider relationship, 3) condition related factors symptom severity, co-morbidity, and depression, 4) therapy-related factors-complexity of medication, and barrier, 5) patient-related factors-gender, age, attitudes, and knowledge and medication adherence. Medication adherence was measured objectively using the medication event monitoring system for 3 months. Three indicators of adherence were assessed by the medication event monitoring system: 1) dose count, the percentage of prescribed doses taken; 2) dose days, the percentage of days the correct number of doses were taken; and 3) dose time, the percentage of

doses that were taken on schedule. The study found that barriers to medication adherence were ethnicity and perceived social support ($p < .001$). New York Heart Association functional class, barriers to medication adherence, financial status, and perceived social support predicted dose day ($p<.001$). Barriers to medication adherence and financial status predicted dose time ($p< .005$).

Although there are some findings from previous studies that have been conducted using MAM, no research has been carried out to explain MAM in MI patients. As a consequence, there is a need to investigate the MAM in MI patient so as to expand the existing knowledge in various types of heart disease across wider cultural contexts. In this study, the researcher considered the antecedents of four dimensions because from previous studied show that health related factor was unpredictable medication adherence (Wu et al., 2008). The four dimensions composes of socioeconomic factors, condition-related factors, therapy-related factors, and patient-related factors, and medication adherence was regarded as an outcome since the literature review supports that these dimensions are most relevant to post-MI patients and can be manipulated. These factors were as follow:

Social support has a significant effect on medication adherence and a marked impact on the progression of MI and has been positively linked with medication adherence across different chronic illnesses (Horne and Weinman, 1999; Molloy et al., 2008; Simoni et al., 2006). Moreover, social support not only enhances self-efficacy but also affects adherence through physiological mechanisms by improving patient adherence through reduced depression as well (Byrne et al., 2005; Glanz, Rimer, and Viswanath, 2008; DiMatteo, 2004).

Financial status levels demonstrate significant associations with medication adherence (Gerber et al., 2010; Jackevicius et al., 2008; Kison, 1992). Similarly, Armstrong (2010) and Bosworth et al. (2006) showed that patients who have a low income level are more likely to have poor adherence with their medication regimen.

Education is associated with medication adherence. Low levels of education are more likely to be associated with poor medication adherence (Bosworth et al., 2006). High levels of education give patients a deeper knowledge of risk factors for coronary heart disease (CAD), which can lead to improvement in medication adherence (Alm-Roijer et al., 2004). High levels of education give patients a deeper knowledge of risk factors for CHD, which can lead to improvement of medication adherence (Alm-Roijer et al., 2004). Kayaniyil et al. (2009) showed that a greater level of education in cardiac patients contributed to a higher level of knowledge.

Symptom severity was consistently related to medication adherence, and higher severity of symptoms related to poor medication adherence (Wu et al., 2008). Sud et al. (2005) found that symptoms severity is an important variable associated with medication adherence of patients after acute coronary syndromes.

Depression has been associated with failure to adhere to medication prescription (Molloy et al., 2008). In CAD patients, depression was associated with poor medication adherence and a 70% increased rate of CAD event, including nonfatal myocardial infarction compared with those who are not depressed (Gehi et al., 2005).

Barriers influence poor medication adherence with cardiovascular disease management (Lehane et al., 2008). Albert (2008) showed barriers to medication adherence included forgetting to take medication, cost, too many pills taken per day, and too frequent medication schedule. Patients who had any of these barriers were less likely to adhere to medication.

Knowledge is a prerequisite to understanding disease and how to manage health (Lynch et al., 2006; Wu et al., 2008). Cohen (2009) found that knowledge is a factor related to medication adherence in the cardiovascular patient.

Self-efficacy is a well-known predictor of health-related behavior. Individuals with chronic diseases who have high levels of self-efficacy are more likely to perform health-related behaviors in future situations (Schoenthaler et al., 2009). Additionally, Kang et al. (2010) and Chiou et al. (2009) found that self-efficacy was the strongest predictor of taking medication. It had the greatest single effect on medication regimen in CAD patients.

Thus, a conceptual-theoretical-empirical structure using the MAM was developed to test the concept of medication adherence among post-MI patients in the study (see Figure 2).

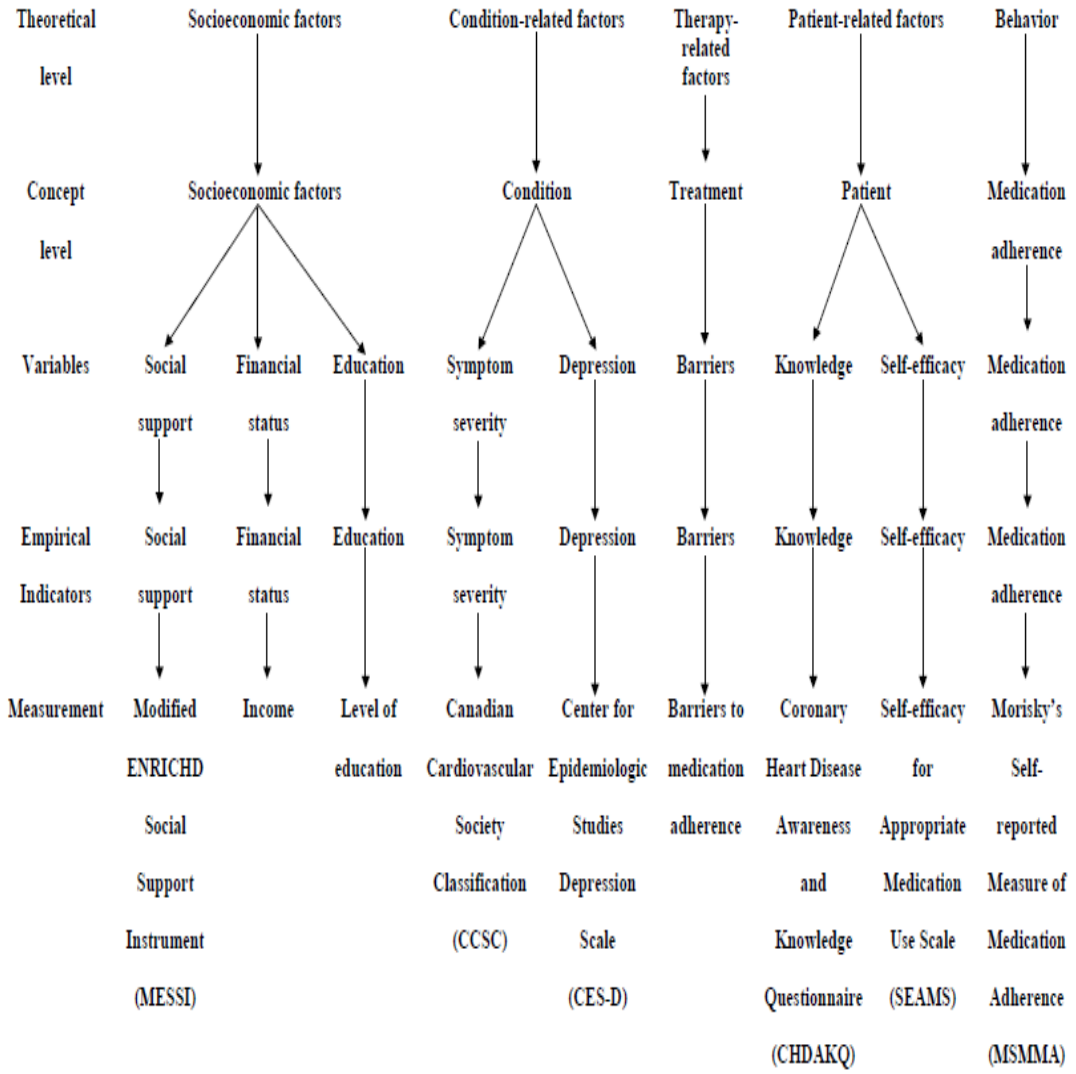

Figure 2 Theoretical substruction diagram of medication adherence among post-MI patients

4. Factors related to medication adherence in myocardial infarction patients

4.1 Socioeconomic factors

Socioeconomic factors found that related to medication adherence. Based on empirical literature socioeconomic factors including three variables which the details as follows:

4.1.1 Social support

The effect of social support on the prognosis of patients with CAD remains one of the strongest findings in literature reviews. Several studies have shown a variety of social support indicators to be important predictors of prognosis in CAD patients (Burg et al., 2005; Horne and Weinman, 1999; Molloy et al., 2008; Simoni et al., 2006). Social support is broadly defined as the existence or availability of people on whom one can rely; people who let one know that they are cared about, valued, and loved (Vaglio et al., 2004). Moreover, social support has been widely used to refer to the mechanisms by which interpersonal relationships in an individual's social network buffer against a stressful environment. Social support has a marked impact on the progression of CAD. CAD patients with greater practical support were more likely to achieve medication adherence and social support was associated with clinical outcomes over 4.5 years (Molloy et al., 2008). In studies conducted specifically among patients who had heart failure (HF), the majority of investigator found that social support was significantly related to medication adherence (Wu et al., 2008). Lack of social support was one of the most common factors in poor medication adherence (Wu et al., 2008). In addition, DiMatteo (2004) found that social support indirectly affects lifestyle and health behaviors. Khuwatsamrit (2006) demonstrated that social support had a positive direct effect on adherence to self-care requirements. Moreover, Polsook (2006) found that social support was positively related to adherence to health recommendations among CAD patients.

There were many researchers describe the definition of social support. Clearly definition of social support paves the way researcher understands and appropriately selects the instrument to measure social support. The definition of social support was as follow:

1) Definition of social support

Cobb (1979) Social support is defined as information leading the subject to believe that he is cared for and love, esteemed, and a member of a network of mutual obligations. The evidence that supportive interactions among people are protective against the health consequences of life stress is reviewed. It appears that social support can protect people in crisis from a wide variety of pathological states: from low birth weight to death, from arthritis through tuberculosis to depress, alcoholism and the social breakdown syndrome. Furthermore, social support may reduce the amount of medication required, accelerate recovery, and facilitate compliance with prescribed medical regimens (Williams, Barclay, and Schmied, 2004).

House (1981) social support is an interpersonal transaction involving one or more of the following: (1) emotional concern (liking, love, empathy), (2) instrumental aid (goods or services), (3) information (about the environment), or (4) appraisal (information relevant to self evaluation) (Williams et al., 2004).

Orth-Gomer and Unden (1987) the term 'social support' is here defined in its wider sense, including both structural aspects (social contacts, social network) and the provision of social support in its more narrow functional sense.

Hamalainen et al., (2000) social support refer to the mechanisms by which interpersonal relationships in an individual's social network buffer against a stressful environment. There is no general agreement with regard to a precise definition of social**.**

Timmerman, Emanuels-Zuurveen, and Emmelkamp (2000) social support consist of informative support; supports your actions, says to you 'that is the right way', makes constructive criticism about you, makes you understand why you did something wrong, and emphasizes your strong points. Social companionship; pays you a social visit, calls you up just for a chat, takes care of diversion, goes shopping, to the cinema, to a match or just a day out with you, and invites you to a party or for dinner. Instrumental support; lends you small things like effects or a little money, gives you advice on all kinds of small domestic problems, takes you somewhere, offers you help under special circumstances, like illness, moving, babysitting, and offers you practical help with daily matters, like housekeeping or a small job.

There is no general agreement with regard to a precise definition of social**.** However, even though there are many definitions of social support, but enhancing recovery in coronary heart disease center (ENRICHD) (1996) definition is the most meaningful of this study. Social support refers to post-MI patient's perception of help regarding medication adherence in aspects of emotion, instrumental, information, and appraisal support that they received from family, caregivers or health professions.

The ENRICHD Social Support Instrument (ESSI) assesses the four defining attributes of social support: emotional, instrumental, informational, and appraisal.

Emotional support refers to the provision of caring, empathy, love, and trust.

Instrumental support refers to the provision of help in both tangible ways such as finance, labor, or time and service forms.

Information support refers to the information provided to another during a time stress that is useful for problem solving.

Appraisal support refers to the communication of information that is relevant to self-evaluation.

2) Measurement of social support

There are many different methods for assessing social support. From literature reviews the instruments to evaluate social support had been documented as follow:

The Medical Outcomes Study Social Support Survey (MOS-SSS) was developed based on the responses of nearly 3,000 patients with chronic health conditions from the Medical Outcome Study, an observational study that examined variations in patient outcomes and physician practice styles in different systems of care. Four factors of social support: emotional-informational support, characterized by both emotional support and guidance or advice; tangible support, characterized by material aid or assistance; affectionate support, characterized by the expression of love and affection; and positive social interaction, characterized by the availability of individuals with whom to do fun things. The MOS-SSS consists of 12 items responses range from 1 (none of the time) to 5 (all of the time) Likert scale, range from 0 to 100. Higher score indicate a high level of social support availability (Gjesfjeld, Greeno, and Kim, 2008).

The ENRICHD Social Support Instrument (ESSI) investigates 2,481 post myocardial infarction (MI) patients (Vaglio et al., 2004). The authors created items by searching the literature for evidence of the types of structural, instrumental, and emotional support that predict lower mortality in myocardial infarction patients. The measure was designed to avoid assessing network morphology, based on evidence from the literature that network structural properties are less important than emotional support for survival after myocardial infarction. The four defining attributes of social support: emotional, instrumental, informational, and appraisal (Burg et al., 2005; Frasure-Smith and Lesperance, 2003; Gottlieb and Bergen, 2010; Vaglio et al., 2004). The ENRICHD Social Support is composed of 6 items that other studies had found individually predictive of MI/death in cardiac patients and a seventh item regarding partner status. Each item is endorsed on a 1 (none of the time) to 5 (all of the time) Likert scale. Items are then summed for a total score, range from 1 to 30, higher scores indicate greater social support. This instrument has been measured social support in cardiac patients such as MI (Burg et al., 2005), CAD (Frasure-Smith and Lesperance, 2003), percutaneous coronary intervention (PCI) (Burg et al., 2005; Vaglio et al., 2004), and heart failure (Frasure-Smith and Lesperance, 2003; Vaglio et al., 2004).

The Social Provisions Scale (SPS) was develop based on Weiss's model of social provisions, which distinguishes the assistance-related functions of social ties (i.e., reassurance of worth, guidance, and reliable alliance) from their non–assistance-related functions (i.e., opportunity for nurturance, attachment, and social integration). The SPS consisted of 24 items which respondent’s rate on four-point strength of dis/agreement response format (Gottlieb andBergen, 2010).

The Inventory of Socially Supportive Behaviors (ISSB) was designed the basis of evidence from empirical research and literature reviews regarding the types of help and support people receive from members of their social networks. Six main functions of support: material aid, behavioral assistance, intimate interaction, guidance, feedback, and positive social interaction. The ISSB consisted of 40 items which scored using a five-point ordinal response format reflecting the frequency of receipt of each supportive behavior during the previous month (1=not at all, 2=once or twice, 3=about once a week, 4=several times a week, 5=about every day). Higher score indicating a high level of social support. This instrument has been measure social support in students (Gottlieb & Bergen, 2010).

Social Support Questionnaire (SSQ) modified and tested by Sarason et al. (1983) used 602 University of Washington undergraduates was administered the Social Support Questionnaire to measure the amount of social support and the satisfaction in the support of the society that is or find it which consists of the personal relations, adaptation or management and lifestyle change. (Sarason et al., 1983). The SSQ consisted of 27 items. Item responses was Likert scale ranging from 1 (very satisfaction) to 6 (unsastisfaction). The number scores for the 27 items ranged from 2.92 to 5.46, with a mean of 4.25. Higher score indicate a high level of social support (Sarason et al., 1983). This instrument has been measure social support in students (Orth-Gomer and Unden, 1987).

Therefore, this study will use The ESSI to measure social support in MI patients. Because this instrument assesses cover the defining attributes of social support which were emotional, instrumental, informational, and appraisal. This instrument has been measured social support in cardiac patients such as MI (Burg et

al., 2005), CAD (Frasure-Smith and Lesperance, 2003), percutaneous coronary intervention (PCI) (Burg et al., 2005; Vaglio et al., 2004), and heart failure (Frasure-Smith and Lesperance, 2003; Vaglio et al., 2004). In addition, this instrument has demonstrated acceptable psychometric properties and has shown to correlate positively with other social support instruments (Vaglio et al., 2004). Moreover, the format used Likert scale for item responses that appropriate to measure perceive social support. So, social support in MI need the instrument that specific, high validity and reliability, appropriate number of questions and format, and consist of social support that cover very dimension of social support in MI patients. Thus, the ESSI appropriate to measure social support in this group.

4.1.2 Financial status

Financial situation was a predictor of medication adherence in heart failure patients (Wu et al., 2008). MI patients who have low income may have difficulty with medication adherence (Jackevicius et al., 2008). Similarly, Bosworth et al. (2006) demonstrated that patients who have low incomes are more likely to have poor adherence. Among patients with low income, spending money on medication often becomes a low priority because of competing needs and limited sources. Financial burden is a crucial issue in medication adherence. Dunbar-Jacob et al. (2003 cited in Wu et al., 2008) studied medication adherence in persons with cardiovascular disease and found that as total household income increases, medication adherence increases. Financial status which means determined by patient’s interview developed by researcher.

4.1.3 Education

Education was one of the socioeconomic factors that related to medication adherence. Low levels of education are more likely to be tied to poor medication adherence (Bosworth et al., 2006). High levels of education provide patients with a deeper understanding of risk factors for coronary heart disease, which can lead to improvement of medication adherence (Alm-Roijer et al., 2004). Ho et al (2009) found that cardiovascular patients who had lower educational levels correlated to poor medication adherence. Additionally, Gehi et al. (2007) demonstrated that coronary heart disease patient's poor medication adherence was associated with educational level. Moreover, Wu et al. (2008) found that heart failure patients with more education were more likely to adhere to the medication regimen. Education determined by patient interview developed by researcher.

4.2 Condition-related factors

Based on literature review and multidimensional adherence model (WHO, 2003), there were two variables of condition-related factors related to medication adherence. These variables were described as follow:

4.2.1 Symptom severity

Symptom severity was consistently related to medication adherence and higher severity of disease related to poor medication adherence. Physical symptoms remind patients to take medications because they perceive negative outcomes if they did not take medication and are motivated to take them in order to feel better (Wu et al., 2008). Similarly, Ho, Bryson, & Rumsfeld (2009) studied medication adherence and cardiovascular outcomes and showed that asymptomatic and those with chronic

conditions that require long- term therapy have also been associated with poor adherence. Moreover, Sud et al (2005) studied adherence to medication with patients after acute coronary syndromes and showed that severity of disease is an important variable associated with medication adherence. Symptom severity will be measured by the Canadian Cardiovascular Society Classification (CCSC) (Sangareddi et al., 2004). Canadian Cardiovascular Society is commonly used this scale for the classification of the severity of angina. This scale was grading of angina as follow:

Class I: Ordinary physical activity (such as walking or climbing stairs) does not cause angina. Angina may occur with strenuous rapid or prolonged exertion at work or recreation.

Class II: Angina may occur with walking or climbing stairs rapidly; walking uphill; walking or stair climbing after meals or in the cold in the wind or under emotional stress; walking more than 2 blocks on the level at a normal pace and in normal conditions climbing more than 1 flight of ordinary stairs at a normal pace and in normal conditions.

Class II: Angina may occur after walking 1-2 blocks on the level or climbing one flight of stairs in normal conditions at a normal pace.

Class IV: Angina may be present at rest.

4.2.2 Depression

Depression has been shown to be associated with poor adherence in CAD patients. Depression is common in patients who experience CAD, with approximately 1 in 3 patients experiencing depressive symptoms during hospitalization (Rieckmann et al., 2006). CAD patients who had depression showed poorer medication adherence

when compared with non-depressive patients (Rieckmann et al., 2006). Depression affects outcomes by reducing adherence to treatment regimens during the post-myocardial infarction period. Similarly, Leong, Molassiotis, & Marsh (2004) found that CAD patients with depression adhere less often to medications compared to patients without depression and had increased adverse outcomes. Additionally, CAD patients with depression were associated with poorer medication adherence and 70% showed increased rates of CAD events, including nonfatal myocardial infarction, compared with those who were not depressed (Gehi et al., 2005). Cardiovascular patients who were depressed are less likely to follow the medication regimen and showed increased morbidity and mortality (Bane, Hughes, & McElnay, 2006). Higher depressive symptoms were associated with lower adherence to medication within the first 2 weeks after discharge compared with non-depressed patients; those with severe depressive symptoms had a 3-fold incidence of not taking medication (Rieckmann et al., 2006). Furthermore, depression was negatively related to adherence to health recommendations among CAD patients (Polsook, 2006).

The clearly definition of depression linked to select the instrument to measure this concept. The definition and measurement of depression were as follow:

1) Definition of depression

Depression refers to depressed, sad mood most of the day, decreased interest or pleasure in almost all activities, insomnia or hypersomnia nearly every day, psychomotor retardation/ agitation, changes in appetite; unintentional weight gain or loss, fatigue or loss of energy nearly every day, feelings of worthlessness or inappropriate guilt, concentration and memory problems (Dobbeld et al., 2002).

Beeber (1998) depression referred to a condition in which people show unusual fatigue, lost power, automatic thinking negatively, less appetite, insomnia, relationships with others less.

Beck (1967) explains the meaning of depression that is a condition that makes people with mood disorders in cognitive behavior and physiology of such a concept in the negative, stigmatize themselves, changes in mood, try to avoid situation, physical inactivity, less appetite, insomnia, lack of sexual interest, and so on.

Depression is a condition in people with mood disorders. Several definition of depression has been documented such as depression refers to depressed, sad mood most of the day, decreased interest or pleasure in almost all activities, insomnia or hypersomnia nearly every day, psychomotor retardation/ agitation, changes in appetite, unintentional weight gain or loss, fatigue or loss of energy nearly every day, feelings of worthlessness or inappropriate guilt, concentration and memory problems (Dobbeld et al., 2002). In addition, Beeber (1998) stated that depression referred to a condition in which people show unusual fatigue, lost power, automatic thinking negatively, less appetite, insomnia, and relationships with others less. Similar to Beck (1967) explains the meaning of depression that is a condition that makes people with mood disorders in cognitive behavior and physiology of such a concept in the negative, stigmatize themselves, changes in mood, try to avoid situation, physical inactivity, less appetite, insomnia, lack of sexual interest, and so on. However, the definition of depression by Radloff (1977) is the most meaningful to this study. Radloff (1977) defined depression as the major components of depressive symptomatology were depressed mood, feelings of guilt and worthlessness, feelings

of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance.

2) Measurement of depression

There were several instruments to measure depression as follow:

Beck Depression Inventory-II (BDI-II) developed by Beck et al. (1996). BDI-II assesses somatic or performance-related symptoms and reflects agitation, concentration, loss of energy, and feelings of worthlessness. The BDII has 21 items, each consisting of a graded series of statement ranging from neutral (0) to maximum severity (3). The total score ranges from 0 to 63, reflecting the intensity of symptoms. The BDII was also categorized into two levels of depression: a score of 10–15 indicated at least mild to moderate symptoms of depression and a score of 16 and above indicated clinical depression. (Arnau et al 2001; Thombs et al., 2008). This instrument has measured depressive symptom in mental health patients, primary care medical patients, and MI (Rieckmann et al., 2006; Beck et al., 1988 cite in Soderman, Lisspers, and Sundin, 2003).

The Center for Epidemiologic Studies Depression Scale (CES-D) developed base on Radloff (1977) identified four factors that have subsequently come to constitute independent subscales: Depressed Affect, Positive Affect, Somatic and Retarded Activity, and Interpersonal Difficulties. Internal consistency reliability using Cronbach alpha has been reported to be .88. Construct validity using factor analysis which factor loading 0.44 to 0.82. The CES-D consisted of 20-items. The response scale was as follows: 0 = rarely or none of the time (less than 1 day), 1 = some or a little of the time (1-2 days), 2 = occasionally or a moderate amount of the time (3-4 days) and 3 = most or all of the time (5-7 days). A score of 16 or more is indicative of

symptoms of depression. The CES-D measures current levels of depressive symptomatology. Additional, the CES-D is not used as a diagnostic tool, but rather as a screening test, to identify groups at risk of depression or in need of treatment. Higher score indicating a high level of depressive symptom. This instrument has measured depressive symptom in cardiac patients such as MI, CAD, and heart failure (Bane et al., 2006; Polsook, 2006; Dobbeld et al., 2002).

The Patient Health Questionnaire (PHQ) assesses eight diagnoses, divide into threshold disorders (disorders that correspond to specific DSM-IV diagnoses: major depressive disorder, panic disorder, other anxiety disorder, and bulimia nervosa), and subthreshold disorder (disorders whose criteria encompass fewer symptoms than are required for any specific DSM-IV diagnoses: other depressive disorder, probable alcohol abuse/ dependence, somatoform, and binge eating disorder). Major depression is diagnosed if five or more of the nine depressive symptom criteria have been present at least “more than half the days” in the past 2 weeks, and 1 of the symptoms is depressed mood or anaerobia. The PHQ assessed depressive symptoms using the 9-items. Participants indicated the frequency of experiencing each symptom during the prior 2 weeks; the items were scored as non point for not at all, 1 point for several days, 2 points for more than half the days, or 3 points for nearly every day. Evaluated of depressive symptoms as a continuous variable (range, 0-27), as a categorical variable, and as a dichotomous variable using the standard cut point of 10 or higher. Higher score indicating a high level of depressive symptom. This instrument has measured depressive symptom in mental health patients, primary care patients, and spinal cord injury (Krause, Reed, and McArdle, 2010; Kroenke, Spitzer, and Williams, 2001; Whooley et al., 2008).

Therefore, this study will use the Center for Epidemiologic Studies Depression Scale (CES-D) (Lesman-Leegte, 2009; Polsook, 2005) measure depression in patients with MI. Because of this instrument assesses current levels of depressive symptomatology. Additionally, this instrument has demonstrated acceptable psychometric properties and the format for item responses appropriate to measure depressive symptom. The CES-D is not used as a diagnostic tool, but rather as a screening test, to identify groups at risk of depression or in need of treatment. Moreover, this instrument has measured depressive symptom in cardiac patients such as MI, CAD, (Polsook, 2005) and heart failure (Lesman-Leegte, 2009). So, this instrument appropriate for assess depression in patients with MI.

4.3 Therapy-related factors

The empirical review and multidimensional adherence model (WHO, 2003) found that the most potential of therapy-related factors related to medication adherence was barriers. The detail of this variable as follow:

4.3.1 Barriers

Barriers that influence poor medication adherence with cardiovascular disease management include adverse effects, polypharmacy, frequent dosing, and cost (Albert, 2008). Wu et al (2008) showed barriers that have been studied including forgetting to take medications, cost, too many pills taken per day, and too frequent a medication schedule. Patients who had any of these barriers were less likely to adhere to medication. Similarly, Wu et al (2008) found that limited communication with health care providers, forgetting to take daily medication, characteristics of

medication (difficult schedule, frequent dosing, side effects, and difficulty swallowing), and cost of medication were also related.

Barriers are very important variable related to medication adherence. The definition of the variable and measurement were as follow:

1) Definition of barriers

Barriers that influence poor medication adherence with cardiovascular disease management include adverse effects, polypharmacy, frequent dosing, and cost (Albert, 2008). Wu et al (2008) showed barriers that have been studied including forgetting to take medications, cost, too many pills taken per day, and too frequent a medication schedule. Thus, the meaning of barriers in this study is the definition by Wu et al. (2008). Barriers were defined as forgetting the time of medication, not carrying any medication when I am out, cost of medication, amount of pill per day, and too frequent medication schedule.

2) Measurement of barriers

The Medication Adherence Scale (MAS) initial version of the instrument was based on constructs of the theory of planed behavior (TPB) and the health belief model (HBM) (Wu et al., 2008). Barriers in this instrument are relevant to medication-taking behavior. Internal consistency using Cronbach's alpha which barrier subscale was .94. The inter-item correlations were adequate for all other items (.30-.78). Content validity has used four experts in the field of HF adherence who commented on the appropriateness, completeness, and wording of the items. Construct validity of barrier using factor analysis which factor loading of barrier .65 to .88. The MAS barriers subscale consisted of 11 items. Patients are instructed to rate how much they agree or disagree with each item on a scale from 0 (strongly disagree)

to 10 (strongly agree). The total score can range from 0 to 110; higher scores indicate more barriers in taking prescribed medication (Wu et al., 2008).

4.4 Patient-related factors

From multidimensional adherence model (WHO, 2003) and literature review found that two variables of patient-related factors related to medication adherence. The details of each variable were as follow:

4.4.1 Knowledge

Knowledge is a fundamental prerequisite to adherence. Knowledge is defined according to the Cambridge Dictionary (2009) as a basic understanding of or information held by people as a result of experience or study. A number of investigators have demonstrated a relationship between knowledge and medication adherence (Wu et al., 2008). Albert (2008) found that knowledge about medication and adverse effects influenced medication adherence. In addition, Kayaniyil et al. (2009) demonstrated that general knowledge about CAD was significantly related to medication adherence. Similarly, Alm-Roijer et al. (2004) found that there were significant correlations between general knowledge about CAD and taking medication.

The definition of knowledge is very essential to consider the measurement to measure this variable. The detail of definition and measurements for knowledge were as follow:

1) Definition of knowledge

Kang, et al. (2010) defined knowledge as disease knowledge. Disease knowledge composed of pathophysiology, causes, risk factors, symptoms and treatment of CAD.

Kayaniyil et al. (2009) defined knowledge as patients' knowledge about their disease can be comprised of their awareness about the general pathophysiology, risk factors, symptoms, prevention, and treatment associated with their condition.

Wu et al. (2008) defined knowledge as knowledge about the medications they take daily; name of pill, dose, and side effect of medication.

Khuwatsamrit (2006) knowledge is defined as patients' ability to identify and explain necessary self-care about cardiac factors including diet, exercise, smoking cessation; medication management, stress management; disease, treatment, and diagnosis; and self monitoring.

Taepaiboon (2003) defined knowledge as medication knowledge that is patients' knowledge of the medication they had to take following the physician's prescription, name of medication, purpose, dosage, frequency per day, time related meals, possible side effects, what to be done if side effects occurred, what to be done while taking this medication, and how to store the medication.

There were many definitions of knowledge have been documented such as Kang et al (2010) defined knowledge as disease knowledge. Disease knowledge composed of pathophysiology, causes, risk factors, symptoms and treatment of CAD. Kayaniyil et al. (2009) defined knowledge as patients' knowledge about their disease can be comprised of their awareness about the general pathophysiology, risk factors, symptoms, prevention, and treatment associated with

their condition. Wu et al. (2008) defined knowledge as knowledge about the medications they take daily; name of pill, dose, and side effect of medication. Moreover, Khuwatsamrit (2006) knowledge is defined as patients' ability to identify and explain necessary self-care about cardiac factors including diet, exercise, smoking cessation, medication management, stress management, disease, treatment, and diagnosis, and self monitoring. Similarly, Taepaiboon (2003) defined knowledge as medication knowledge that is patients' knowledge of the medication they had to take following the physician's prescription, name of medication, purpose, dosage, frequency per day, time related meals, possible side effects, what to be done if side effects occurred, what to be done while taking this medication, and how to store the medication. Therefore, from the literature review revealed that not only knowledge about medication, but also overall CAD knowledge strongly influenced medication adherence. Thus, the meaningful of definition of knowledge in this study is the information and understanding about pathophysiology, risk factors, symptoms, and treatment of MI by Kayaniyil et al. (2009).

2) Measurement of knowledge

The instruments to measure knowledge have been documented as follow:

Coronary Heart Disease Awareness and Knowledge Questionnaire (CHDKQ) (Kayaniyil et al., 2009) was used to measure the cardiac knowledge; it was revised from the Cardiac Knowledge Questionnaire (Maeland and Havik, 1987) and the Coronary Heart Disease Knowledge (Smith, Hicks, and Heyward, 1991). Originally, this instrument consisted of 23 items measuring knowledge on pathophysiology, causes, risk factors, symptoms and treatment of CADs, and main

cause of death in the United States. For this study, 20 items were utilized excluding the 3 items on the statistics of the main cause of death and experience on treatment modality, which were not congruent with the purpose of this study. Each correct answer scored one point and each incorrect answer scored zero point. A higher score indicates greater cardiac knowledge. (Kang et al., 2010; Kayaniyil et al., 2009).

Knowledge Inventory (KI) developed by Schuster, Wright, and Tomich (1995). The KI assessing the patient's knowledge of heart disease, bypass surgery, diagnosis tests, exercise guidelines, smoking, nutrition, medication, and stress. The KI was reviewed for clarity, content, and face validity by 10 cardiac rehabilitation professionals and administered to 10 rehabilitation patients to establish its clarity, adequacy, and freedom from bias. The KI composed of 50-items. Scores range from 0 to 50 with 50 indicating greatest knowledge (Khuwatsamrit, 2006).

Knowledge of risk factors for coronary heart disease (CHD) was develop based on the patients' general overall knowledge about risk factors for CHD (obesity, lipid levels, blood glucose levels, physical activity, stress, smoking, dietary issuer and blood pressure) (Alm-Roijer et al., 2004). The CHD consisted of 28 items. Patient's knowledge was evaluated by creating questions using a scale from 0 to 9 defined as 0 being less important for the progress of coronary heart disease and 9 being very important for the progress of coronary heart disease. An ordinal scale 0–9 was used to illustrate the patients' general knowledge of risk factors for CHD, the degree of achieved lifestyle changes and adherence to medication.

Therefore, this study will use the Coronary Heart Disease Knowledge Questionnaire (CHDKQ) measured knowledge in MI patients. Because of this instrument assesses overall knowledge of CAD. From literature review found that not

only knowledge about medication, but also overall CAD knowledge strongly influence medication adherence. In addition, this instrument acceptable psychometric properties. Thus, the CHDKQ appropriate measured medication knowledge in this group.

4.2.2 Self-efficacy

Self-efficacy is one of patient-related factors which were related to medication adherence. The clearly definition of self-efficacy help the researcher selected the instrument to measure this concept. The detail of definition and instrument of self-efficacy were as follow:

1) Definition of self-efficacy

Self-efficacy is defined as “one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997) and “a judgment of one’s capability to accomplish a certain level of performance” (Bandura, 1986). Bandura (1986, 1997) developed the concept of self-efficacy under the broad social cognitive theory. Bandura proposed that the actual performance of a particular behavior is highly related to an individual's belief in his/her ability to perform that behavior in specific situations. An individual with low self-efficacy is likely to have lower expectations of successfully performing the behavior and will be more affected by situational temptations that are counterproductive to promoting and maintaining behavior change. In contrast, an individual who has high self-efficacy not only expects to succeed but is actually more likely to do so. Several factors influence an individual's self-efficacy, including persuasion by others, observing others' behavior (modeling), previous experience with performing the

behavior, and direct physiological feedback. Self-efficacy exerts such a strong influence on behavior change that confidence has been found to outperform past performance in predicting future behavior (Glanz et al., 2008; Glantz et al., 2002; Redding et al., 2000).

Self- efficacy was the strongest predictor of taking medication, accounting for 24% in modifying behavior and the greatest effect on medication regimens in CAD patients. These results revealed that CAD patients with higher perceptions of self-efficacy had better adherence to taking medication (Kang et al., 2010; Chiou et al., 2009). Additionally, self- efficacy had a positive direct effect on adherence to self-care requirements. Social support had a positive direct effect on self –efficacy and positive direct effect on adherence to self-care requirements (Khuwatsamrit, 2006). Moreover, Dongyan (2000) found that there was strong positive relationship between self-efficacy and compliance with medical regimen among hypertensive patients. Thus, the meaningful of self-efficacy in this study is the confidence in one's ability to perform a given task such as taking one's medication by Risser, Jacobson, and Kripalani (2007).

2) Measurement of self-efficacy

The Self-efficacy for Appropriate Medication Use Scale (SEAMS) develops by a multidisciplinary team with expertise in medication adherence and health literacy. Self-efficacy is the key construct in social cognitive theory by Bandura. Self-efficacy refers to the belief or confidence that one can successfully perform a specific action required to attain a desired outcome. Patients were asked to indicate, under a number of different circumstances, their level of confidence about taking medication. The psychometric by mea properties were evaluated among 436

patients with coronary heart disease and other comorbid condition. The SEAMS consisted of 13- items. Patients were asked to indicate, under a number of different circumstances, their level of confidence about taking medication correctly (1= not confident, 2= somewhat confident, and 3= very confidence). The potential score for the 13-items scale ranged from 13 to 39. Higher scores indicated higher levels of self-efficacy for medication adherence. This instrument had measure self-efficacy in chronic disease such as coronary heart disease and psychiatric illness (Risser et al., 2007).

Medication self-efficacy was measured using the Long-Term medication behavior Self-efficacy Scale (LTMBSES). The tool assesses side effects, physical discomfort, emotional distress, distraction, and being observed. It was a 33-item which self administered, self- report scale measures an individual's confidence in taking medications. Each item is ranked on a scale from 0 (very little confidence) to 5 (quit a lot of confidence). Scores ranged from 0 to 135 with higher score indicating a greater level of medication self-efficacy. The LTMBSES has been used with heart disease, renal, human with hyperlipidemia, and so on. (De Geest et al., 1994 cite in Russell et al., 2010).

Therefore, this study used the SEAMS to measure self-efficacy in MI patients. Because this instrument used to assesses medication self-efficacy in coronary heart disease. Additionally, the format used Likert scale for item responses that appropriate to measure self-efficacy of medication behavior. So, self-efficacy in MI needs the instrument that specific, high validity and reliability, appropriate number of questions and format, and consist of self-efficacy of medication adherence in MI

patients. Thus, the SEAMS appropriate to measure medication self-efficacy in this group.

From literature reviews above, the detail of variable and instruments in this study show in table 2.

Table 2 Summary detail of the instruments used in this study

Variable	Instrument	Conceptual definition	Operational definition
Social support	Modified the ENRICHD Social Support Instrument (MESSI)	ESSI assess the four defining attributes of social support: emotional, instrumental, informational, and appraisal of post-MI patients focusing on the prior work.	MESSI- assesses social support in medication adherence:-Emotional support refers to the provision of caring, empathy, love, and trust. -Instrumental support refers to the provision of help in tangible form such as finance, labor, or time and service forms. -Informational support refers to the information useful for problem solving provided to another during a time of stress. -Appraisal support refers to the communication of information that is relevant to self-evaluation (12 items).
Depression	Center for Epidemiologic Studies Depression Scale (CES-D)	CES-D measures current levels of depressive symptomatology. This tool used for screening test, to	CES-D assesses post-MI patients having depressive symptomatology: depressed mood, feelings of guilt and

		identify groups at risk of depression or in need of treatment.	worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance (20 items).

Table 2 (Cont)

Variable	**Instrument**	**Conceptual definition**	**Operational definition**
Barriers	Barriers to medication adherence	Barriers to taking medication.	Barriers to medication adherence: forgetting the time of medication, not carrying any medication when go out, cost of medication, amount of pill per day, and too frequent medication schedule (11 items).
Knowledge	Coronary Heart Disease Knowledge Questionnaire (CHDKQ)	Knowledge about coronary heart disease.	CHDKQ- the information about pathophysiology, risk factors, symptoms, and treatment of MI (20 items).
Self-Efficacy	Self-efficacy for Appropriate Medication Use Scale (SEAMS)	The confidence in one's ability to perform a given task this is taking one's medication.	SEAMS- the confidence in ability to perform medication-taking according to prescription (13 items).
Medication adherence	Morisky et al.'s Self-Rated Measure of Medication Adherence	Adherence to Medication regimens.	Morisky et al.'s Self-Rated Measure of Medication Adherence - assess continuing to take medication according to agreed recommendations from

			a health care provider during the first three month after discharge (5 items).

5. The relationships among socioeconomic factors, condition-related factors, treatment-related factors, patient-related factors, and medication adherence in Myocardial Infarction patients.

Based on the multidimensional adherence model (MAM) (WHO, 2003) and empirical literature, the selected variables to explain and predict medication adherence among post-MI patients were socioeconomic factors, condition-related factors, treatment-related factors, and patient-related factors. The details of each variable and their relationships are as follows:

5.1 Socioeconomic factors

The Multidimensional adherence model (MAM) (WHO, 2003) includes multiple factors under the category of socioeconomic factors such as social support, socioeconomic status, level of education, and distance from treatment center. Base on literature reviews, only financial status, education and social support will be investigated as potential factors related to medication adherence in post-MI patients in this study.

5.1.1 Social support has a significant effect on medication adherence, and a marked impact on the progression of MI. MI patients with greater practical support were more likely to have good medication adherence. Social support was seen to be associated with clinical outcomes over a 4.5-year period (Molloy et al., 2008).

Lack of social support was one of the most common factors in poor medication adherence (Wu et al., 2008).

Social support has been positively linked with medication adherence across different chronic illnesses (Simoni et al., 2006). The effect of social support on the prognosis of patients with coronary artery disease (CAD) remains one of the strongest findings in the literature. Subsequent studies have shown a variety of social support indicators to be important predictors of prognosis in CAD patients (Burg et al., 2005). Additionally, Molloy et al. (2008) found that practical support predicts medication adherence and attendance at cardiac rehabilitation following acute coronary syndrome. That study found that social support has a significant impact on the progression of MI. MI patients with greater practical support were more likely to have good medication adherence. Similarly, in a meta-analysis, DiMatteo (2004) studied social support and patient adherence to medical treatment. The study demonstrated that social support is an important factor benefiting health by buffering stress, influencing a positive affective state, changing behavior, and also influencing the ability to adjust to and live with illness.

Social support, self-efficacy, and medication adherence have been linked to access to resources that help solve problems, thus leading to confidence (Armstrong, 2010). DiMatteo (2004) found that social support improved patient adherence through improvement in self-efficacy. Additionally, Khuwatsamrit (2006) studied adherence to a self-care requirements model using an empirical test among patients with CAD to show that social support had a positive direct effect on self–efficacy. Similarly, Simoni et al. (2006) conducted a longitudinal evaluation of a social support model of medication adherence among HIV-positive men and women

on antiretroviral therapy. According to the study, social support is thought to increase self-efficacy and then increase medication adherence. Moreover, Pender, Murdaugh, and Parson (2001, citation in Kusuma, 2006) suggested that social support functions as an important lay referral system for individuals in making the decision to seek professional care for health promotion, illness prevention, or care of illness.

Social support not only provides a stress buffer, but also enhances self-efficacy (Bandura, 1997 cite in Glanz et al., 2008). Furthermore, using a questionnaire survey, Cha et al., (2008) studied the mediating role of medication-taking self-efficacy and depressive symptoms on self-reported medication adherence in persons with HIV. The study demonstrated that social support indirectly affects medication adherence through self-efficacy. Therefore, social support is likely to have a positive direct effect on self-efficacy and an indirect effect on medication adherence. Social support not only affects adherence through physiological mechanisms but also improves patient adherence through reduced depression (DiMatteo, 2004). According to Simoni et al. (2006) longitudinal evaluation of social support models among HIV-positive men and women, social support was associated with less depression, and improved medication adherence. In addition, Cha et al. (2008) used a questionnaire survey to investigate the mediating role of medication-taking self-efficacy and depressive symptoms on self-reported medication adherence in persons with HIV. Like Cha et al. (2008) this study showed that increased social support may decrease depression and then enhance medication adherence in HIV patients. Similarly DiMatteo's (2004) meta-analysis found that social support not only was strongly related to decrease patient depression and increased patient adherence, but this led to better adherence. Furthermore, Singhares (2006) and Naewbood (2005) found that

social support is positively related to medication adherence in tuberculosis and hypertension patients which meant that patient had high social support led to increase medication adherence Thus, in this study, it is hypothesized that social support will have a direct positive effect on medication adherence. Additionally, social support will have a negative direct effect on depression and a positive but indirect effect on medication adherence.

5.1.2 Financial status was a predictor of medication adherence in heart failure patients (Wu et al., 2008). In MI patients, income levels demonstrate significant associations with medication adherence which is MI patients had high level of income tend to be paid for medication (Jackevicius et al., 2008). Similarly, Bosworth et al. (2006) showed that patients who have a low income level are more likely to have poor adherence with their medication regimen. Among patients with low income, medication often becomes a low priority because of competing needs and limited sources which meant that patients had low income cannot pay for fill medication. Financial burden is a crucial issue in medication adherence.

People with higher incomes tend to receive healthcare on a more regular basis than those with lower incomes (Armstrong, 2010). Socioeconomic deprivation has been shown to have a profound effect on the risk of having a first MI, the chance of reaching a hospital alive, and the probability of surviving the first month (Macintyre et al., 2001). Additionally, Jackevicius et al., (2008) studied prevalence, predictors, and outcomes of primary poor adherence after acute myocardial infarction (AMI). Primary poor adherence was the start of therapy if a patient receives the initial prescription but does not fill it or after therapy has started if

the patient fails to follow the instructions. Findings indicate that among MI patients low income is significantly associated with poor medication adherence. The one-year mortality rate was higher for those patients with low income because they did not fill all of their discharge medications after AMI. Similarly, Odubanjo, Bennett, and Feely (2004) investigated the influence of socioeconomic status on the quality of prescribing in the elderly. This population-based study found that in some health care systems, high income had an influence on treatment selection by physicians in the elderly, with those on the highest income levels getting newer and more expensive branded drugs. Also, people with higher socioeconomic status may have greater access to information sources on health. Moreover, Bosworth et al. (2006) demonstrated that patients with low income are more likely to have poor adherence with their medication regimen. Financial burden is a crucial issue in medication adherence. Furthermore, Armstrong (2010) studied relationships among personal characteristics, behavioral capability, environmental factors, and hypertension medication adherence in African American adults with metabolic syndrome. The study showed that metabolic syndrome patients with a low income were 5.8 times more likely to be poor adherents (odd ratio 5.828, 95% CI, 1.014-33.493, p = .0482). Thus, financial status is likely to have a positive direct effect on medication adherence in post-MI Thai patients.

5.1.3 Education was another socioeconomic factor that related to medication adherence. Low levels of education are more likely to be associated with poor medication adherence (Bosworth et al., 2006). High levels of education give patients a deeper knowledge of risk factors for coronary heart disease (CAD), which

can lead to improvement in medication adherence (Alm-Roijer et al., 2004). Similarly, Ho et al. (2009) and Gehi et al. (2007) found that lower education levels correlated with poor medication adherence among cardiovascular patients.

Patient education is essential in managing illness. A higher level of education in cardiac patients led to a higher level of knowledge about and control regarding CAD (Kayaniyil et al., 2009). Gehi et al. (2007) conducted a study using self-report on medication adherence and cardiovascular events in patients with stable coronary heart disease (CHD). According to the study, in CHD patients with poor adherence to their medications, lower educations were implicated. Similarly Ho et al. (2009) showed that in cardiovascular patients with lower education levels correlated to poor medication adherence. Additionally, Wu et al. (2008) studied medication adherence in patients who have heart failure and found that heart failure patients with more education were more likely to have good medication adherence. Moreover, Limcharoen (2006) conducted a study of factors related to medication adherence among essential hypertension patients and found that knowledge of hypertension had a significant positive relationship on medication adherence. Wongyou (2005) investigated factors related to medication adherence among tuberculosis patients and showed that knowledge of tuberculosis had a positive significant relationship to medication adherence which is patients higher knowledge led to high level of medication. Thus, education is likely to have a positive direct effect on medication adherence in post-MI Thai patients.

An additional way that education may be related to medication adherence is through knowledge. High levels of education give patients a deeper knowledge of risk factors for coronary heart disease, which can lead to improvement

of medication adherence (Alm-Roijer et al., 2004). Kayaniyil et al. (2009) studied the degree of correlation of cardiac knowledge and awareness among cardiac inpatients. The study showed that greater levels of education in cardiac patients contributed to higher levels of knowledge. Similarly, Baker et al. (2007, cited in Kayaniyil et al., 2009) investigated health literacy and mortality among elderly persons. The study found that low education levels were associated with poor health literacy, which resulted in less knowledge. Moreover, Naewbood (2005) studied factors related to medication adherence among essential hypertension patients. In accordance with the study's findings, education level increased knowledge of hypertension and predicted medication adherence (19.7%).

Furthermore, Fisher et al. (2001) studied contributors to depression in Latino and European-American patients with type 2 diabetes. According to the results found that low level of education associated with depression and lead to poor medication adherence. Bogner et al. (2012) studied integrated management of type 2 diabetes mellitus and depression treatment to improve medication adherence and found that low level of education associated with depression and linked to poor medication adherence. Additionally, Job, Bhugra, and Mann (2002) studied educational intervention for depression among Asian women in primary care in the United Kingdom. According to the study finding found that patient's education can change the patient's understanding of the illness and lead to decrease depression. Thus, education is not only likely to have a positive direct effect on medication adherence and a positive indirect effect through knowledge but also negative direct effect on depression.

Summary Socioeconomic factors

According to MAM includes multiple factors under the category of socioeconomic factors. Only, social support, financial status, and education will be investigated as potential factors related to medication adherence in post-MI patients in this study. Social support is likely to have a direct effect on self-efficacy and an indirect effect on medication adherence. Additionally, it is hypothesized that social support will have a negative direct effect on depression and a positive but indirect effect on medication adherence. Accordingly, financial status is likely to have a positive direct effect on medication adherence in post-MI Thai patients. Education is likely to have positive direct effect on medication adherence in post-MI Thai patients. Moreover, education is not only likely to have a positive direct effect on medication adherence, but also a positive indirect effect through knowledge (see Figure 3).

5.2 Condition-related factors

Condition-related factors in Multidimensional adherence model (MAM) include multiple items; for instance, level of disability, symptom severity, depression, and drug and alcohol abuse. Only symptom severity and depression will be investigated as potential factors related to medication adherence in post-MI patient.

5.2.1 Symptom severity was consistently related to medication adherence, and higher severity of symptoms related to high medication adherence. Physical symptoms reminded patients to take medications because they perceived negative physical symptoms if they did not take medication and they were motivated to take medication to feel better (Wu et al., 2008).

Symptom severity as physical discomfort might be an important internal cue to action. In all of the studies in which investigator examined the

relationships between symptom severity and medication adherence, symptom severity was consistently related to medication adherence. In another word, patients who have high level of symptom severity linked to high medication adherence (Wu et al., 2008). Sud et al. (2005) studied adherence to medications by patients after acute coronary syndromes. According to the study's findings, symptom severity is an important variable associated with medication adherence. The patients who have high level of symptom severity, they had high level of medication adherence. Ho et al. (2009) studied the importance of medication adherence in cardiovascular outcomes. The study demonstrated that asymptomatic and chronic illness that requires long-term therapy has also been associated with poor adherence which meant that patients low symptom severity linked to poor medication adherence. Therefore, symptom severity is likely to have a positive direct effect on medication adherence.

5.2.2 Depression is a co-morbidity which is an important modifier of medication adherence and it has been associated with failure to adhere to medication prescriptions (Molloy et al., 2008). In CAD patients, depression was associated with poor medication adherence and a 70% increased rate of CAD event, including nonfatal myocardial infarction compared with those who are not depressed (Gehi et al., 2005). Cardiovascular patients who were depressed are less likely to have good medication adherence and more likely to have increased morbidity and mortality in this group (Bane et al., 2006).

The major components of depressive symptomatology were depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. Patients with

depression frequently have feelings of hopelessness toward themselves and their future and may not fully appreciate the association of medication adherence to improved health outcomes (Simoni et al., 2006). In addition, Gehi et al. (2005) investigated depression and medication adherence in outpatients with coronary artery disease. According to the study, in CAD patients, depression was associated with poor medication adherence and a 70% increased rate of CAD events, including nonfatal myocardial infarction, compared with those who were not depressed. Depression is associated with a two-fold increase in the chance of not taking medications as prescribed. Similarly, Rieckmann et al. (2006) conducted a study of the course of depressive symptoms and medication adherence after acute coronary syndromes. The studied shown that depression has been associated with poor medication adherence in CAD patients.

Higher depressive symptoms were associated with lower adherence to medication within the first two weeks after discharge compared with non-depressed patients; those with severe depressive symptoms were three times more likely to not take medication. Bane et al. (2006) studied the impact of depressive symptoms and psychosocial factors on medication adherence in cardiovascular disease. The study demonstrated that patients with cardiovascular disease who are depressed are less likely to adhere to prescribed medical regimens, which may account for poorer outcomes. Likewise, Cohen (2009) investigated adherence in the context of cardiovascular risk reduction and demonstrated that poor adherence occurs when patients do not take their medication correctly due to depression.

Similarly Ziegelstein and Howard (2010) examined depression and poor adherence to lipid-lowering medications among patients with coronary artery

disease**.** The study showed that cardiovascular patients who were depressed were less likely to adhere to medication. Morbidity and mortality in this group were increased. Furthermore, Chao et al. (2005) studied the mediating role of health beliefs in the relationship between depressive symptoms and medication adherence in persons with diabetes. The study showed that greater depressive symptoms were associated with lower adherence to diabetes medications. Patients with severe depressive symptoms perceived more barriers to treatment adherence and were less confident in their ability to adhere to medication. Thus, depression is likely to have a negative direct effect on medication adherence.

Depressive symptoms affecting medication adherence also leads to difficulties in self-management. Depressed individuals experience self-doubt in the form of lower self-efficacy and often decrease their efforts, subsequently leading to an inability to carry out recommended health-related behaviors such as adherence to medication (Schoenthaler et al., 2009). Maguire, Hughes, and McElnay (2008), explored the impact of depressive symptoms and medication beliefs on medication adherence in hypertension in a primary care study and found that depressive symptoms related to low self-efficacy and decreased medication adherence in hypertension patients.

Chao et al. (2005) studied the mediating role of health beliefs in the relationship between depressive symptoms and medication adherence in persons with diabetes. The studied showed that depression was associated with lower self-efficacy for diabetes self-management, and depressive symptoms had an indirect effect on medication adherence through self-efficacy. In this study, diabetic patients with more severe depressive symptoms were less confident about taking medication. Similarly,

Cha et al. (2008) investigated the mediating role of self-efficacy and depressive symptoms on self-reported medication adherence in persons with HIV. A questionnaire survey demonstrated that depressive symptoms associated with low self-efficacy and then decreased medication adherence.

Furthermore, Schoenthaler et al. (2009) determined self-efficacy mediates the relationship between depressive symptoms and medication adherence among hypertensive African Americans. According to the study's findings, self-efficacy mediated the relationship between depression and medication adherence in hypertension patients which meant that patients had high depressive symptom linked to low self-confident and then poor medication adherence. So, in this study, it is hypothesized that depression will have a negative direct effect on self-efficacy and a negative indirect effect through self-efficacy on medication adherence.

Summary Condition-related factors

According to Condition-related factors, based on the literature review, only symptom severity and depression will be investigated as potential factors related to medication adherence in post-MI patients. Symptom severity is likely to have a positive direct effect on medication adherence. Depression is likely to have a negative direct effect on medication adherence. In addition, it is hypothesized that depression will have a negative direct effect on self-efficacy and a negative indirect effect through self-efficacy on medication adherence (see Figure 3).

5.3 Therapy-related factors

The Multidimensional adherence model (MAM) (WHO, 2003) includes multiple therapy-related factors, such as complexity of the medical regimen, side effects, previous treatment failure, and frequent change in treatment. These factors can be described as barriers to medication adherence. So, barriers will be investigated as potential factors related to medication adherence in post-MI Thai patients. Barriers influence poor medication adherence with cardiovascular disease management. Wu et al (2008) and Albert (2008) showed that barriers studied included forgetting to take medication, cost, too many pills taken per day, and too frequent medication schedule were related to patients who were less likely to adhere to medication.

5.3.1 Barriers influence poor medication adherence in cardiovascular disease management. Albert (2008) investigated improving medication adherence in chronic cardiovascular disease. The study found barriers to medication adherence are composed of failure to initiate therapy during hospitalization, poor communication and education at discharge about the importance of medications, complexity of medication regimen (polypharmacy and frequent dosing), medication costs, adverse side effects, and lack of knowledge about possible adverse effects.

Wu et al. (2008) conducted a review of the literature on medication adherence in patients who have heart failure (HF). The findings of barriers to enhanced medication adherence included forgetting to take daily medication, characteristics of medication (difficult schedule, frequent dosing, side effects, and difficulty swallowing), and cost of medication. Wu et al. (2008) also examined factors influencing medication adherence in patients with heart failure, finding that barriers to medication adherence predicted medication adherence in HF patients. Moreover, this

study demonstrated that barriers to medication adherence included perceived effects or side effects, previous hospitalization, number of pills taken, packaging, medication container, and cost of medication (Wu et al., 2008).

Moreover, Apter et al. (2003) studied modifiable barriers to adherence to inhaled steroids among adults with asthma found that modifiable barriers to medication adherence by encourage patients have high self-efficacy. In other word, if patients had several barriers, it will lead to low self-efficacy. So, patients have high medication adherence by increasing self-efficacy. Aljasem et al. (2001) studied the impact of barriers and self-efficacy on self-care behaviors in type 2 diabetes. According to the result found that self-efficacy is especially important when the task to be faced is more difficult. Self-efficacy is crucial to taking on a challenging to overcome barriers to medication adherence. Similarly, Grindley, Zizzi, and Nasypany (2008) studied use of protection motivation theory, affect, and barriers to understand and predict adherence to outpatient rehabilitation and found that barriers can overcome, if patients have high self-efficacy. Therefore, barriers are likely to have a negative direct effect on self-efficacy and negative direct effect on medication adherence.

Summary Treatment-related factors

Based on treatment-related factors, complexity of medical regimen, side effects, previous treatment failure, and frequent changes in treatment can be described as barriers to medication adherence. Therefore, barriers are likely to have a negative direct effect on medication adherence (see Figure 3).

5.4 Patient-related factors

The Multidimensional adherence model (MAM) (WHO, 2003) includes patients' knowledge, confidence (self-efficacy) in their ability to engage in illness management behavior, and motivation to manage under the category of patient-related factors. Based on literature review, only knowledge and self-efficacy will be investigated as potential factors related to medication adherence in post-MI Thai patients.

5.4.1 Knowledge is very important with MI patients. Patients who have a higher level of knowledge have a better understanding about the disease and treatment adherence. A low level of knowledge is related to poor medication adherence (Wu et al., 2008). Kayaniyil et al. (2009) demonstrated that general knowledge about CAD showed a significant relationship with medication adherence. Similarly, Alm-Roijer et al. (2004) found significant correlations between general knowledge about CAD and taking medication. Albert (2008) found that knowledge about medication and adverse effects influence medication adherence. Moreover, Thidaratana (2001 cited in Taepaiboon, 2003) found that medication knowledge was the most important variable affecting medication adherence.

Knowledge is a prerequisite to understanding disease, how to manage health, and is essential for medication adherence (Wu et al., 2008). Patients must believe that by following their medication prescription they will at least reduce the threat or severity of the disease (Bosworth et al., 2006). Cohen (2009) investigated adherence in the context of cardiovascular risk reduction and demonstrated that knowledge is a factor related to medication adherence in the cardiovascular patient. Lack of knowledge is also a factor in poor medication adherence. Similarly,

Naewbood (2005) studied factors related to medication adherence among essential hypertension patients. This study showed that knowledge of hypertension had a significant positive relationship to medication adherence and accounted for 19.7% of the variance.

Furthermore, Taepaiboon (2003) investigated medication knowledge and medication self-care practices in the patients with coronary artery disease. According to the study's findings, percentage of medication knowledge of the name and purpose of medications was important for CAD patients (45.6% and 33.5%, respectively). Thus, knowledge is likely to have a positive direct effect on medication adherence.

5.4.2 Self-efficacy is a well-known predictor of health-related behavior. Self efficacy means an individual's own perceived ability to perform a specified behavior or set of behaviors. Individuals with chronic diseases who have high levels of self-efficacy are more likely to cognitively appraise their capabilities positively and thus are more likely to perform health-related behaviors in future situations (Schoenthaler et al., 2009). Additionally, Kang et al. (2010) and Chiou et al. (2009) found that self-efficacy was the strongest predictor of taking medication, accounting for 24% of modifying behavior. It had the greatest single effect on medication regimen in CAD patients. These results revealed that CAD patients with higher self-efficacy had better medication adherence.

Additionally, self-efficacy had a positive direct effect on adherence to self-care requirements (medication adherence was a subscale of self-care requirements) in the study of adherence to a self-care requirements model in an

empirical test among patients with coronary artery disease (Khuwatsamrit, 2006). The study of the relationship of personal characteristics, behavioral capability, environmental factors, and hypertension medication adherence in African American adults with metabolic syndrome found that self-efficacy was one of the strongest predictors of medication adherence in that chronic illness (Armstrong, 2010). Moreover, Dongyan (2000) studied self-efficacy and compliance with the medical regimen among hypertensive patients and found that hypertensive patients with a perceived high level of self-efficacy also had a high level of compliance with medication regimen. Furthermore, Chiou et al. (2009) investigated factors associated with behavior modification in patients with coronary artery disease in Northern Taiwan. The study showed that a total of 38% of the variance caused by modifying behaviors was explained by self-efficacy. Similarly, Kang et al. (2010) studied correlates of health behaviors in patients with coronary artery disease. According to the study, self-efficacy related to health behaviors and cardiac self-efficacy had the greatest effect on health behaviors ($\beta = .39$). So, self-efficacy is likely to have a positive direct effect on medication adherence.

Self-efficacy is a construct central to Social Cognitive Theory, which proposes that behaviors are determined not solely by knowledge. Self-efficacy has also been proposed as a mediating factor between knowledge attainment and health behaviors (Wolf et al., 2007). Ngamvitroj and Kang (2007) studied effects of self-efficacy, social support, and knowledge on adherence to peak expiratory flow rate (PEFR) self-monitoring among adults with asthma in a prospective repeated measures study. The study found that asthma knowledge was associated with self-efficacy and had a positive effect on adherence to PEFR self-monitoring among adults with

asthma. Additionally, Boulet (1998) investigated perception of the role and potential side effects of inhaled corticosteroids among asthmatic patients. The study found knowledge can increase patients willingness to use medication and decrease fear and misconception about medication that is, knowledge can increase self-efficacy and lead to greater adherence to medication. Similarly Wolf et al. (2007) examined literacy, self-efficacy, and HIV medication adherence. According to that study's findings, patients who were more likely to possess poorer knowledge of their HIV treatment reported lower self-efficacy for taking their medications as prescribed. Low knowledge resulted in low self-efficacy and continuity of poor medication adherence. So, knowledge is likely to have a positive direct effect on self-efficacy and a positive indirect effect through self-efficacy on medication adherence.

Summary Patient-related factors

According to patient-related factors, only knowledge and self-efficacy will be investigated as potential factors related to medication adherence in post-MI Thai patients. Knowledge is likely to have a positive direct effect on medication adherence. Self-efficacy is likely to have a positive direct effect on medication adherence. Moreover, knowledge is likely to have a positive direct effect on self-efficacy and a positive indirect effect through self-efficacy on medication adherence (see Figure 3).

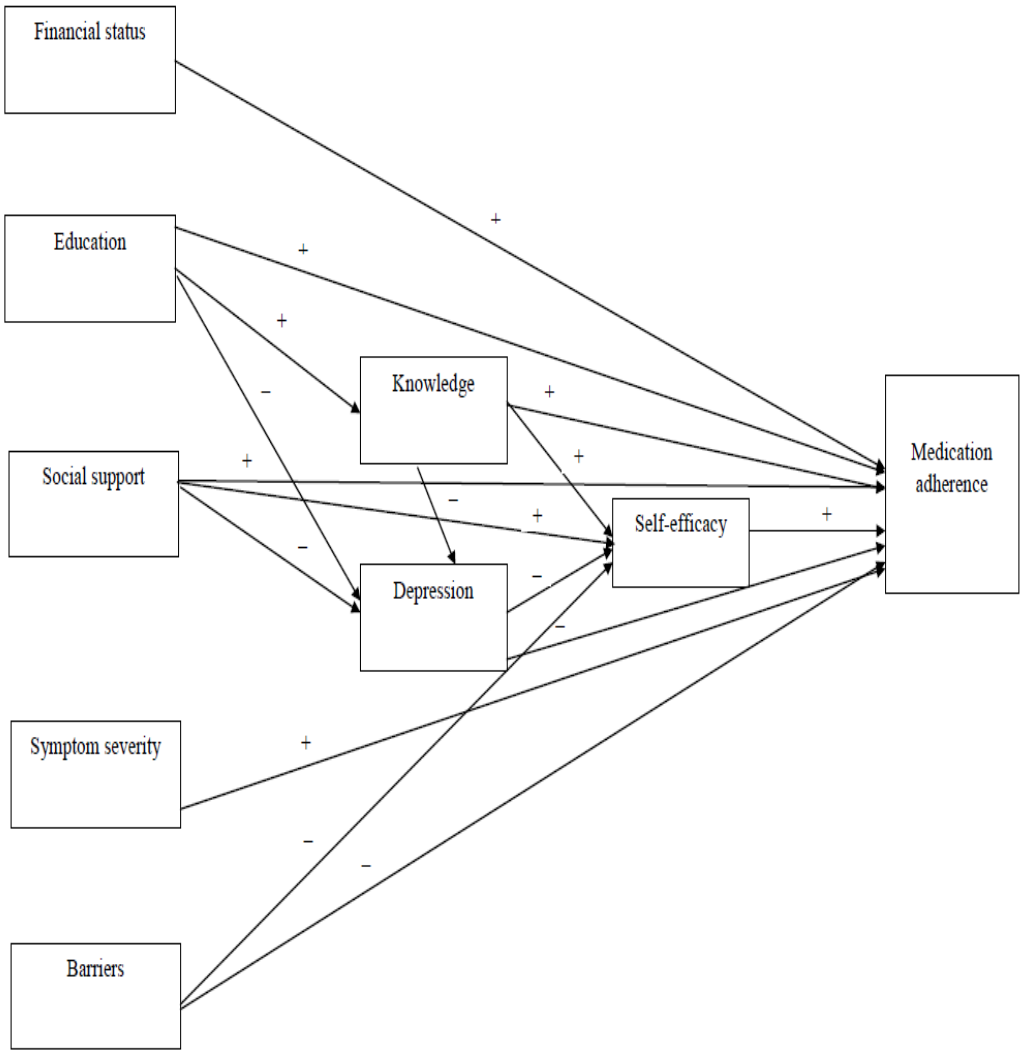

Figure 3 Hypothesized model of medication adherence among post-MI patients

Summary

In this study, medication adherence refers to the extent to which patients taking medication corresponds with agreed upon recommendations from a health care provider during the first three month after diagnosis with MI. Among MI patients

taking medication, continuous use is important because medication significantly reduces risk for recurrent MI, recurrent cardiac events, reduces morbidity and mortality, rehospitalizations, and reduces health care costs (Choudhry et al., 2008; Corrao et al., 2010; Dragomir et al., 2010; Jackevicius, Li, & Tu, 2008; Perreault et al., 2009). Even though medication adherence is useful for MI patients, studies have found that as few as 8% take their medication exactly as prescribed (Albert, 2008; Choudhry et al., 2008; Jackevicius et al., 2008; Polack et al., 2008; Taepaiboon, 2003).

The literature shows significantly low rates of medication adherence in post-MI patients in the first three months after hospital discharge. Various reasons are given for not adhering to prescription medications, such as the complexity of drugs and their dosages. For example, patients often do not know the purpose of the medication or experience poor communication and education at discharge about the importance of medication. Additionally, some patients are concerned about the possibility of adverse effects and medication costs (Charmati, 2001 cited in Taepaiboon; Jackevicius et al., 2008; Ho et al., 2006; Mann et al., 2007; Taepaiboon, 2003). Some intervention studies related to medication adherence showed improvements in some dimensions but not in others (Choudhry et al., 2008; Smith et al., 2008; Wood et al. cited in Maddox & Ho, 2009). Thus, knowledge related to medication adherence in persons living with MI is limited and still unclear

Furthermore, in Thailand, little research has been done on medication adherence in CAD patients and it is not known how Thai cultural characteristics influence medication adherence. Gaps remain in the literature about medication adherence and it remains an important health problem, which is often overlooked and

linked to increased adverse outcomes (Albert, 2008; Choudhry et al., 2008; Polack et al., 2008). In order to decrease the progression of disease and improve quality of life in Thai persons with MI, this study is crucial and will provide the foundation for an intervention study.

Chapter III

Methodology

This chapter describes the methodology used in the present study. The research design, population and sample, instrumentation, protection of the rights of human subjects, pilot study, and data analysis are detailed.

Research design

A cross-sectional, descriptive design was employed to explore the theoretical linkage among potential factors of interest and medication adherence among post-MI patients in Thailand. The potential factors were derived from the multidimensional adherence model (MAM) (WHO, 2003) and available relevant research evidence. Generally, a descriptive study answers basic questions about "what is happening in a defined population or situation and can also help to identify relationships between variables (Kleinpell, 2009). The knowledge derived helps to develop nursing interventions that benefit individuals, families, or group to obtain desirable and predictable outcomes (Kleinpell, 2009).

Although this design is limited in its ability to explain causal relationships among variables, it has much strength. First, it can explore the relationships among variables in naturally occurring situations without any artificial manipulation. It is practical and economical. Next, this study enables the exploration of health conditions that is affected by human development; the procedure is reasonably simple to design and carry out; and data are collected at one point in time, so results can be timely and relevant. Finally, large samples are relatively inexpensive to obtain and loss of

subjects due to study attrition is minimal (Kleinpell, 2009; Polit and Beck; 2006). The MAM used as the foundation for this study, hypothesizes relationships among five antecedent variables and medication adherence. Thus, a cross-sectional descriptive correlational design was deemed appropriate.

Population and sample

Population

Post-MI patients who are recently discharged from the hospital and undergoing follow-up in the first three months after hospital discharge at cardiology clinics in tertiary hospitals in Thailand.

Sample

The participants were recruited from all various parts of Thailand including the Northern, Southern, Central, and Northeastern regions (National Statistics Organization, 2011). All potential participants who met the inclusion criteria were approached and requested to participate in the study. In addition to the diagnosis of MI, additional inclusion criteria were as follows:

1) Recently discharged from the hospital and undergoing follow-up in the first three months after hospital discharge at cardiology clinics

2) Twenty years of age or older

3) Are able to understand Thai language

4) No cognitive impairment and no disease complications (based on current medical record).

Sample size

An optimum sample size was needed for the rejection of the null hypothesis that R equal zero. In this case, it is estimated by number of predictors, alpha level, desired power, and effect size or a specific level of R^2 (Hair et al., 2006; Polit and Beck, 2004). A desired ratio of 15 to 20 respondents for each variable has been recommended (Hair et al., 2010). However, Hair et al. (2006) recommended for a sound basic for estimate sample size is 200 and suggested that the model complex and more construct is require more parameters to be estimate. The adequate sample size for path analysis could be 10 times for each parameter. In this study, the hypothesized model contained 25 parameters; thus, a sample size of 250-500 was the requirement to match the complexity to the path model. In addition, 10% of the total sample size will be added to take into account any attrition. Therefore, the total sample size of this study was 300-550 Thai post-MI patients. The number of participants in this study was 348 cases. It is adequately for path analysis.

Sampling technique

A modified cluster sampling using multi-stage process was used to yield a probability sample of post-MI Thai patients. Participants were drawn from regional hospitals from four regions of Thailand; North, Northeast, Central, and South (National Statistics Organization, 2011). This sampling ensured all regions of the country were covered and that there was adequate sample size to represent the medication adherence of Thai people who living with MI as show in Figure 4. The process of sampling technique as follow:

1. The researcher calculated the estimated sample size availability from regional hospitals in Thailand by analyzing the proportion of regional hospitals in

each region of Thailand. The numbers of regional hospitals were 26 hospitals; Northern 6 hospitals, Northeastern 6 hospitals, Central 9 hospitals, and Southern 5 hospitals.

2. The following numbers of regional hospitals were required: Northern = 2 hospitals, Northeastern = 2 hospitals, Central = 3 hospitals, and Southern = 2 hospitals by using a 3:1 ratio.

3. After got number of hospital in each region, simple random sampling was used to select the regional hospitals in each region of Thailand. Nine regional hospitals are needed: 2 hospital from Northern (Nakornping and Buddhachinaraj Phitsanulok), 2 hospitals from Northeastern (Khon Kaen and Sunpasitthiprasong), 3 hospitals from Central (Saraburi, Chonburi, and Rajburi), and 2 hospital from Southern (Suratthani and Hatyai).

All setting in the current study had educational intervention about lifestyle change in this group including health promotion center, advance practice nursing who caring participant in this group, and home visit in order to manage patient's health and continuous caring for patients. Additionally, they had provided direct care to patients and refer them to high level of care if necessary.

4. Then, the proportion of patients available per hospital in each region was calculated. Sample size in each regional hospital in Thailand required at least thirty cases in order to meet the recommendation of a sound basic for adequate estimate sample size for path analysis.

5. Purposive sampling was used to select the study participants who met inclusion criteria. Thus, the total participants in this study were 348 Thai post-MI patient which includes Nakornping 40 cases, Buddhachinaraj Phitsanulok 34 cases,

Khon Kaen 34 cases, Sunpasitthiprasong 20 cases, Saraburi 45 cases, Chonburi 45 cases, Rajburi 40 cases, Suratthani 45 cases, and Hatyai 45 cases. Sampling technique shows in Figure 4.

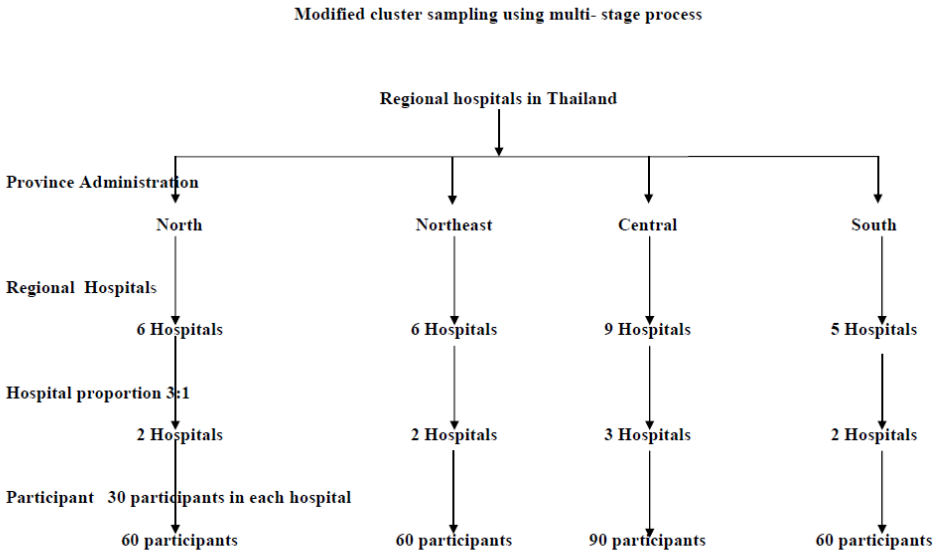

Figure 4 Sampling technique

Research instruments

All research instruments were tested for psychometric properties. The instruments were translated from English into Thai version by two instructors who has expertise in the English language at Language Institute, Chulalongkorn University and an independent translator who is a nurse instructor with expertise in cardiovascular nursing and studied abroad for more than 5 years. The Thai versions of the instruments were evaluated by two Thai/English bilingual people. The questionnaire was translated back into English by two Thai-English independent translators who each had taught English to graduate students for more than 10 years and a nurse

instructor with expertise in cardiovascular nursing who had studied abroad for more than 5 years. These instruments were Morisky's Self-reported Measure of Medication Adherence, Barriers to Medication Adherence, Self-efficacy for Appropriate Medication Use Scale, and Coronary Heart Disease Knowledge Questionnaire. These instruments were translated into Thai versions using the translation-back translation method. The investigators then compared both versions in the original language, conducted checks with the translators, discussed the differences, and produced a final consensus version. Then, the content validity was determined by five experts: two cardiologists, three nursing instructors who expertise in cardiovascular nursing. A pilot study was used to assess the feasibility of using the proposed instruments, to assess their psychometric properties, to evaluate data-collection procedures, and provide an opportunity to test the instructions and administration of the translated instruments.

Translation procedure for translated instruments

After obtaining written permission from owners, the instruments were modified by the researcher to reflect medication adherence in post-MI patients through translation-back translation method. The Morisky's Self-reported Measure of Medication Adherence, Barriers to Medication Adherence, Self-efficacy for Appropriate Medication Use Scale, and Coronary Heart Disease Knowledge Questionnaire were translated from English into Thai by two instructors who has expertise in the English language at Language Institute, Chulalongkorn University and an independent translator who is a nurse instructor with expertise in cardiovascular nursing and studied abroad for more than 5 years.

The Thai versions of the instruments were evaluated by two Thai/English bilingual people. The questionnaire was translated back into English by two Thai-English independent translators who each had taught English to graduate students for more than 10 years and a nurse instructor with expertise in cardiovascular nursing who had studied abroad for more than 5 years. Then, the investigators compared both versions in the original language, conducted checks with the translators and advisors, discussed the differences, and produced a final consensus version. The finally version of instruments were acceptable and reflect the meaning of each items.

Content validation of the instruments

After translation, the researcher adapted the translated instruments to achieve a closer cultural fit for post-MI Thai patients by establishing content validity. Content validity was determined by five experts: two cardiologists and three nursing instructors. The experts were asked to rate the level of relevancy between the items and the definition of the concepts as represented. A four-point Likert-type scale ranging from 4 (strongly relevant) to 1 (Strongly irrelevant) was used to rate each item. The Content Validity Index (CVI) was calculated for each instrument. The CVI of the Morisky's Self-reported Measure of Medication Adherence, Barriers to Medication Adherence, Self-efficacy for Appropriate Medication Use Scale, and Coronary Heart Disease Knowledge Questionnaire were 1.0, 0.91, 1.0, and 1.0, respectively. Some items were rephrased following the expert's recommendation and the advisor's suggestions.

Measurement model testing (Confirmatory Factor Analysis)

Before testing the hypothesized model, the goodness-of-fit was used to estimate the parameters of the path model associated with the study's specific aims. The overall model-fit-index was examined to determine how well the hypothesized model fit the existing data to indices of the measurement model and the data. In this study, statistical criteria could be utilized to evaluate the overall model-fit-index, so the researcher selected some statistical criteria to evaluate the hypothesize model as follows (Hair et al., 2010):

1. The first set of goodness of fit statistics was the Chi-square (χ^2) value. The χ^2 test statistics was used in hypothesis testing to evaluate the appropriateness of the hypothesized model. χ^2 is non-significant of a level with a corresponding p value > .05, and preferably a value close to 1.00 is recommended for the hypothesized model that fit the data. However, χ^2 value is dependent on the model's complexity and sample size. The χ^2 value of a more complex, highly parameterized model tends to be smaller than that of simpler models because of the reduced degree of freedom (df). When the sample size and a constant number of df are larger, the χ^2 value increases. For a good model fit, the ratio χ^2/df should be as small as possible. A ratio less than 2 is indicative of a "good" or "acceptable" data-model fit. Thus, the first set of criteria for testing a goodness of fit statistics is that χ^2 is non-significant (p >.05), and χ^2/df should be less than 2.

2. The second set of goodness of fit statistics is based on the difference between the sample covariance matrix and the model implied covariance matrix. The following indices are descriptive measures of overall model fit: Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), and

Standardized Root Mean Square Residual (SRMR). RMSEA values ≤ .05 can be considered as a good fit model, while values between .05 and .08 as an adequate fit model. SRMR values should be less than .05 for a good fit model.

3. The last goodness of fit statistics is the comparison between the fit of a model of interest and the fit of some baseline model. The goodness-of-fit index (GFI) is a measure of the proportion of all variances and covariance accounted for by the model and compared the squared residuals from prediction with the actual data. It represents the overall degree of fit ranging from 0 (poor fit) to 1 (perfect fit). GFI ≥ .95 is indicative of a good fit relative to the baseline model, while values greater than .90 are usually interpreted as indicating an acceptable fit. The adjusted goodness of fit index (AGFI) is an extension of GFI that is adjusted by the degree of freedom for the proposed model to the degree of freedom for the null model. AGFI greater than .90 is indicative of a good fit relative to the baseline model, while values greater than .85 may be considered as an acceptable fit. Thus, the last criteria for testing a goodness of fit statistic are GFI ≥ .95 and AGFI ≥ .90.

In this study, five measurement models were tested including social support, barriers, depression, self-efficacy, and medication adherence. Factor analysis was conducted to examine factor loading for each item and the second-order confirmatory factor analysis (CFA) was tested reliability of measurement model as follow:

Social support

Results show that the relationships between social supports by using Pearson's correlation found that indicators of social support had significant

relationship (p<.01) and Pearson's correlation was .381 to .877. The highest correlation was SS4 and SS2 (r = .89), followed by SS8 and SS7 (r = .85), and SS3 and SS2 (r =.85), respectively. The lowest was SS10 and SS1 (r = .38, p=.00). The test for overall significance of all correlations within a correlation matrix found that Bartlett's Test of Sphericity = 4013.49 (p =.00), which means correlation matrix significantly different from identity matrix and relevant to Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .94. It is close to 1.0, which means these variables high correlation and appropriate for confirmatory factor analysis (CFA) (see Table 3).

Table 3 Mean, standard deviation, and Pearson's correlation of social support

	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	SS10	SS11	SS12
SS1	1.00											
SS2	.79	1.00										
SS3	.73	.84	1.00									
SS4	.76	.87	.88	1.00								
SS5	.64	.72	.73	.76	1.00							
SS6	.71	.75	.73	.74	.63	1.00						
SS7	.62	.66	.67	.67	.56	.704	1.00					
SS8	.62	.67	.63	.67	.53	.726	.85	1.00				
SS9	.59	.63	.65	.65	.63	.642	.77	.81	1.00			
SS10	.38	.46	.43	.45	.48	.390	.46	.51	.58	1.00		
SS11	.63	.69	.70	.71	.66	.652	.57	.57	.56	.47	1.00	
SS12	.44	.52	.51	.52	.53	.475	.49	.48	.58	.65	.57	1.00
Mean	3.85	3.84	3.95	3.93	3.67	3.78	3.59	3.62	3.50	2.98	3.85	3.26
SD	1.19	1.22	1.16	1.19	1.29	1.30	1.38	1.34	1.33	1.39	1.21	1.34
Bartlett's Test of Sphericity = 4013.49						df=66	p=.00					
KMO = .94												

SS = social support
KMO = Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The results of confirmatory factor analysis (CFA) found that the measurement model had 44 parameters for estimation. Model identification by using unknown parameter estimation compared n (n+1)/2 with number of parameter estimation in model 12(12+1)/2= 78. Thus, this model was over identification, indicating the model can be analysis. The measurement model of social support revealed that the model had good overall model fit. The second-order CFA showed that social support had low Chi-square values resulting in a non-significant difference level of 0.05. The χ^2/df ratio was less than 2.00, with CFI, GFI and AGFI values close to 1.00. The RMSEA and SRMR values were less than .05. Largest/ Smallest Standardized Residual ± 2.00 and Q-Plot slope > 1.00, indicating a validity of measurement constructs (See Table 4).

Table 4 Goodness of fit statistics of social support measurement model

Relative fit index	**Social support**	**Goodness of Fit Statistics**
χ^2 - test	51.58 (p =0.02)	(p =0.05)
χ^2 / df	1.51	< 2.00
CFI	0.99	≥ 0.95
GFI	0.98	≥ 0.95
AGFI	0.95	≥ 0.95
RMSEA	0.04	< 0.05
SRMR	0.02	< 0.05
Largest Standardized Residual	-2.26	± 2.00
Smallest Standardized Residual	3.26	± 2.00

χ^2 = Chi-square**,** df = degree of freedom**,** CFI = Comparative Fit Index, GFI = Goodness of Fit Index AGFI **=** Adjust Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation**,** SRMR = Standardized Root Mean Square Residual

Emotional support had SS4 as a highest factor loading (B = 0.97) and squared multiple correlation for emotional support 94.6%, followed by SS3 had factor loading (B= 0.95) and squared multiple correlation for emotional support 91%, and SS2 had factor loading (B= 0.95) and squared multiple correlation for emotional support 90%, respectively. Instrument support had SS5 as highest factor loading (B = 0.92) and squared multiple correlation for emotional support 84.7%, followed by SS6 had factor loading (B= 0.91) and squared multiple correlation for emotional support 84.4%, and SS8 had factor loading (B= 0.85) and squared multiple correlation for emotional support 74.9%, respectively. Information support had SS9 as highest factor loading (B = 0.96) and squared multiple correlation for emotional support 93.9% and SS10 had factor loading (B= 0.66) and squared multiple correlation for emotional support 43.79%. Appraisal had SS11 as highest factor loading (B = 0.91) and squared multiple correlation for emotional support 83.4%, and SS12 had factor loading (B= 0.71) and squared multiple correlation for emotional support 51.5% (see Table 5).

Table 5 Factor loading and factor score regression of social support

Social support	Factor loading					Factor score regression
	b	B	SE	t	R^2	
Emotional support						
SS1	1.00	0.85	0.05	19.78	0.73	0.03
SS2	1.44	0.95	0.06	23.88	0.91	0.13
SS3	1.54	0.95	0.06	24.02	0.91	0.17
SS4	1.29	0.97	0.05	24.89	0.95	0.28
Instrument support						
SS5	1.66	0.92	0.08	20.80	0.85	0.15
SS6	1.90	0.92	0.09	21.99	0.84	0.23
SS7	1.67	0.84	0.09	19.27	0.71	-0.02
SS8	1.70	0.86	0.09	20.01	0.75	0.07
Information support						
SS9	1.77	0.97	0.08	23.08	0.94	0.30
SS10	1.45	0.66	0.10	13.98	0.44	0.02
Appraisal support						
SS11	1.58	0.91	0.08	20.69	0.83	0.34
SS12	1.27	0.72	0.08	15.34	0.52	0.03

From table 6 found that emotional support, instrument support, information support, and appraisal support had high reliability ($\rho c > .60$) and most of factors can explain variance of variable at high level ($\rho v > .50$).

Table 6 Construct reliability and average variance extracted of social support

Variables	Construct reliability (ρc > .60)	Average variance extracted (ρv> .50)
Emotional support	.98	.87
Instrument support	.93	.79
Information support	.81	.69
Appraisal support	.88	.67

Barriers

Results show that the relationships between social supports by using Pearson's correlation found that indicators of barriers had significant relationship ($p<.01$) and Pearson's correlation was .16 to .69. The highest correlation was Bar6 ($r = .69$), followed by Bar2 and Bar7 ($r = .67$ and $r=.59$), respectively. The lowest was Bar9 ($r = .16$, $p=.00$). The test for overall significance of all correlations within a correlation matrix found that Bartlett's Test of Sphericity = 1407.211 ($p =.000$), which means correlation matrix significantly different from identity matrix and relevant to Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .834. It is close to 1.0, which means these variables high correlation and appropriate for confirmatory factor analysis (CFA) (see Table7).

Table 7 Mean, standard deviation, and Pearson's correlation of barriers

	Bar1	Bar2	Bar3	Bar4	Bar5	Bar6	Bar7	Bar8	Bar9	Bar10	Bar11
Bar1	1.00										
Bar2	.67	1.00									
Bar3	.46	.47	1.00								
Bar4	.27	.38	.55	1.00							
Bar5	.32	.24	.39	.41	1.00						
Bar6	.39	.29	.39	.31	.69	1.00					
Bar7	.26	.22	.23	.17	.46	.59	1.00				
Bar8	.32	.25	.22	.22	.49	.56	.42	1.00			
Bar9	.29	.28	.26	.31	.26	.27	.16	.23	1.00		
Bar10	.31	.37	.37	.42	.26	.25	.19	.25	.54	1.00	
Bar11	.22	.29	.30	.33	.37	.36	.23	.29	.27	.29	1.00
Mean	2.29	2.04	1.92	1.66	2.74	3.04	3.42	3.04	1.89	1.72	1.88
SD	2.23	1.91	1.83	1.49	2.53	2.85	4.01	2.81	1.57	1.38	1.84
Bartlett's Test of Sphericity = 1407.21 df =55 p=0.00											
KMO = .83											

Bar = barriers
KMO = Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The results of confirmatory factor analysis (CFA) found that the measurement model had 40 parameters for estimation. Model identification by using unknown parameter estimation compared n (n+1)/2 with number of parameter estimation in model 11(11+1)/2 = 66. Thus, this model was over identification, indicating the model can be analysis. The measurement model of barriers revealed that the model had good overall model fit. The second-order CFA showed that barriers had low Chi-square values resulting in a non-significant difference level of 0.05. The χ^2/df ratio was less than 2.00, with CFI, GFI and AGFI values close to 1.00. The RMSEA and SRMR values were less than .05. Largest/ Smallest Standardized

Residual ± 2.00 and Q-Plot slope > 1.00, indicating a validity of measurement constructs (See Table 8).

Table 8 Goodness of fit statistics of barriers measurement model

Relative fit index	**Barriers**	**Goodness of Fit Statistics**
χ^2 - test	49.57 (p =0.00)	(p =0.05)
χ^2 / df	1.90	< 2.00
CFI	0.99	≥ 0.95
GFI	0.97	≥ 0.95
AGFI	0.94	≥ 0.95
RMSEA	0.04	< 0.05
SRMR	0.13	< 0.05
Largest Standardized Residual	-3.46	± 2.00
Smallest Standardized Residual	2.61	± 2.00

χ^2 = Chi-square, df = degree of freedom, CFI = Comparative Fit Index
GFI = Goodness of Fit Index, AGFI = Adjust Goodness of Fit Index,
RMSEA = Root Mean Square Error of Approximation,
SRMR = Standardized Root Mean Square Residual

Barriers had bar3 as a highest factor loading (B = 0.78) and squared multiple correlation for barriers 62%, followed by bar43 had factor loading (B= 0.77) and squared multiple correlation for barriers 60.7%, and bar2 had factor loading (B= 0.71) and squared multiple correlation for barriers 51.5%, respectively (see Table 9).

Table 9 Factor loading and factor score regression of barriers

Barriers	Factor loading					Factor score regression
	b	B	SE	t	R^2	
Bar1	1.20	0.68	0.09	13.37	0.46	0.09
Bar2	1.43	0.72	0.09	14.47	0.52	0.03
Bar3	1.67	0.79	0.10	16.32	0.62	0.09
Bar4	1.97	0.78	0.12	16.09	0.61	0.09
Bar5	1.75	0.71	0.12	14.39	0.51	0.04
Bar6	1.99	0.69	0.14	13.81	0.48	0.01
Bar7	1.68	0.64	0.14	12.24	0.40	0.01
Bar8	1.72	0.59	0.16	10.87	0.36	0.05
Bar9	1.28	0.64	0.10	12.51	0.40	0.04
Bar10	1.44	0.71	0.09	14.52	0.51	0.05
Bar11	1.37	0.67	0.10	13.45	0.45	0.06

From table 10 found that barriers had high reliability (ρc > .60) and most of factors can explain variance of variable at moderate level (ρv> .50).

Table 10 Construct reliability and average variance extracted of barriers

Variables	Construct reliability (ρc > .60)	Average variance extracted (ρv> .50)
Barriers	.91	.48

Depression

Results show that the relationships between social supports by using Pearson's correlation found that indicators of depression had significant relationship ($p<.01$) and Pearson's correlation was -.06 to .68. The highest correlation was Dep16 ($r = .68$), followed by Dep10 and Dep7 ($r = .54$ and $r=.53$), respectively. The lowest was Dep4 ($r = -.06$, $p=.00$). The test for overall significance of all correlations within a correlation matrix found that Bartlett's Test of Sphericity equal to 2774.84 ($p =.00$), which means correlation matrix significantly different from identity matrix and relevant to Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .89. It is close to 1.0, which means these variables high correlation and appropriate for confirmatory factor analysis (CFA) (see Table 11).

Table 11 Mean, standard deviation, and Pearson's correlation of depression

	Dep1	Dep2	Dep3	Dep4	Dep5	Dep6	Dep7	Dep8
Dep1	1.00							
Dep2	.47	1.00						
Dep3	.42	.46	1.00					
Dep4	-.06	-.01	.04	1.00				
Dep5	.29	.32	.46	-.01	1.00			
Dep6	.47	.52	.32	-.02	.36	1.00		
Dep7	.34	.44	.41	.09	.44	.53	1.00	
Dep8	-.05	.03	.12	.45	.03	-.05	.04	1.00
Mean	.76	.60	.45	1.56	.53	.43	.36	1.56
SD	.71	.76	.64	1.13	.68	.67	.59	1.07

Table 11 cont's

	Dep9	Dep10	Dep11	Dep12	Dep13	Dep14	Dep15	Dep16	Dep17	Dep18
Dep9	1.00									
Dep10	.54	1.00								
Dep11	.39	.47	1.00							
Dep12	.08	.08	.06	1.00						
Dep13	.47	.36	.33	.03	1.000					
Dep14	.50	.49	.36	.10	.40	1.00				
Dep15	.31	.20	.16	.12	.36	.35	1.00			
Dep16	.16	.14	.08	.68	.09	.15	.07	1.00		
Dep17	.43	.39	.34	.09	.29	.32	.31	.13	1.00	
Dep18	.41	.38	.32	.06	.42	.38	.39	.08	.41	1.00
Mean	.33	.31	.68	1.23	.48	.29	.38	1.33	.24	.37
SD	.59	.59	.82	1.09	.72	.52	.69	1.08	.48	.62
	Dep19	Dep20								
Dep19	1.00									
Dep20	.499	1.00								
Mean	.29	.29								
SD	.51	.53								
Bartlett's Test of Sphericity = 2774.84 df = 190 p = 0.00										
KMO = .89										

Dep = depression
KMO = Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The results of confirmatory factor analysis (CFA) found that the measurement model had 91 parameters for estimation. Model identification by using unknown parameter estimation compared n (n+1)/2 with number of parameter estimation in model 20(20+1)/2 = 210. Thus, this model was over identification, indicating the model can be analysis. The measurement model of depression revealed that the model had good overall model fit. The second-order CFA showed that depression had low Chi-square values resulting in a non-significant difference level of 0.05. The χ^2/df ratio was less than 2.00, with CFI, GFI and AGFI values close to 1.00.

The RMSEA and SRMR values were less than .05. Largest/ Smallest Standardized Residual ± 2.00 and Q-Plot slope > 1.00, indicating a validity of measurement constructs (See Table 12).

Table 12 Goodness of fit statistics of depression measurement model

Relative fit index	**Depression**	**Goodness of Fit Statistics**
χ^2 - test	234.59 (p =0.00)	(p =0.05)
χ^2 / df	1.97	< 2.00
CFI	0.99	≥ 0.95
GFI	0.97	≥ 0.95
AGFI	0.94	≥ 0.95
RMSEA	0.05	< 0.05
SRMR	0.42	< 0.05
Largest Standardized Residual	-3.79	± 2.00
Smallest Standardized Residual	3.82	± 2.00

χ^2 = Chi-square, df = degree of freedom, CFI = Comparative Fit Index
GFI = Goodness of Fit Index, AGFI = Adjust Goodness of Fit Index
RMSEA = Root Mean Square Error of Approximation
SRMR = Standardized Root Mean Square Residual

Depression had Dep7 as a highest factor loading (B = 0.87) and squared multiple correlation for depression 76%, followed by Dep9 had factor loading (B= 0.84) and squared multiple correlation for depression 71%, and Dep10 and Dep 20 had factor loading (B= 0.82) and squared multiple correlation for depression 68%, respectively (see Table 13).

Table 13 Factor loading and factor score regression of depression

Depression	Factor loading					Factor score regression
	b	B	SE	t	R^2	
Dep1	0.36	0.58	0.03	11.54	0.33	-0.09
Dep2	0.60	0.66	0.04	13.57	0.43	-0.03
Dep3	0.51	0.63	0.04	12.82	0.39	0.03
Dep4	-0.03	-0.02	0.08	-0.39	0.00	-0.01
Dep5	0.56	0.64	0.04	13.30	0.42	0.08
Dep6	0.73	0.78	0.04	17.03	0.60	0.21
Dep7	0.72	0.87	0.04	20.45	0.76	0.17
Dep8	0.00	0.00	0.07	0.06	0.00	0.03
Dep9	0.78	0.84	0.04	19.34	0.71	0.20
Dep10	0.82	0.82	0.04	18.65	0.68	0.04
Dep11	0.60	0.64	0.05	13.19	0.41	0.05
Dep12	0.24	0.17	0.08	3.13	0.03	-0.01
Dep13	0.77	0.70	0.05	14.71	0.48	0.10
Dep14	0.51	0.74	0.03	15.92	0.55	0.18
Dep15	0.56	0.50	0.06	9.62	0.25	-0.15
Dep16	0.33	0.23	0.08	4.30	0.05	-0.01
Dep17	0.58	0.77	0.03	16.79	0.59	0.13
Dep18	0.69	0.73	0.04	15.70	0.54	0.12
Dep19	0.57	0.75	0.04	16.09	0.56	0.23
Dep20	0.74	0.82	0.04	18.47	0.68	0.16

From table 14 found that depression had high reliability (ρc > .60) and most of factors can explain variance of variable at moderate level (ρv> .50)

Table 14 Construct reliability and average variance extracted of depression

Variables	**Construct reliability** (ρc > .60)	**Average variance extracted** (ρv> .50)
Depression	.92	.42

Self-efficacy

Results show that the relationships between self-efficacy by using Pearson's correlation found that indicators of self-efficacy had significant relationship (p<.01) and Pearson's correlation was .33 to .72. The highest correlation was SE13 (r = .72), followed by SE8 and SE4 (r = .72 and r=.71, respectively. The lowest was SE10 (r = .325, p=.01). The test for overall significance of all correlations within a correlation matrix found that Bartlett's Test of Sphericity = 3025.00 (p =.00), which means correlation matrix significantly different from identity matrix and relevant to Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .94. It is close to 1.0, which means these variables high correlation and appropriate for confirmatory factor analysis (CFA) (see Table 15).

Table 15 Mean, standard deviation, and Pearson's correlation of self-efficacy

	SE1	SE2	SE3	SE4	SE5	SE6	SE7	SE8	SE9	SE10	SE11	SE12	SE13
SE1	1.00												
SE2	.66	1.00											
SE3	.61	.64	1.00										
SE4	.60	.59	.71	1.00									
SE5	.50	.45	.60	.58	1.00								
SE6	.41	.51	.51	.60	.47	1.00							
SE7	.44	.52	.56	.69	.56	.63	1.00						
SE8	.46	.50	.63	.72	.53	.60	.69	1.00					
SE9	.48	.44	.49	.48	.48	.34	.47	.46	1.00				
SE10	.49	.48	.43	.46	.39	.33	.44	.42	.64	1.00			
SE11	.46	.53	.62	.63	.49	.58	.61	.68	.48	.44	1.00		
SE12	.54	.49	.55	.55	.56	.45	.53	.53	.54	.47	.56	1.00	
SE13	.51	.58	.67	.68	.51	.58	.64	.67	.51	.47	.72	.69	1.00
Mean	2.48	2.52	2.50	2.49	2.36	2.51	2.46	2.47	2.25	2.25	2.48	2.38	2.49
SD	.62	.56	.58	.59	.65	.59	.62	.63	.73	.73	.62	.66	.61
Bartlett's Test of Sphericity = 3025.00 df =78 p = 0.00													
KMO = .94													

SE = self-efficacy
KMO = Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The results of confirmatory factor analysis (CFA) found that the measurement model had 51 parameters for estimation. Model identification by using unknown parameter estimation compared n (n+1)/2 with number of parameter estimation in model 13(13+1)/2 = 91. Thus, this model was over identification, indicating the model can be analysis. The measurement model of self-efficacy revealed that the model had good overall model fit. The second-order CFA showed that self-efficacy had low Chi-square values resulting in a non-significant difference level of 0.05. The χ^2/df ratio was less than 2.00, with CFI, GFI and AGFI values close to 1.00. The RMSEA and SRMR values were less than .05. Largest/ Smallest

Standardized Residual ± 2.00 and Q-Plot slope > 1.00, indicating a validity of measurement constructs (See Table 16).

Table 16 Goodness of fit statistics of self-efficacy measurement model

Relative fit index	**Self-efficacy**	**Goodness of Fit Statistics**
χ^2 - test	68.92 (p =0.00)	(p =0.05)
χ^2 / df	1.80	< 2.00
CFI	0.99	≥ 0.95
GFI	0.97	≥ 0.95
AGFI	0.93	≥ 0.95
RMSEA	0.04	< 0.05
SRMR	0.02	< 0.05
Largest Standardized Residual	-3.02	± 2.00
Smallest Standardized Residual	4.10	± 2.00

χ^2 = Chi-square, df = degree of freedom, CFI = Comparative Fit Index
GFI = Goodness of Fit Index AGFI = Adjust Goodness of Fit Index
RMSEA = Root Mean Square Error of Approximation
SRMR = Standardized Root Mean Square Residual

Self-efficacy had SE3 as a highest factor loading (B = 0.92) and squared multiple correlation for self-efficacy 86.2%, followed by SE4 had factor loading (B= 0.91) and squared multiple correlation for self-efficacy 83.6%, and SE7 had factor loading (B= 0.88) and squared multiple correlation for self-efficacy 77.8%, respectively (see Table 17).

Table 17 Factor loading and factor score regression of self-efficacy

Self-efficacy	Factor loading					Factor score regression
	b	B	SE	t	R^2	
SE1	0.52	0.72	0.04	15.10	0.52	-0.14
SE2	0.45	0.78	0.03	17.49	0.62	0.07
SE3	0.56	0.93	0.03	22.68	0.86	0.84
SE4	0.60	0.91	0.03	22.26	0.84	0.16
SE5	0.54	0.78	0.03	17.22	0.60	0.04
SE6	0.53	0.82	0.03	18.38	0.67	0.31
SE7	0.61	0.88	0.03	20.76	0.78	0.42
SE8	0.62	0.85	0.03	19.60	0.72	-0.12
SE9	0.38	0.69	0.03	14.52	0.47	0.03
SE10	0.36	0.66	0.03	13.49	0.43	0.16
SE11	0.67	0.83	0.04	18.94	0.68	0.04
SE12	0.54	0.74	0.03	16.01	0.54	0.00
SE13	0.60	0.86	0.03	20.15	0.74	0.01

From table 18 found that self-efficacy had high reliability (ρc > .60) and most of factors can explain variance of variable at moderate level (ρv> .50)

Table 18 Construct reliability and average variance extracted of self-efficacy

Variables	**Construct reliability** (ρc > .60)	**Average variance extracted** (ρv> .50)
Self-efficacy	.96	.48

Medication adherence

Results show that the relationships between medication adherence by using Pearson's correlation found that indicators of medication adherence had significant relationship ($p<.01$) and Pearson's correlation was .25 to .54. The highest correlation was MA5 ($r = .54$), followed by MA3 and MA4 ($r = .35$ and $r=.34$, respectively. The lowest was MA1 ($r = .25$, $p < 01$). The test for overall significance of all correlations within a correlation matrix found that Bartlett's Test of Sphericity equal to 354.15 ($p =.00$), which means correlation matrix significantly different from identity matrix and relevant to Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .76. It is close to 1.0, which means these variables high correlation and appropriate for confirmatory factor analysis (CFA) (see Table 19).

Table 19 Mean, standard deviation, and Pearson's correlation of medication adherence

	MA1	MA2	MA3	MA4	MA5
MA1	1.00				
MA2	.25	1.00			
MA3	.35	.34	1.00		
MA4	.34	.29	.37	1.00	
MA5	.49	.28	.54	.33	1.000
Mean	3.55	3.79	3.79	3.67	3.72
SD	.52	.52	.48	.60	.48
Bartlett's Test of Sphericity = 354.15			df =10 p = 0.0		
KMO = .76					

MA = medication adherence
KMO = Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The results of confirmatory factor analysis (CFA) found that the measurement model had 12 parameters for estimation. Model identification by using unknown parameter estimation compared n (n+1)/2 with number of parameter estimation in model 5(5+1)/2 = 15. Thus, this model was over identification, indicating the model can be analysis. The measurement model of medication adherence revealed that the model had good overall model fit. The second-order CFA showed that medication adherence had low Chi-square values resulting in a non-significant difference level of 0.05. The χ^2/df ratio was less than 2.00, with CFI, GFI and AGFI values close to 1.00. The RMSEA and SRMR values were less than .05. Largest/ Smallest Standardized Residual ± 2.00 and Q-Plot slope > 1.00, indicating a validity of measurement constructs (See Table 20).

Table 20 Goodness of fit statistics of medication adherence measurement model

Relative fit index	**Medication adherence**	**Goodness of Fit Statistics**
χ^2 - test	3.54 (p =0.32)	(p =0.05)
χ^2 / df	1.18	< 2.00
CFI	1.00	≥ 0.95
GFI	0.99	≥ 0.95
AGFI	0.98	≥ 0.95
RMSEA	0.02	< 0.05
SRMR	0.02	< 0.05
Largest Standardized Residual	-1.71	± 2.00
Smallest Standardized Residual	1.71	± 2.00

χ^2 = Chi-square**,** df = degree of freedom**,** CFI = Comparative Fit Index
GFI = Goodness of Fit Index AGFI **=** Adjust Goodness of Fit Index
RMSEA = Root Mean Square Error of Approximation
SRMR = Standardized Root Mean Square Residual

Medication adherence had MA3 as a highest factor loading (B = 0.92) and squared multiple correlation for medication adherence 85.9%, followed by MA1 had factor loading (B= 0.84) and squared multiple correlation for medication adherence 71%, and MA5 had factor loading (B= 0.84) and squared multiple correlation for medication adherence 70.8%, respectively (see Table 21).

Table 21 Factor loading and factor score regression of medication adherence

Medication adherence	**Factor loading**					**Factor score regression**
	b	**B**	**SE**	**t**	**R^2**	
MA1	0.39	0.84	0.02	17.41	0.71	0.99
MA2	1.09	0.57	0.09	11.36	0.33	-0.00
MA3	1.00	0.93	0.05	20.49	0.86	0.62
MA4	1.06	0.62	0.08	12.61	0.39	-0.00
MA5	2.21	0.84	0.12	18.40	0.71	-0.00

From table 22 found that medication adherence had high reliability (ρc > .60) and most of factors can explain variance of variable at high level (ρv> .50)

Table 22 Construct reliability and average variance extracted of medication adherence

Variables	**Construct reliability** (ρc > .60)	**Average variance extracted** (ρv> .50)
Medication adherence	.88	.59

Reliability of Instruments

The Cronbach's alpha correlation coefficient and test-retest were used for reliability. Reliability of research instrument reflects its stability and consistency within Thai context. Reliability coefficients range from 0.00-1.00, with higher coefficients indicating higher levels of reliability. Internal consistency used Cronbach's alpha correlation coefficient. Based on criteria of internal consistency by Polit and Hungler, (1999), reliability coefficients was $\alpha < 0.5$ Unacceptable, $0.5 \leq \alpha < 0.6$ = Poor, $0.6 \leq \alpha < 0.7$= Questionable, $0.7 \leq \alpha < 0.8$ = Acceptable, $0.8 \leq \alpha < 0.9$=Good, and $\alpha \geq 0.9$ = Excellent. Reliability took place at cardiology clinic with 30 post-MI patients. Then, test-retest was performed two weeks later. Two weeks is reasonable period of time between the initial and follow-up administration of questionnaire to minimize the possibility of real or random change occurring. Test-retest determined the correlation or strength of association of the two sets of scores, with higher correlation indicating higher levels of stability of research instrument. The instruments were tested reliability including the Morisky's Self-reported Measure of Medication Adherence, Barriers to Medication Adherence, Self-efficacy for Appropriate Medication Use Scale, Coronary Heart Disease Knowledge, and Center for Epidemiologic Studies Depression Scale.

Instrument description

The following section describes the instruments applied in the study that includes description of instrument, scoring, and psychometric properties as follow:

1. The personal data sheet

A personal data sheet was used to collect data regarding the post-MI Thai patient's demographic characteristics (age, gender, occupation) including financial status, symptom severity, level of education, and type of health care coverage (sources of payment), history disease, medication use, and amount of medication taking per day. Education determined by patient's interview of level of graduation. Financial status used the salary of patients. Symptom severity used the Canadian Cardiovascular Society Classification (CCSC) (Sangareddi et al., 2004).

2. Modified ENRICHD Social Support Instrument (MESSI)

The modified ENRICHD Social Support Instrument (ESSI) was used to assess the four defining attributes of social support: emotional, instrumental, informational, and appraisal of post-MI patients. The original ENRICHD Social Support Instrument (ESSI) was used to measure social support in myocardial infarction (MI) patients. This instrument was investigated in 2,481 post-MI patients in a recent clinical trial (Burg et al., 2005; Frasure-Smith and Lesperance, 2003; Vaglio et al., 2004). The researcher modified the ESSI to assess social support specific to medication adherence among post-MI Thai patients. The MESSI was used to evaluate the four attributes of social support: emotional, instrumental, informational, and appraisal. The MESSI was used to elicit data that revealed social support in

medication adherence of post-MI Thai patients, focusing on those that had occurred in the prior week.

Scoring

Social support was rated in Likert format as occurring 1 (none of the time) to 5 (all of the time). The total MESSI score was obtained by summing all four attributes of social support, with possible scores ranging from 12 to 60 points. A higher MESSI score indicated higher social support in medication adherence. The levels of social support were categorized into three levels (low, moderate, and high) by employing the range between minimum and maximum scores of the MESSI and dividing it by three (Burg et al., 2005, Lortajakul, 2006; Polsook, 2005; Vaglio et al., 2004).

Total scores of MESSI	Interpretation
12-28 points	low
29-44 points	moderate
45-60 points	high

Validity and Reliability

The ESSI was tested for validity and reliability in a study of 2,481 post-MI patients by with internal consistency, using Cronbach's of 0.88 (Burg et al., 2005; Frasure-Smith and Lesperance, 2003; Vaglio et al., 2004). The intra-class correlation coefficient was 0.94, reflecting excellent reproducibility. Items are summed for a total score, ranging from 6 to 30 (Burg et al., 2005; Frasure-Smith and Lesperance, 2003; Vaglio et al., 2004). In Thailand, Lortajakul (2006) translated the ESSI into a Thai version and tested its reliability with post-MI patients. Reliability

analysis for the back-translated ESSI version was reported with internal consistency of .96. Therefore, the ESSI has demonstrated high validity and reliability in various MI patients.

In the current study, the researcher assessed the validity of MESSI through a panel of five experts, including two cardiologists who provided treatments to MI patients, and three nursing instructors who were advanced practice nurses (APN), and a specialist in cardiovascular nursing. Most experts rated each item of MESSI as 3 or 4 (from 1 = not relevant to 4 = very relevant), which met the criteria for appropriate content validity (Polit and Hungler, 1999: 419). A content validity index (CVI) score of .80 or more is generally considered to be good (Polit and Hungler, 1999: 419). In this study, the CVI was .91 (see Appendix C). In addition, Cronbach's alpha was 0.92 and test-retest was 1.0. The validity and reliability were acceptable.

3. The Center for Epidemiologic Studies Depression Scale (CES-D)

The Center for Epidemiologic Studies Depression Scale (CES-D) measures current levels of depressive symptomatology. The CES-D is not used as a diagnostic tool, but rather as a screening test to identify groups at risk of depression or in need of treatment. This instrument is a 20-items scale which a score of 16 or more that is indicative of symptoms of depression. Internal consistency reliability using Cronbach alpha has been reported to be 0.76 (Bane et al., 2006; Dobbeld et al., 2002; Radloff, 1977).

Scoring

Depression was rated as occurring 0 (nothing) to 3 (often) on a Likert scale. The total CES-D score was 60 (a score of 16 or more is indicative of symptoms of depression). Question numbers 4, 8, 12, and 16 were score in the negative (Radloff, 1977). In this study, the levels of depression were categorized into four levels (none, low, moderate, and high) by employing the maximum score of the CES-D and dividing it by score 16 (Worapong et al., 1990)

Total scores of CES-D	Interpretation
0-15 point	none
16-30 point	low
31-45 point	moderate
46-60 point	high

Validity and Reliability

The CES-D was tested for validity and reliability in the general population. Reliability of the CES-D was reported using Cronbach's alpha ad 0.76. Each item is scaled on a 0 (nothing) to 3 (often) Likert scale. Items are then summed for a total score 60, where a score of 16 or more is indicative of symptoms of depression (Radloff, 1977). In Thailand, Worapong et al. (1990) translated the CES-D into a Thai version and tested its reliability with general population. Reliability analysis for the back-translated CES-D version was reported with internal consistency of 0.76. This instrument was used for screening depressive symptoms in Thailand since 1990 and was used in various populations including cardiovascular patients (Polsook, 2005). Therefore, the CES-D has demonstrated validity and reliability in MI

patients. In this study, the researcher assessed reliability using Cronbach's alpha (0.73) (see Appendix C).

4. Barriers to medication adherence

Barriers to medication adherence measure barriers to taking medication in heart failure patients (Wu et al., 2008). Barriers to medication adherence were used to assess barriers relevant to medication-taking behavior. This instrument consists of 11 items. Internal consistency was tested using Cronbach's alphas for the 11 items and ranged from 0.75 to 0.94 (Wu et al., 2008).

Scoring

Barriers to medication adherence was rated by how much participants agreed or disagreed with each item on a scale from 0 (strongly disagree) to 10 (strongly agree) (Wu et al., 2008). Items are then summed for a total score, ranging from 0 to 110. A higher barrier to medication adherence score indicated a higher barrier in medication adherence. The levels of barriers were categorized into three levels (low, moderate, and high) by employing the range between minimum and maximum scores of the barriers and dividing it by three (Wu et al., 2008).

Total scores of barriers	Interpretation
0-37 point	low
38-75 point	moderate
76-110 point	high

Validity and Reliability

The barriers to medication adherence were tested for validity and reliability in a study of heart failure patients using Cronbach's was .94 (Wu et al., 2008). Items are then summed for a total score, ranging from 0 to 110. A higher barrier to medication adherence score indicated a higher barrier in medication adherence.

In the current study, after translation-back translate into Thai language, the researcher assessed the validity of barriers by five content experts, including two cardiologists who provided treatments to MI patients, three nursing instructors who were advanced practice nurses (APN), and a specialist in cardiovascular nursing. Most experts rated each item as 3 and 4 (from 1 = not relevant to 4 = very relevant), which met the criteria for appropriate content validity (Polit and Hungler, 1999: 419). In this study, the CVI was .91 (see Appendix C). In addition, Cronbach's alpha correlation coefficient, and test-retest were used for reliability. The Cronbach's alpha correlation coefficient was .87, and test- retest was 1.0.

5. Coronary Heart Disease Awareness and Knowledge Questionnaire

Coronary Heart Disease Awareness and Knowledge Questionnaire (CHDAKQ) (Kayaniyil et al., 2009) was used to measure cardiac knowledge. It was revised from the Cardiac Knowledge Questionnaire (Maeland and Havik, 1987) and the Coronary Heart Disease Knowledge (Smith, Hicks, & Heyward, 1991) Questionnaire. Originally, this instrument consisted of 23 items measuring knowledge on pathophysiology, causes, risk factors, symptoms and treatment of CADs, and the main cause of death in the United States (Kayaniyil et al., 2009). For this study, 20

items were utilized excluding the 3 items on the statistics of the main cause of death and experience of treatment modality, which were not congruent with the purpose of this study. Internal consistency using Cronbach's alpha was 0.84 (Kang et al., 2010; Kayaniyil et al., 2009).

Scoring

CHDAKQ items were rated as true or false. Each correct answer scored one point and each incorrect answer scored zero points. The total CHDAKQ score was obtained by summing knowledge of CAD on pathophysiology, causes, risk factors, symptoms and treatment of CADs, with possible scores ranging from 0 to 20 points. A higher CHDAKQ score indicates greater CAD knowledge. The levels of CAD knowledge were categorized into three levels (low, moderate, and high) by employing the range between minimum and maximum scores of the CHDAKQ and dividing it by three (Kayaniyil et al., 2009).

Total scores of CHDAKQ	**Interpretation**
0-6 point	low
7-13 point	moderate
14-20 point	high

Validity and Reliability

CHDAKQ was tested for validity and reliability in a study of coronary artery disease patients. Internal consistency, using the Kuder-Richardson formula 20 (KR-20) was .84 (Kayaniyil et al., 2009). Items are then summed for a total score, ranging from 0 to 20. A higher CHDAKQ score indicates greater CAD knowledge (Smith et al., 1991).

In the current study, after translation-back translate into Thai language, the researcher assessed the validity of the tool using five content experts, including two cardiologists who provided treatments to MI patients, and three nursing instructors who were advanced practice nurses (APN) and a specialist in cardiovascular nursing. Most experts rated each item as 3 or 4 (from 1 = not relevant to 4 = very relevant), which met the criteria for appropriate content validity (Polit and Hungler, 1999: 419). In this study, the CVI was 1.0 (see Appendix C). In addition, test- retest was used for reliability by using the Carver Method which was .87.

6. The Self-efficacy for Appropriate Medication Use Scale

The Self-efficacy for Appropriate Medication Use Scale (SEAMS) developed by Risser et al. (2007) was used to measure self-efficacy in lower literacy patients with chronic disease. The SEAMS was developed by a multidisciplinary team with expertise in medication adherence and health literacy. Its psychometric properties were evaluated among 436 patients with coronary heart disease and other co-morbid conditions (Risser et al., 2007). Patients were asked about their level of confidence about taking medication correctly (1= not confident, 2= somewhat confident, and 3= very confidence). The potential score for the 13- items scale ranged from 13 to 39. Higher scores indicated higher levels of self-efficacy for medication adherence. Reliability was evaluated by internal consistency was tested using Cronbach's alpha (0.89) (Risser et al., 2007).

Scoring

The SEAMS were asked patients about their level of confidence about taking medication correctly. The rating used was 1 (not confident), 2 (somewhat confident), and 3 (very confidence). Items are then summed for a total score, ranging from 13 to 39. A higher SEAMS score indicated a higher self-efficacy in medication adherence. The levels of SEAMS were categorized into three levels (low, moderate, and high) by employing the range between minimum and maximum scores of the SEAMS and dividing it by three (Risser et al., 2007).

Total scores of SEAMS	**Interpretation**
1-13 point	low
14-27 point	moderate
28-39 point	high

Validity and Reliability

The SEAMS was tested for psychometric properties among 436 patients with coronary heart disease and other co-morbid conditions. Principal component factor analysis was performed to evaluate the validity of the SEAMS. Reliability and validity analyses were also performed separately among patients with low and higher literacy levels. The final 13-item scale had good internal consistency reliability (Cronbach's alpha = 0.89) (Risser et al., 2007).

In this study, after translation-back translate into Thai language, the researcher assess the validity of barriers using five content experts, including two cardiologists who provided treatments to MI patients, and four nursing instructors who were advanced practice nurses (APN) and a specialist in cardiovascular nursing. Most

experts rated each item as 3 or 4 (from 1 = not relevant to 4 = very relevant) which met the criteria for appropriate content validity (Polit and Hungler, 1999: 419). In this study, the CVI was 1.0 (see Appendix C). The Cronbach's alpha correlation coefficient was .91, and test- retest was 1.0.

7. The Morisky's Self-reported Measure of Medication Adherence (MSMMA)

This instrument was designed to assess adherence to medication regimens in patients with hypertension and has also been used to measure adherence to antiretroviral therapy in patients who are HIV-positive (Tzeng et al., 2008). MSMMA is a commonly used and adapted measure of self-report adherence. Reliability was evaluated by measuring internal consistency. Internal consistency was tested using Cronbach's alpha (alpha = 0.61) (Morisky et al., 1986). Scores for each of the five items are summed to give a scale score ranging from 5 to 20 (Bosworth et al., 2006; Morisky et al., 1986).

Scoring

The Morisky's Self-report Measure of Medication Adherence (MSMMA) was rated as occurring 1 (nothing) to 4 (very often). The total Morisky's Self-report Measure of Medication Adherence score was obtained by summing medication adherence of with possible scores ranging from 5 to 20 points (Bosworth et al., 2006). A higher MSMMA score indicated a lower medication adherence. The levels of MSMMA were categorized into three levels (low, moderate, and high) by employing the range between minimum and maximum scores of the Morisky's Self-

report Measure of Medication Adherence and dividing it by three (Bosworth et al., 2006).

Total scores of Morisky's Self-reported Measure of Medication Adherence	**Interpretation**
4-9 point	low
10-15 point	moderate
16-20 point	high

Validity and Reliability

The Morisky's Self-reported Measure of Medication Adherence (MSMMA) (1986) was designed to assess adherence to medication regimens in patients with hypertension and has also been used to measure adherence to antiretroviral therapy in patients who are HIV-positive (Tzeng et al., 2008). MSMMA is a commonly used and adapted measure of self-report adherence in hypertensive patients and chronic illness. Reliability was evaluated by measuring internal consistency. Internal consistency was tested using Cronbach's alpha (alpha = 0.61). Scores for each of the four items are summed to give a scale score ranging from 5 to 20 (Bosworth et al., 2006; Morisky et al., 1986).

In the current study, after translation-back translate into Thai language, the researcher assessed the validity of barriers by five experts, including two cardiologists who provided treatments to MI patients, and three nursing instructors who were advanced practice nurses (APN) and a specialist in cardiovascular nursing. Most experts rated each item of barriers as 3 or 4 (from 1 = not relevant to 4 = very relevant) which met the criteria for appropriate content validity (Polit and Hungler, 1999: 419). In this study,

the CVI was 1.0 (see Appendix C). In addition, the Cronbach's alpha correlation coefficient was .65, and test- retest was 1.0. See the table 23 for specific details on psychometric properties.

Table 23 Psychometric properties of the instruments used in this study

Instrument	**Items and responses**	**Validity**		**Reliability**	
		Content (CVI index) (n=30)	**CFA (N=348)**	**Cronbach's alpha (n=30)**	**Test-retest (n=30)**
Social support (MESSI)	12 items Likert scale	.91	.90	.92	1.0
Depression (CES-D)	20 items Likert scale	-	.92	.72	1.0
Barriers (Barriers to medication adherence)	11 items Likert scale	.91	.91	.87	1.0
Knowledge (CHDKQ)	20 items True or False	1.0	-	-	.87
Self-Efficacy (SEAMS)	13 items Likert scale	1.0	.96	.91	1.0
Medication adherence (The Morisky et al.'s Self-Rated Measure of Medication Adherence**)**	5 items Likert scale	1.0	.88	.65	1.0

Protection of the rights of human subjects

This study was approved by Chulalongkorn University ethics committee and the Institutional Review Board (IRB) of each hospital before data collection (see Appendix A). The participants were informed of the purpose of the study and their rights to decline participation. The participants were also informed that if they decided to participate in the study, during the participation, they could express doubt about some questions or refuse to answer any of the questions. In addition, the participants were told that they were able to withdraw from the study at any time if they wished and their decision would not affect the treatments or services they would receive from healthcare providers at the hospitals. If the participants felt uncomfortable while filling out the questionnaires, the researcher would stop the interviews immediately and provide psychological support.

The participants were assured that their names and addresses would be kept strictly confidential and would not be reported with the study findings. Instead, a code number would be used to ensure confidentiality. The participants were also assured that the study data collected from them would be stored in a secure place and would not be accessible to any other person without their permission. The participants' data will be kept in a locker and only the researcher will have access to the data.

Finally, the researcher explained that there was no harm to the participants in this study and it would take approximate 30 to 45 minutes to complete all the questionnaires, with the researcher being readily available by mobile phone for all participants to reach if they needed to ask any questions about the study.

Pilot study

A pilot study was conducted to assess the feasibility of the study, the use of the proposed instruments, to assess their psychometric properties, and to evaluate the appropriateness of data collection procedures. It was carried out at the cardiology outpatient department at Police General Hospital in September 2011.

After approval from the IRB committee of Police General Hospital, the researcher made appointments to meet the nurses at the cardiology outpatient department. At the meeting, the investigator and informed the healthcare professionals of the objective of this study. Then, the investigator asked for their cooperation and collaborated with the nurses to select the study participants. The participants were Thai post-MI patients who met the inclusion criteria. Purposive sampling was employed to recruit a sample of 30 post-MI patients from the cardiology clinic.

After the participants were identified, the researcher explained the objective of the study. They were informed of their rights to decide to participate or refuse to participate in the study. If the participants agreed to participate in the pilot study, they would be asked to sign a consent form. Then, the participants were asked to complete the questionnaire and to evaluate the clarity and appropriateness of the questions. The researcher recorded the time spent on completion of the questionnaire, administration issues associated with the questionnaire, and suggested improvements. The pilot study process spent six months for collected data. The results of pilot study were acceptable of psychometric property and feasibility to data collection. The psychometric property was shown in table 23.

Data collection

Data collection was conducted after approval from the Chulalongkorn University ethics committee and the IRB of each hospital. It was carried out from December 2011 to February 2013. The steps involved in data collection were as follows:

1. A letter asking for permission to collect data from the Faculty of Nursing, Chulalongkorn University was sent to Chulalongkorn University ethics committee and the IRB of each hospital before data collection.

2. After approval from the ethics committee, the researcher explained and clarified the study objectives, data collection procedures, and expected outcomes and benefits of the study to the physicians and nurses of each cardiology outpatient department in the selected hospitals.

3. The researcher asked for cooperation from physicians and nurses to select participants who met the inclusion criteria. Nurses introduced the researcher and/or the research assistants to potential participants.

4. Two nurses with experience in taking care of cardiovascular patients were as research assistants. The researcher trained and tested the research assistants to make sure of their understanding in using the questionnaires. Research assistants were trained by the researcher in questionnaire administration, informed consent procedures, and participant information sheet. Research assistants were trained to interview the participants by reading the questionnaires word by word. During the interviews, the participants received a description of the questionnaires from the interviewers. If the participants did not understand the questions or answer choices, the interviewers repeated those questions as well as the response options until the

participants were able to respond to the questionnaire items by themselves. The interviewers were not allowed to help the participants select the answers. If the participants could not answer the questions, those questions must be treated as missing data.

5. The participants who met the inclusion criteria were invited to participate in this study. They were informed of the study objective, the process of data collection, and their rights to decide to participate or refuse to participate in the study. The participants who agreed to take part in this study were asked to sign an informed consent form.

6. While waiting to see the physician, the participants were checked by themselves using the demographic characteristics questionnaire, Morisky et al.'s Self-Rated Measure of Medication Adherence, Barriers to Medication Adherence, Self-efficacy for Appropriate Medication Use Scale, and Coronary Heart Disease Knowledge Questionnaire in a private place. If participant do not understand questionnaires, researcher and research assistance will help them clarify each items. This took approximately 30 to 45 minutes to complete.

7. After finishing each interview, the researcher and research assistants examined the questionnaires to ensure completeness of the data.

Data analysis

In preparation data analysis, the researcher checked and cleaned the data. The Statistical Package for Social Science (SPSS) program version 17 was used to analyze data and provide descriptive statistics. Linear Structural Relationship (LISREL) version 8.72 was employed for the path analysis. An alpha level of .05 was set as the

accepted level of significance for this study. The steps involved in data analysis were as follows:

1. All data were double-checked to confirm the accuracy of the data file. The researcher used a frequency table to verify incorrectly keyed category variables. In addition, a summary of descriptive statistics was used to help check the range of variables for incorrectly keyed values, numbers of sample, mean, median, and maximum and minimum values.

2. Missing data and outliers were investigated. A total of 348 questionnaires were selected for accuracy data check. The researcher found no missing data. As for outliers, the data set must be checked for both univariate and multivariate outliers. A box plot was used to detect a univariate outlier. In this study, no case had outliers. For multivariate analysis, the outliers were detected by Mahalanobis distance. Mahalanobis distance is distributed as a Chi-square (χ^2) variable with degree of freedom (df) equal to the number of variables (Hair et al., 2010). In the current study, critical χ^2 at alpha level .001 for 4 df was 13.30. Any case with a value greater than 13.30 was then a multivariate outlier. No case had multivariate outliers.

3. Descriptive statistics, including frequencies, means, and standard deviations were used to describe the demographic data and to examine the distribution of demographic and other major variables in the study.

4. Path analysis was used to analyze the hypothesized model because it can assess the direct effects and indirect effects of some variables that have been theorized to be the causes of other variables (Hair et al., 2010). The statistical assumptions underlying path analysis including normality of distribution, linearity of

relationships, homoscedasticity, and multicollinearity were examined. Pearson's Product Moment correlations were used to test for bivariate relationships among pairs of variables and to assess multicollinearity among the independent variables. Multiple regression analyses were used to compute a variance inflation factor and tolerance to examine multicollinearity among the major variables.

5. The hypothesized path model was tested and modified for best fit and parsimony. LISREL was used to estimate the parameters of the path model associated with the study's specific aims. The overall model-fit-index was examined to determine how well the hypothesized model fit the existing data. According to Hair et al. (2010), statistical criteria could be utilized to evaluate the overall model-fit-index, so the researcher selected some statistical criteria to evaluate the hypothesize model as follows:

5.1 The first set of goodness of fit statistics was the Chi-square (χ^2) value. The χ^2 test statistics was used in hypothesis testing to evaluate the appropriateness of the hypothesized model. χ^2 is non-significant of a level with a corresponding p value > .05, and preferably a value close to 1.00 is recommended for the hypothesized model that fit the data. However, χ^2 value is dependent on the model's complexity and sample size. The χ^2 value of a more complex, highly parameterized model tends to be smaller than that of simpler models because of the reduced degree of freedom (df). When the sample size and a constant number of df are larger, the χ^2 value increases. For a good model fit, the ratio χ^2/df should be as small as possible. A ratio between 2 and 3 is indicative of a "good" or "acceptable" data-model fit, respectively. Thus, the first set of criteria for testing a goodness of fit statistics is that χ^2 is non-significant (p >.05), and χ^2/df should be less than 2.

5.2 The second set of goodness of fit statistics is based on the difference between the sample covariance matrix and the model implied covariance matrix. The following indices are descriptive measures of overall model fit: Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), and Standardized Root Mean Square Residual (SRMR). RMSEA values $\leq .05$ can be considered as a good fit model, while values between .05 and .08 as an adequate fit model. SRMR values should be less than .05 for a good fit model.

5.3 The last goodness of fit statistics is the comparison between the fit of a model of interest and the fit of some baseline model. The goodness-of-fit index (GFI) is a measure of the proportion of all variances and covariance accounted for by the model and compared the squared residuals from prediction with the actual data. It represents the overall degree of fit ranging from 0 (poor fit) to 1 (perfect fit). GFI $\geq .95$ is indicative of a good fit relative to the baseline model, while values greater than .90 are usually interpreted as indicating an acceptable fit. The adjusted goodness of fit index (AGFI) is an extension of GFI that is adjusted by the degree of freedom for the proposed model to the degree of freedom for the null model. AGFI greater than .90 is indicative of a good fit relative to the baseline model, while values greater than .85 may be considered as an acceptable fit. Thus, the last criteria for testing a goodness of fit statistic are GFI $\geq .95$ and AGFI $\geq .90$.

6. In the present study, once it was determined that the hypothesized model fit the data, path coefficients and R^2 were estimated and the effects of the independent variables (financial status, symptom severity, social support, education, barriers, depression knowledge, and self-efficacy) on the dependent variable (medication adherence) were determined to answer the research questions and test the

hypotheses. The goodness-fit-indices were used to determine whether the model adequately fit the data.

Summary

This chapter has provide information about the study design, population and sample including sample size and sampling technique, translation procedure, instrumentation, protection of the rights of human subject, data collection, and data analysis.

CHAPTER IV

RESULTS

This chapter presents the findings of the study. The findings regarding demographic characteristics of the participants and the nine major study variables derived from descriptive statistical analysis are presented. The preliminary analysis and analysis of the hypothesized model are also displayed.

Characteristics of the participants

Demographic characteristics of the participants

A total of 348 participants who were post-myocardial infarction patients were included in this analysis. The findings revealed that most of the participants' age was ≥ 61years old (47.70%). They were predominantly male (60.9%), married (71.3 %), and more than half of participants completed primary school (56 %). Moreover, almost one-thirds of the participants (39.4%) do not worked. In addition, more than three quarter of the participants (78.1%) had salary less than 5,000 baht (1 US dollar = 30 baht). Most of the participants (71.5%) used Universal Coverage Scheme (the 30-Baht Scheme). For symptom severity, Cardiac Canadian Society Class used to categorize symptom severity of participants. The participants had class I (55.5 %), class II (22.7%), class III (14.0%), and class IV (7.8%), respectively. Most of the participants had been diagnosis with Hypertension; Diabetes Miletus and Hypertension; Diabetes Miletus, Hypertension, and Dislipidemia; Diabetes Miletus; and Hypertension and Dislipidemia as co-morbidities (16.7, 6.0, 6.0, 5.2, and 4.6%, respectively). All participants non-exhibited symptoms of depression. The findings

regarding demographic and clinical characteristics of the study participants are summarized in Table 24.

Table 24 Demographic and clinical characteristics of patients with post-MI (n =348)

Characteristics	Number	Percentage
Age (year)		
20-40	26	7.5
41-60	156	44.8
≥ 61	166	47.7
Gender		
Male	212	60.9
Female	136	39.1
Marital status		
Single	29	8.3
Married	248	71.3
Widowed	63	18.1
Divorced	8	2.3
Education level		
Non education	28	8.0
Primary school	195	56.0
High school	63	18.2
Higher education	62	17.8
Financial status		
Less than 5,000 Baht/ month	272	78.1
5,001-10,000 Baht/ month	50	14.4
10,001-15,000 Baht/ month	0	0.0
More than 20,000 Baht/ month	26	7.5

Table 24 Cont.

Characteristics	Number	Percentage
Occupation		
Do not work	137	39.4
Employee	89	25.5
Employee of the government	5	1.4
Government pension	16	4.6
State enterprise	3	0.9
Business	49	14.2
Government official	20	5.7
Agriculture	29	8.3
Type of health care coverage		
Universal Coverage Scheme (the 30- Baht Scheme)	249	71.5
Social security	37	10.6
Pay by themselves	3	0.9
Government coverage	59	17.0
Cardiac Canadian Society Class		
Class 1	193	55.5
Class 2	79	22.7
Class 3	49	14.0
Class 4	27	7.8
Co-morbidities		
Myocardial infarction	214	61.5
Hypertension	58	16.7
Diabetes Miletus	18	5.2
Hypertension and Dislipidemia	16	4.6
Diabetes Miletus and Hypertension	21	6.0
Diabetes Miletus, Hypertension, and Dislipidemia	21	6.0

Table 25 Medication history of the participants (n = 348)

Medication history	Number	Percentage
ASA	307	25.2
Plavix (Clopidogrel)	203	16.7
Isordil	123	10.0
Enalapril	157	12.9
Simvastatin	233	19.1
Atenolol	41	3.3
Propanolol	7	0.6
Ismo	3	0.3
Betaloc	5	0.4
Concor	3	0.3
Amlodepin	132	10.8
Apresoline	5	0.4
The amount of taking medication per day		
1 tablet	25	7.3
2 tablets	32	9.3
3 tablets	37	10.6
4 tablets	76	21.9
5 tablets	57	16.4
6 tablets	56	16.1
7 tablets	27	7.9
8 tablets	13	3.8
9 tablets	7	2.1
10 tablets	5	1.4
11 tablets	1	0.3
12 tablets	6	1.7
13 tablets	2	0.6
14 tablets	2	0.6

Regarding medication history, Most of the participants were taking ASA, Simvastatin, and Plavix (25.2, 19.1, and 16.7%, respectively). In addition, most of the participant had been take medication four tablets per day (21.9%) (see Table 25).

Characteristics of the study variables

The nine major variables in the current study include medication adherence, social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy. The detail regarding characteristics of each variable is presented as follows:

Medication adherence

The total scores of the medication adherence ranged from 5 to 20 points with a mean of 18.52 (SD = 1.81). The medication adherence scores had a negative skewness value (-1.27), thus indicating that most of the participants had scores of medication adherence with extreme values to the left of mean score. The kurtosis value of medication adherence was also close to zero (1.15), thus suggesting that the medication adherence scores were shaped like a platykurtic which means flatter than normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a high medication adherence (see Table 26).

Social support

The total scores of the social support ranged from 12 to 60 points with a mean of 43.83 (SD = 12.39). The social support scores had a negative skewness values (-.56), thus indicating that most of the participants had scores of social support with extreme values to the left of mean score. The kurtosis value of social support was also a negative value (-.57), thus suggesting that the social support scores were shaped like a platykurtic (flattened curve) which means flatter than normal distribution.

Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a moderate social support (see Table 26).

Depression

The total scores of the depression ranged from 0 to 60 points with a mean of 12.49 (SD = 7.71). The depression scores had a positive skewness value (.51), thus indicating that most of the participants had scores of depression with extreme values to the right of mean score. The kurtosis value of depression was also a negative value (-.40), thus suggesting that the depression scores were shaped like a platykurtic (flattened curve) which means flatter than normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a low depression (see Table 26).

Barriers

The total scores of the barriers ranged from 0 to 110 points with a mean of 25.64 (SD =15.74). The barriers scores had a positive skewness value (1.53), thus indicating that most of the participants had scores of barriers with extreme values to the right of mean score. The kurtosis value of barriers was also a positive value (2.85), thus suggesting that barriers scores were shaped like a platykurtic (flattened curve) which means flatter than normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a low barriers (see Table 26).

Knowledge

The total scores of the knowledge ranged from 0 to 20 points with a mean of 13.47 (SD = 2.09). The knowledge scores had a positive skewness value (.94), thus indicating that most of the participants had scores of knowledge with extreme values to the right of mean score. The kurtosis value of knowledge was also a positive value (5.86), thus suggesting that the knowledge scores were shaped like a leptokutosis which means sharper than normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a high knowledge (see Table 26).

Self-efficacy

The total scores of the self-efficacy ranged from 13 to 39 points with a mean of 31.63 (SD = 6.19). The self-efficacy scores had a negative skewness value (-.38), thus indicating that most of the participants had scores of self-efficacy with extreme values to the left of mean score. The kurtosis values of self-efficacy was also a negative value (-.97), thus suggesting that the self-efficacy scores were shaped like a platykurtic (flattened curve) which means flatter than a normal distribution. Based on the mean score, skewness, and the kurtosis value, it could be concluded that the participants as a whole had a high self-efficacy (see Table 26).

Table 26 Possible range, actual range, mean, SD, skewness, kurtosis, and the interpretation of medication adherence, social support, depression, barriers, knowledge, and self-efficacy (n =348)

Variables	Possible range	Actual range	Mean	Average total score (%)	SD	Skewness (Z value)	Kurtosis (Z value)	Interpretation (level)
Medication adherences	5-20	11-20	18.52	92.6	1.81	-1.27 (.13)	1.15 (.26)	High
Social support	12-60	12-60	43.83	73.05	12.39	-.56 (.13)	-.57 (.26)	Moderate
Depression	0-60	0-35	12.49	20.82	7.71	.51 (.13)	-.40 (.26)	none
Barriers	0-110	11-99	25.64	23.31	15.74	1.53 (.13)	2.85 (.26)	low
Knowledge	0-20	8-18	13.47	67.35	2.09	.94 (.13)	5.86 (.26)	high
Self-efficacy	1-39	15-39	31.62	81.08	6.19	-.38 (.13)	-.97 (.26)	High

Preliminary Analysis

Before future analysis with path analysis will be conducted, normality, linearity, homoscedasticity, and muticollinearity were tested in order to ensure that there was no violation of the underlying assumption. The results of normality, linearity, homoscedasticity, and multicollinearity testing are presented.

Normality testing

In the current study, descriptive statistics including mean, standard deviation, skewness, and kurtosis were used to test normality of variables. The skewness of influencing variables ranged from -1.27 to 2.43, and the kurtosis of variables ranged from -.97 to 5.86 (see Tables 26). In fact, an absolute value of 2.0 for skewness is considered a departure from normality (Li et al., 1998), and a value of univariate

skewness greater than ± 3.0 indicates extreme skewness (Kline, 1998). According to Hair and colleagues (2006), the z value of skeweness and kurtosis not exceeding ± 1.96 which corresponds to a .05 level or ± 2.58 at the .01 probability level reflects a normal distribution. As for the influencing variables, the z value of skewness = .13 and kurtosis = .26 (see Tables 6) that were within the normal curve. Additionally, the Kolmogorov-Smirnov test and Q-Q plot indicated that the nine major variables were normally distributed (see Appendix C).

Linearity Testing

Multiple regression assumes that there is a linear relationship between the independent variables and the dependent variable. The linearity testing can be checked by the residual plot which is a visual examination of the scatter plot graph between the standardized residual (y-axis) versus the predict values (x-axis). Nonlinearity is indicated when most of the residuals are above the zero line on the plot at some predicted values and below the zero line at other predict values (Tabachnick and Fidell, 2007). In other words, the assumption of linearity is met when the standardized residual values are randomly around the horizontal line. In the current study, the scatter plot between independent and dependent variables showed such a linear relationship (see Appendix C).

Homoscedasticity testing

Homoscedasticity means that the variance of error is the same across all levels of the independent variables (Hair et al., 2010). This assumption can be tested by a visual examination of the plot of the regression of the standardized predicted

dependent variable against the regression standardized residual. Homoscedastisticity is indicated when the residual plots are randomly scattered around zero (in the horizontal line) (Hair et al., 2010). In the current study, the scatter plot of residuals showed the results from homoscedastic data (see Appendix C).

Multicollinearity testing

Two common criteria can be used to examine multicollinearity: 1) Pearson's correlation coefficients and 2) tolerance values and variance inflation factor (VIF). The correlation of two variables that does not exceed ± .9 indicates that there is no multicollinearity (Hair et al., 2010). In the current study, the correlation coefficients among the nine major variables ranged from -.34 to 3.60. Thus, these correlation coefficients indicated no multicollimearity.

In fact, the tolerance measures of multicollinearity among the independent variables (values ranging from 0 to 1) and the tolerance value that approaches zero indicates multicollinearity (Hair et al., 2010). It is worth noting that the values of VIF that are greater than 10 indicate a cause of concern (Hair et al., 2010). In the present study, the results of the multiple regression analysis indicated that the tolerance ranged from .67 to .96 (not approaching 0) and VIF ranged from 1.04 to 1.47 (not greater than 10) (see Appendix C). Thus, these results confirmed no violation for multicollinearity.

Findings of research questions and hypothesis testing

The findings that answered the research questions and the results of the testing of the hypothesized model are described below:

1. The relationships among social support, financial status, education, symptom severity, depression, barriers, knowledge, self-efficacy, and medication adherence of Thai persons living with MI.

Bivariate Pearson's correlations were used to evaluate relationships among social support, financial status, education, symptom severity, depression, barriers, knowledge, self-efficacy, and medication adherence (see Table 7). The magnitude of relationships was determined by the following criteria: r <.30 = weak or low relationship, .30 $\geq$ r $\leq$ .50 = moderate relationship and r >.50 = strong or high relationship (Burn and Grove, 2005).

The results showed that a moderate positive correlation existed between self-efficacy and medication adherence (r = .32, p < .05) and barriers and depression had low negative correlation with medication adherence (r = -.23 and -28, p < .05). Depression had a moderate negative correlation with self-efficacy (r = -.34, p < .05). Financial status, social support, and symptom severity had low positive correlation with self-efficacy (r = .16, .16, .12, p < .05, respectively) and barriers had low negative correlation with self-efficacy (r = -.22, p < .05). Additionally, financial status, education, and knowledge had low negative correlation with depression (r = -.19, -.24, -.13, p < .05, respectively) and social support had moderate negative correlation with depression (r = -.45, p < .05). Moreover, financial status and education had low positive correlation with knowledge (r = .23 and .14, p < .05).

Financial status had low negative correlation with barriers (r = -.13, p < .05) and social support had low positive correlation with barriers (r = .12, p < .05). Social support had low positive correlation with symptom severity (r = .11, p < .05). Furthermore, financial status and education had low positive correlation with social support (r = .19 and r = .15 p < .05). Finally, financial status had moderate positive correlation with education (r = .36, p < .05) (see Table 27).

Table 27 Pearson's relationships among medication adherence, social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy

	FS	EDU	SS	CCS	BAR	KCAD	DEPR	SE	MA
FS	1.00								
EDU	.36**	1.00							
SS	.19**	.15**	1.00						
CCS	-.01	-.08	.11*	1.00					
BAR	-.13*	.06	.12*	.03	1.00				
KCAD	.23**	.14**	.05	.01	-.01	1.00			
DEPR	-.19**	-.24**	-.42**	-.06	.87	-.13*	1.00		
SE	.16**	.08	.16**	.12	-.22	-.08	-.34**	1.00	
MA	.09	-.00	.05	.03	-.23**	.08	-.28**	.32	1.00

*p <.05

** p <.01

MA = medication adherence, FS = financial status, EDU = education, SS = social support, CCS = symptom severity, BAR = barriers, KCAD = knowledge, DEPR = depression, SE = self-efficacy

2. The hypothesized model explain medication adherence of Thai persons living with MI

2.1 Model testing and modification

In the present study, once it was determined that the hypothesized model fit the data, path coefficients and R^2 were estimated and the effects of the independent variables (financial status, symptom severity, social support, education, barriers, depression knowledge, and self-efficacy) on the dependent variable (medication adherence) were determined to answer the research questions and test the hypotheses.

2.1.1 Model identification

The hypothesized path model was drawn from multidimensional adherence model and empirical literature. LISREL statistics was used to test this path model. Identification path model is a crucial process before testing a model (Hair et al., 2010) because the computer program will run when the model is only over-identification. According to Hair et al. (2010), over-identification is one with more data points than free parameters. The number of data points is {p (p+1)}/2, where p equals the number of observed variables (Hair et al., 2010). In the hypothesized model, there were nine variables and 25 free parameters. The number of data points was 45 = {9(9+1)}/2. The hypothesized model had thirty free parameters than data points. Thus, this model was over-identification which meant that it could be identified.

2.1.2 Model testing

From the hypothesized model, the exogenous variables were financial status, education, social support, symptom severity, and barriers. The endogenous variables were knowledge, depression, self-efficacy, and medication adherence. The process of model testing is presented as follows:

In the initially hypothesized model (see Figure 4), the researcher did not constrain or fix any parameter. The results showed that the fit index statistics were within an acceptable range (see Table 28). Additionally, the largest (3.55) and smallest (-3.15) standardized residuals were less than ± 2. The initially hypothesized model explained 15.9% (R^2 = .159) of the variance of medication adherence.

The final model explained 20% (R^2 = .20) (see Figure 5) of the variance of medication adherence. The fit index statistics were in the acceptable range more than the initially hypothesized model (see Table 28), and the largest (1.97) and smallest standardized residuals (-2.28) were less than ± 2. As for path coefficients found that four path coefficients of exogenous variables were significant at 0.05 level and found that path coefficients of social support and depression was the most impact on medication adherence (-.28) followed by barriers and self-efficacy (-3.55). Regarding endogenous variables, path coefficients of self-efficacy was the most effect on medication adherence (.16) followed by depression was effect on medication adherence (-.14). All of path coefficients are displayed in Table 29.

Table 28 Comparison of the goodness of fit statistics among the initially hypothesized model, and the final model of medication adherence in post-MI patients

Relative fit index	Initial model	Final model	Goodness of Fit Statistics
χ^2 - test	33.09 (p = 0.00)	5.87 (p = 0.43)	(p < 0.05) non significant
χ^2 / df	33.09/10 = 3.30	5.87/6 = 0.97	< 2.00
CFI	0.93	1.00	≥ 0.95
GFI	0.98	0.99	≥ 0.95
AGFI	0.90	0.97	≥ 0.95
RMSEA	0.08	0.00	< 0.05
SRMR	0.04	0.01	< 0.05
PGFI	0.21	0.13	< 0.50
Largest s.	3.55	1.97	± 2.00
Smallest s.	-3.15	-2.28	± 2.00
R^2	0.15	0.20	> 0.50

χ^2 = Chi-square**,** df = degree of freedom**,** CFI = Comparative Fit Index
GFI = Goodness of Fit Index, AGFI **=** Adjust Goodness of Fit Index
RMSEA = Root Mean Square Error of Approximation
SRMR = Standardized Root Mean Square Residual
Smallest s = Smallest standardized residual, Largest s = Largest standardized residual

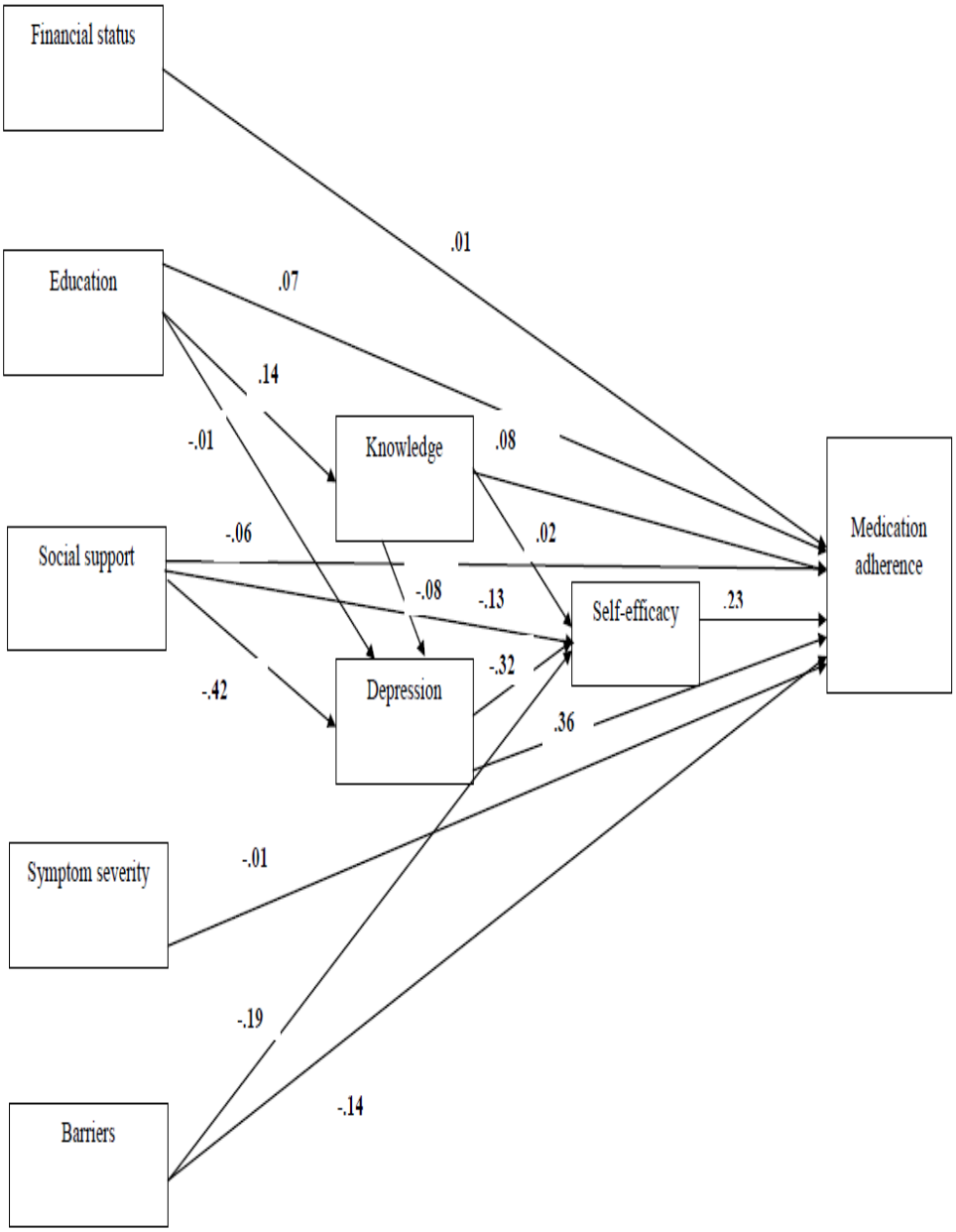

Figure 5 initially model of medication adherence in post- MI patients

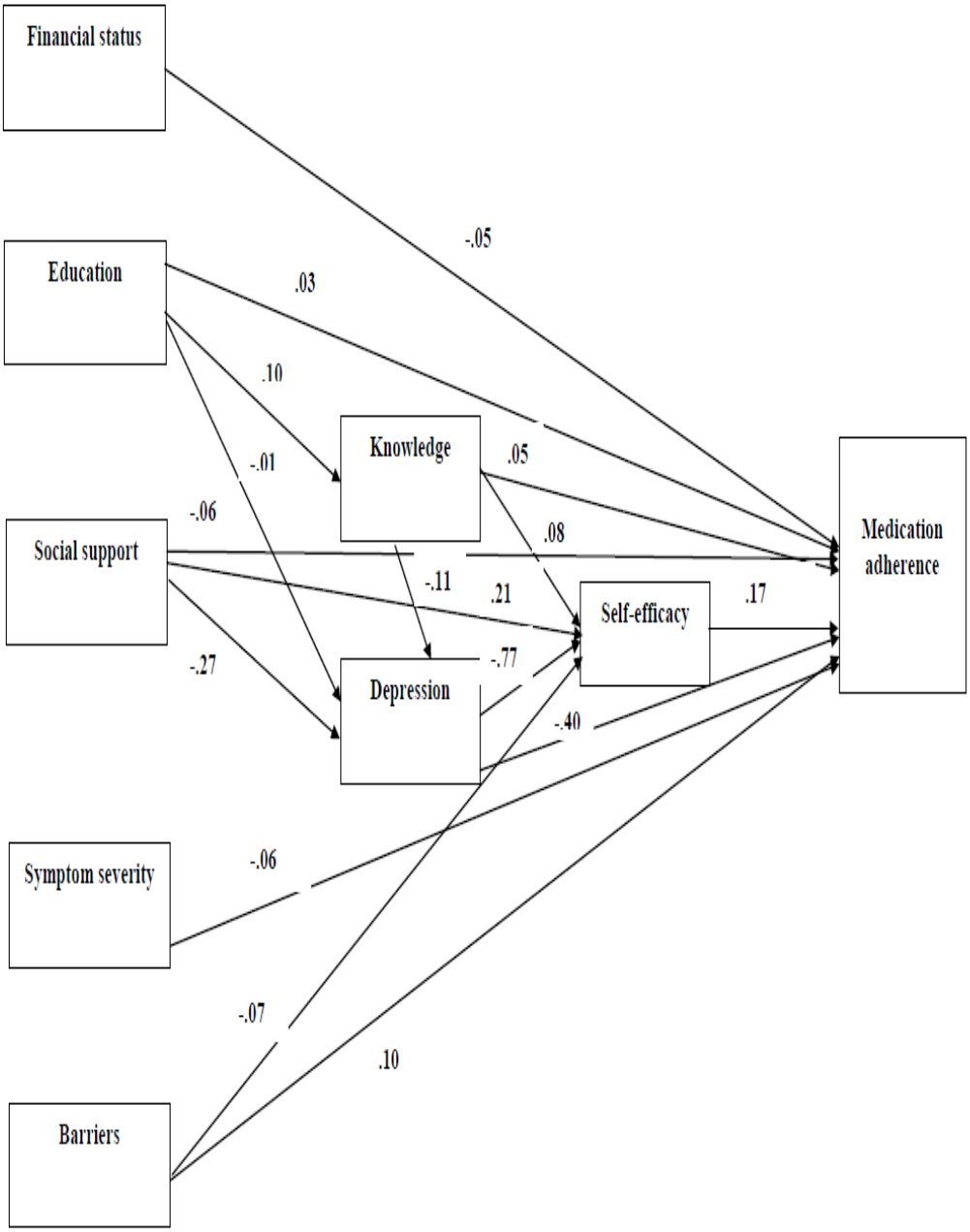

Figure 6 Final model of medication adherence among post- MI patients

Table 29 Standardized path coefficients, standard error (SE), and T-value of parameters of the final model of medication adherence in post-MI patients (n = 348)

Path diagram	Standardized path coefficients	SE	T- value
Gamma			
Financial status ⟶ Medication adherence	-0.047	0.079	-0.588
Education⟶ Knowledge	0.101	0.028	3.538*
Education ⟶ Depression	-0.078	0.029	-2.673*
Education ⟶ Medication adherence	0.028	0.073	0.389
Social support ⟶ Depression	-0.268	0.030	-8.963*
Social support ⟶ Self-efficacy	-0.063	0.092	-1.779
Social support ⟶ Medication adherence	-0.055	0.029	-1.888
Symptom severity⟶ Medication adherence	-0.063	0.065	-0.962
Barriers ⟶ Self-efficacy	-0.068	0.019	-3.557*
Barriers ⟶ Medication adherence	-0.079	0.040	-1.954
Beta			
Knowledge⟶ Depression	-0.107	0.058	-1.830
Knowledge ⟶ Self-efficacy	-0.182	0.068	-2.693*
Knowledge⟶ Medication adherence	0.055	0.035	1.552
Depression ⟶ Self-efficacy	-0.773	0.311	-2.482*
Depression ⟶ Medication adherence	-0.144	0.034	-4.205*
Self-efficacy ⟶ Medication adherence	0.168	0.042	4.021*

*p <.05

The study findings revealed that the hypothesized model fit the empirical data and could explain 20% (R^2 = .20) of the variance of medication adherence by financial status, education, social support, symptom severity, barriers, knowledge, depression, and self-efficacy. Nineteen percent (R^2 = .19) of the variance of self-efficacy by education, social support, barriers, knowledge, and depression. Twenty-two percent (R^2 = .22) of the variance of depression by education, social support, and knowledge. Two percent (R^2 = .02) of the variance of knowledge by education. The results of final model testing are summarized in accordance with the hypothesized model as follows (see Table 30):

1. Financial status had a negative direct effect (-.05, $p < .05$) on medication adherence.

2. Education had a positive direct effect (.03, $p < .05$) on medication adherence, positive indirect effect (.10, $p < .05$) on medication adherence through knowledge, positive indirect effect (.05, $p < .05$) on medication adherence through knowledge and self-efficacy, and negative indirect effect (-.0.01, $p < .05$) on medication adherence through depression and self-efficacy.

3. Social support had a negative direct effect (-.06, $p < .05$) on medication adherence, positive indirect effect (.21, $p < .05$) on medication adherence through self-efficacy, negative indirect effect (-.27, $p < .05$) on medication adherence through depression and self-efficacy.

4. Symptom severity had a negative direct effect (-.06, $p < .05$) on medication adherence.

5. Barriers had positive direct effect (.10, $p < .05$) on medication adherence and negative indirect effect (-.07, $p < .05$) on medication adherence through self-efficacy.

6. Knowledge had positive direct effect (.05, $p < .05$) on medication adherence, positive indirect effect (.08, $p < .05$) on medication adherence through self-efficacy, and negative indirect effect (-.11, $p < .05$) on medication adherence through depression and self-efficacy.

7. Depression had negative direct effect (-.40, $p < .05$) on medication adherence and negative effect (-0.77, $p < .05$) on medication adherence through self-efficacy.

8. Self-efficacy had a positive direct effect (.17, $p < .05$) on medication adherence.

Table 30 Summary the total, direct, and indirect effects of influencing variables on affected variables (n=348)

Dependent Variables	R2	Influencing Variables	TE	IE	DE
MA	.20	FS	-0.05	-	-0.05
		EDU	0.056	0.03	0.03
		SS	-0.01	0.05	-0.06
		CCS	-0.06	-	-0.06
		BAR	-0.09	-0.01	0.10
		K	0.05	-0.00	0.05
		DEP	-0.27	-0.13	-0.40
		SE	0.17	-	0.17
SE	-.19	EDU	0.05	0.05	0.00
		SS	0.04	0.21	-0.16
		BAR	-0.07	-	-0.07
		K	-0.09	0.08	-0.02
		DEP	-0.77	-	-0.77
DEP	.22	EDU	-0.09	-0.01	-0.08
		SS	-0.27	-	-0.27
		K	-0.11	-	-0.11
K	.02	EDU	0.10	-	0.10

EDU= Education, FS= Financial status, CCS= Symptom severity, DEP= Depression, BAR= Barriers, K= CAD knowledge, SE= Self-efficacy, MA= Medication adherence
TE= Total effect, IE= Indirect effect, DE= Direct effect

Summary

The descriptive statistic characteristics of the variables investigated in this study have been explained. The preliminary analysis reported did not violate the assumption for the path analysis. The hypothesized path model of medication adherence in post-MI patients was tested. It is noteworthy that the hypothesized model fit the empirical data of medication adherence in post-MI patients. Although some research hypotheses were only partially supported, the model is still meaningful and useful for explaining factors influencing medication adherence in post-MI patients. Finally, all the variables in the model explained approximately 20% of the variance in medication adherence.

CHAPTER V

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This chapter provides the discussion of the study findings. It includes conclusion, discussion of the characteristics of the participants and study variables, hypothesis testing, limitations, implications for nursing, and recommendations for future research.

Summary

The purpose of this cross-sectional descriptive correlation study was to develop and test a model that explains the influence of social support, financial status, education, symptom severity, depression, barriers, knowledge, and self-efficacy on medication adherence among Thai post myocardial infarction patients. The conceptual framework used in this study was multidimensional adherence model and empirical literature. Multi-stage sampling techniques of 348 post-myocardial infarction patients were recruited from the cardiovascular outpatient department at tertiary hospital from all regions of Thailand. Data collection was carried out from December 2011 to February 2013.

The instruments used in this study included personal data sheet, Modified ENRICHD Social Support Instrument, Center for Epidemiologic Studies Depression Scale, Barriers to medication adherence, Coronary Heart Disease Awareness and Knowledge Questionnaire, Self-efficacy for Appropriate Medication Use Scale, and Morisky's Self-reported Measure of Medication Adherence. All participants responded to a set of seven questionnaires in a structured interview format. The

validity and reliability of the instruments were examined. A LISREL version 8.72 was used to test the hypothesized path model.

According to the study findings, most of the participants' age was ≥ 61years old (47.70%). They were predominantly male (60.9%), married (71.3 %), and more than half of participants completed primary school (56 %). Moreover, almost one-thirds of the participants (39.4%) do not worked. In addition, more than three quarter of the participants (78.1%) had salary less than 5,000 baht (1 US dollar = 30baht). Most of the participants (71.5%) used Universal Coverage Scheme (the 30-Baht Scheme). For symptom severity, Cardiac Canadian Society Class used to categorize symptom severity of participants. The participants had class I (55.5 %), class II (22.7%), class III (14.0%), and class IV (7.8%), respectively. Most of the participants had been diagnosis with Hypertension; Diabetes Miletus and Hypertension; Diabetes Miletus, Hypertension, and Dislipidemia; Diabetes Miletus; and Hypertension and Dislipidemia as co-morbidities (16.7, 6.0, 6.0, 5.2, and 4.6%, respectively). All participants non-exhibited symptoms of depression. Regarding medical history, Most of the participants were taking ASA, Simvastatin, and Plavix (25.2, 19.1, and 16.7%, respectively). In addition, most of the participant had been take medication four tablets per day (21.9%).

Furthermore, the findings revealed that the hypothesized model fit the empirical data and could explain 20% (R^2 = .20) (Chi-square = 5.87, df = 5, p < .43, Chi-square/df = 0.97, GIF = 0.99, RMSEA = 0.065, SRMR = 0.041, AGFI = 0.97). Moreover, the study findings revealed that the hypothesized model fit the empirical data and could explain 20% (R^2 = .20) of the variance of medication adherence by financial status, education, social support, symptom severity, barriers, knowledge,

depression, and self-efficacy. Nineteen percent (R^2 = .19) of the variance of self-efficacy by education, social support, barriers, knowledge, and depression. Twenty-two percent (R^2 = .22) of the variance of depression by education, social support, and knowledge. Two percent (R^2 = .02) of the variance of knowledge by education.

The results of the final model testing are summarized according to the research hypotheses as follows:

1. Financial status had a negative direct effect (-.05, $p < .05$) on medication adherence.

2. Education had a positive direct effect (.03, $p < .05$) on medication adherence, positive indirect effect (.10, $p < .05$) on medication adherence through knowledge, positive indirect effect (.05, $p < .05$) on medication adherence through knowledge and self-efficacy, and negative indirect effect (-.0.01, $p < .05$) on medication adherence through depression and self-efficacy.

3. Social support had a negative direct effect (-.06, $p < .05$) on medication adherence, positive indirect effect (.21, $p < .05$) on medication adherence through self-efficacy, negative indirect effect (-.27, $p < .05$) on medication adherence through depression and self-efficacy.

4. Symptom severity had a negative direct effect (-.06, $p < .05$) on medication adherence.

5. Barriers had positive direct effect (.10, $p < .05$) on medication adherence and negative indirect effect (-.07, $p < .05$) on medication adherence through self-efficacy.

6. Knowledge had positive direct effect (.05, $p < .05$) on medication adherence, positive indirect effect (.08, $p < .05$) on medication adherence through

self-efficacy, and negative indirect effect (-.11, $p < .05$) on medication adherence through depression and self-efficacy.

7. Depression had negative direct effect (-.40, $p < .05$) on medication adherence and negative effect (-0.77, $p < .05$) on medication adherence through self-efficacy.

8. Self-efficacy had a positive direct effect (.17, $p < .05$) on medication adherence.

Discussions

This study conducted based on a modified version of the World Health Organization's multidimensional adherence model (MAM). The World health Organization (WHO) (2003) defined medication adherence as the extent to which a person's taking medication corresponds with recommendations from a health care provider. Furthermore, medication adherence is viewed as a multidimensional phenomenon determined by the interplay of five sets of factors. The common belief that patients are solely responsible for taking their medication is misleading and most often reflects a misunderstanding of how various factors affect medication adherence and capacity to adhere to medication. Modified versions of the World Health Organization's multidimensional adherence model were socioeconomic factors, condition-related factors, therapy-related factors, and patient-related factors. Thus, based on this model, the study finding will be discussed as follow:

1. Socioeconomic factors

Socioeconomic factors have a significant effect on adherence include poor income, poverty, illiteracy, low level of education, unemployment, and so on. Poor adherence to prescribed regimens affects all age groups. This study found that financial status had a negative direct effect on medication adherence. This finding do not support the hypothesis number one that is financial status had positive direct effect on medication adherence. The other factor is education found that education has a positive direct effect on medication adherence, positive indirect effect on medication adherence through knowledge, positive indirect effect on medication adherence through knowledge and self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy. This finding support the hypothesis number two that education had a positive direct effect on medication adherence, positive indirect effect on medication adherence through knowledge, positive indirect effect on medication adherence through knowledge and self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy. As for social support, social support has a negative direct effect on medication adherence. This finding do not support the hypothesis number three that social support has a positive direct effect on medication adherence , and another hypotheses support the hypotheses number two that social support were positive indirect effect on medication adherence through self-efficacy, negative indirect effect on medication adherence through depression and self-efficacy. The detail of discussion for socioeconomic factors as follow:

1.1Financial status had a negative direct effect on medication adherence.

The findings of the present study showed that financial status had negative direct effect on medication adherence. The result does not support the hypothesis that is financial status had positive direct effect on medication adherence. This means that even though the most of post-MI patients had a lower financial status (78.1%) (Less than 5,000 baht/month) but they were more likely to have a higher level of medication adherence, because of their Thai citizens whose most of them (71.6%) covered by Thai health care coverage (30-Baht Scheme) (National Health Security Office, 2013), so they did not pay for fill medication prescribed. The result contrast with previous studied by Kronish and Ye (2013) who investigated adherence to cardiovascular medication and found that low income was a significant predictor associated to poor medication adherence in cardiovascular patients. As well as myocardial infarction patients who had low financial status associated with poor medication adherence because they have to pay for fill medication prescribed (Jackevicius et al, 2008; Laba et al., 2013). Cardiovascular patients who had low income correlated with poor medication adherence (Berben et al., 2012) Similarly, Bosworth et al. (2006) showed that patients who have low income levels are more likely to have poor adherence with their medication regimen. Among patients with low income, medication often becomes a low priority because of competing needs and limited sources. In addition, financial status was predictor of medication adherence in heart failure patients (Wu et al, 2008). Furthermore, Mishra et al. (2011) study adherence to medication regimens among low income patient with multiple comorbid

chronic condition and found that low income result in patients did not fill all their prescriptions because of cost and skipped doses to take their prescription last longer.

1.2 Education has a positive direct effect on medication adherence, positive indirect effect on medication adherence through knowledge, positive indirect effect on medication adherence through knowledge and self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy.

1.2.1. Education had positive direct effect on medication adherence.

The results of this study showed that education had positive direct effect on medication adherence which it supports the hypothesis. This meant that post-MI patients who had higher education also had higher medication adherence. The reason is that the patients who have higher education increasing understanding about disease, treatment, and medication adherence. Nearly one forth of participants had higher education level (17.8%). Thus, they concern about taking medication to decrease severity of disease and improve their health (Laba et al., 2013). This finding supports previous studied that coronary heart disease (CHD) patients with poor adherence to their medications, lower educations were implicated (Gehi et al., 2007). Similarly, Ho et al. (2009) study medication adherence among cardiovascular patients and found that cardiovascular patients with higher education levels associated to higher medication adherence. Additionally, Wu et al. (2008) studied medication adherence in heart failure patients and found that heart failure patients with more education were more likely to have good medication adherence.

1.2.2 Education had positive indirect effect on medication adherence through knowledge and positive indirect effect through knowledge and self-efficacy.

The results of this study showed that education had positive indirect effect on medication adherence through knowledge and positive indirect effect through knowledge and self-efficacy which are the results support the hypothesis. As expected, post-MI patients who had higher education also had higher level of knowledge. It could be explained that a higher level of education in cardiac patients led to increasing knowledge and understanding about control regarding coronary artery disease and lead to high self- efficacy to taking medication (Kayaniyil et al., 2009; Laba et al., 2013). The result support previous studied by Castillo et al. (2013) studied community-based diabetes education for Latinos and found that diabetes patient who have high education will be deeper understanding and increasing knowledge, and significantly increase self-efficacy. Additionally, Berben et al. (2012) studied an ecological perspective on medication adherence and found that cardiovascular patients who have higher education significant improvement knowledge, gained insight literacy, and led to high self-efficacy on medication adherence. Post MI patients who had a high level of education increasing knowledge and linked to high self-efficacy. Thus, if post MI patients who had high level of self-efficacy, it will link to higher medication adherence (Berben et al., 2012; Kayaniyil et al., 2009).

1.2.3 Education had negative indirect effect on medication adherence through depression and self-efficacy.

This study reveals that education had negative indirect effect on medication adherence through depression and self-efficacy. The result supports the hypothesis because it might be more than two third of the participants had education level lower than higher education (74.1%) (Office of the Civil Service Commission, 2010; National Statistic Office, 2011). Basically like everywhere, Thai education level related to qualification and salary. The participants who had low level of education did not know about how to dealing with the health situation. They also fill low self-esteem, life stress, and stigma when they encountered with myocardial infarction (Cha et al., 2008; Jacob et al., 2002). As a result, the patients exhibited anxiety and linked to depressive symptom (Jacob et al., 2002; Negash and Ehlers, 2013). These results supported previous studied by Negash and Ehlers (2013) studied personal factors influencing patient's adherence to antiretroviral therapy (ART) and found that patient high education enhancing the way to coping with problem and linked to absence depression. Patient did not have depressive symptom more likely to be high level of medication adherence.

According to, Saver et al. (2007) who studied a qualitative study of depression in primary care: misses opportunities for diagnosis and education, the study found that education is a key component of support and facilitating to increase knowledge and reduce depression. Education may help to decrease personal stigma associated with depression. Similarly, Fisher et al. (2001) studied contributors' depression in Latino and European-American patients with type 2 diabetes and found that low level of education was high rate of cause depression and significant negative

associated to depression. Job et al. (2002) studied educational intervention for depression among Asian women in primary care in the United Kingdom and found that patient who had higher education can changing patient perspective and patient understands of illness.

1.3. Social support has a negative direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, negative indirect effect on medication adherence through depression and self-efficacy.

1.3.1 Social support has a negative direct effect on medication adherence

The finding of this study showed that social support has a negative direct effect on medication adherence which this result did not support the hypothesis since most of the participants were elderly people which mean age of 60 years. Additionally, the participants had social support at moderate level ($\bar{x}$ =43.83; SD = 12.39). For the reason that Thailand had an extended family, most of the participants live with family members, it is possible that family members participated in care and supported medication adherence in these patients (Johnson et al., 2010; Office of the permanent Secretary, 2011). This result contrasts other studies in that social support had a positive correlation with medication adherence because they need family member to help them for medication taking (Johnson et al., 2010). Kronish and Ye (2013) studied adherence to cardiovascular medications and found that social support provide powerful for medication adherence in cardiovascular patients. Additionally, social support was shown to have a predictor on antihypertensive medication adherence in urban health-care systems (Grigoryan, Pavlik, and Hyman, 2012).

Similarly, Daley et al. (2012) studied factor associated medication non-adherence in Parkinson's disease. According to the study finding found that social support was important factors helping to manage medication adherence throughout the entirely of the disease process. Additionally, social support was shown to have a predictor on antihypertensive medication adherence in urban health-care systems (Grigoryan et al., 2012). Holt et al. (2012) found that social support has been shown to maintain a strong relationship with medication adherence. Molloy et al. (2008) studied practical support predicts medication adherence and attendance at cardiac rehabilitation following acute coronary syndrome and found that social support was shown to have antihypertensive medication adherence a marked impact on the progression of MI and was positively linked with medication adherence.

1.3.2 Social support has a positive indirect effect on medication adherence through self-efficacy and negative indirect effect on medication adherence through depression and self-efficacy

The result revealed that social support has a positive indirect effect on medication adherence through self-efficacy which is the result support the hypothesis. As the researcher mention above, Thailand had an extended family, most of the participants live with family members, it is possible that family members participated in care and supported medication adherence in these patients (Johnson et al., 2010; Office of the permanent Secretary, 2011). The patients had already family member helping them to manage medication as prescribe such as calling with reminders to taking medication or refill prescription, so they had self-confident to taking medication (Kronish and Ye, 2013). This finding was supported by Diloio et al.

(2009) studied adherence to antiretroviral medication regimen and found that patients who had greater social support tended to have high self-efficacy. The strongly relationship between social support and depression can decrease depressive symptom, which in turn increased medication adherence level. Similarly, Cha et al. (2009) studied mediating of medication adherence-taking self-efficacy and depression symptom on self-report medication adherence in person with HIV. According to the studied finding found that social support improve a person self-confidence and self-esteem. Adequate social support help overcome depressive symptom by diminishing hopelessness, and decrease feeling of guilty and worthlessness resulting from depression and obtain optimal medication adherence level. In contrast, patient lacked of social support resulting increase level of depression and led to low self-efficacy. In addition, patient who has high level of social support found associated with increase self-efficacy and led to medication adherence. At the same time, patient who found depressive symptom tended to be decreased self-efficacy and diminish medication adherence (Dilorio et al., 2009).

2. Condition-related factors

Condition-related factors represent particular illness-related demands faced by the patient. Some strong determinants of adherence are those related to the severity of symptoms, level of disability (physical, psychological, social and vocational), rates of progression and so on. Their impact depends on how they influence patients' risk perception, the importance of following treatment, and the priority placed on adherence. The current study found symptom severity had a negative direct effect on medication adherence. This result did not support the hypothesis that symptom

severity had a negative direct effect on medication adherence. As for depression had negative direct effect on medication adherence and negative effect on medication adherence through self-efficacy. These results support the hypotheses that symptom severity had a positive direct effect on medication adherence and depression had negative direct effect on medication adherence and negative effect on medication adherence through self-efficacy. The explanations for discussion in condition-related factors as follow:

2.1. Symptom severity had a negative direct effect on medication adherence

The result of this study found that symptom severity had a negative direct effect on medication adherence which this result did not support the hypothesis number four. More than half of the participants in this study had symptom severity class I (55.5 %). The Canadian Society Class was used categorize symptom severity of participants (Sangareddi et al., 2004). For class I, angina only during strenuous or prolonged physical activity, so the participants can do any activities without clinical symptoms. This is in contrast to previous studies, where symptom severity was consistently related to medication adherence, and higher severity of symptoms related to poor medication adherence (Wu et al., 2008). Sud et al. (2005) studied adherence to medication with patients after acute coronary syndromes and showed that severity of disease is an important variable associated with medication adherence which meant that patient had high symptom severity tended to high medication adherence level because they were scared of death. Daley et al. (2012) studied adherence to antiretroviral medication regimens and found that patient who has increase symptom

severity revealed medication adherence because more symptom severity can motivate patient to taking medication in order to control clinical condition. On the contrary, If patient poor medication adherence, it will increase symptom severity and linked to fatality.

2.2. Depression had negative direct effect on medication adherence and negative effect on medication adherence through self-efficacy

This study revealed that depression had negative direct effect on medication adherence and negative effect on medication adherence through self-efficacy which support hypothesis number seven. For the reason that the participants might not take medication if they feel hopeless or give up when they know the hazard of the disease or have to restrict some activities. This study, all participants non-exhibited depressive symptom **(**$\bar{x}$=12.49; SD = 7.71), they had high level of medication adherence (Molly et al., 2008; Cohen, 2009). The result is supported by a previous studied by Holt et al. (2012) that found depression had been shown to maintain a strong associated with medication adherence among older adults. Krousel-Wood et al. (2011) studied predictors of decline in medication adherence. According the study finding found that depression was a strongest predictor to decline and associated with poor medication adherence. Similarly, Dilorio et al. (2009) studied adherence to antiretroviral medication regimen and revealed that depression was directly related to medication adherence. Likewise, Cohen (2009) investigated adherence in the context of cardiovascular risk reduction and demonstrated that poor adherence occurs when patients do not take their medication correctly due to depression.

Moreover, Cruess et al. (2012) conducted benefits of adherence to psychotropic medication adherence on depressive symptoms and antiretroviral medication adherence among men and women living with HIV. According to the study finding showed that depression is the one of the strongest predictors of medication adherence and profound negative effect on self-confidence which is depression impacts medication adherence by reducing self-efficacy on medication prescription. Dilorio et al. (2009) demonstrated that self-efficacy was found to have a weak indirect relationship to medication adherence through its association with depression which meant that depression resulting in low self-efficacy to take medication. Similarly to Castillo et al. (2011) studied community-base diabetes empowerment education program for Latino. The results revealed that depressive symptom was significant to perform management of medication adherence which is depression leaded to low self-efficacy to take medication.

3. Therapy-related factors

There are many therapy-related factors that affect adherence. Most notable are those related to the complexity of the medical regimen, duration of treatment, previous treatment failures, frequent changes in treatment, the immediacy of beneficial effects , side-effects, and the availability of medical support to deal with them. These therapy-related factors know as barriers to taking medication. The finding of this study found that barriers had positive direct effect on medication and negative indirect effect on medication adherence through self-efficacy. The result did not support the hypothesis that barriers had negative direct effect on medication and

negative indirect effect on medication adherence through self-efficacy. The explanations for therapy-related factors as follow:

3.1. Barriers had positive direct effect on medication and negative indirect effect on medication adherence through self-efficacy

The results revealed that barriers had positive direct effect on medication and negative indirect effect on medication adherence through self-efficacy. Barriers in this study included poor communication and education at discharge about the importance of medications, complexity of medication regimen, medication costs, adverse side effects, and lack of knowledge about possible adverse effects (Teapaiboon, 2003; Wu et al., 2008). The result did not support the hypothesis number five in that barriers had negative direct effect on medication in this study possibly Thai health care policy guarantees coverage for all citizens, so the participants can get the access to health care service without pay for medication (Coronini-Cronberg, Laohasiriwong, and Gericke, 2007: National Health Security Office, 2013). For the other barriers such as forget the time, number of medication, bring medication when they go outside did not relevant to medication adherence because they belief that if they take medication, it will decrease severity of disease and no chest pain (Cohen, 2009; Wu et al., 2008).

Moreover, in Thailand had advanced practice nurses have roles and responsibilities to take care and manage individual condition for patients. They keep regular contact with their clients, so problems or these barriers can be detected before poor medication adherence occur (Hanucharurnkul, 2007). Furthermore, the patients trust their physician is more likely to medication adherence and patient's perception

that drug regimens can improve adherence and result in clinical improvement (Mishra et al., 2011). These results contrast with previous study by Kronish and Ye (2013) studied adherence to cardiovascular medications and found that barriers is key competent concern medication adherence in cardiovascular patients. Berner et al. (2012) studied an ecological perspective on medication adherence. It found that barriers were factors associated to medication adherence. Additionally, Barriers to medication adherence such as regimen complexcity/ polypharmacy was associated with medication adherence. Patients were 20-40% poor medication adherence with one-daily dose compared to multiple doses (Daley et al., 2012). In addition, Kronish and Ye (2013) revealed that barrier- high drug cost- was major barrier in patient without prescription coverage.

Moreover, Grindley et al. (2008) studied use of protection motivation on theory, affect, and barriers to understand and predict adherence to outpatient rehabilitation. The results revealed that barriers predicted adherence to treatment recommendation. If barriers are not overcome, then the desired behavior- medication adherence- may cease resulting in poor adherence. Barriers can reduce patient self-efficacy that is low self-efficacy was associated to high barriers. Similarly, Aljasem et al. (2001) studied the impact of barriers and self-efficacy on self-care behavior in type 2 diabetes and found that barriers was related to self-efficacy resulting in medication adherence. It can be explained that patients had high barriers bring about low self-efficacy to taking medication. In contrast, if patients have low barriers, it will increase self-efficacy to perform medication adherence. Self- efficacy was found to help people overcome barriers and accomplish medication adherence. Al so, Apter et al. (2003) studied modifiable barriers to adherence to inhaled steroids among adult with

asthma. According to the study finding found that barriers such as less fear of adverse effect and strong beliefs in medication benefit was associated with self-confident to taking medication resulting in greater medication adherence.

4. Patient-related factors

Patient-related factors represent the resources, knowledge, attitudes, beliefs, perceptions and expectations of the patient. Patients' knowledge and beliefs about their illness, motivation to manage it, confidence (self-efficacy) in their ability to engage in illness-management behaviors, and expectations regarding the outcome of treatment and its consequences, interact in ways not yet fully understood. The results of the study found that knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy. The results support the hypotheses that knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy. As for self-efficacy found that self-efficacy had a positive direct effect on medication adherence. The result support the hypothesis that self-efficacy had a positive direct effect on medication adherence. The details of discussion for patient-related factors as follow:

4.1. Knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy, and negative indirect effect on medication adherence through depression and self-efficacy

4.1.1 Knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy

The results of this study revealed that knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy. The results support the hypothesis number six that knowledge had positive direct effect on medication adherence, positive indirect effect on medication adherence through self-efficacy. Since nearly one fourth of participants had higher education (17.8%) which meant that participants had high level of knowledge resulting in better understanding about the disease and treatment adherence and linked to medication adherence (National Statistic Office, 2011; Office of the Civil Service Commission, 2010; Wu et al., 2008).

According to Thai social and cultural background, the advance practice nurse (APN) who is responsibility for prevention and management of chronic illness. They are key health care profession in improving the health and well being of all people. They manages medication adherence by using health assessment of individual, family, and community. So, they early detect and management of this issue such as telephone visits or home visits to evaluate clients and find out the problem if they find the client poor medication adherence including gave them information or knowledge about medication. They took good care for participant (Hanucharurnkul, 2007); thus so patients are more likely to medication adherence.

This study supports other study for knowledge was associated to medication adherence (Daley et al., 2012; Wu et al., 2008). Berben et al. (2012) studied an ecological perspective on medication adherence. The results revealed that knowledge was factor related to medication adherence. Al-Qazaz et al. (2011) studied perception and knowledge of patient with type 2 diabetes in Malaysia about their disease and medication and found that knowledge related to medication adherence, that is, patients higher knowledge had awareness about taking medication can be improved medication adherence. Moreover, Daley et al. (2012) studied factor associated with medication adherence in Parkinson's disease. The result revealed that higher knowledge was associated with medication adherence.

In addition, self-efficacy is a construct central to Social Cognitive Theory, which proposes that behaviors are determined not solely by knowledge. Self-efficacy has also been proposed as a mediating factor between knowledge attainment and health behaviors (Bandura and Adam, 1977; Wolf et al., 2007). Wolf et al. (2007) examined literacy, self-efficacy, and HIV medication adherence. According to that study's findings, patients who were more likely to possess poorer knowledge of their HIV treatment reported lower self-efficacy for taking their medications as prescribed. Low knowledge resulted in low self-efficacy and continuity of poor medication adherence. Daley et al. (2012) studied factor associated with medication adherence in Parkinson's disease and found that higher knowledge afford patient greater capacity to challenge medication adherence that mean patient who has higher knowledge is deeper insight about treatment resulting in patients higher self-confidence to taking medication. Ngamvitroj and Knge (2007) studied effects of self-efficacy, social support, and knowledge on adherence to peak respiratory flow rate (PEFR) self-

monitoring among adults with asthma. According to the study finding found that knowledge was significant related to self-efficacy and linked to PEFR adherence which meant that patients, who had higher knowledge, had a confidence performing and understanding the benefits of PEFR adherence. So, patients were greater adherence to medication.

4.1.2 Knowledge negative indirect effect on medication adherence through depression and self-efficacy

The result of this study showed that knowledge negative indirect effect on medication adherence through depression and self-efficacy. The finding supports the hypothesis number six that knowledge negative indirect effect on medication adherence through depression and self-efficacy. This study found that the participants had a high knowledge, that is, total scores of the knowledge ranged from 0 to 20 points with a mean of 13.47 (SD = 2.09). For the reason of more than one third of participants had high level of education (35.9%) is that patients have high knowledge insight about illness condition and treatment and not know the way to reduce depressive symptoms (National Statistic Office, 2011; Office of the Civil Service Commission, 2010; Saver et al., 2007). This result support previous studied by Gabriel and Violato (2010) conducted knowledge of and attitude towards depression and adherence to treatment. The results revealed that poor knowledge was significant to depression and impact on medication adherence which meant that patients who had depressive symptoms lead to careless about taking medication. Similarly, Cherrington et al. (2006) examined knowledge, attitudes, and beliefs about depression among Latino adults with type 2 diabetes and found that poor knowledge related to

depressive symptom and led to poor medication adherence which meant that patient had high level of knowledge tended to deeper understanding about diabetes and insight with diabetes management- medication adherence.

4.1.2 Self-efficacy had a positive direct effect on medication adherence

The result of this study found that self-efficacy had a positive direct effect on medication adherence. The results support the hypothesis number eight that self-efficacy had a positive direct effect on medication adherence. Since each regional hospital had advance practice nurses to empower the participants to utilize their maximum potential for taking medication. They had educational intervention and home visit after patients discharge from hospital (Hanucharurnkul, 2007). Thus, the participants had confidence in taking medication, even though; they had a lot of work to do or to travel a long distance from home, and beliefs in benefits of medication (Kronish and Ye, 2013; Mishra et al., 2011).

This result supports other studies in that self-efficacy had a positive correlation with medication adherence. Berben et al. (2012) conducted an ecological perspective on medication adherence. The study found that self-efficacy was significant factors related to medication adherence. Similarly, Kronish and Ye (2013) studied adherence to cardiovascular medication and found that patient's confidence and belief in the importance of cardiovascular medication were more likely taking medication. Dilorio et al, (2009) studied adherence to antiretroviral medication regimens. The result revealed that self-efficacy was directly related to medication adherence. Additionally, Cha et al. (2008) conducted mediating role of medication-

taking self-efficacy and depressive symptom on medication adherence and also found that self-efficacy was important factor associated to medication adherence.

Limitations

In the present study have limitations as follow:

1. The study data was conducted based on self-reports which could have caused overestimated or underestimated values.

2. The vast majority of the sample was male and although this is typical of study in Thailand, generalizability of results is limited nonetheless. Specifically, in Thai context when compared to male counterparts, women are more likely to follow-up and adhere to taking medication

3. The instruments to measure these variables were used the first time in Thai context. Testing of psychometric properties within the Thai context is needed for reliability of instruments in further research.

Implications for nursing science

The present study was conducted based on the Multidimentional Adherence Model (MAM) of WHO which was used as a theoretical framework to gather empirical data to conduct a path model for testing the effects of financial status, education, social support, symptom severity, barrier, knowledge, depression, and self-efficacy on medication adherence. The MAM is a broad model that provides the specificity needed for usefulness in research and practice. The current study can be contributed to knowledge development for strengthening of nursing science for caring post-MI patients. The findings support the MAM and empirical literature that

depression, barriers, and self-efficacy to promote medication adherence for post-MI patients. There was no prior study that examined support for relationships between barriers and depression on medication adherence in post-MI patients. Thus, this study has contributed the new knowledge that can explain the influence of each variable in the model on medication adherence in post-MI patients. Furthermore, the findings provide knowledge that offers directions for development of interventions to promote medication adherence in post-MI patients.

Recommendations for future research

Based on the findings of the present study, the following recommendations for future research can be made as follows:

1. A longitudinal study should be conducted to assess the change of financial status, education, social support, symptom severity, barrier, knowledge, depression, and self-efficacy and medication adherence in post-MI patient's overtime so as to provide a more causal explanation regarding medication adherence in post-MI patients and its predictors.

2. Studies should be conducted to replicate the present study in diverse settings and with a larger sample size recruited by means of random sampling to increase generalizability of the findings. Model testing in subgroups of post-MI patients should involve comparisons between men and women, outpatients and inpatients, and curative treatment and palliative treatments, for instance, to increase trustworthiness of the tested model.

3. An intervention study to promote medication adherence in post-MI patients should be developed and tested as well. It should corporate promotion of self-efficacy, and decrease barriers to enhance medication adherence in Post-MI patients.

4. This study tested the instruments to measure these variables in Thai context only one time. Further testing of psychometric properties within the Thai context is needed. These findings will serve as a reference point for interventions to study to promote medication adherence in this population.

5. Future studies are needed with an experimental/quasi experimental design with intervention and control groups that promote self-efficacy, and decrease barriers to show that the two variables are effective in increasing medication adherence in this group in order to enhance medication adherence so as to decrease adverse effects of disease and improve quality of life.

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APPENDICES

APPENDIX A

AF 02-12

The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University
Institute Building 2, 4 Floor, Soi Chulalongkorn 62, Phyat hai Rd., Bangkok 10330, Thailand,
Tel: 0-2218-8147 Fax: 0-2218-8147 E-mail: eccu@chula.ac.th

COA No. 078/2012

Certificate of Approval

Study Title No.027.2/55 : FACTORS INFLUENCING MEDICATION ADHERENCE AMONG POST-MYOCARDIAL IN FARCTION PATIENTS

Principal Investigator : POL.CAPT.RAPIN POLSOOK

Place of Proposed Study/Institution : Faculty of Nursing,
Chulalongkorn University

The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University, Thailand, has approved constituted in accordance with the International Conference on Harmonization – Good Clinical Practice (ICH-GCP) and/or Code of Conduct in Animal Use of NRCT version 2000.

Signature: ..... Signature: .....

(Associate Professor Prida Tasanapradit, M.D.) (Assistant Professor Dr. Nuntaree Chaichanawongsaroj)

Chairman Secretary

Date of Approval : 15 May 2012 Approval Expire date : 14 May 2013

The approval documents including

1) Research proposal
2) Patient/Participant Information Sheet and Informed Consent Form
3) Researcher
4) Questionnaire

Protocol No. 027.2/55
Date of Approval 15 MAY 2012
Approval Expire Date 14 MAY 2013

The approved investigator must comply with the following conditions:

1. *The research/project activities must end on the approval expired date of the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (ECCU). In case the research/project is unable to complete within that date, the project extension can be applied one month prior to the ECCU approval expired date.*
2. *Strictly conduct the research/project activities as written in the proposal.*
3. *Using only the documents that bearing the ECCU's seal of approval with the subjects/volunteers (including subject information sheet, consent form, invitation letter for project/research participation (if available).*
4. *Report to the ECCU for any serious adverse events within 5 working days*
5. *Report to the ECCU for any change of the research/project activities prior to conduct the activities.*
6. *Final report (AF 03-12) and abstract is required for a one year (or less) research/project and report within 30 days after the completion of the research/project. For thesis, abstract is required and report within 30 days after the completion of the research/project.*
7. *Annual progress report is needed for a two- year (or more) research/project and submit the progress report before the expire date of certificate. After the completion of the research/project processes as No. 6.*

แบบสอบถามที่ใช้ในการวิจัย

แบบสอบถามฉบับนี้ ประกอบด้วยแบบสอบถาม 7 ส่วน คือ ข้อมูลส่วนบุคคล แบบสอบถามแรงสนับสนุนทางสังคม แบบสอบถามภาวะซึมเศร้า แบบสอบถามอุปสรรคต่อความร่วมมือในการรับทานยา แบบสอบถามความรู้เรื่องโรคหลอดเลือดหัวใจ แบบสอบถามการรับรู้สมรรถนะแห่งตนในการรับประทานยา และแบบสอบความร่วมมือในการรับประทานยา

ส่วนที่ 1 แบบสอบถามข้อมูลส่วนบุคคล

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 8 ข้อ โปรดตอบคำถามต่อไปนี้ โดยให้ท่านเติมคำตอบหรือทำเครื่องหมาย (✓) ลงในช่องที่ตรงกับตัวของท่านตามความเป็นจริง

1. เพศ

( ) ชาย ( ) หญิง

2. อายุ .....ปี

3. สถานภาพสมรส

( ) โสด ( ) หม้าย ( ) แยก

( ) คู่ ( ) หย่า

4. ระดับการศึกษา

( ) ไม่ได้ศึกษา ( ) อนุปริญญา

( ) ประถมศึกษา ( ) ปริญญาตรี

( ) มัธยมศึกษาตอนต้น ( ) ปริญญาโท

( ) มัธยมศึกษาตอนปลาย ( ) อื่นๆ (ระบุ).....

5. รายได้ของผู้ป่วยต่อเดือน

( ) ไม่มีรายได้ ( ) 5,001-10,000 บาท

( ) น้อยกว่า 2,000 บาท ( ) 10,001-15,000 บาท

( ) 2,001-5,000 บาท ( ) 15,001 - 20,000 บาท

( ) อื่นๆ (ระบุ).....

6. อาชีพ

( ) ไม่ได้ทำงาน ( ) พนักงานมหาวิทยาลัย

( ) รับจ้าง ( ) รัฐวิสาหกิจ

( ) ลูกจ้าง ( ) ธุรกิจส่วนตัว

( ) พนักงานของรัฐ ( ) ข้าราชการ

( ) ข้าราชการบำนาญ

7. สิทธิในการรักษา

( ) ประกันสุขภาพถ้วนหน้า ( ) จ่ายค่ารักษาพยาบาลเอง

( ) ประ กันสังคม ( ) สวัสดิการข้าราชการ

8. โรคประจำตัว (โปรดระบุ)..... .....

9. ยาที่รับประทานเป็นประจำ..... .....

รับประทานยาวันละกี่เม็ด..... .....

10. ข้อมูลส่วนบุคคลในด้านการรักษา เรื่องระดับความรุนแรงของโรคท่านมีอาการเจ็บแน่นหน้าอกเมื่อใด

( ) อาการเจ็บหน้าอกเกิดเฉพาะเมื่อออกกำลังกายหนักๆ หรือออกกำลังกายเป็นเวลานาน

( ) อาการเจ็บหน้าอกเกิดเมื่อออกแรงปานกลาง เช่น เดินขึ้นบันไดมากกว่า 1 ชั้น ด้วยความเร็วปกติหรือเกิดขณะมีความเครียดทางอารมณ์

( ) อาการเจ็บหน้าอกเกิดแม้เพียงทำกิจวัตรประจำวันที่เบาๆ เช่นเดินขึ้นบันไดเพียง 1 ชั้น เท่านั้น หรือเดินได้ระยะทาง น้อยกว่า 100 เมตร

( ) อาการเจ็บหน้าอกเกิดขึ้นแม้ขณะพัก ไม่สามารถทำกิจกรรมเล็กๆ น้อยๆ ได้

ส่วนที่ 2 แบบสอบถามแรงสนับสนุนทางสังคม

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 12 ข้อ โปรดพิจารณาข้อใดตรงกับความรู้สึกของท่านมากที่สุดแล้วทำเครื่องหมาย (√) ลงในข้อความที่ตรงกับความรู้สึกของท่าน

ข้อความ	ไม่มเลย	มีบ้างเล็กน้อย	มีบางครั้ง	มีเกือบตลอดเวลา	มีตลอดเวลา
1.ฉันมีคนที่พร้อมที่จะดูแลฉันเมื่ออยู่ที่บ้าน					
2. ฉันมีคนที่พร้อมจะพูดคุยด้วยเมื่อต้องการ					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.....					
11.....					
12. ฉันมีการติดต่อกับเจ้าหน้าที่ทางด้านสุขภาพที่ฉันรู้สึกไว้วางใจได้เมื่อฉันต้องการ					

ส่วนที่ 3 แบบสอบถามภาวะซึมเศร้า

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 20 ข้อ โปรดพิจารณาว่าข้อใดตรงกับความรู้สึกของท่านมากที่สุดในช่วงเวลา 1สัปดาห์ที่ผ่านมา แล้วทำเครื่องหมาย (√) ลงในช่องว่างของแต่ละกิจกรรมที่ตรงกับความรู้สึกของท่านมากที่สุด

ข้อความ	ไม่เลย < 1วัน ต่อสัปดาห์	นานๆครั้ง 1-2 วัน ต่อสัปดาห์	ค่อนข้างบ่อย 3-4วัน ต่อสัปดาห์	บ่อยครั้ง 5-7 วัน ต่อสัปดาห์
1. ฉันรู้สึกหงุดหงิดง่าย				
2. ฉันรู้สึกเบื่ออาหาร				
3.....				
4.				
5.....				
6…….				
7.				
8.				
9.....				
10.....				
11…….				
12…….				
13.....				
14…….				
15……..				
16…….				
17……..				
18……..				
19.ฉันรู้สึกว่าคนรอบข้างไม่ชอบฉัน				
20. ฉันรู้สึกท้อถอยในชีวิต				

ส่วนที่ 4 แบบสอบถามอุปสรรคต่อความร่วมมือในการรับประทานยา

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 11 ข้อ โปรดตอบคำถามต่อไปนี้ โดยให้ท่านทำเครื่องหมาย O ลงในหมายเลขที่ตรงกับความคิดเห็นของท่านเกี่ยวกับอุปสรรคในการรับประทานยามากที่สุดตามความเป็นจริง

1. การลืมเวลาในการรับประทานยา

ไม่เป็นอุปสรรค เป็นอุปสรรค

1 2 3 4 5 6 7 8 9 10

2. ความสับสนเกี่ยวกับเวลาในการรับประทานยา

ไม่เป็นอุปสรรค เป็นอุปสรรค

1 2 3 4 5 6 7 8 9 10

3.....

ไม่เป็นอุปสรรค เป็นอุปสรรค

1 2 3 4 5 6 7 8 9 10

4.....

5…….

6…….

7……..

10. ความถี่ของตารางเวลาในการรับประทานยาของฉัน

ไม่เป็นอุปสรรค เป็นอุปสรรค

1 2 3 4 5 6 7 8 9 10

11. การไม่ได้รับความช่วยเหลือจากครอบครัวหรือใครบางคนในการเตือนให้ฉันรับประทานยา

ไม่เป็นอุปสรรค เป็นอุปสรรค

1 2 3 4 5 6 7 8 9 10

ส่วนที่ 5 **แบบสอบถามความรู้เรื่องโรคหลอดเลือดหัวใจ**

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 20 ข้อ โปรดวงกลมข้อความที่ถูก หรือ ผิด ลงในช่องแต่ละข้อด้านล่างที่เกี่ยวกับความรู้เรื่องโรคหลอดเลือดหัวใจ

1. ผู้ที่ออกกำลังกายอย่างสม่ำเสมอสามารถลดความเสี่ยงของการเกิดโรคหัวใจได้	**ถูก**	**ผิด**
2.....	**....**	**.....**
3.....		
4.....	**....**	**.....**
5.....	**....**	**.....**
6.....	**....**	**.....**
7.....	**....**	**.....**
8.....	**....**	**.....**
9.....	**....**	**.....**
10.....	**....**	**.....**
19.....	**....**	**.....**
20. การผ่าตัดทางเบี่ยงหัวใจไม่สามารถเพิ่มการไหลเวียนของเลือดผ่านหลอดเลือดแดงที่อุดตัน	**ถูก**	**ผิด**

ส่วนที่ 6 แบบสอบถามการรับรู้สมรรถนะแห่งตน

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 13 ข้อ โปรดทำเครื่องหมาย (√)ลงในข้อความที่ตรงกับความเชื่อมั่นของท่านว่าท่านสามารถรับประทานยาได้ถูกต้องเพียงใด

ข้อความ	มีความมั่นใจมาก	ค่อนข้างมีความมั่นใจ	ไม่มีมีความมั่นใจ
1. ฉันมีความมั่นใจเมื่อฉันรับประทานยาที่แตกต่างกันหลายชนิดในแต่ละวัน			
2.....			
3.....			
4.....			
5.....			
6.....			
7.....			
8.....			
9.....			
10.....			
11.....			
12.....			
13. ฉันมีความมั่นใจในการรับประทานยาถึงแม้ว่าแพทย์เปลี่ยนยาของฉัน			

ส่วนที่ 7 แบบสอบถามความร่วมมือในการรับประทานยา

คำชี้แจง แบบสอบถามนี้ประกอบด้วยคำถาม จำนวน 5 ข้อ โปรดทำเครื่องหมาย (√) ลงใน ข้อความที่ เกี่ยวข้องกับการรับประทานยาโรคหัวใจของท่านมากที่สุด

ข้อความ	ไม่เคย	บางครั้ง	บ่อยครั้ง	ประจำ
1. ฉันลืมรับประทานยาของฉัน				
2.....				
3.....				
4…….				
5. ในเดือนที่ผ่านมา ฉัน ได้งดยาบางมื้อ				

APPENDIX B

APPENDIX C

Reliability Statistics

Barriers

Cronbach's Alpha	N of Items
.866	11

Item Statistics

	Mean	Std. Deviation	N
barr1	2.5333	2.51524	30
barr2	2.4333	2.58221	30
barr3	2.3333	2.24888	30
barr4	2.0000	2.54613	30
barr5	3.3667	3.01128	30
barr6	4.6000	3.71947	30
barr7	4.4000	3.50959	30
barr8	3.2333	3.44096	30
barr9	2.2333	2.47307	30
barr10	2.0667	2.30342	30
barr11	2.0000	2.03419	30

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
barr1	28.6667	341.885	.653	.848
barr2	28.7667	338.116	.675	.847
barr3	28.8667	362.602	.482	.860
barr4	29.2000	371.752	.313	.870
barr5	27.8333	344.351	.497	.859
barr6	26.6000	313.834	.617	.852
barr7	26.8000	334.234	.486	.862
barr8	27.9667	331.620	.522	.859
barr9	28.9667	345.275	.626	.850
barr10	29.1333	338.464	.769	.842
barr11	29.2000	345.338	.786	.844

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
31.2000	408.924	20.22187	11

Reliability Statistics

Depression

Cronbach's Alpha	N of Items
.725	20

Item Statistics

	Mean	Std. Deviation	N
depr1	.8667	.68145	30
depr2	.4667	.62881	30
depr3	.3667	.61495	30
depr4	1.7333	1.14269	30
depr5	.3667	.61495	30
depr6	.2667	.52083	30
depr7	.2333	.43018	30
depr8	1.8667	1.10589	30
depr9	.1000	.30513	30
depr10	.2333	.43018	30
depr11	.8333	.83391	30
depr12	1.2333	1.19434	30
depr13	.7667	1.07265	30
depr14	.2333	.62606	30
depr15	.4000	.85501	30
depr16	1.4667	1.16658	30
depr17	.1333	.57135	30
depr18	.3000	.65126	30
depr19	.1667	.37905	30
derp20	.3333	.60648	30

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
depr1	11.5000	35.569	.263	.716
depr2	11.9000	36.921	.112	.727
depr3	12.0000	34.552	.448	.704
depr4	10.6333	33.757	.234	.724
depr5	12.0000	35.379	.330	.712
depr6	12.1000	35.886	.323	.714
depr7	12.1333	36.051	.375	.713
depr8	10.5000	31.569	.433	.699
depr9	12.2667	37.237	.226	.721
depr10	12.1333	35.499	.485	.707
depr11	11.5333	35.637	.185	.724
depr12	11.1333	32.671	.298	.717
depr13	11.6000	33.076	.320	.713
depr14	12.1333	37.775	.001	.734
depr15	11.9667	34.585	.284	.715
depr16	10.9000	31.128	.437	.698
depr17	12.2333	36.047	.262	.717
depr18	12.0667	34.340	.446	.703
depr19	12.2000	36.993	.224	.720
derp20	12.0333	34.309	.492	.701

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
12.3667	38.171	6.17829	20

Reliability Statistics

Medication adherence

Cronbach's Alpha	N of Items
.647	5

Item Statistics

	Mean	Std. Deviation	N
ma1	3.2333	.50401	30
ma2	3.9000	.30513	30
ma3	3.9333	.25371	30
ma4	3.6667	.54667	30
ma5	3.8333	.37905	30

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ma1	15.3333	.989	.528	.524
ma2	14.6667	1.333	.489	.572
ma3	14.6333	1.689	.028	.710
ma4	14.9000	.921	.526	.529
ma5	14.7333	1.237	.464	.568

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.5667	1.771	1.33089	5

- **วิธีของคาร์เวอร์** (Carver Method)

เป็นวิธีการหาความเชื่อมั่นแบบสอดคล้องในการตัดสินใจ โดยการทดสอบกับผู้เรียนกลุ่มเดียวกัน จำนวน 2 ครั้ง หรือใช้แบบทดสอบคู่ขนานจำนวน 2 ฉบับแล้วทดสอบเพียงครั้งเดียว

สูตรการหาค่าความเชื่อมั่นของคาร์เวอร์

$$r = \frac{a+c}{N}$$

เมื่อ

r = ความเชื่อมั่นของแบบทดสอบ
a = จำนวนผู้เรียนที่สอบผ่านทั้งฉบับที่ 1 และฉบับที่ 2
b = จำนวนผู้เรียนที่สอบไม่ผ่านทั้งฉบับที่ 1 และฉบับที่ 2
N = จำนวนผู้เรียนทั้งหมด

TEST1 * TEST2 Crosstabulation

Count

		TEST2		Total
		1.00 (ไม่ผ่าน)	2.00 (ผ่าน)	
TEST1	1.00 (ไม่ผ่าน)	2	4	6
	2.00 (ผ่าน)	0	24	24
	Total	2	28	30

หมายเหตุ เกณฑ์ผ่าน คือ ร้อยละ 50

$$r_{cc} = \frac{24 + 2}{30} = \frac{26}{30} = 0.8667$$

Reliability Statistics

Self-efficacy

Cronbach's Alpha	N of Items
.909	13

Item Statistics

	Mean	Std. Deviation	N
se1	2.2667	.82768	30
se2	2.4000	.72397	30
se3	2.4000	.62146	30
se4	2.4667	.57135	30
se5	2.1333	.62881	30
se6	2.6667	.47946	30
se7	2.5333	.57135	30
se8	2.4667	.50742	30
se9	2.0333	.76489	30
se10	2.0000	.83045	30
se11	2.3333	.71116	30
se12	2.4000	.62146	30
se13	2.5667	.50401	30

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
30.6667	34.437	5.86829	13

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
se1	28.4000	27.834	.678	.900
se2	28.2667	28.271	.733	.897
se3	28.2667	29.651	.650	.901
se4	28.2000	30.303	.605	.903
se5	28.5333	29.775	.622	.902
se6	28.0000	30.759	.648	.902
se7	28.1333	29.913	.672	.900
se8	28.2000	30.924	.577	.904
se9	28.6333	29.344	.544	.906
se10	28.6667	28.299	.617	.903
se11	28.3333	28.506	.714	.898
se12	28.2667	29.857	.617	.902
se13	28.1000	30.921	.582	.904

Reliability Statistics

Social support

Cronbach's Alpha	N of Items
.920	12

Item Statistics

	Mean	Std. Deviation	N
ss1	4.0333	1.03335	30
ss2	4.1000	.80301	30
ss3	4.5000	.62972	30
ss4	4.4000	.89443	30
ss5	4.3333	.88409	30
ss6	3.9667	1.12903	30
ss7	3.9000	1.29588	30
ss8	4.0000	1.08278	30
ss9	3.9667	1.15917	30
ss10	3.3000	1.31700	30
ss11	4.1667	1.11675	30
ss12	3.9000	1.02889	30

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
48.5667	84.116	9.17148	12

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ss1	44.5333	73.982	.510	.920
ss2	44.4667	75.223	.592	.916
ss3	44.0667	77.099	.599	.917
ss4	44.1667	72.833	.687	.913
ss5	44.2333	72.737	.703	.912
ss6	44.6000	69.007	.738	.910
ss7	44.6667	65.057	.831	.905
ss8	44.5667	66.875	.907	.902
ss9	44.6000	68.317	.754	.909
ss10	45.2667	69.995	.562	.920
ss11	44.4000	73.076	.513	.920
ss12	44.6667	70.161	.748	.910

Test- retest

Correlations

barriers

		Totalbarr	Totalbarr2w
Totalbarr	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	30	30
Totalbarr2w	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

Self-efficacy

		TotalSE	TotalSE2W
TotalSE	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	30	30
TotalSE2W	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

Social support

		TOTALSS2W	TotalSS
TOTALSS2W	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	30	30
TotalSS	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

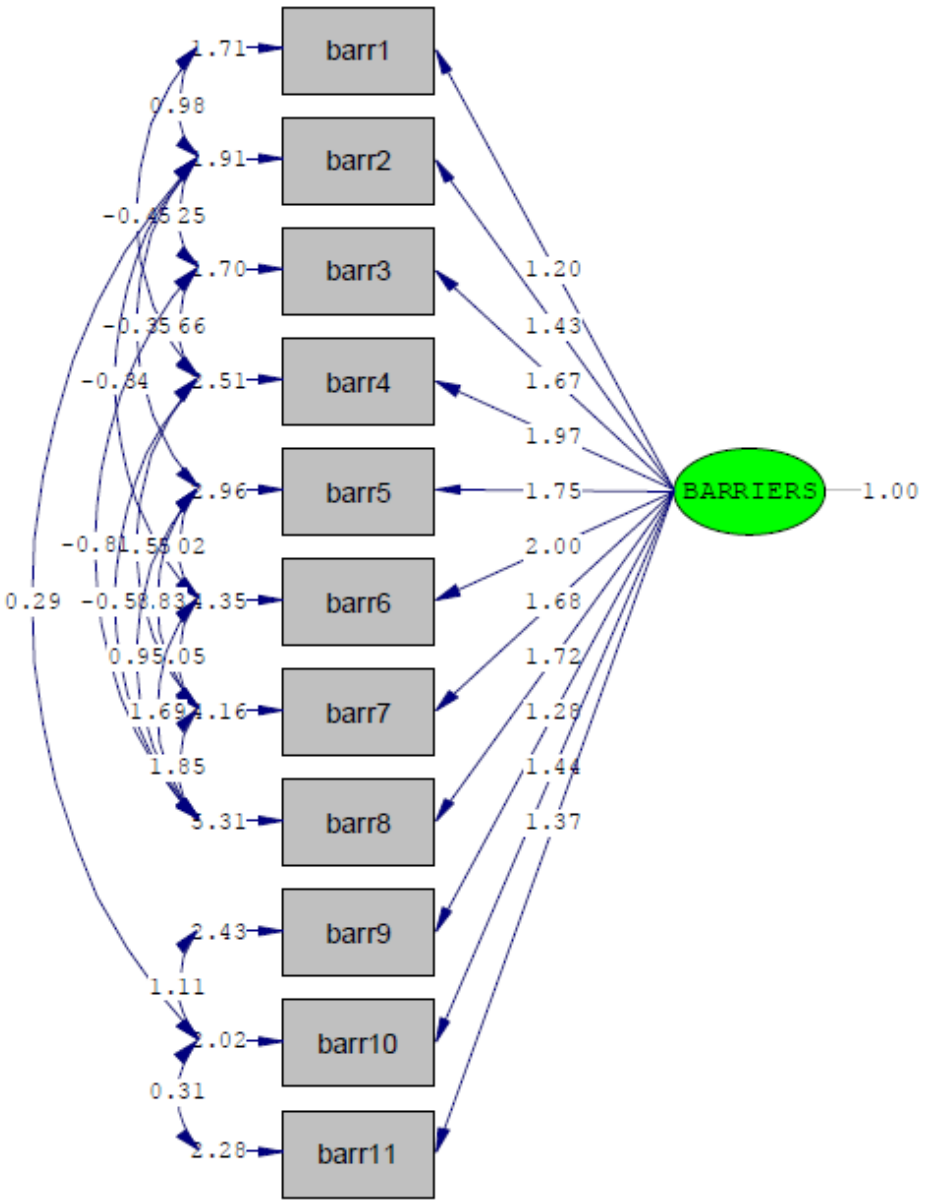
Correlations

Medication adherence

		TotalMA	TotalMA2W
TotalMA	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	30	30
TotalMA2W	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Measurement Model of barriers



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DATE:  4/12/2013
                                    TIME: 17:31

                                L I S R E L  8.72

                                      BY

                           Karl G. J”reskog & Dag S”rbom


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 LK
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LX(9,1)
 FR LX(10,1) LX(11,1)
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1,10)TD(6,5)TD(7,5)TD(8,4)TD(8,7)TD(8,6)TD(8,5)TD(4,1)TD(3,2)
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 TI CFA

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                           Number of Y - Variables    0
                           Number of X - Variables   11
                           Number of ETA - Variables  0
                           Number of KSI - Variables  1
                           Number of Observations   348
```

Covariance Matrix

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	3.149					
barr2	2.664	3.945				
barr3	2.056	2.694	4.493			
barr4	1.948	2.916	3.950	6.393		
barr5	2.140	2.052	3.008	3.485	6.068	
barr6	2.652	2.456	3.360	3.621	5.577	8.409
barr7	2.197	2.299	2.799	2.561	4.806	6.503
barr8	2.066	2.115	2.012	2.661	3.975	5.195
barr9	1.529	1.871	2.076	2.563	1.933	2.370
barr10	1.628	2.398	2.392	2.973	2.166	2.639
barr11	1.516	1.992	2.115	2.567	2.560	2.969

Covariance Matrix

	barr7	barr8	barr9	barr10	barr11
barr7	7.044				
barr8	4.751	8.246			
barr9	2.096	2.266	4.078		
barr10	2.369	2.546	2.989	4.137	
barr11	2.404	2.660	1.959	2.427	4.163

Parameter Specifications

LAMBDA-X

	BARRIERS
barr1	1
barr2	2
barr3	3
barr4	4
barr5	5
barr6	6
barr7	7
barr8	8
barr9	9
barr10	10
barr11	11

THETA-DELTA

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	12					
barr2	13	14				
barr3	0	15	16			
barr4	17	0	18	19		
barr5	0	20	0	0	21	
barr6	0	22	0	0	23	24
barr7	0	0	0	25	26	27
barr8	0	0	29	30	31	32
barr9	0	0	0	0	0	0
barr10	0	36	0	0	0	0
barr11	0	0	0	0	0	0

THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	28				
barr8	33	34			
barr9	0	0	35		
barr10	0	0	37	38	
barr11	0	0	0	39	40

Number of Iterations = 39

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	BARRIERS
barr1	1.201
	(0.090)
	13.372
barr2	1.426
	(0.099)
	14.474
barr3	1.665
	(0.102)
	16.324
barr4	1.967
	(0.122)
	16.099
barr5	1.748
	(0.122)
	14.389
barr6	1.996
	(0.144)
	13.812
barr7	1.680
	(0.137)
	12.240
barr8	1.716
	(0.158)
	10.873
barr9	1.282
	(0.103)
	12.506
barr10	1.444
	(0.099)
	14.515
barr11	1.371
	(0.102)
	13.447

PHI

	BARRIERS
	1.000

THETA-DELTA

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	1.714					
	(0.152)					
	11.309					
barr2	0.980	1.914				
	(0.131)	(0.171)				
	7.499	11.201				
barr3	- -	0.247	1.700			
		(0.093)	(0.181)			
		2.662	9.377			

barr4	-0.448	- -	0.656	2.507		
	(0.105)		(0.169)	(0.260)		
	-4.288		3.880	9.649		
barr5	- -	-0.351	- -	- -	2.965	
		(0.095)			(0.269)	
		-3.703			11.018	
barr6	- -	-0.342	- -	- -	2.024	4.347
		(0.091)			(0.270)	(0.387)
		-3.772			7.492	11.237
barr7	- -	- -	- -	-0.549	1.830	3.046
				(0.126)	(0.262)	(0.339)
				-4.348	6.985	8.993
barr8	- -	- -	-0.807	-0.577	0.947	1.689
			(0.184)	(0.231)	(0.287)	(0.352)
			-4.380	-2.493	3.303	4.799
barr9	- -	- -	- -	- -	- -	- -
barr10	- -	0.293	- -	- -	- -	- -
		(0.078)				
		3.763				
barr11	- -	- -	- -	- -	- -	- -

THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	4.158				
	(0.366)				
	11.363				
barr8	1.851	5.306			
	(0.338)	(0.479)			
	5.476	11.080			
barr9	- -	- -	2.433		
			(0.204)		
			11.934		
barr10	- -	- -	1.113	2.018	
			(0.148)	(0.175)	
			7.542	11.545	
barr11	- -	- -	- -	0.311	2.282
				(0.111)	(0.196)
				2.812	11.646

Squared Multiple Correlations for X - Variables

barr1	barr2	barr3	barr4	barr5	barr6
0.457	0.515	0.620	0.607	0.508	0.478

Squared Multiple Correlations for X - Variables

barr7	barr8	barr9	barr10	barr11
0.404	0.357	0.403	0.508	0.452

Goodness of Fit Statistics

Degrees of Freedom = 26
Minimum Fit Function Chi-Square = 49.573 (P = 0.00353)
Normal Theory Weighted Least Squares Chi-Square = 46.973 (P = 0.00709)
Estimated Non-centrality Parameter (NCP) = 20.973
90 Percent Confidence Interval for NCP = (5.599 ; 44.173)

Minimum Fit Function Value = 0.143
Population Discrepancy Function Value (F0) = 0.0604
90 Percent Confidence Interval for F0 = (0.0161 ; 0.127)
Root Mean Square Error of Approximation (RMSEA) = 0.0482
90 Percent Confidence Interval for RMSEA = (0.0249 ; 0.0700)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.524

Expected Cross-Validation Index (ECVI) = 0.366
90 Percent Confidence Interval for ECVI = (0.322 ; 0.433)
ECVI for Saturated Model = 0.380
ECVI for Independence Model = 15.157

Chi-Square for Independence Model with 55 Degrees of Freedom = 5237.480
Independence AIC = 5259.480
Model AIC = 126.973
Saturated AIC = 132.000
Independence CAIC = 5312.854
Model CAIC = 321.061
Saturated CAIC = 452.245

Normed Fit Index (NFI) = 0.991
Non-Normed Fit Index (NNFI) = 0.990
Parsimony Normed Fit Index (PNFI) = 0.468
Comparative Fit Index (CFI) = 0.995
Incremental Fit Index (IFI) = 0.995
Relative Fit Index (RFI) = 0.980

Critical N (CN) = 320.481

Root Mean Square Residual (RMR) = 0.131
Standardized RMR = 0.0248
Goodness of Fit Index (GFI) = 0.976
Adjusted Goodness of Fit Index (AGFI) = 0.939
Parsimony Goodness of Fit Index (PGFI) = 0.384

Fitted Covariance Matrix

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	3.156					
barr2	2.692	3.947				
barr3	1.999	2.621	4.473			
barr4	1.913	2.805	3.931	6.376		
barr5	2.099	2.142	2.911	3.439	6.021	
barr6	2.396	2.504	3.323	3.925	5.513	8.329
barr7	2.017	2.395	2.797	2.755	4.767	6.398
barr8	2.061	2.447	2.051	2.799	3.948	5.114
barr9	1.540	1.829	2.136	2.522	2.242	2.559
barr10	1.733	2.351	2.404	2.840	2.524	2.881
barr11	1.647	1.956	2.284	2.698	2.398	2.737

Fitted Covariance Matrix

	barr7	barr8	barr9	barr10	barr11
barr7	6.980				
barr8	4.734	8.252			
barr9	2.154	2.201	4.078		
barr10	2.425	2.478	2.964	4.102	
barr11	2.304	2.354	1.759	2.291	4.163

Fitted Residuals

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	-0.007					
barr2	-0.028	-0.002				
barr3	0.057	0.073	0.020			
barr4	0.034	0.112	0.019	0.017		
barr5	0.041	-0.090	0.097	0.046	0.047	
barr6	0.257	-0.047	0.036	-0.304	0.064	0.080
barr7	0.180	-0.096	0.001	-0.194	0.039	0.106
barr8	0.005	-0.333	-0.040	-0.138	0.027	0.080
barr9	-0.011	0.042	-0.059	0.041	-0.309	-0.190
barr10	-0.106	0.047	-0.012	0.133	-0.358	-0.242
barr11	-0.131	0.037	-0.168	-0.130	0.162	0.233

Fitted Residuals

	barr7	barr8	barr9	barr10	barr11
barr7	0.064				
barr8	0.017	-0.006			
barr9	-0.058	0.064	0.000		
barr10	-0.056	0.068	0.024	0.034	
barr11	0.100	0.306	0.200	0.135	0.000

Summary Statistics for Fitted Residuals

Smallest Fitted Residual = -0.358
Median Fitted Residual = 0.022
Largest Fitted Residual = 0.306

Stemleaf Plot

```
- 3|6310
- 2|4
- 1|99743310
- 0|966654311110000
  0|1222223334444445566667788
  1|00113468
  2|036
  3|1
```

Standardized Residuals

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	-0.456					
barr2	-0.890	-0.053				
barr3	0.860	1.533	1.934			
barr4	0.760	1.353	0.548	0.564		
barr5	0.423	-1.288	1.169	0.437	1.822	
barr6	2.143	-0.479	0.353	-2.334	1.877	1.909
barr7	1.514	-0.798	0.011	-1.989	1.007	2.511
barr8	0.040	-2.594	-0.781	-1.983	0.565	1.491
barr9	-0.119	0.440	-0.700	0.390	-2.545	-1.273
barr10	-1.324	0.793	-0.177	1.513	-3.456	-1.898
barr11	-1.475	0.407	-2.128	-1.323	1.413	1.652

Standardized Residuals

	barr7	barr8	barr9	barr10	barr11
barr7	1.495				
barr8	0.339	-0.140			
barr9	-0.394	0.398	- -		
barr10	-0.447	0.505	1.052	1.707	
barr11	0.716	2.021	1.825	2.613	- -

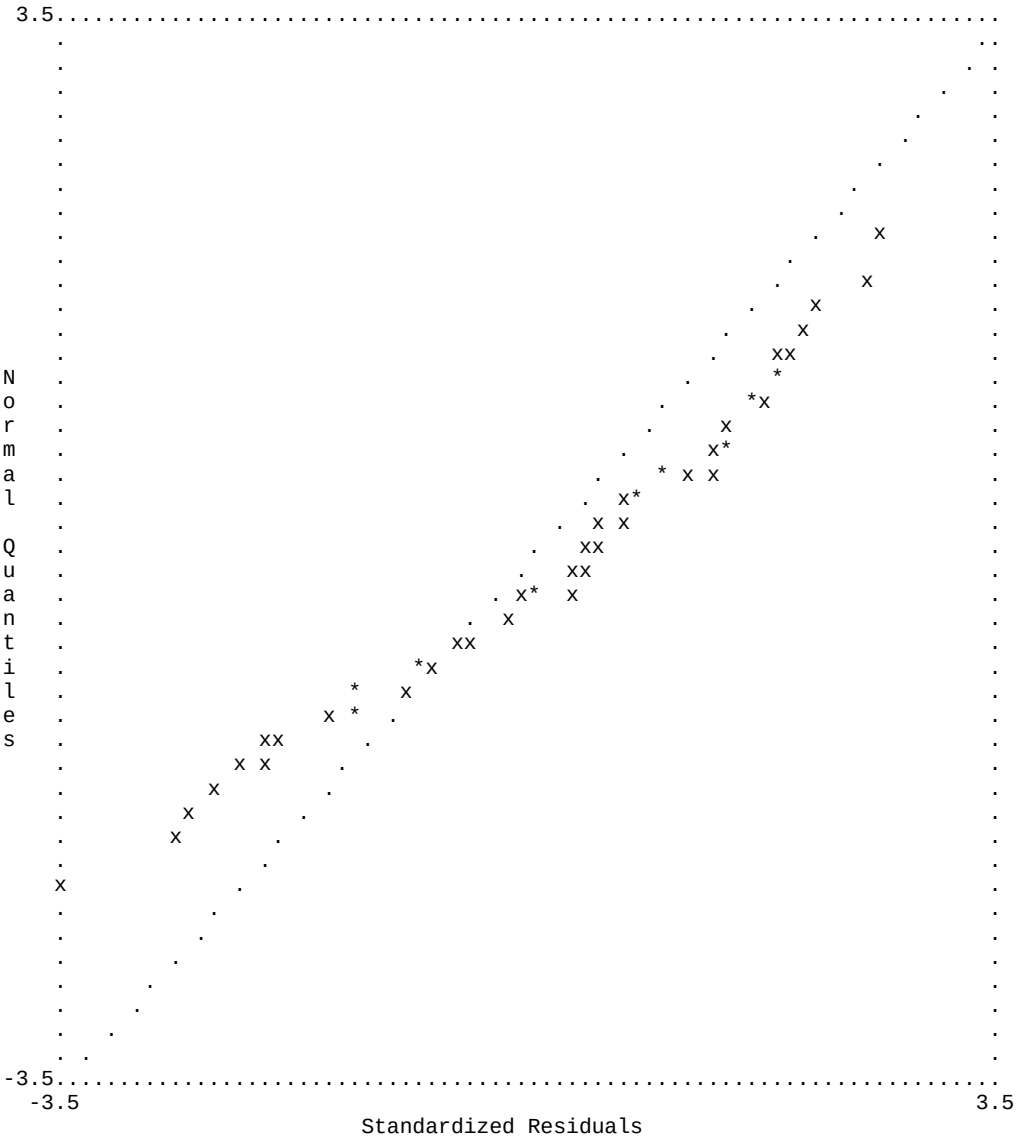
Summary Statistics for Standardized Residuals
Smallest Standardized Residual = -3.456
Median Standardized Residual = 0.403
Largest Standardized Residual = 2.613

Stemleaf Plot

```
- 3|5
- 2|653100
- 1|953333
- 0|9887554421110000
  0|3444444455667889
  1|01244555557788999
  2|0156
```

Largest Negative Standardized Residuals
Residual for barr8 and barr2 -2.594
Residual for barr10 and barr5 -3.456
Largest Positive Standardized Residuals
Residual for barr11 and barr10 2.613

Qplot of Standardized Residuals



Modification Indices and Expected Change
 No Non-Zero Modification Indices for LAMBDA-X
 No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	- -					
barr2	- -	- -				
barr3	0.354	- -	- -			
barr4	- -	0.208	- -	- -		
barr5	0.355	- -	0.324	2.455	- -	
barr6	1.450	- -	0.563	4.700	- -	- -
barr7	0.303	0.339	0.222	- -	- -	- -
barr8	0.532	4.695	- -	- -	- -	- -
barr9	0.206	0.022	0.367	0.001	0.699	0.000
barr10	0.531	- -	0.008	2.676	4.245	1.607
barr11	6.930	5.806	1.758	3.826	1.973	3.314

Modification Indices for THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	- -				
barr8	- -	- -			
barr9	0.019	0.001	- -		
barr10	2.660	0.966	- -	- -	
barr11	3.494	0.513	3.332	- -	- -

Expected Change for THETA-DELTA

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	- -					
barr2	- -	- -				
barr3	0.074	- -	- -			
barr4	- -	0.079	- -	- -		
barr5	-0.067	- -	0.059	0.211	- -	
barr6	0.130	- -	0.079	-0.344	- -	- -
barr7	0.050	-0.071	-0.056	- -	- -	- -
barr8	0.097	-0.306	- -	- -	- -	- -
barr9	0.040	-0.016	-0.057	0.003	-0.087	0.002
barr10	-0.072	- -	0.008	0.177	-0.196	-0.115
barr11	-0.261	0.257	-0.150	-0.277	0.170	0.211

Expected Change for THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	- -				
barr8	- -	- -			
barr9	0.013	0.004	- -		
barr10	0.143	0.139	- -	- -	
barr11	-0.213	0.139	0.266	- -	- -

Completely Standardized Expected Change for THETA-DELTA

	barr1	barr2	barr3	barr4	barr5	barr6
barr1	- -					
barr2	- -	- -				
barr3	0.020	- -	- -			
barr4	- -	0.016	- -	- -		
barr5	-0.015	- -	0.011	0.034	- -	
barr6	0.025	- -	0.013	-0.047	- -	- -
barr7	0.011	-0.014	-0.010	- -	- -	- -
barr8	0.019	-0.054	- -	- -	- -	- -
barr9	0.011	-0.004	-0.013	0.001	-0.017	0.000
barr10	-0.020	- -	0.002	0.035	-0.039	-0.020
barr11	-0.072	0.063	-0.035	-0.054	0.034	0.036

Completely Standardized Expected Change for THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	- -				
barr8	- -	- -			
barr9	0.002	0.001	- -		
barr10	0.027	0.024	- -	- -	
barr11	-0.039	0.024	0.065	- -	- -

Maximum Modification Index is 6.93 for Element (11, 1) of THETA-DELTA

TI CFA

Factor Scores Regressions

KSI

	barr1	barr2	barr3	barr4	barr5	barr6
BARRIERS	0.088	0.030	0.093	0.095	0.043	0.007

KSI

	barr7	barr8	barr9	barr10	barr11
BARRIERS	0.014	0.047	0.039	0.046	0.062

Standardized Solution

LAMBDA-X

	BARRIERS
barr1	1.201
barr2	1.426
barr3	1.665
barr4	1.967
barr5	1.748
barr6	1.996
barr7	1.680
barr8	1.716
barr9	1.282
barr10	1.444
barr11	1.371

PHI

BARRIERS
1.000

TI CFA

Completely Standardized Solution

LAMBDA-X

	BARRIERS
barr1	0.676
barr2	0.718
barr3	0.787
barr4	0.779
barr5	0.712
barr6	0.691
barr7	0.636
barr8	0.597
barr9	0.635
barr10	0.713
barr11	0.672

PHI

	BARRIERS
	1.000

THETA-DELTA

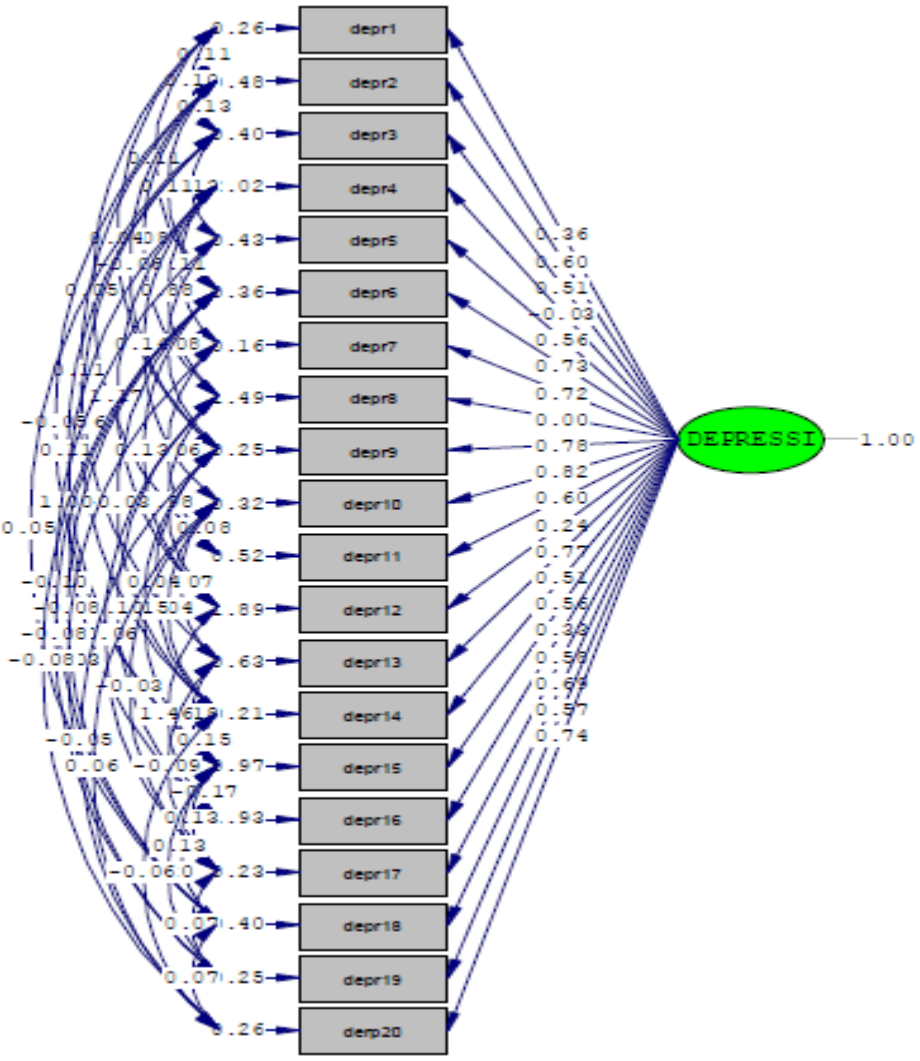
	barr1	barr2	barr3	barr4	barr5	barr6
barr1	0.543					
barr2	0.278	0.485				
barr3	- -	0.059	0.380			
barr4	-0.100	- -	0.123	0.393		
barr5	- -	-0.072	- -	- -	0.492	
barr6	- -	-0.060	- -	- -	0.286	0.522
barr7	- -	- -	- -	-0.082	0.282	0.399
barr8	- -	- -	-0.133	-0.080	0.134	0.204
barr9	- -	- -	- -	- -	- -	- -
barr10	- -	0.073	- -	- -	- -	- -
barr11	- -	- -	- -	- -	- -	- -

THETA-DELTA

	barr7	barr8	barr9	barr10	barr11
barr7	0.596				
barr8	0.244	0.643			
barr9	- -	- -	0.597		
barr10	- -	- -	0.272	0.492	
barr11	- -	- -	- -	0.075	0.548

Time used: 0.031 Seconds

Measurement model of depression



DATE: 4/12/2013

TIME: 15:41

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

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The following lines were read from file C:\Users\CS670G-01\Desktop\CFA\DEPRESS51.LPJ:

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TI CFA
BUY CAR
!DA NI=20 NO=0 MA=CM
SY='C:\Users\CS670G-01\Desktop\CFA\sem1.dsf' NG=1
MO NX=20 NK=1 TD=SY
LK
DEPRESSION
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1) LX(5,1) LX(6,1) LX(7,1) LX(8,1) LX(9,1)
FR LX(10,1) LX(11,1) LX(12,1) LX(13,1) LX(14,1) LX(15,1) LX(16,1) LX(17,1) LX(18,1)
FR LX(19,1) LX(20,1)
FR
TD(16,12)TD(8,4)TD(19,15)TD(16,8)TD(6,1)TD(12,8)TD(12,4)TD(16,4)TD(20,14)TD(5,3)TD(3,1
)TD(19,17)TD(3,2)TD(15,2)TD(19,6)TD(16,15)TD(12,6)TD(20,6)TD(15,13)TD(17,15)TD(15,14)T
D(18,5)TD(2,1)TD(6,2)TD(18,15)TD(13,2)TD(17,13)TD(13,10)TD(11,7)TD(10,4)TD(7,4)TD(20,1
8)TD(20,10)TD(9,5)TD(15,9)TD(9,2)TD(17,8)TD(11,10)TD(8,2)TD(15,3)TD(14,3)TD(18,6)TD(14
,6)TD(17,10)TD(18,3)TD(20,9)TD(11,1)TD(9,1)TD(14,9)TD(14,10)TD(19,7)
PD
OU AM RS FS SC
```

TI CFA

Number of Input Variables 20
Number of Y - Variables 0
Number of X - Variables 20
Number of ETA - Variables 0
Number of KSI - Variables 1
Number of Observations 348

Covariance Matrix

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	0.39					
depr2	0.34	0.85				
depr3	0.28	0.44	0.66			
depr4	-0.08	-0.04	0.06	2.08		
depr5	0.22	0.33	0.42	-0.03	0.74	
depr6	0.37	0.55	0.36	-0.05	0.40	0.90
depr7	0.24	0.43	0.37	0.14	0.42	0.54
depr8	-0.04	0.06	0.16	0.94	0.04	-0.08
depr9	0.31	0.42	0.40	-0.07	0.37	0.57
depr10	0.29	0.51	0.41	0.10	0.49	0.63
depr11	0.27	0.36	0.29	-0.06	0.31	0.44
depr12	0.05	0.09	0.22	1.22	0.09	0.26
depr13	0.30	0.56	0.42	0.04	0.39	0.50
depr14	0.18	0.33	0.33	0.07	0.27	0.34
depr15	0.16	0.27	0.41	0.26	0.37	0.31
depr16	0.06	0.14	0.28	1.00	0.14	0.22
depr17	0.20	0.35	0.26	-0.01	0.30	0.43

depr18	0.25	0.41	0.40	0.00	0.30	0.40
depr19	0.17	0.33	0.31	0.06	0.35	0.30
derp20	0.29	0.44	0.36	-0.02	0.42	0.48

Covariance Matrix

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.68					
depr8	0.08	1.49				
depr9	0.57	-0.01	0.86			
depr10	0.57	0.01	0.65	1.00		
depr11	0.37	-0.03	0.48	0.58	0.89	
depr12	0.26	0.96	0.15	0.20	0.12	1.95
depr13	0.60	0.02	0.63	0.56	0.45	0.10
depr14	0.37	0.08	0.45	0.47	0.34	0.18
depr15	0.45	0.20	0.53	0.46	0.31	0.33
depr16	0.33	1.07	0.28	0.27	0.16	1.50
depr17	0.41	-0.04	0.44	0.44	0.34	0.17
depr18	0.49	-0.06	0.52	0.54	0.39	0.11
depr19	0.38	0.08	0.41	0.46	0.32	0.23
derp20	0.51	-0.01	0.53	0.65	0.44	0.22

Covariance Matrix

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	1.21					
depr14	0.43	0.48				
depr15	0.65	0.42	1.28			
depr16	0.20	0.22	0.22	1.97		
depr17	0.36	0.27	0.45	0.21	0.57	
depr18	0.56	0.36	0.59	0.13	0.43	0.87
depr19	0.45	0.27	0.53	0.27	0.39	0.44
derp20	0.55	0.32	0.47	0.23	0.46	0.57

Covariance Matrix

	depr19	derp20
depr19	0.58	
derp20	0.46	0.80

TI CFA

Parameter Specifications

LAMBDA-X

	DEPRESSI
depr1	1
depr2	2
depr3	3
depr4	4
depr5	5
depr6	6
depr7	7
depr8	8
depr9	9
depr10	10
depr11	11
depr12	12
depr13	13
depr14	14
depr15	15
depr16	16
depr17	17
depr18	18
depr19	19
derp20	20

THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	21					
depr2	22	23				
depr3	24	25	26			
depr4	0	0	0	27		
depr5	0	0	28	0	29	
depr6	30	31	0	0	0	32
depr7	0	0	0	33	0	0
depr8	0	35	0	36	0	0
depr9	38	39	0	0	40	0
depr10	0	0	0	42	0	0
depr11	44	0	0	0	0	0
depr12	0	0	0	48	0	49
depr13	0	52	0	0	0	0
depr14	0	0	55	0	0	56
depr15	0	60	61	0	0	0
depr16	0	0	0	66	0	0
depr17	0	0	0	0	0	0
depr18	0	0	76	0	77	78
depr19	0	0	0	0	0	81
derp20	0	0	0	0	0	86

THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	34					
depr8	0	37				
depr9	0	0	41			
depr10	0	0	0	43		
depr11	45	0	0	46	47	
depr12	0	50	0	0	0	51
depr13	0	0	0	53	0	0
depr14	0	0	57	58	0	0
depr15	0	0	62	0	0	0
depr16	0	67	0	0	0	68
depr17	0	71	0	72	0	0
depr18	0	0	0	0	0	0
depr19	82	0	0	0	0	0
derp20	0	0	87	88	0	0

THETA-DELTA

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	54					
depr14	0	59				
depr15	63	64	65			
depr16	0	0	69	70		
depr17	73	0	74	0	75	
depr18	0	0	79	0	0	80
depr19	0	0	83	0	84	0
derp20	0	89	0	0	0	90

THETA-DELTA

	depr19	derp20
depr19	85	
derp20	0	91

Number of Iterations = 18

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	DEPRESSI
depr1	0.36
	(0.03)
	11.54
depr2	0.60
	(0.04)
	13.57
depr3	0.51
	(0.04)
	12.82
depr4	-0.03
	(0.08)
	-0.39
depr5	0.56
	(0.04)
	13.30
depr6	0.73
	(0.04)
	17.03
depr7	0.72
	(0.04)
	20.45
depr8	0.00
	(0.07)
	0.06
depr9	0.78
	(0.04)
	19.34
depr10	0.82
	(0.04)
	18.65
depr11	0.60
	(0.05)
	13.19
depr12	0.24
	(0.08)
	3.13
depr13	0.77
	(0.05)
	14.71
depr14	0.51
	(0.03)
	15.92
depr15	0.56
	(0.06)
	9.62

depr16	0.33
	(0.08)
	4.30
depr17	0.58
	(0.03)
	16.79
depr18	0.69
	(0.04)
	15.70
depr19	0.57
	(0.04)
	16.09
derp20	0.74
	(0.04)
	18.47

PHI

	DEPRESSI
	1.00

THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	0.26					
	(0.02)					
	13.23					
depr2	0.11	0.48				
	(0.02)	(0.04)				
	5.98	13.20				
depr3	0.10	0.13	0.40			
	(0.02)	(0.02)	(0.03)			
	6.38	6.16	13.34			
depr4	- -	- -	- -	2.02		
				(0.15)		
				13.50		
depr5	- -	- -	0.13	- -	0.43	
			(0.02)		(0.03)	
			5.91		12.84	
depr6	0.11	0.11	- -	- -	- -	0.36
	(0.02)	(0.02)				(0.03)
	6.53	5.36				12.50
depr7	- -	- -	- -	0.11	- -	- -
				(0.03)		
				4.21		
depr8	- -	0.08	- -	0.88	- -	- -
		(0.03)		(0.10)		
		3.06		8.74		
depr9	0.04	-0.06	- -	- -	-0.08	- -
	(0.01)	(0.02)			(0.02)	
	2.91	-3.19			-4.86	
depr10	- -	- -	- -	0.14	- -	- -
				(0.03)		
				4.47		
depr11	0.05	- -	- -	- -	- -	- -
	(0.02)					

	2.89					
depr12	- -	- -	- -	1.17 (0.12) 9.86	- -	0.13 (0.02) 5.28
depr13	- -	0.11 (0.03) 4.09	- -	- -	- -	- -
depr14	- -	- -	0.06 (0.01) 4.85	- -	- -	-0.03 (0.01) -2.31
depr15	- -	-0.05 (0.03) -1.93	0.11 (0.02) 4.40	- -	- -	- -
depr16	- -	- -	- -	1.00 (0.11) 8.69	- -	- -
depr17	- -	- -	- -	- -	- -	- -
depr18	- -	- -	0.05 (0.02) 2.40	- -	-0.10 (0.02) -4.63	-0.08 (0.02) -4.24
depr19	- -	- -	- -	- -	- -	-0.08 (0.01) -5.73
derp20	- -	- -	- -	- -	- -	-0.08 (0.02) -4.95

THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.16 (0.01) 11.47					
depr8	- -	1.49 (0.11) 13.35				
depr9	- -	- -	0.25 (0.02) 11.58			
depr10	- -	- -	- -	0.32 (0.03) 12.08		
depr11	-0.06 (0.02) -3.54	- -	- -	0.08 (0.02) 3.66	0.52 (0.04) 12.89	
depr12	- -	0.98 (0.10) 9.57	- -	- -	- -	1.89 (0.14) 13.50
depr13	- -	- -	- -	-0.07 (0.02) -3.44	- -	- -
depr14	- -	- -	0.04 (0.01) 3.19	0.04 (0.01) 2.63	- -	- -

depr15	- -	- -	0.15 (0.02) 6.07	- -	- -	- -
depr16	- -	1.10 (0.11) 10.31	- -	- -	- -	1.46 (0.13) 11.60
depr17	- -	-0.06 (0.02) -2.67	- -	-0.03 (0.01) -2.51	- -	- -
depr18	- -	- -	- -	- -	- -	- -
depr19	-0.03 (0.01) -3.06	- -	- -	- -	- -	- -
derp20	- -	- -	-0.05 (0.01) -3.67	0.06 (0.02) 3.14	- -	- -

THETA-DELTA

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	0.63 (0.05) 12.77					
depr14	- -	0.21 (0.02) 12.23				
depr15	0.18 (0.04) 5.24	0.15 (0.02) 7.04	0.97 (0.07) 14.10			
depr16	- -	- -	-0.17 (0.04) -4.88	1.93 (0.14) 13.46		
depr17	-0.09 (0.02) -4.51	- -	0.13 (0.02) 5.49	- -	0.23 (0.02) 12.42	
depr18	- -	- -	0.13 (0.03) 5.08	- -	- -	0.40 (0.03) 12.38
depr19	- -	- -	0.20 (0.03) 7.85	- -	0.07 (0.01) 4.45	- -
derp20	- -	-0.06 (0.01) -4.39	- -	- -	- -	0.07 (0.02) 3.64

THETA-DELTA

	depr19	derp20
depr19	0.25 (0.02) 12.09	
derp20	- -	0.26 (0.02) 11.22

Squared Multiple Correlations for X - Variables

depr1	depr2	depr3	depr4	depr5	depr6
0.33	0.43	0.39	0.00	0.42	0.60

Squared Multiple Correlations for X - Variables

depr7	depr8	depr9	depr10	depr11	depr12
0.76	0.00	0.71	0.68	0.41	0.03

Squared Multiple Correlations for X - Variables

depr13	depr14	depr15	depr16	depr17	depr18
0.48	0.55	0.25	0.05	0.59	0.54

Squared Multiple Correlations for X - Variables

depr19	derp20
0.56	0.68

Goodness of Fit Statistics

Degrees of Freedom = 119
Minimum Fit Function Chi-Square = 234.59 (P = 0.00)
Normal Theory Weighted Least Squares Chi-Square = 221.70 (P = 0.00)
Estimated Non-centrality Parameter (NCP) = 102.70
90 Percent Confidence Interval for NCP = (64.66 ; 148.56)

Minimum Fit Function Value = 0.68
Population Discrepancy Function Value (F0) = 0.30
90 Percent Confidence Interval for F0 = (0.19 ; 0.43)
Root Mean Square Error of Approximation (RMSEA) = 0.050
90 Percent Confidence Interval for RMSEA = (0.040 ; 0.060)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.49

Expected Cross-Validation Index (ECVI) = 1.16
90 Percent Confidence Interval for ECVI = (1.05 ; 1.30)
ECVI for Saturated Model = 1.21
ECVI for Independence Model = 38.11

Chi-Square for Independence Model with 190 Degrees of Freedom = 13185.37
Independence AIC = 13225.37
Model AIC = 403.70
Saturated AIC = 420.00
Independence CAIC = 13322.41
Model CAIC = 845.25
Saturated CAIC = 1438.96

Normed Fit Index (NFI) = 0.98
Non-Normed Fit Index (NNFI) = 0.99
Parsimony Normed Fit Index (PNFI) = 0.62
Comparative Fit Index (CFI) = 0.99
Incremental Fit Index (IFI) = 0.99
Relative Fit Index (RFI) = 0.97

Critical N (CN) = 234.41

Root Mean Square Residual (RMR) = 0.049
Standardized RMR = 0.042
Goodness of Fit Index (GFI) = 0.94
Adjusted Goodness of Fit Index (AGFI) = 0.89
Parsimony Goodness of Fit Index (PGFI) = 0.5

Fitted Covariance Matrix

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	0.40					
depr2	0.33	0.84				
depr3	0.28	0.43	0.66			
depr4	-0.01	-0.02	-0.02	2.02		
depr5	0.20	0.34	0.41	-0.02	0.74	
depr6	0.37	0.56	0.37	-0.02	0.41	0.89
depr7	0.26	0.43	0.36	0.08	0.40	0.53
depr8	0.00	0.09	0.00	0.88	0.00	0.00
depr9	0.32	0.42	0.40	-0.02	0.35	0.58
depr10	0.30	0.50	0.42	0.11	0.46	0.60
depr11	0.27	0.36	0.30	-0.02	0.33	0.44
depr12	0.09	0.14	0.12	1.16	0.13	0.30
depr13	0.28	0.57	0.39	-0.02	0.43	0.56
depr14	0.19	0.31	0.32	-0.02	0.29	0.35
depr15	0.20	0.29	0.39	-0.02	0.31	0.41
depr16	0.12	0.20	0.17	0.99	0.18	0.24
depr17	0.21	0.35	0.29	-0.02	0.32	0.42
depr18	0.25	0.41	0.39	-0.02	0.28	0.43
depr19	0.21	0.34	0.29	-0.02	0.32	0.33
derp20	0.27	0.45	0.37	-0.02	0.41	0.47

Fitted Covariance Matrix

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.68					
depr8	0.00	1.49				
depr9	0.56	0.00	0.86			
depr10	0.59	0.00	0.65	1.00		
depr11	0.37	0.00	0.47	0.57	0.88	
depr12	0.17	0.98	0.18	0.19	0.14	1.95
depr13	0.55	0.00	0.60	0.56	0.46	0.18
depr14	0.37	0.00	0.44	0.46	0.31	0.12
depr15	0.40	0.00	0.59	0.46	0.34	0.13
depr16	0.24	1.10	0.26	0.27	0.20	1.54
depr17	0.42	-0.05	0.45	0.44	0.35	0.14
depr18	0.49	0.00	0.54	0.56	0.41	0.16
depr19	0.37	0.00	0.44	0.47	0.34	0.13
derp20	0.53	0.00	0.53	0.66	0.44	0.17

Fitted Covariance Matrix

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	1.22					
depr14	0.39	0.47				
depr15	0.62	0.43	1.28			
depr16	0.25	0.17	0.01	2.04		
depr17	0.35	0.30	0.46	0.19	0.57	
depr18	0.53	0.35	0.52	0.23	0.40	0.87
depr19	0.44	0.29	0.52	0.19	0.39	0.39
derp20	0.57	0.32	0.42	0.24	0.43	0.57

Fitted Covariance Matrix

	depr19	derp20
depr19	0.57	
derp20	0.42	0.80

Fitted Residuals

	deprl	depr2	depr3	depr4	depr5	depr6
deprl	0.00					
depr2	0.01	0.01				
depr3	0.00	0.01	0.01			
depr4	-0.07	-0.02	0.07	0.06		
depr5	0.02	-0.01	0.01	-0.01	0.00	
depr6	0.00	0.00	-0.01	-0.03	-0.01	0.00
depr7	-0.02	0.00	0.01	0.06	0.02	0.01
depr8	-0.04	-0.03	0.16	0.06	0.04	-0.08
depr9	-0.02	0.00	0.00	-0.05	0.02	-0.01
depr10	-0.01	0.02	-0.01	-0.02	0.03	0.02
depr11	0.00	0.00	-0.01	-0.04	-0.03	0.00
depr12	-0.03	-0.05	0.11	0.05	-0.04	-0.05
depr13	0.02	-0.01	0.03	0.06	-0.03	-0.07
depr14	0.00	0.02	0.01	0.09	-0.01	0.00
depr15	-0.05	-0.01	0.02	0.28	0.06	-0.10
depr16	-0.06	-0.06	0.12	0.01	-0.04	-0.03
depr17	-0.01	0.01	-0.03	0.01	-0.02	0.00
depr18	0.00	-0.01	0.00	0.02	0.02	-0.02
depr19	-0.03	-0.02	0.02	0.08	0.03	-0.04
derp20	0.03	-0.01	-0.02	0.00	0.00	0.01

Fitted Residuals

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.00					
depr8	0.07	0.00				
depr9	0.01	-0.02	-0.01			
depr10	-0.02	0.01	0.00	0.00		
depr11	-0.01	-0.04	0.01	0.01	0.00	
depr12	0.09	-0.02	-0.03	0.00	-0.02	0.01
depr13	0.05	0.02	0.03	0.00	-0.01	-0.08
depr14	0.01	0.08	0.00	0.01	0.04	0.06
depr15	0.04	0.19	-0.06	-0.01	-0.03	0.20
depr16	0.09	-0.03	0.02	0.00	-0.04	-0.04
depr17	-0.01	0.01	-0.02	0.00	0.00	0.03
depr18	0.00	-0.06	-0.02	-0.03	-0.02	-0.05
depr19	0.00	0.08	-0.04	-0.01	-0.02	0.10
derp20	-0.02	-0.01	0.01	-0.01	-0.01	0.04

Fitted Residuals

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	-0.01					
depr14	0.04	0.00				
depr15	0.04	-0.01	0.00			
depr16	-0.06	0.06	0.21	-0.08		
depr17	0.00	-0.02	-0.01	0.02	0.00	
depr18	0.03	0.01	0.07	-0.10	0.04	0.00
depr19	0.02	-0.02	0.01	0.09	0.00	0.05
derp20	-0.02	0.00	0.05	-0.01	0.03	-0.01

Fitted Residuals

	depr19	derp20
depr19	0.00	
derp20	0.05	0.00

Summary Statistics for Fitted Residuals

```
 Smallest Fitted Residual =   -0.10
   Median Fitted Residual =    0.00
  Largest Fitted Residual =    0.28
```

Stemleaf Plot

```
-10|2
- 8|94
- 6|97963
- 4|986528777322
- 2|998665432211198665422222100
- 0|888777766554433222111100098877776665555443333332222111100000
  0|11222223333344555555667778888888991112223577788999
  2|0023446668000356679
  4|125612456668
  6|1484567
  8|060229
 10|57
 12|
 14|7
 16|
 18|39
 20|9
 22|
 24|
 26|9
```

Standardized Residuals

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	-0.34					
depr2	1.14	1.02				
depr3	0.22	0.94	0.86			
depr4	-1.78	-0.42	1.56	1.80		
depr5	1.01	-0.33	0.69	-0.29	-0.94	
depr6	-0.01	-0.10	-0.51	-0.70	-0.26	0.36
depr7	-1.73	-0.21	0.68	2.84	1.31	0.65
depr8	-1.28	-0.71	3.82	2.06	0.92	-2.05
depr9	-2.01	0.30	0.03	-1.27	1.91	-0.47
depr10	-0.46	0.87	-0.30	-0.55	1.51	1.42
depr11	-0.05	0.00	-0.60	-0.71	-1.05	-0.22
depr12	-0.87	-0.94	2.28	1.96	-0.88	-1.23
depr13	0.94	-0.68	0.99	1.08	-1.27	-2.74
depr14	-0.36	1.48	0.63	2.60	-0.77	-0.24
depr15	-1.80	-0.60	0.91	3.74	1.64	-3.45
depr16	-1.56	-1.24	2.51	0.42	-0.80	-0.60
depr17	-0.95	0.34	-1.86	0.20	-1.36	0.33
depr18	0.04	-0.26	0.15	0.51	1.94	-1.75
depr19	-2.32	-0.95	1.36	2.01	1.92	-3.30
derp20	1.99	-0.40	-0.95	-0.06	0.29	1.36

Standardized Residuals

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.19					
depr8	2.92	-0.09				
depr9	0.83	-0.55	-2.42			
depr10	-1.99	0.22	0.13	0.52		
depr11	-1.50	-0.76	0.64	0.82	1.47	
depr12	3.24	-0.78	-0.91	0.05	-0.35	0.28
depr13	2.97	0.35	1.30	0.41	-0.32	-1.45
depr14	0.63	2.59	0.13	1.13	2.14	1.69
depr15	2.20	3.01	-3.79	-0.22	-0.83	2.75
depr16	3.21	-1.74	0.55	0.08	-0.79	-1.39
depr17	-1.01	0.44	-1.53	-0.20	-0.19	0.86
depr18	-0.23	-1.42	-1.44	-1.60	-0.71	-1.13
depr19	0.45	2.45	-3.28	-0.79	-1.06	2.71
derp20	-2.17	-0.41	0.71	-1.54	-0.35	1.15

Standardized Residuals

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	-1.06					
depr14	1.92	0.98				
depr15	1.67	-0.75	-0.15			
depr16	-0.95	1.65	3.29	-2.80		
depr17	0.39	-2.23	-1.02	0.48	0.18	
depr18	1.18	0.78	3.23	-2.12	2.34	-0.59
depr19	0.75	-1.95	0.86	2.33	-0.54	3.26
derp20	-1.11	-0.28	2.08	-0.41	2.57	-0.59

Standardized Residuals

	depr19	derp20
depr19	1.17	
derp20	3.74	-0.79

Summary Statistics for Standardized Residuals

Smallest Standardized Residual = -3.79
Median Standardized Residual = -0.01
Largest Standardized Residual = 3.82

Stemleaf Plot

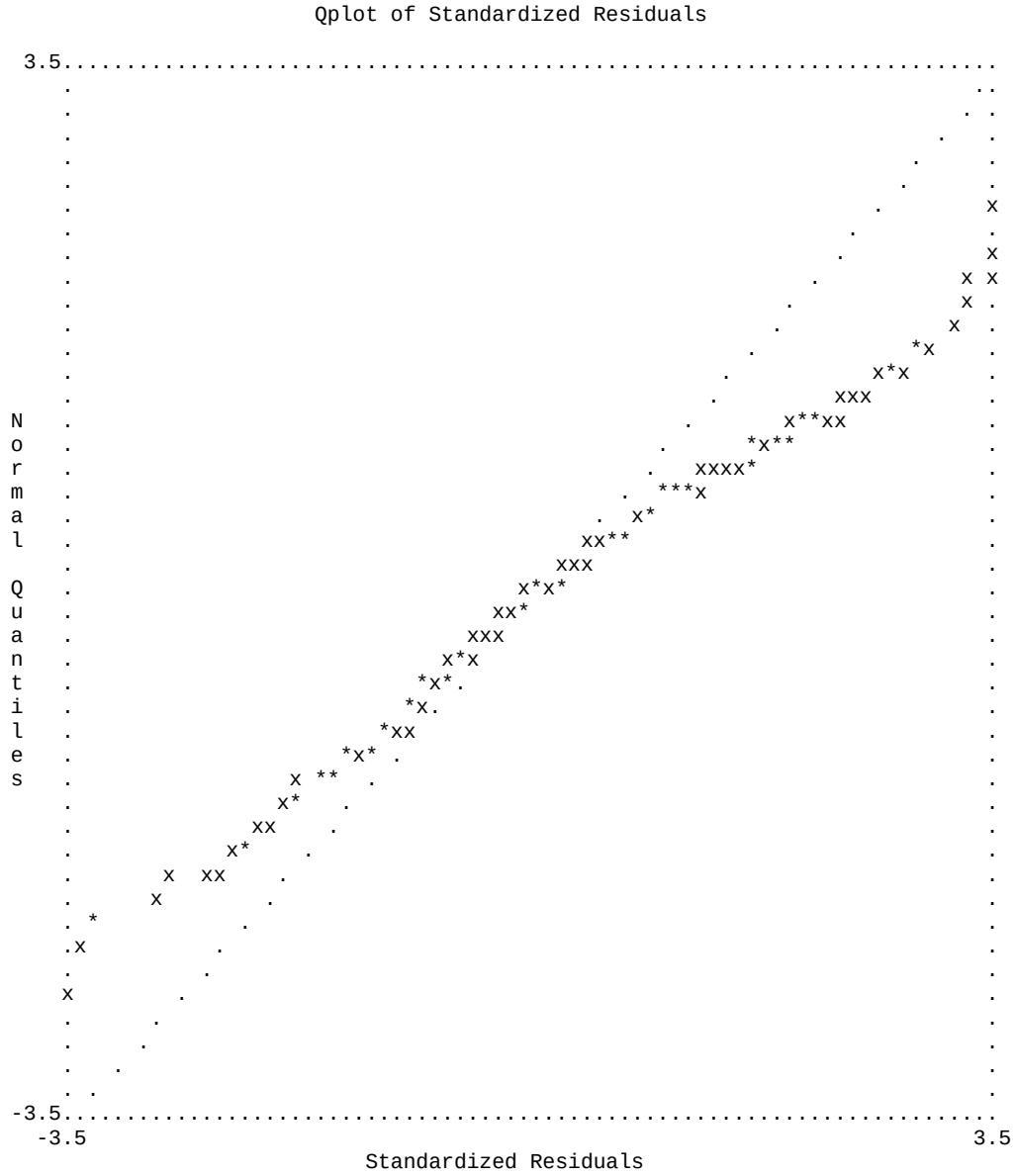
```
- 3|85
- 3|33
- 2|87
- 2|432211000
- 1|988877665555
- 1|44443332211111000
- 0|99999999888888888777766666655555
- 0|44444433333333322222221111000000
  0|11112222233333444444
  0|55556667777888899999999
  1|000011112233444
  1|5556677789999
  2|0001112333
  2|556667889
  3|0022233
  3|778
```

Largest Negative Standardized Residuals

Residual for	depr13	and	depr6	-2.74
Residual for	depr15	and	depr6	-3.45
Residual for	depr15	and	depr9	-3.79
Residual for	depr16	and	depr16	-2.80
Residual for	depr19	and	depr6	-3.30
Residual for	depr19	and	depr9	-3.28

Largest Positive Standardized Residuals

Residual for	depr7	and	depr4	2.84
Residual for	depr8	and	depr3	3.82
Residual for	depr8	and	depr7	2.92
Residual for	depr12	and	depr7	3.24
Residual for	depr13	and	depr7	2.97
Residual for	depr14	and	depr4	2.60
Residual for	depr14	and	depr8	2.59
Residual for	depr15	and	depr4	3.74
Residual for	depr15	and	depr8	3.01
Residual for	depr15	and	depr12	2.75
Residual for	depr16	and	depr7	3.21
Residual for	depr16	and	depr15	3.29
Residual for	depr18	and	depr15	3.23
Residual for	depr19	and	depr12	2.71
Residual for	depr19	and	depr18	3.26
Residual for	derp20	and	depr19	3.74



Modification Indices and Expected Change

No Non-Zero Modification Indices for LAMBDA-X

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	- -					
depr2	- -	- -				
depr3	- -	- -	- -			
depr4	0.09	0.00	1.20	- -		
depr5	1.72	0.11	- -	0.11	- -	
depr6	- -	- -	0.00	0.46	0.05	- -
depr7	4.75	0.24	1.54	- -	1.45	0.40
depr8	0.01	- -	4.21	- -	0.16	4.00
depr9	- -	- -	0.01	4.42	- -	0.01
depr10	0.94	0.98	0.09	- -	2.34	0.78
depr11	- -	0.01	0.07	0.14	1.13	0.31
depr12	0.99	0.01	0.08	- -	1.43	- -
depr13	3.40	- -	0.02	0.45	2.81	4.28

depr14	0.05	1.17	- -	2.23	3.11	- -
depr15	0.94	- -	- -	1.61	3.86	3.45
depr16	4.12	0.62	2.11	- -	0.66	1.47
depr17	0.07	1.19	2.23	0.03	1.92	0.92
depr18	0.70	0.58	- -	3.47	- -	- -
depr19	1.84	2.01	3.59	0.03	0.83	- -
derp20	5.48	0.01	2.85	0.21	0.00	- -

Modification Indices for THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	- -					
depr8	0.50	- -				
depr9	0.95	0.58	- -			
depr10	2.41	0.24	1.61	- -		
depr11	- -	0.02	0.18	- -	- -	
depr12	0.93	- -	2.27	1.76	1.19	- -
depr13	3.68	1.29	0.02	- -	0.06	2.20
depr14	0.27	0.01	- -	- -	6.39	0.23
depr15	1.29	0.06	- -	0.02	0.81	1.35
depr16	1.45	- -	3.18	0.16	0.27	- -
depr17	1.04	- -	0.03	- -	0.07	0.41
depr18	0.05	0.55	2.88	0.74	0.41	1.06
depr19	- -	0.15	3.45	0.36	0.11	0.85
derp20	1.63	0.92	- -	- -	0.03	4.75

Modification Indices for THETA-DELTA

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	- -					
depr14	0.27	- -				
depr15	- -	- -	- -			
depr16	0.40	0.85	- -	- -		
depr17	- -	0.18	- -	0.06	- -	
depr18	0.61	0.70	- -	3.43	1.94	- -
depr19	0.19	1.65	- -	0.19	- -	3.91
derp20	2.46	- -	0.08	0.38	0.64	- -

Modification Indices for THETA-DELTA

	depr19	derp20
depr19	- -	
derp20	1.95	- -

Expected Change for THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	- -					
depr2	- -	- -				
depr3	- -	- -	- -			
depr4	-0.01	0.00	-0.03	- -		
depr5	0.02	-0.01	- -	-0.01	- -	
depr6	- -	- -	0.00	0.02	0.00	- -
depr7	-0.02	-0.01	0.02	- -	0.02	0.01
depr8	0.00	- -	0.05	- -	0.01	-0.05
depr9	- -	- -	0.00	-0.06	- -	0.00
depr10	-0.01	0.02	0.00	- -	0.03	0.02
depr11	- -	0.00	-0.01	-0.02	-0.02	-0.01
depr12	0.02	0.00	0.01	- -	-0.03	- -
depr13	0.03	- -	0.00	0.03	-0.04	-0.05
depr14	0.00	0.02	- -	0.04	-0.03	- -
depr15	-0.02	- -	- -	0.06	0.05	-0.05
depr16	-0.04	-0.02	0.03	- -	-0.02	0.04
depr17	0.00	0.02	-0.02	0.00	-0.02	0.01
depr18	0.01	-0.02	- -	0.07	- -	- -
depr19	-0.02	-0.02	0.03	0.00	0.01	- -
derp20	0.03	0.00	-0.03	-0.01	0.00	- -

Expected Change for THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	- -					
depr8	0.01	- -				
depr9	0.01	-0.02	- -			
depr10	-0.02	0.01	0.02	- -		
depr11	- -	0.00	0.01	- -	- -	
depr12	0.02	- -	-0.03	-0.03	0.03	- -
depr13	0.03	0.04	0.00	- -	0.01	-0.05
depr14	-0.01	0.00	- -	- -	0.05	0.01
depr15	0.02	0.01	- -	0.00	-0.03	0.05
depr16	0.02	- -	0.04	0.01	-0.02	- -
depr17	-0.01	- -	0.00	- -	0.00	-0.01
depr18	0.00	-0.02	-0.03	-0.02	-0.01	-0.03
depr19	- -	0.01	-0.03	-0.01	-0.01	0.02
derp20	-0.02	-0.02	- -	- -	0.00	0.05

Expected Change for THETA-DELTA

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	- -					
depr14	0.01	- -				
depr15	- -	- -	- -			
depr16	-0.02	-0.02	- -	- -		
depr17	- -	0.00	- -	-0.01	- -	
depr18	0.02	0.01	- -	-0.05	0.02	- -
depr19	0.01	-0.01	- -	0.01	- -	0.03
derp20	-0.03	- -	0.01	-0.01	0.01	- -

Expected Change for THETA-DELTA

	depr19	derp20
depr19	- -	
derp20	0.02	- -

Completely Standardized Expected Change for THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	- -					
depr2	- -	- -				
depr3	- -	- -	- -			
depr4	-0.01	0.00	-0.03	- -		
depr5	0.04	-0.01	- -	-0.01	- -	
depr6	- -	- -	0.00	0.02	-0.01	- -
depr7	-0.04	-0.01	0.02	- -	0.03	0.01
depr8	0.00	- -	0.05	- -	0.01	-0.05
depr9	- -	- -	0.00	-0.05	- -	0.00
depr10	-0.02	0.02	-0.01	- -	0.03	0.02
depr11	- -	0.00	-0.01	-0.01	-0.03	-0.01
depr12	0.02	0.00	0.01	- -	-0.02	- -
depr13	0.05	- -	0.00	0.02	-0.04	-0.05
depr14	0.01	0.03	- -	0.04	-0.05	- -
depr15	-0.03	- -	- -	0.03	0.06	-0.04
depr16	-0.04	-0.02	0.03	- -	-0.02	0.03
depr17	0.01	0.02	-0.03	0.00	-0.03	0.02
depr18	0.02	-0.02	- -	0.05	- -	- -
depr19	-0.03	-0.03	0.04	0.00	0.02	- -
derp20	0.05	0.00	-0.03	-0.01	0.00	- -

Completely Standardized Expected Change for THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	- -					
depr8	0.01	- -				
depr9	0.02	-0.02	- -			
depr10	-0.03	0.01	0.02	- -		
depr11	- -	0.00	0.01	- -	- -	
depr12	0.02	- -	-0.02	-0.02	0.02	- -
depr13	0.04	0.03	0.00	- -	0.01	-0.03
depr14	-0.01	0.00	- -	- -	0.07	0.01
depr15	0.02	0.01	- -	0.00	-0.02	0.03
depr16	0.02	- -	0.03	0.01	-0.01	- -
depr17	-0.02	- -	0.00	- -	0.01	-0.01
depr18	0.00	-0.02	-0.04	-0.02	-0.02	-0.02
depr19	- -	0.01	-0.04	-0.01	-0.01	0.02
derp20	-0.02	-0.02	- -	- -	0.00	0.04

Completely Standardized Expected Change for THETA-DELTA

	depr13	depr14	depr15	depr16	depr17	depr18
depr13	- -					
depr14	0.01	- -				
depr15	- -	- -	- -			
depr16	-0.01	-0.02	- -	- -		
depr17	- -	-0.01	- -	0.00	- -	
depr18	0.02	0.02	- -	-0.04	0.03	- -
depr19	0.01	-0.03	- -	0.01	- -	0.05
derp20	-0.03	- -	0.01	-0.01	0.02	- -

Completely Standardized Expected Change for THETA-DELTA

	depr19	derp20
depr19	- -	
derp20	0.03	- -

Maximum Modification Index is 6.39 for Element (14,11) of THETA-DELTA

Factor Scores Regressions

KSI

	depr1	depr2	depr3	depr4	depr5	depr6
DEPRESSI	-0.09	-0.03	0.03	-0.01	0.08	0.21

KSI

	depr7	depr8	depr9	depr10	depr11	depr12
DEPRESSI	0.17	0.03	0.20	0.04	0.05	-0.01

KSI

	depr13	depr14	depr15	depr16	depr17	depr18
DEPRESSI	0.10	0.18	-0.15	-0.01	0.13	0.12

KSI

	depr19	derp20
DEPRESSI	0.23	0.16

Standardized Solution

LAMBDA-X

	DEPRESSI
depr1	0.36
depr2	0.60
depr3	0.51
depr4	-0.03
depr5	0.56
depr6	0.73
depr7	0.72
depr8	0.00
depr9	0.78
depr10	0.82
depr11	0.60
depr12	0.24
depr13	0.77
depr14	0.51
depr15	0.56
depr16	0.33
depr17	0.58
depr18	0.69
depr19	0.57
derp20	0.74

PHI

	DEPRESSI
	1.00

TI CFA

Completely Standardized Solution

LAMBDA-X

	DEPRESSI
depr1	0.58
depr2	0.66
depr3	0.63
depr4	-0.02
depr5	0.64
depr6	0.78
depr7	0.87
depr8	0.00
depr9	0.84
depr10	0.82
depr11	0.64
depr12	0.17
depr13	0.70
depr14	0.74
depr15	0.50
depr16	0.23
depr17	0.77
depr18	0.73
depr19	0.75
derp20	0.82

PHI

	DEPRESSI
	1.00

THETA-DELTA

	depr1	depr2	depr3	depr4	depr5	depr6
depr1	0.67					
depr2	0.19	0.57				
depr3	0.19	0.17	0.61			
depr4	- -	- -	- -	1.00		
depr5	- -	- -	0.18	- -	0.58	
depr6	0.18	0.13	- -	- -	- -	0.40
depr7	- -	- -	- -	0.09	- -	- -
depr8	- -	0.08	- -	0.51	- -	- -
depr9	0.06	-0.07	- -	- -	-0.10	- -
depr10	- -	- -	- -	0.10	- -	- -
depr11	0.08	- -	- -	- -	- -	- -
depr12	- -	- -	- -	0.59	- -	0.10
depr13	- -	0.11	- -	- -	- -	- -
depr14	- -	- -	0.12	- -	- -	-0.04
depr15	- -	-0.05	0.12	- -	- -	- -
depr16	- -	- -	- -	0.49	- -	- -
depr17	- -	- -	- -	- -	- -	- -
depr18	- -	- -	0.06	- -	-0.13	-0.09
depr19	- -	- -	- -	- -	- -	-0.11
derp20	- -	- -	- -	- -	- -	-0.09

THETA-DELTA

	depr7	depr8	depr9	depr10	depr11	depr12
depr7	0.24					
depr8	- -	1.00				
depr9	- -	- -	0.29			
depr10	- -	- -	- -	0.32		
depr11	-0.07	- -	- -	0.08	0.59	
depr12	- -	0.57	- -	- -	- -	0.97
depr13	- -	- -	- -	-0.07	- -	- -
depr14	- -	- -	0.07	0.05	- -	- -
depr15	- -	- -	0.14	- -	- -	- -
depr16	- -	0.63	- -	- -	- -	0.73
depr17	- -	-0.06	- -	-0.04	- -	- -
depr18	- -	- -	- -	- -	- -	- -
depr19	-0.05	- -	- -	- -	- -	- -
derp20	- -	- -	-0.06	0.06	- -	- -

THETA-DELTA

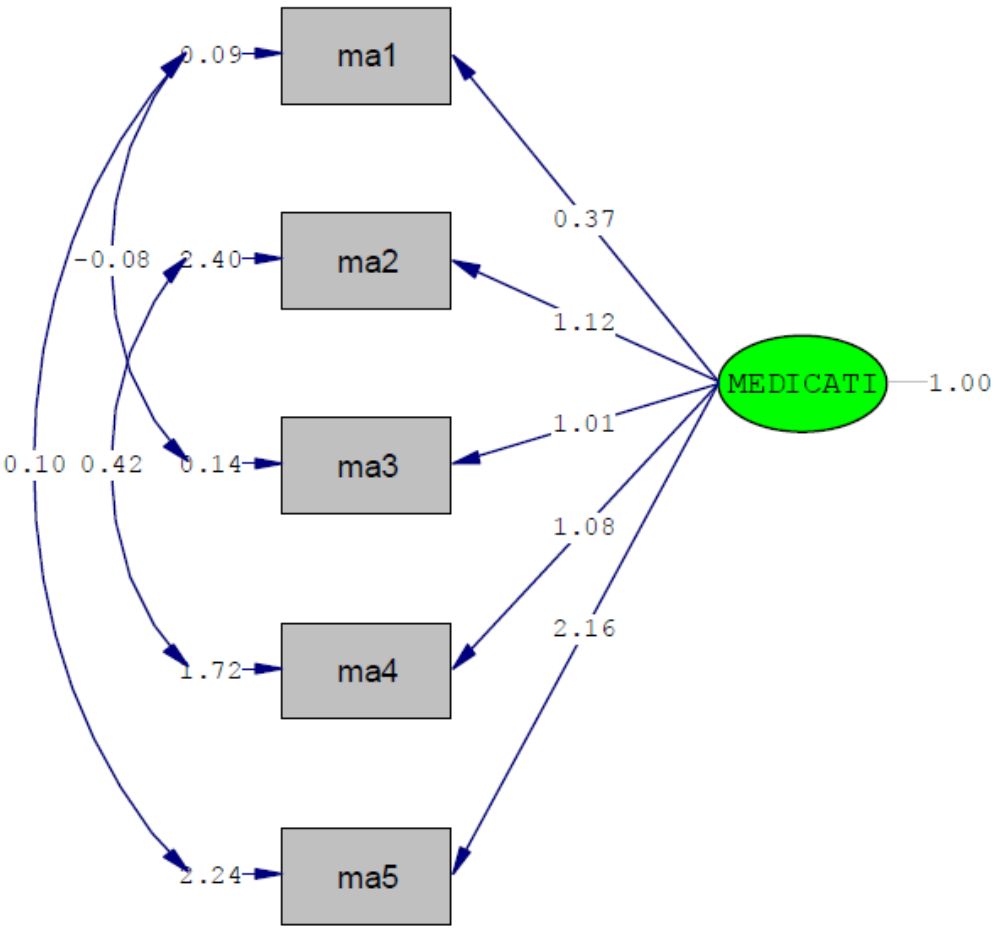
	depr13	depr14	depr15	depr16	depr17	depr18
depr13	0.52					
depr14	- -	0.45				
depr15	0.15	0.19	0.75			
depr16	- -	- -	-0.11	0.95		
depr17	-0.11	- -	0.15	- -	0.41	
depr18	- -	- -	0.13	- -	- -	0.46
depr19	- -	- -	0.24	- -	0.12	- -
derp20	- -	-0.09	- -	- -	- -	0.08

THETA-DELTA

	depr19	derp20
depr19	0.44	
derp20	- -	0.32

Time used: 0.062 Seconds

Measurement model of medication adherence



DATE: 4/12/2013
TIME: 18:57

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

The following lines were read from file C:\Users\CS670G-01\Desktop\CFA\MA2.LPJ:

```
TI CFA
BUY CAR
!DA NI=5 NO=0 MA=CM
SY='C:\Users\CS670G-01\Desktop\CFA\sem4.dsf' NG=1
MO NX=5 NK=1 TD=SY
LK
'MEDICATION A'
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1) LX(5,1)
FR TD(3,1)TD(4,2)
PD
OU AM RS FS SC ND=3
```

TI CFA

Number of Input Variables 5
Number of Y - Variables 0
Number of X - Variables 5
Number of ETA - Variables 0
Number of KSI - Variables 1
Number of Observations 348

Covariance Matrix

	ma1	ma2	ma3	ma4	ma5
ma1	0.224				
ma2	0.402	3.644			
ma3	0.293	1.142	1.171		
ma4	0.406	1.624	1.088	2.888	
ma5	0.899	2.444	2.190	2.317	6.912

Parameter Specifications

LAMBDA-X

	MEDICATI
ma1	1
ma2	2
ma3	3
ma4	4
ma5	5

THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	6				
ma2	0	7			
ma3	8	0	9		
ma4	0	10	0	11	
ma5	0	0	0	0	12

Number of Iterations = 9

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	MEDICATI
ma1	0.398
	(0.023)
	17.414
ma2	1.088
	(0.096)
	11.362
ma3	1.003
	(0.049)
	20.496
ma4	1.059
	(0.084)
	12.606
ma5	2.212
	(0.120)
	18.401

PHI

	MEDICATI
	1.000

THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	0.065				
	(0.010)				
	6.740				
ma2	- -	2.461			
		(0.191)			
		12.856			
ma3	-0.107	- -	0.165		
	(0.017)		(0.045)		
	-6.421		3.646		
ma4	- -	0.472	- -	1.766	
		(0.122)		(0.140)	
		3.870		12.624	
ma5	- -	- -	- -	- -	2.021
					(0.233)
					8.669

Squared Multiple Correlations for X - Variables

ma1	ma2	ma3	ma4	ma5
0.710	0.325	0.859	0.389	0.708

Goodness of Fit Statistics

Degrees of Freedom = 3
Minimum Fit Function Chi-Square = 3.544 (P = 0.315)
Normal Theory Weighted Least Squares Chi-Square = 3.501 (P = 0.321)
Estimated Non-centrality Parameter (NCP) = 0.501
90 Percent Confidence Interval for NCP = (0.0 ; 9.549)

Minimum Fit Function Value = 0.0102
Population Discrepancy Function Value (F0) = 0.00144
90 Percent Confidence Interval for F0 = (0.0 ; 0.0275)
Root Mean Square Error of Approximation (RMSEA) = 0.0219
90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0958)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.637

Expected Cross-Validation Index (ECVI) = 0.0793
90 Percent Confidence Interval for ECVI = (0.0778 ; 0.105)
ECVI for Saturated Model = 0.0865
ECVI for Independence Model = 3.337

Chi-Square for Independence Model with 10 Degrees of Freedom = 1147.905
Independence AIC = 1157.905
Model AIC = 27.501
Saturated AIC = 30.000
Independence CAIC = 1182.166
Model CAIC = 85.727
Saturated CAIC = 102.783

Normed Fit Index (NFI) = 0.997
Non-Normed Fit Index (NNFI) = 0.998
Parsimony Normed Fit Index (PNFI) = 0.299
Comparative Fit Index (CFI) = 1.00
Incremental Fit Index (IFI) = 1.00
Relative Fit Index (RFI) = 0.990
Critical N (CN) = 1112.041
Root Mean Square Residual (RMR) = 0.0228
Standardized RMR = 0.0137
Goodness of Fit Index (GFI) = 0.996
Adjusted Goodness of Fit Index (AGFI) = 0.980
Parsimony Goodness of Fit Index (PGFI) = 0.199

Fitted Covariance Matrix

	ma1	ma2	ma3	ma4	ma5
ma1	0.224				
ma2	0.433	3.644			
ma3	0.293	1.091	1.171		
ma4	0.422	1.624	1.062	2.888	
ma5	0.881	2.406	2.218	2.343	6.912

Fitted Residuals

	ma1	ma2	ma3	ma4	ma5
ma1	0.000				
ma2	-0.032	0.000			
ma3	0.000	0.051	0.000		
ma4	-0.016	0.000	0.026	0.000	
ma5	0.018	0.038	-0.028	-0.026	0.000

Summary Statistics for Fitted Residuals
Smallest Fitted Residual = -0.032
Median Fitted Residual = 0.000
Largest Fitted Residual = 0.051
Stemleaf Plot

```
- 2|286
- 0|60000000
  0|8
  2|68
  4|1
```

Standardized Residuals

	ma1	ma2	ma3	ma4	ma5
ma1	- -				
ma2	-1.582	- -			
ma3	- -	1.590	- -		
ma4	-0.995	- -	0.988	- -	
ma5	1.714	0.464	-1.714	-0.464	- -

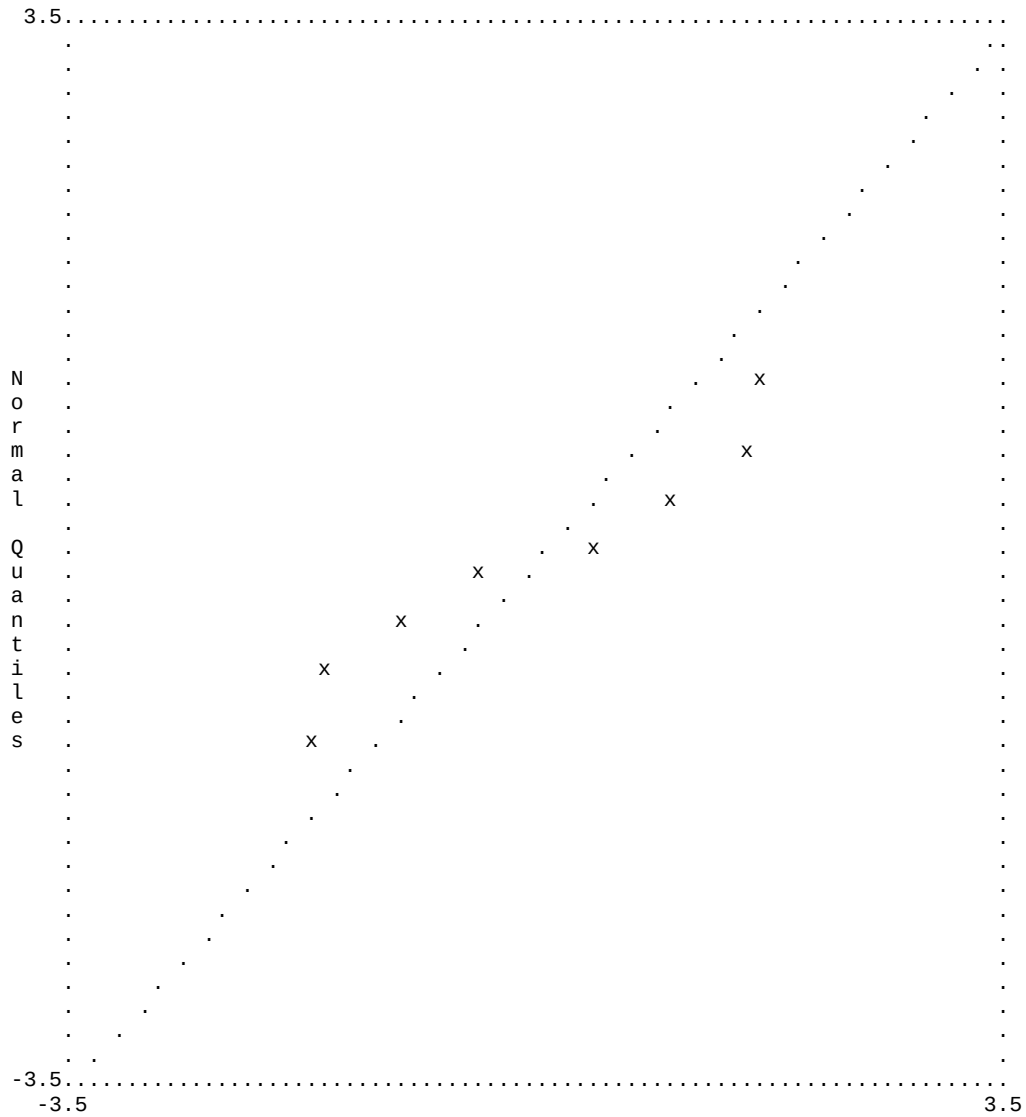
Summary Statistics for Standardized Residuals

Smallest Standardized Residual = -1.714
Median Standardized Residual = 0.000
Largest Standardized Residual = 1.714

Stemleaf Plot

```
- 1|760
- 0|50000000
  0|5
  1|067
```

Qplot of Standardized Residuals



Standardized Residuals

Modification Indices and Expected Change

No Non-Zero Modification Indices for LAMBDA-X

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	- -				
ma2	1.987	- -			
ma3	- -	0.510	- -		
ma4	0.119	- -	0.596	- -	
ma5	2.936	0.215	2.936	0.215	- -

Expected Change for THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	- -				
ma2	-0.044	- -			
ma3	- -	0.049	- -		
ma4	-0.010	- -	0.048	- -	
ma5	0.105	0.065	-0.264	-0.063	- -

Completely Standardized Expected Change for THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	- -				
ma2	-0.049	- -			
ma3	- -	0.024	- -		
ma4	-0.012	- -	0.026	- -	
ma5	0.084	0.013	-0.093	-0.014	- -

Maximum Modification Index is 2.94 for Element (5, 3) of THETA-DELTA

Factor Scores Regressions

KSI

	ma1	ma2	ma3	ma4	ma5
MEDICATI	0.995	-0.001	0.619	-0.002	-0.004

Standardized Solution

LAMBDA-X

	MEDICATI
ma1	0.398
ma2	1.088
ma3	1.003
ma4	1.059
ma5	2.212

PHI

	MEDICATI
	1.000

Completely Standardized Solution

LAMBDA-X

	MEDICATI
ma1	0.843
ma2	0.570
ma3	0.927
ma4	0.623
ma5	0.841

PHI

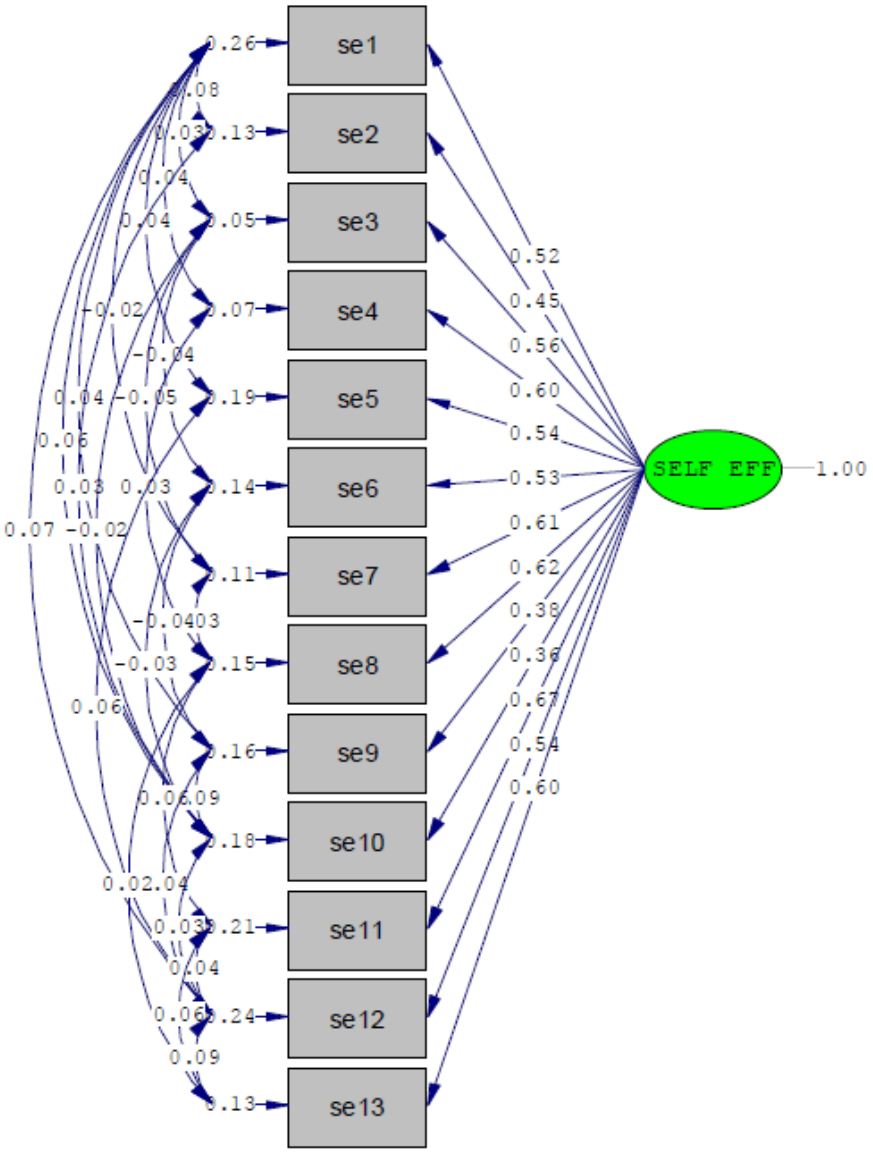
	MEDICATI
	1.000

THETA-DELTA

	ma1	ma2	ma3	ma4	ma5
ma1	0.290				
ma2	- -	0.675			
ma3	-0.209	- -	0.141		
ma4	- -	0.145	- -	0.611	
ma5	- -	- -	- -	- -	0.292

Time used: 0.016 Seconds

Measurement model of self-efficacy



DATE: 4/12/2013
TIME: 18:34

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

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The following lines were read from file C:\Users\CS670G-01\Desktop\CFA\SE25.LPJ:

```
TI CFA
BUY CAR
!DA NI=13 NO=0 MA=CM
SY='C:\Users\CS670G-01\Desktop\CFA\sem3.dsf' NG=1
MO NX=13 NK=1 TD=SY
LK
'SELF EFFICAC'
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1) LX(5,1) LX(6,1) LX(7,1) LX(8,1) LX(9,1)
FR LX(10,1) LX(11,1) LX(12,1) LX(13,1)
FR
TD(10,9)TD(2,1)TD(13,12)TD(7,3)TD(13,11)TD(12,1)TD(4,1)TD(11,8)TD(6,3)TD(12,5)TD(8,4)T
D(5,1)TD(12,11)TD(10,2)TD(10,1)TD(10,3)TD(7,1)TD(9,6)TD(10,6)TD(8,7)TD(13,8)TD(3,1)TD(
9,1)TD(12,9)TD(12,10)
PD
OU AM RS FS SC ND=3

TI CFA
```

Number of Input Variables 13
Number of Y - Variables 0
Number of X - Variables 13
Number of ETA - Variables 0
Number of KSI - Variables 1
Number of Observations 348

Covariance Matrix

	se1	se2	se3	se4	se5	se6
se1	0.540					
se2	0.331	0.335				
se3	0.332	0.265	0.369			
se4	0.357	0.272	0.342	0.437		
se5	0.323	0.230	0.310	0.331	0.486	
se6	0.254	0.233	0.250	0.311	0.269	0.413
se7	0.288	0.258	0.287	0.368	0.330	0.332
se8	0.321	0.267	0.343	0.409	0.340	0.342
se9	0.249	0.181	0.212	0.225	0.230	0.164
se10	0.256	0.197	0.189	0.220	0.195	0.158
se11	0.351	0.303	0.364	0.404	0.353	0.367
se12	0.365	0.263	0.302	0.329	0.346	0.272
se13	0.331	0.281	0.337	0.366	0.314	0.315

Covariance Matrix

	se7	se8	se9	se10	se11	se12
se7	0.477					
se8	0.413	0.540				
se9	0.231	0.242	0.311			
se10	0.217	0.225	0.235	0.315		
se11	0.415	0.476	0.274	0.259	0.657	
se12	0.335	0.356	0.267	0.242	0.407	0.541
se13	0.365	0.402	0.252	0.233	0.465	0.416

Covariance Matrix

	se13
se13	0.490

Parameter Specifications

LAMBDA-X

	SELF EFF
se1	1
se2	2
se3	3
se4	4
se5	5
se6	6
se7	7
se8	8
se9	9
se10	10
se11	11
se12	12
se13	13

THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	14					
se2	15	16				
se3	17	0	18			
se4	19	0	0	20		
se5	21	0	0	0	22	
se6	0	0	23	0	0	24
se7	25	0	26	0	0	0
se8	0	0	0	28	0	0
se9	31	0	0	0	0	32
se10	34	35	36	0	0	37
se11	0	0	0	0	0	0
se12	42	0	0	0	43	0
se13	0	0	0	0	0	0

THETA-DELTA

	se7	se8	se9	se10	se11	se12
se7	27					
se8	29	30				
se9	0	0	33			
se10	0	0	38	39		
se11	0	40	0	0	41	
se12	0	0	44	45	46	47
se13	0	48	0	0	49	50

THETA-DELTA

	se13
se13	51

Number of Iterations = 31

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	SELF EFF
se1	0.524
	(0.035)
	15.101
se2	0.454
	(0.026)
	17.488
se3	0.561
	(0.025)
	22.678
se4	0.604
	(0.027)
	22.257
se5	0.541
	(0.031)
	17.219
se6	0.528
	(0.029)
	18.379
se7	0.608
	(0.029)
	20.757
se8	0.623
	(0.032)
	19.602
se9	0.381
	(0.026)
	14.519
se10	0.364
	(0.027)
	13.494
se11	0.669
	(0.035)
	18.944
se12	0.538
	(0.034)
	16.010
se13	0.601
	(0.030)
	20.150

PHI

	SELF EFF
	1.000

THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	0.256					
	(0.020)					
	12.933					
se2	0.085	0.129				
	(0.010)	(0.010)				
	8.449	12.911				
se3	0.026	- -	0.050			
	(0.007)		(0.006)			
	3.701		8.772			
se4	0.042	- -	- -	0.072		
	(0.007)			(0.006)		
	5.966			11.906		
se5	0.043	- -	- -	- -	0.194	
	(0.010)				(0.015)	
	4.114				12.965	
se6	- -	- -	-0.042	- -	- -	0.138
			(0.006)			(0.012)
			-7.060			11.633
se7	-0.021	- -	-0.051	- -	- -	- -
	(0.008)		(0.005)			
	-2.652		-9.345			
se8	- -	- -	- -	0.031	- -	- -
				(0.006)		
				5.471		
se9	0.042	- -	- -	- -	- -	-0.041
	(0.010)					(0.009)
	4.391					-4.741
se10	0.058	0.029	-0.016	- -	- -	-0.033
	(0.011)	(0.007)	(0.005)			(0.009)
	5.312	3.828	-3.060			-3.832
se11	- -	- -	- -	- -	- -	- -
se12	0.066	- -	- -	- -	0.058	- -
	(0.010)				(0.010)	
	6.529				5.617	
se13	- -	- -	- -	- -	- -	- -

THETA-DELTA

	se7	se8	se9	se10	se11	se12
se7	0.106					
	(0.010)					
	10.821					
se8	0.029	0.151				
	(0.007)	(0.012)				
	3.957	12.515				
se9	- -	- -	0.163			
			(0.013)			
			12.918			
se10	- -	- -	0.090	0.176		
			(0.011)	(0.014)		
			8.493	12.752		
se11	- -	0.057	- -	- -	0.207	
		(0.009)			(0.016)	
		6.161			12.897	
se12	- -	- -	0.037	0.028	0.036	0.244
			(0.009)	(0.009)	(0.011)	(0.018)
			4.031	3.043	3.306	13.566
se13	- -	0.021	- -	- -	0.060	0.086
		(0.006)			(0.010)	(0.010)
		3.393			6.254	8.586

THETA-DELTA

	se13
se13	0.126
	(0.010)
	12.722

Squared Multiple Correlations for X - Variables

se1	se2	se3	se4	se5	se6
0.517	0.615	0.862	0.836	0.601	0.669

Squared Multiple Correlations for X - Variables

se7	se8	se9	se10	se11	se12
0.778	0.720	0.472	0.430	0.684	0.542

Squared Multiple Correlations for X - Variables

se13
0.741

Goodness of Fit Statistics

Degrees of Freedom = 40
Minimum Fit Function Chi-Square = 72.103 (P = 0.00139)
Normal Theory Weighted Least Squares Chi-Square = 68.919 (P = 0.00301)
Estimated Non-centrality Parameter (NCP) = 28.919
90 Percent Confidence Interval for NCP = (9.750 ; 55.951)

Minimum Fit Function Value = 0.208
Population Discrepancy Function Value (F0) = 0.0833
90 Percent Confidence Interval for F0 = (0.0281 ; 0.161)
Root Mean Square Error of Approximation (RMSEA) = 0.0456

90 Percent Confidence Interval for RMSEA = (0.0265 ; 0.0635)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.633

Expected Cross-Validation Index (ECVI) = 0.493
90 Percent Confidence Interval for ECVI = (0.437 ; 0.570)
ECVI for Saturated Model = 0.524
ECVI for Independence Model = 35.279

Chi-Square for Independence Model with 78 Degrees of Freedom = 12215.713
Independence AIC = 12241.713
Model AIC = 170.919
Saturated AIC = 182.000
Independence CAIC = 12304.791
Model CAIC = 418.382
Saturated CAIC = 623.550

Normed Fit Index (NFI) = 0.994
Non-Normed Fit Index (NNFI) = 0.995
Parsimony Normed Fit Index (PNFI) = 0.510
Comparative Fit Index (CFI) = 0.997
Incremental Fit Index (IFI) = 0.997
Relative Fit Index (RFI) = 0.988

Critical N (CN) = 307.520

Root Mean Square Residual (RMR) = 0.00965
Standardized RMR = 0.0223
Goodness of Fit Index (GFI) = 0.970
Adjusted Goodness of Fit Index (AGFI) = 0.933
Parsimony Goodness of Fit Index (PGFI) = 0.427

Fitted Covariance Matrix

	se1	se2	se3	se4	se5	se6
se1	0.531					
se2	0.323	0.335				
se3	0.320	0.255	0.365			
se4	0.359	0.274	0.339	0.437		
se5	0.326	0.245	0.303	0.327	0.486	
se6	0.277	0.240	0.255	0.319	0.285	0.417
se7	0.298	0.276	0.291	0.368	0.329	0.321
se8	0.326	0.283	0.350	0.408	0.337	0.329
se9	0.242	0.173	0.214	0.230	0.206	0.161
se10	0.249	0.194	0.188	0.220	0.197	0.159
se11	0.351	0.304	0.376	0.405	0.362	0.353
se12	0.348	0.244	0.302	0.325	0.349	0.284
se13	0.315	0.273	0.337	0.363	0.325	0.317

Fitted Covariance Matrix

	se7	se8	se9	se10	se11	se12
se7	0.476					
se8	0.408	0.539				
se9	0.232	0.238	0.308			
se10	0.221	0.227	0.229	0.308		
se11	0.407	0.474	0.255	0.244	0.655	
se12	0.327	0.335	0.242	0.224	0.397	0.534
se13	0.366	0.395	0.229	0.219	0.462	0.410

Fitted Covariance Matrix

	se13
se13	0.487

Fitted Residuals

	se1	se2	se3	se4	se5	se6
se1	0.009					
se2	0.008	0.000				
se3	0.011	0.011	0.003			
se4	-0.001	-0.002	0.003	0.000		
se5	-0.003	-0.016	0.006	0.004	0.000	
se6	-0.022	-0.006	-0.004	-0.008	-0.016	-0.003
se7	-0.009	-0.018	-0.004	0.001	0.001	0.011
se8	-0.005	-0.016	-0.007	0.001	0.003	0.013
se9	0.008	0.008	-0.002	-0.006	0.024	0.003
se10	0.007	0.003	0.001	0.000	-0.002	-0.001
se11	0.001	0.000	-0.012	-0.001	-0.009	0.013
se12	0.017	0.019	-0.001	0.004	-0.004	-0.013
se13	0.016	0.009	0.000	0.003	-0.011	-0.002

Fitted Residuals

	se7	se8	se9	se10	se11	se12
se7	0.001					
se8	0.004	0.000				
se9	-0.001	0.004	0.002			
se10	-0.005	-0.002	0.007	0.006		
se11	0.008	0.003	0.019	0.015	0.002	
se12	0.008	0.021	0.025	0.018	0.010	0.007
se13	0.000	0.006	0.022	0.015	0.003	0.006

Fitted Residuals

	se13
se13	0.002

Summary Statistics for Fitted Residuals

```
 Smallest Fitted Residual =   -0.022
   Median Fitted Residual =    0.002
  Largest Fitted Residual =    0.025
```

Stemleaf Plot

```
- 2|2
- 1|8666
- 1|321
- 0|99876655
- 0|44433222221111100000000
  0|111111222333333334444
  0|66667778888899
  1|011133
  1|5567899
  2|124
  2|5
```

Standardized Residuals

	se1	se2	se3	se4	se5	se6
se1	1.648					
se2	1.961	- -				
se3	3.026	2.630	1.796			
se4	-0.264	-0.497	1.010	0.043		
se5	-0.502	-1.894	1.227	0.662	- -	
se6	-2.583	-0.960	-1.478	-1.812	-1.971	-1.926
se7	-1.940	-3.023	-2.146	0.195	0.111	2.139
se8	-0.639	-2.235	-1.824	0.242	0.321	1.948
se9	1.219	1.116	-0.494	-1.093	2.597	0.923
se10	1.295	0.674	0.300	0.022	-0.203	-0.388
se11	0.062	-0.034	-2.298	-0.116	-0.839	1.575
se12	2.082	1.999	-0.099	0.616	-0.647	-1.332

```
    se13      2.061      1.298      0.000      0.673     -1.388     -0.380

        Standardized Residuals

              se7        se8        se9       se10       se11       se12
         --------   --------   --------   --------   --------   --------
     se7      0.965
     se8      1.231      0.170
     se9     -0.160      0.492      1.810
    se10     -0.723     -0.224      2.549      2.198
    se11      1.069      0.862      2.022      1.593      1.827
    se12      0.978      2.125      4.106      2.879      1.691      1.409
    se13     -0.009      1.523      3.053      2.023      1.827      1.674

        Standardized Residuals

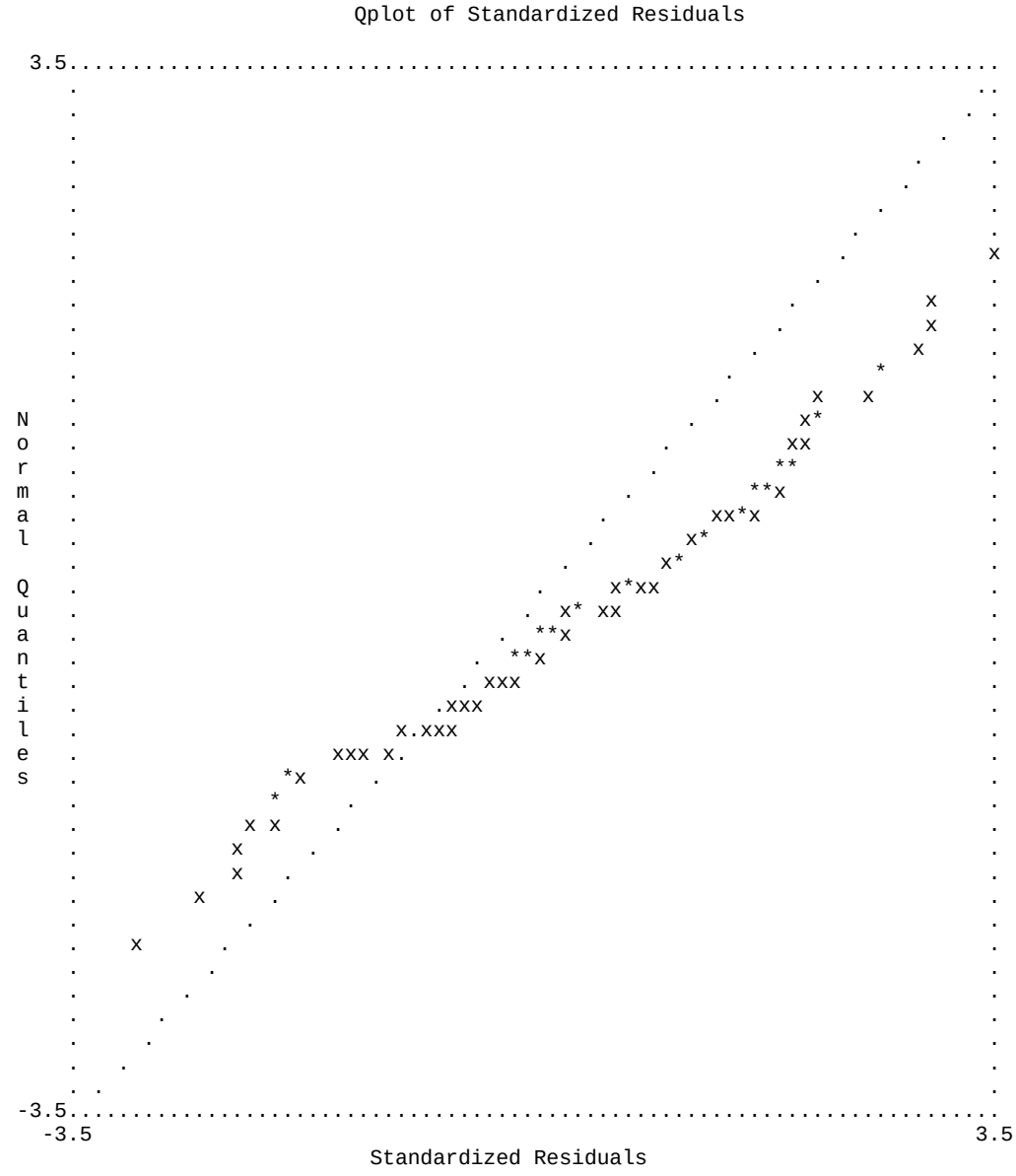
              se13
         --------
    se13      1.827


Summary Statistics for Standardized Residuals

Smallest Standardized Residual =   -3.023
  Median Standardized Residual =    0.492
 Largest Standardized Residual =    4.106

Stemleaf Plot

- 3|0
- 2|63210
- 1|9998854310
- 0|8766555443222110000000
  0|11222335677799
  1|00011222334566677888889
  2|0000111125669
  3|01
  4|1
Largest Negative Standardized Residuals
Residual for      se6 and      se1  -2.583
Residual for      se7 and      se2  -3.023
Largest Positive Standardized Residuals
Residual for      se3 and      se1   3.026
Residual for      se3 and      se2   2.630
Residual for      se9 and      se5   2.597
Residual for     se12 and      se9   4.106
Residual for     se12 and     se10   2.879
Residual for     se13 and      se9   3.053
```



Modification Indices and Expected Change

No Non-Zero Modification Indices for LAMBDA-X

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	- -					
se2	- -	- -				
se3	- -	5.005	- -			
se4	- -	0.009	2.035	- -		
se5	- -	4.092	2.225	0.283	- -	
se6	1.194	0.431	- -	3.425	0.206	- -
se7	- -	1.974	- -	0.749	0.407	2.121
se8	0.002	2.047	0.981	- -	0.037	1.762
se9	- -	0.485	3.710	4.069	7.266	- -
se10	- -	- -	- -	1.216	2.088	- -
se11	0.190	0.023	1.459	0.027	0.105	1.536
se12	- -	3.443	2.811	0.013	- -	1.235
se13	1.441	0.024	0.079	0.000	1.979	0.036

Modification Indices for THETA-DELTA

	se7	se8	se9	se10	se11	se12
se7	- -					
se8	- -	- -				
se9	1.364	0.479	- -			
se10	0.044	0.362	- -	- -		
se11	0.056	- -	0.384	0.439	- -	
se12	0.033	3.337	- -	- -	- -	- -
se13	0.540	- -	3.290	0.211	- -	- -

Modification Indices for THETA-DELTA

	se13
se13	- -

Expected Change for THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	- -					
se2	- -	- -				
se3	- -	0.013	- -			
se4	- -	0.000	0.008	- -		
se5	- -	-0.016	0.010	0.003	- -	
se6	-0.010	0.005	- -	-0.012	-0.004	- -
se7	- -	-0.010	- -	0.006	0.005	0.011
se8	0.000	-0.009	-0.006	- -	-0.002	0.011
se9	- -	0.005	-0.012	-0.010	0.022	- -
se10	- -	- -	- -	0.006	-0.012	- -
se11	-0.004	0.001	-0.008	-0.001	-0.003	0.011
se12	- -	0.014	-0.011	-0.001	- -	-0.010
se13	0.009	-0.001	0.001	0.000	-0.011	-0.001

Expected Change for THETA-DELTA

	se7	se8	se9	se10	se11	se12
se7	- -					
se8	- -	- -				
se9	-0.008	0.004	- -			
se10	0.001	-0.004	- -	- -		
se11	0.002	- -	0.005	0.005	- -	
se12	-0.001	0.016	- -	- -	- -	- -
se13	-0.004	- -	0.011	-0.003	- -	- -

Expected Change for THETA-DELTA

	se13
se13	- -

Completely Standardized Expected Change for THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	- -					
se2	- -	- -				
se3	- -	0.038	- -			
se4	- -	-0.001	0.019	- -		
se5	- -	-0.040	0.024	0.007	- -	
se6	-0.021	0.012	- -	-0.028	-0.009	- -
se7	- -	-0.024	- -	0.013	0.011	0.025
se8	0.001	-0.020	-0.014	- -	-0.003	0.023
se9	- -	0.017	-0.035	-0.028	0.057	- -
se10	- -	- -	- -	0.017	-0.032	- -
se11	-0.006	0.002	-0.016	-0.002	-0.005	0.021
se12	- -	0.034	-0.025	-0.001	- -	-0.020
se13	0.018	-0.002	0.003	0.000	-0.023	-0.003

Completely Standardized Expected Change for THETA-DELTA

	se7	se8	se9	se10	se11	se12
se7	- -					
se8	- -	- -				
se9	-0.020	0.010	- -			
se10	0.004	-0.009	- -	- -		
se11	0.004	- -	0.010	0.011	- -	
se12	-0.003	0.030	- -	- -	- -	- -
se13	-0.009	- -	0.029	-0.008	- -	- -

Completely Standardized Expected Change for THETA-DELTA

	se13
se13	- -

Maximum Modification Index is 7.27 for Element (9, 5) of THETA-DELTA

Factor Scores Regressions

KSI

	se1	se2	se3	se4	se5	se6
SELF EFF	-0.144	0.067	0.843	0.158	0.038	0.314

KSI

	se7	se8	se9	se10	se11	se12
SELF EFF	0.424	-0.121	0.031	0.162	0.037	0.001

KSI

	se13
SELF EFF	0.013

Standardized Solution

LAMBDA-X

	SELF EFF
se1	0.524
se2	0.454
se3	0.561
se4	0.604
se5	0.541
se6	0.528
se7	0.608
se8	0.623
se9	0.381
se10	0.364
se11	0.669
se12	0.538
se13	0.601

PHI

SELF EFF
1.000

Completely Standardized Solution

LAMBDA-X

	SELF	EFF
se1	0.719	
se2	0.784	
se3	0.929	
se4	0.914	
se5	0.775	
se6	0.818	
se7	0.882	
se8	0.848	
se9	0.687	
se10	0.655	
se11	0.827	
se12	0.737	
se13	0.861	

PHI

	SELF	EFF
	1.000	

THETA-DELTA

	se1	se2	se3	se4	se5	se6
se1	0.483					
se2	0.202	0.385				
se3	0.060	- -	0.138			
se4	0.087	- -	- -	0.164		
se5	0.084	- -	- -	- -	0.399	
se6	- -	- -	-0.107	- -	- -	0.331
se7	-0.042	- -	-0.122	- -	- -	- -
se8	- -	- -	- -	0.065	- -	- -
se9	0.104	- -	- -	- -	- -	-0.113
se10	0.145	0.089	-0.047	- -	- -	-0.093
se11	- -	- -	- -	- -	- -	- -
se12	0.123	- -	- -	- -	0.115	- -
se13	- -	- -	- -	- -	- -	- -

THETA-DELTA

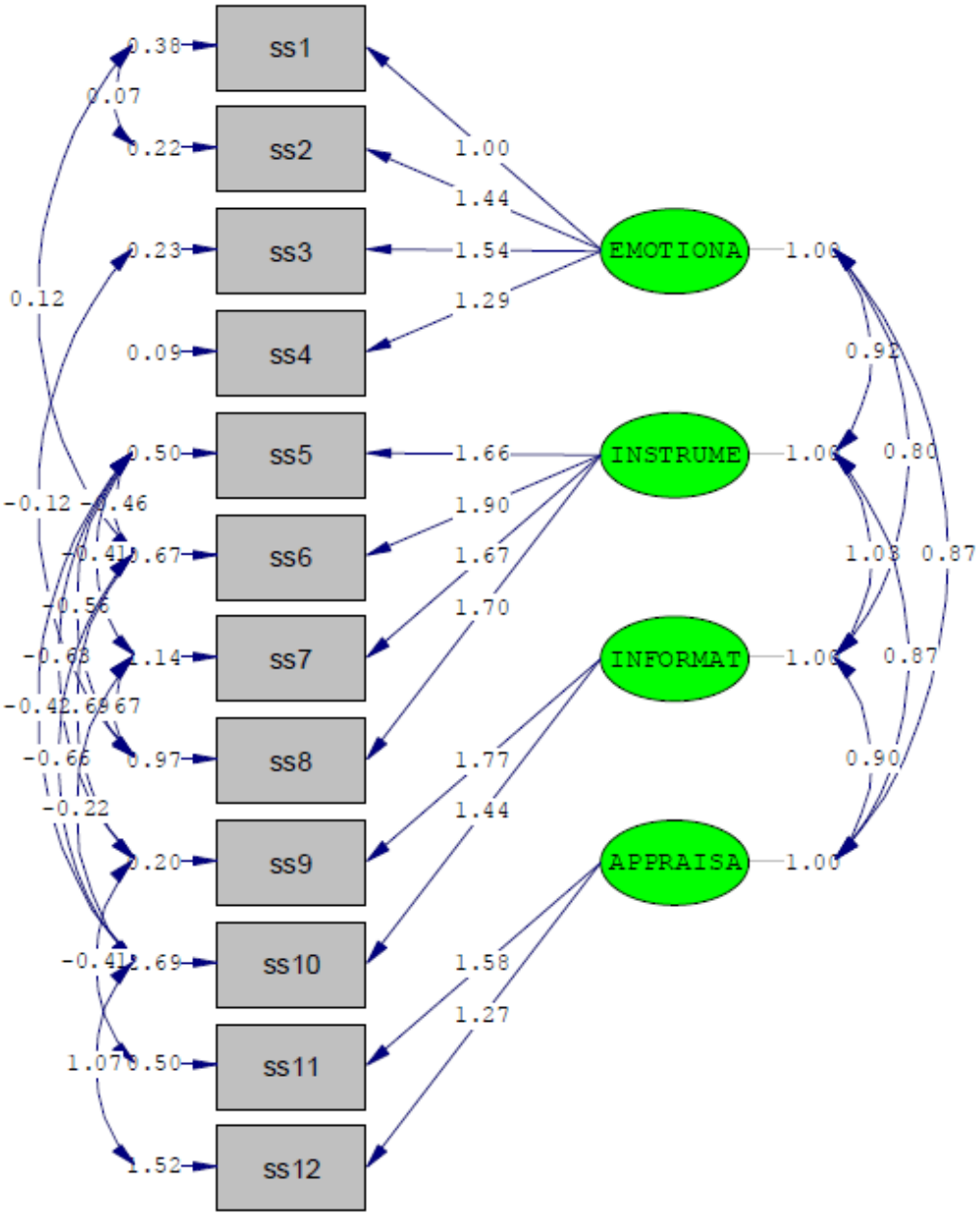
	se7	se8	se9	se10	se11	se12
se7	0.222					
se8	0.058	0.280				
se9	- -	- -	0.528			
se10	- -	- -	0.292	0.570		
se11	- -	0.096	- -	- -	0.316	
se12	- -	- -	0.090	0.069	0.061	0.458
se13	- -	0.041	- -	- -	0.106	0.169

THETA-DELTA

	se13
se13	0.259

Time used: 0.031 Seconds

Measurement model of social support



DATE: 4/12/2013

TIME: 13:37

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

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TI CFA
BUY CAR
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SY='C:\Users\CS670G-01\Desktop\CFA\sem.dsf' NG=1
MO NX=12 NK=4 TD=SY
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EMOTIONAL INSTRUMENT INFORMATION APPRAISAL
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FR LX(10,3) LX(11,4) LX(12,4)
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1)TD(10,5)TD(10,7)
PD
OU AM RS FS SC ND=3

TI CFA
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Number of Input Variables 12
Number of Y - Variables 0
Number of X - Variables 12
Number of ETA - Variables 0
Number of KSI - Variables 4
Number of Observations 348

Covariance Matrix

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	1.388					
ss2	1.522	2.289				
ss3	1.538	2.211	2.615			
ss4	1.288	1.858	1.989	1.752		
ss5	1.530	2.183	2.375	1.993	3.285	
ss6	1.913	2.548	2.695	2.232	2.697	4.297
ss7	1.640	2.215	2.446	1.990	2.380	3.206
ss8	1.631	2.251	2.313	1.981	2.237	3.256
ss9	1.454	1.993	2.196	1.798	2.372	2.757
ss10	1.168	1.815	1.862	1.619	2.251	2.174
ss11	1.410	2.018	2.185	1.794	2.333	2.635
ss12	1.067	1.614	1.719	1.445	1.983	2.053

Covariance Matrix

	ss7	ss8	ss9	ss10	ss11	ss12

ss7	3.929					
ss8	3.490	3.839				
ss9	3.053	3.108	3.373			
ss10	2.366	2.551	2.663	4.895		
ss11	2.268	2.233	2.036	2.100	3.023	
ss12	2.037	1.963	2.127	2.884	2.062	3.206

Parameter Specifications

LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	1	0	0	0
ss2	2	0	0	0
ss3	3	0	0	0
ss4	4	0	0	0
ss5	0	5	0	0
ss6	0	6	0	0
ss7	0	7	0	0
ss8	0	8	0	0
ss9	0	0	9	0
ss10	0	0	10	0
ss11	0	0	0	11
ss12	0	0	0	12

PHI

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
EMOTIONA	0			
INSTRUME	13	0		
INFORMAT	14	15	0	
APPRAISA	16	17	18	0

THETA-DELTA

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	19					
ss2	20	21				
ss3	0	0	22			
ss4	0	0	0	23		
ss5	0	0	0	0	24	
ss6	25	0	0	0	26	27
ss7	0	0	0	0	28	0
ss8	0	0	30	0	31	0
ss9	0	0	0	0	34	35
ss10	0	0	0	0	37	38
ss11	0	0	0	0	0	0
ss12	0	0	0	0	0	0

THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	29					
ss8	32	33				
ss9	0	0	36			
ss10	39	0	0	40		
ss11	0	0	41	0	42	
ss12	0	0	0	43	0	44

PHI

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
EMOTIONA	1.000			
INSTRUME	0.922	1.000		
	(0.013)			
	72.313			
INFORMAT	0.803	1.026	1.000	
	(0.024)	(0.024)		
	33.948	43.563		
APPRAISA	0.871	0.871	0.896	1.000
	(0.020)	(0.022)	(0.025)	
	42.878	40.508	35.975	

Number of Iterations = 15

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	1.003	- -	- -	- -
	(0.051)			
	19.776			
ss2	1.439	- -	- -	- -
	(0.060)			
	23.881			
ss3	1.538	- -	- -	- -
	(0.064)			
	24.023			
ss4	1.287	- -	- -	- -
	(0.052)			
	24.894			
ss5	- -	1.659	- -	- -
		(0.080)		
		20.802		
ss6	- -	1.902	- -	- -
		(0.086)		
		21.986		
ss7	- -	1.670	- -	- -
		(0.087)		
		19.273		
ss8	- -	1.703	- -	- -
		(0.085)		
		20.014		
ss9	- -	- -	1.765	- -
			(0.076)	
			23.080	
ss10	- -	- -	1.445	- -
			(0.103)	
			13.983	
ss11	- -	- -	- -	1.580
				(0.076)
				20.691
ss12	- -	- -	- -	1.271
				(0.083)
				15.344

THETA-DELTA

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	0.379					
	(0.031)					
	12.341					
ss2	0.074	0.218				
	(0.019)	(0.021)				
	3.993	10.354				
ss3	- -	- -	0.234			
			(0.024)			
			9.916			
ss4	- -	- -	- -	0.095		
				(0.012)		
				7.932		
ss5	- -	- -	- -	- -	0.499	
					(0.100)	
					4.971	
ss6	0.119	- -	- -	- -	-0.457	0.668
	(0.033)				(0.094)	(0.088)
	3.635				-4.859	7.607
ss7	- -	- -	- -	- -	-0.409	- -
					(0.090)	
					-4.535	
ss8	- -	- -	-0.116	- -	-0.565	- -
			(0.021)		(0.090)	
			-5.571		-6.256	
ss9	- -	- -	- -	- -	-0.629	-0.686
					(0.104)	(0.094)
					-6.065	-7.282
ss10	- -	- -	- -	- -	-0.425	-0.663
					(0.114)	(0.104)
					-3.710	-6.361
ss11	- -	- -	- -	- -	- -	- -
ss12	- -	- -	- -	- -	- -	- -

THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	1.137					
	(0.099)					
	11.488					
ss8	0.666	0.972				
	(0.088)	(0.093)				
	7.611	10.504				
ss9	- -	- -	0.202			
			(0.101)			
			2.011			
ss10	-0.217	- -	- -	2.688		
	(0.065)			(0.208)		
	-3.350			12.915		
ss11	- -	- -	-0.414	- -	0.498	
			(0.067)		(0.098)	
			-6.166		5.073	

ss12	- -	- -	- -	1.070	- -	1.521
				(0.129)		(0.127)
				8.310		12.013

Squared Multiple Correlations for X - Variables

ss1	ss2	ss3	ss4	ss5	ss6
0.726	0.905	0.910	0.946	0.847	0.844

Squared Multiple Correlations for X - Variables

ss7	ss8	ss9	ss10	ss11	ss12
0.710	0.749	0.939	0.437	0.834	0.515

Goodness of Fit Statistics

Degrees of Freedom = 34
Minimum Fit Function Chi-Square = 53.150 (P = 0.0193)
Normal Theory Weighted Least Squares Chi-Square = 51.581 (P = 0.0271)
Estimated Non-centrality Parameter (NCP) = 17.581
90 Percent Confidence Interval for NCP = (2.105 ; 41.004)

Minimum Fit Function Value = 0.153
Population Discrepancy Function Value (F0) = 0.0507
90 Percent Confidence Interval for F0 = (0.00607 ; 0.118)
Root Mean Square Error of Approximation (RMSEA) = 0.0386
90 Percent Confidence Interval for RMSEA = (0.0134 ; 0.0590)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.806

Expected Cross-Validation Index (ECVI) = 0.402
90 Percent Confidence Interval for ECVI = (0.358 ; 0.470)
ECVI for Saturated Model = 0.450
ECVI for Independence Model = 33.735

Chi-Square for Independence Model with 66 Degrees of Freedom = 11681.929
Independence AIC = 11705.929
Model AIC = 139.581
Saturated AIC = 156.000
Independence CAIC = 11764.156
Model CAIC = 353.078
Saturated CAIC = 534.472

Normed Fit Index (NFI) = 0.995
Non-Normed Fit Index (NNFI) = 0.997
Parsimony Normed Fit Index (PNFI) = 0.513
Comparative Fit Index (CFI) = 0.998
Incremental Fit Index (IFI) = 0.998
Relative Fit Index (RFI) = 0.991

Critical N (CN) = 367.010

Root Mean Square Residual (RMR) = 0.0635
Standardized RMR = 0.0189
Goodness of Fit Index (GFI) = 0.976
Adjusted Goodness of Fit Index (AGFI) = 0.945
Parsimony Goodness of Fit Index (PGFI) = 0.425

Fitted Covariance Matrix

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	1.385					
ss2	1.518	2.289				
ss3	1.542	2.213	2.598			
ss4	1.291	1.853	1.979	1.752		
ss5	1.534	2.201	2.351	1.968	3.252	
ss6	1.877	2.523	2.695	2.256	2.699	4.285
ss7	1.544	2.215	2.366	1.981	2.361	3.176
ss8	1.574	2.259	2.297	2.020	2.261	3.239
ss9	1.423	2.041	2.181	1.826	2.377	2.759
ss10	1.165	1.671	1.785	1.494	2.036	2.157
ss11	1.381	1.981	2.117	1.772	2.284	2.618
ss12	1.111	1.594	1.702	1.425	1.837	2.106

Fitted Covariance Matrix

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	3.925					
ss8	3.510	3.873				
ss9	3.025	3.085	3.318			
ss10	2.259	2.525	2.551	4.776		
ss11	2.299	2.344	2.087	2.047	2.995	
ss12	1.849	1.886	2.011	2.716	2.008	3.136

Fitted Residuals

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	0.003					
ss2	0.004	0.000				
ss3	-0.004	-0.002	0.017			
ss4	-0.004	0.005	0.010	0.000		
ss5	-0.004	-0.018	0.024	0.025	0.033	
ss6	0.036	0.025	0.001	-0.024	-0.002	0.012
ss7	0.096	0.000	0.080	0.009	0.019	0.030
ss8	0.057	-0.008	0.016	-0.040	-0.024	0.017
ss9	0.032	-0.049	0.015	-0.027	-0.004	-0.002
ss10	0.003	0.144	0.077	0.125	0.215	0.017
ss11	0.029	0.037	0.069	0.022	0.049	0.017
ss12	-0.043	0.020	0.017	0.020	0.146	-0.053

Fitted Residuals

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	0.004					
ss8	-0.020	-0.033				
ss9	0.029	0.023	0.055			
ss10	0.108	0.026	0.113	0.119		
ss11	-0.030	-0.111	-0.051	0.054	0.028	
ss12	0.188	0.078	0.116	0.168	0.054	0.071

Summary Statistics for Fitted Residuals

```
Smallest Fitted Residual =   -0.111
  Median Fitted Residual =    0.017
 Largest Fitted Residual =    0.215
```

Stemleaf Plot

```
- 1|1
- 0|555
- 0|443332222100000000000000
  0|1111122222222222223333333344
  0|5556677888
  1|0112224
  1|579
```

```
  2|1

       Standardized Residuals

              ss1        ss2        ss3        ss4        ss5        ss6
         --------   --------   --------   --------   --------   --------
    ss1      1.193
    ss2      1.401       - -
    ss3     -0.306     -0.259      1.767
    ss4     -0.533      1.514      1.647       - -
    ss5     -0.134     -0.809      0.955      1.713      2.847
    ss6      2.128      1.020      0.023     -1.574     -0.139      1.189
    ss7      2.287      0.008      2.039      0.348      1.061      0.953
    ss8      1.465     -0.249      0.640     -1.907     -1.649      0.750
    ss9      0.865     -1.831      0.549     -1.644     -0.333     -0.113
   ss10      0.045      1.894      0.964      2.018      2.847      0.266
   ss11      0.856      1.448      2.566      1.295      1.343      0.416
   ss12     -0.892      0.477      0.371      0.611      2.498     -0.811

       Standardized Residuals

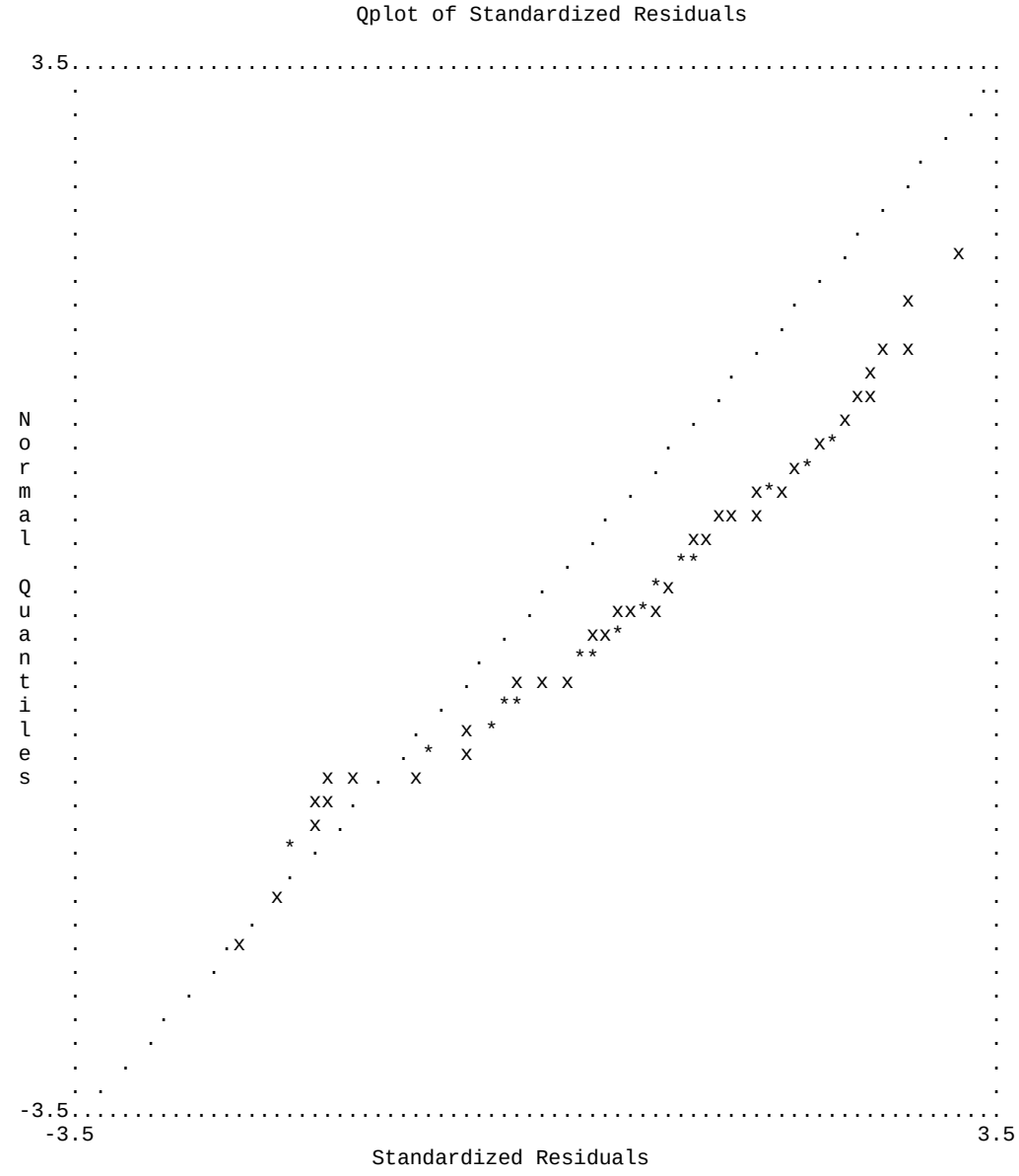
              ss7        ss8        ss9       ss10       ss11       ss12
         --------   --------   --------   --------   --------   --------
    ss7      0.808
    ss8     -1.412     -1.545
    ss9      1.286      1.071      3.257
   ss10      1.819      0.437      2.215      2.013
   ss11     -0.554     -2.258     -1.957      0.670      2.362
   ss12      2.331      1.039      2.449      2.672      1.234      2.362

Summary Statistics for Standardized Residuals

Smallest Standardized Residual =   -2.258
  Median Standardized Residual =    0.861
 Largest Standardized Residual =    3.257

Stemleaf Plot

- 2|30
- 1|9866654
- 0|98865333211100000
  0|33444556678899
  1|0000011222333445567889
  2|000123344456788
  3|3
Largest Positive Standardized Residuals
Residual for      ss5 and      ss5   2.847
Residual for      ss9 and      ss9   3.257
Residual for     ss10 and      ss5   2.847
Residual for     ss12 and     ss10   2.672
```



Modification Indices and Expected Change

Modification Indices for LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	- -	1.338	1.921	0.398
ss2	- -	0.968	0.975	0.631
ss3	- -	0.604	1.153	1.794
ss4	- -	0.128	0.659	0.582
ss5	0.286	- -	0.286	0.286
ss6	0.003	- -	0.003	0.003
ss7	3.433	- -	0.941	1.964
ss8	3.122	- -	0.526	2.445
ss9	5.827	5.106	- -	5.579
ss10	5.827	5.106	- -	5.579
ss11	2.703	4.914	4.915	- -
ss12	2.703	4.914	4.915	- -

Expected Change for LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	- -	0.077	0.067	0.042
ss2	- -	-0.052	-0.038	-0.045
ss3	- -	0.047	0.047	0.089
ss4	- -	-0.016	-0.028	-0.037
ss5	-0.323	- -	0.175	0.136
ss6	0.029	- -	-0.015	-0.012
ss7	0.192	- -	-0.149	0.175
ss8	-0.186	- -	0.109	-0.192
ss9	-0.529	-0.928	- -	-0.755
ss10	0.433	0.759	- -	0.618
ss11	0.564	-1.041	-0.368	- -
ss12	-0.453	0.838	0.296	- -

Standardized Expected Change for LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	- -	0.077	0.067	0.042
ss2	- -	-0.052	-0.038	-0.045
ss3	- -	0.047	0.047	0.089
ss4	- -	-0.016	-0.028	-0.037
ss5	-0.323	- -	0.175	0.136
ss6	0.029	- -	-0.015	-0.012
ss7	0.192	- -	-0.149	0.175
ss8	-0.186	- -	0.109	-0.192
ss9	-0.529	-0.928	- -	-0.755
ss10	0.433	0.759	- -	0.618
ss11	0.564	-1.041	-0.368	- -
ss12	-0.453	0.838	0.296	- -

Completely Standardized Expected Change for LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	- -	0.066	0.057	0.036
ss2	- -	-0.034	-0.025	-0.030
ss3	- -	0.029	0.029	0.055
ss4	- -	-0.012	-0.021	-0.028
ss5	-0.179	- -	0.097	0.075
ss6	0.014	- -	-0.007	-0.006
ss7	0.097	- -	-0.075	0.089
ss8	-0.095	- -	0.055	-0.097
ss9	-0.290	-0.509	- -	-0.415
ss10	0.198	0.347	- -	0.283
ss11	0.326	-0.602	-0.213	- -
ss12	-0.256	0.473	0.167	- -

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	- -					
ss2	- -	- -				
ss3	0.082	0.693	- -			
ss4	0.399	2.293	0.007	- -		
ss5	0.002	1.166	0.004	0.853	- -	
ss6	- -	2.337	0.487	0.461	- -	- -
ss7	1.317	2.014	1.296	0.469	- -	0.857
ss8	0.001	0.579	- -	2.085	- -	0.857
ss9	1.029	2.308	1.593	0.521	- -	- -
ss10	2.508	3.688	4.429	3.997	- -	- -
ss11	0.110	0.035	1.084	0.084	0.639	0.960
ss12	0.210	0.211	0.010	0.601	3.215	2.476

Modification Indices for THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	- -					
ss8	- -	- -				
ss9	1.949	4.755	- -			
ss10	- -	5.972	- -	- -		
ss11	0.117	1.791	- -	0.002	- -	
ss12	3.271	0.290	0.002	- -	- -	- -

Expected Change for THETA-DELTA

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	- -					
ss2	- -	- -				
ss3	-0.005	-0.015	- -			
ss4	-0.009	0.022	-0.002	- -		
ss5	-0.001	-0.027	-0.002	0.020	- -	
ss6	- -	0.044	-0.021	-0.015	- -	- -
ss7	0.029	-0.030	0.032	0.012	- -	-0.045
ss8	-0.001	0.015	- -	-0.025	- -	0.046
ss9	0.025	-0.031	0.031	-0.013	- -	- -
ss10	-0.072	0.072	-0.091	0.061	- -	- -
ss11	0.010	0.005	0.029	-0.006	-0.049	0.056
ss12	-0.016	-0.013	0.003	-0.018	0.125	-0.111

Expected Change for THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	- -					
ss8	- -	- -				
ss9	-0.075	0.110	- -			
ss10	- -	-0.272	- -	- -		
ss11	-0.015	-0.054	- -	-0.005	- -	
ss12	0.099	0.026	0.005	- -	- -	- -

Completely Standardized Expected Change for THETA-DELTA

	ss1	ss2	ss3	ss4	ss5	ss6
ss1	- -					
ss2	- -	- -				
ss3	-0.003	-0.006	- -			
ss4	-0.005	0.011	-0.001	- -		
ss5	-0.001	-0.010	-0.001	0.008	- -	
ss6	- -	0.014	-0.006	-0.005	- -	- -
ss7	0.012	-0.010	0.010	0.005	- -	-0.011
ss8	0.000	0.005	- -	-0.010	- -	0.011
ss9	0.012	-0.011	0.011	-0.005	- -	- -
ss10	-0.028	0.022	-0.026	0.021	- -	- -
ss11	0.005	0.002	0.011	-0.003	-0.016	0.016
ss12	-0.008	-0.005	0.001	-0.008	0.039	-0.030

Completely Standardized Expected Change for THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	- -					
ss8	- -	- -				
ss9	-0.021	0.031	- -			
ss10	- -	-0.063	- -	- -		
ss11	-0.004	-0.016	- -	-0.001	- -	
ss12	0.028	0.008	0.002	- -	- -	- -

Maximum Modification Index is 5.97 for Element (10, 8) of THETA-DELTA

Factor Scores Regressions

KSI

	ss1	ss2	ss3	ss4	ss5	ss6
EMOTIONA	0.027	0.127	0.167	0.280	0.047	0.009
INSTRUME	-0.072	0.043	-0.039	0.038	0.151	0.227
INFORMAT	-0.147	-0.110	-0.127	-0.329	0.397	0.333
APPRAISA	-0.011	0.050	-0.024	0.095	-0.037	0.063

KSI

	ss7	ss8	ss9	ss10	ss11	ss12
EMOTIONA	-0.019	0.065	-0.016	-0.010	0.009	0.013
INSTRUME	-0.072	-0.116	0.431	0.072	0.043	-0.134
INFORMAT	-0.040	0.063	0.296	0.024	0.100	-0.055
APPRAISA	-0.082	-0.142	0.391	-0.033	0.340	0.027

Standardized Solution

LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	1.003	- -	- -	- -
ss2	1.439	- -	- -	- -
ss3	1.538	- -	- -	- -
ss4	1.287	- -	- -	- -
ss5	- -	1.659	- -	- -
ss6	- -	1.902	- -	- -
ss7	- -	1.670	- -	- -
ss8	- -	1.703	- -	- -
ss9	- -	- -	1.765	- -
ss10	- -	- -	1.445	- -
ss11	- -	- -	- -	1.580
ss12	- -	- -	- -	1.271

PHI

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
EMOTIONA	1.000			
INSTRUME	0.922	1.000		
INFORMAT	0.803	1.026	1.000	
APPRAISA	0.871	0.871	0.896	1.000

TI CFA

Completely Standardized Solution

LAMBDA-X

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
ss1	0.852	- -	- -	- -
ss2	0.951	- -	- -	- -
ss3	0.954	- -	- -	- -
ss4	0.973	- -	- -	- -
ss5	- -	0.920	- -	- -
ss6	- -	0.919	- -	- -
ss7	- -	0.843	- -	- -
ss8	- -	0.865	- -	- -
ss9	- -	- -	0.969	- -
ss10	- -	- -	0.661	- -
ss11	- -	- -	- -	0.913
ss12	- -	- -	- -	0.718

PHI

	EMOTIONA	INSTRUME	INFORMAT	APPRAISA
EMOTIONA	1.000			
INSTRUME	0.922	1.000		
INFORMAT	0.803	1.026	1.000	
APPRAISA	0.871	0.871	0.896	1.000

THETA-DELTA

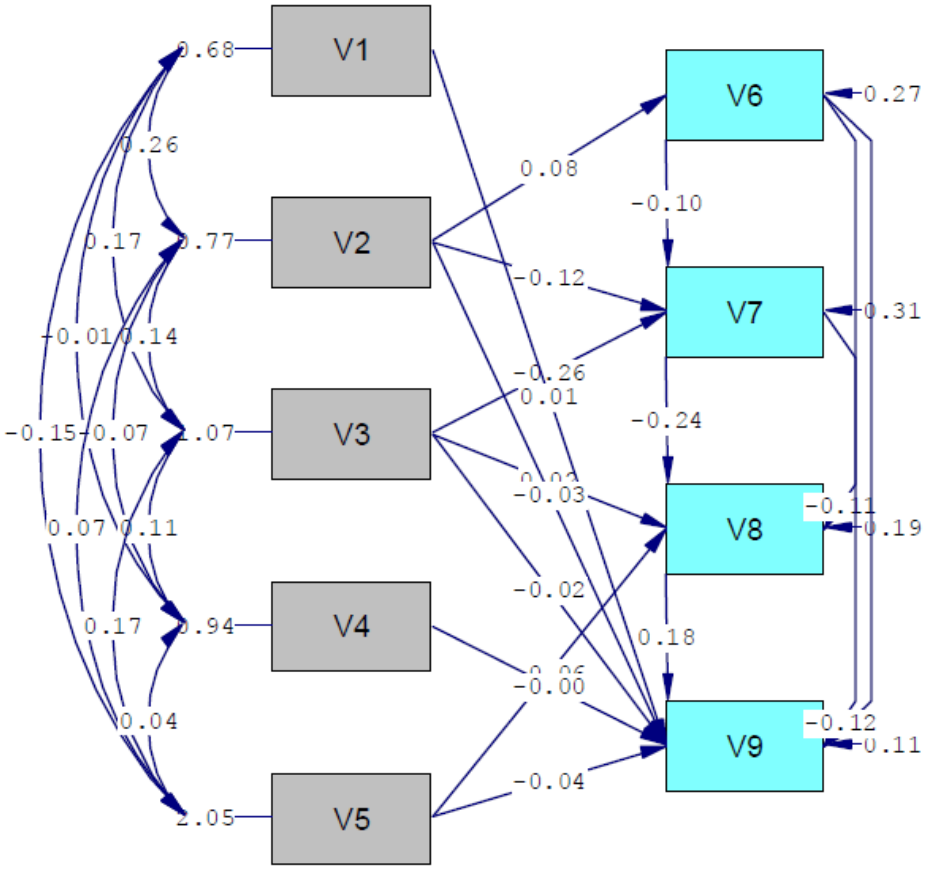
	ss1	ss2	ss3	ss4	ss5	ss6
ss1	0.274					
ss2	0.042	0.095				
ss3	- -	- -	0.090			
ss4	- -	- -	- -	0.054		
ss5	- -	- -	- -	- -	0.153	
ss6	0.049	- -	- -	- -	-0.122	0.156
ss7	- -	- -	- -	- -	-0.115	- -
ss8	- -	- -	-0.037	- -	-0.159	- -
ss9	- -	- -	- -	- -	-0.191	-0.182
ss10	- -	- -	- -	- -	-0.108	-0.147
ss11	- -	- -	- -	- -	- -	- -
ss12	- -	- -	- -	- -	- -	- -

THETA-DELTA

	ss7	ss8	ss9	ss10	ss11	ss12
ss7	0.290					
ss8	0.171	0.251				
ss9	- -	- -	0.061			
ss10	-0.050	- -	- -	0.563		
ss11	- -	- -	-0.131	- -	0.166	
ss12	- -	- -	- -	0.277	- -	0.485

Time used: 0.031 Seconds

Initial model of medication adherence among post myocardil infarction patients



DATE: 4/11/2013
TIME: 15:06

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

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The following lines were read from file C:\Users\CS670G-01\Desktop\Full model\JOB1.LPJ:

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DA NI=9 NO=348 MA=CM
LA
V1 V2 V3 V4 V5 V6 V7 V8 V9
KM
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0.36033 1.00000
0.19843 0.15429 1.00000
-0.01041 -0.07756 0.11312 1.00000
-0.12914 0.05823 0.11673 0.03216 1.00000
0.22818 0.14038 0.04658 0.01267 -0.01004 1.00000
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0.16325 0.08415 0.16406 0.12201 -0.21485 -0.07890 -0.34178 1.00000
0.09469 -0.00210 0.05239 0.02477 -0.23151 0.08206 -0.27782 0.31607 1.00000
ME
1.36782 2.45690 3.65254 1.74138 2.33072 3.36638 1.04071 2.43280 3.70460
SD
.82630 .87612 1.03215 .97034 1.43056 .52127 .64247 .47629 .36136
SE
6 7 8 9 1 2 3 4 5 /
MO NX=5 NY=4 BE=FU GA=FI PS=SY
FR BE(2,1) BE(3,1) BE(3,2) BE(4,1) BE(4,2) BE(4,3) GA(1,2) GA(2,2) GA(2,3)
FR GA(3,3) GA(3,5) GA(4,1) GA(4,2) GA(4,3) GA(4,4) GA(4,5)
PD
OU AM PC RS EF FS SS SC PT MR ND=3 MI

TI
```

Number of Input Variables	9
Number of Y - Variables	4
Number of X - Variables	5
Number of ETA - Variables	4
Number of KSI - Variables	5
Number of Observations	348

Covariance Matrix

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.043	0.413				
V8	-0.020	-0.105	0.227			
V9	0.015	-0.064	0.054	0.131		
V1	0.098	-0.103	0.064	0.028	0.683	
V2	0.064	-0.137	0.035	-0.001	0.261	0.768
V3	0.025	-0.300	0.081	0.020	0.169	0.140
V4	0.006	-0.037	0.056	0.009	-0.008	-0.066
V5	-0.007	0.080	-0.146	-0.120	-0.153	0.073

Covariance Matrix

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Means

V6	V7	V8	V9	V1	V2
3.366	1.041	2.433	3.705	1.368	2.457

Means

V3	V4	V5
3.653	1.741	2.331

Parameter Specifications

BETA

	V6	V7	V8	V9
V6	0	0	0	0
V7	1	0	0	0
V8	2	3	0	0
V9	4	5	6	0

GAMMA

	V1	V2	V3	V4	V5
V6	0	7	0	0	0
V7	0	8	9	0	0
V8	0	0	10	0	11
V9	12	13	14	15	16

PHI

	V1	V2	V3	V4	V5
V1	17				
V2	18	19			
V3	20	21	22		
V4	23	24	25	26	
V5	27	28	29	30	31

PSI

V6	V7	V8	V9
32	33	34	35

ALPHA

V6	V7	V8	V9
36	37	38	39

Initial Estimates (TSLS)

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.268	- -	- -	- -
V8	0.361	-0.129	- -	- -
V9	0.056	-0.123	0.175	- -

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
V7	- -	-0.109	-0.261	- -	- -
V8	- -	- -	0.042	- -	-0.069
V9	0.007	-0.031	-0.021	-0.004	-0.037

Covariance Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.083	0.434				
V8	0.109	-0.095	0.313			
V9	0.042	-0.063	0.074	0.135		
V1	0.022	-0.078	0.036	0.016	0.683	
V2	0.064	-0.137	0.042	0.000	0.261	0.768
V3	0.012	-0.296	0.075	0.017	0.169	0.140
V4	-0.006	-0.021	0.002	-0.003	-0.008	-0.066
V5	0.006	-0.055	-0.124	-0.098	-0.153	0.073

Covariance Matrix of Y and X

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Mean Vector of Eta-Variables

V6	V7	V8	V9
3.366	1.041	2.433	3.705

PHI

	V1	V2	V3	V4	V5
V1	0.683				
V2	0.261	0.768			
V3	0.169	0.140	1.065		
V4	-0.008	-0.066	0.113	0.942	
V5	-0.153	0.073	0.172	0.045	2.047

PSI

Note: This matrix is diagonal.

V6	V7	V8	V9
0.266	0.320	0.250	0.108

Squared Multiple Correlations for Structural Equations

V6	V7	V8	V9
0.020	0.263	0.202	0.197

Squared Multiple Correlations for Reduced Form

V6	V7	V8	V9
0.020	0.219	0.052	0.040

Reduced Form

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
		(0.056)			
		1.496			
V7	- -	-0.131	-0.261	- -	- -
		(0.053)	(0.077)		
		-2.483	-3.369		
V8	- -	0.047	0.076	- -	-0.069
		(0.023)	(0.120)		(0.155)
		2.068	0.630		-0.444
V9	0.007	-0.002	0.024	-0.004	-0.049
	(0.136)	(0.149)	(0.184)	(0.160)	(0.238)
	0.052	-0.012	0.130	-0.026	-0.208

ALPHA

V6	V7	V8	V9
3.161	3.164	1.359	3.458

Behavior under Minimization Iterations

Number of Iterations = 8

LISREL Estimates (Maximum Likelihood)

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.104	- -	- -	- -
	(0.059)			
	-1.775			
V8	-0.113	-0.236	- -	- -
	(0.045)	(0.041)		
	-2.490	-5.725		
V9	0.056	-0.123	0.175	- -
	(0.035)	(0.033)	(0.041)	
	1.602	-3.714	4.280	

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
		(0.032)			
		2.622			
V7	- -	-0.122	-0.263	- -	- -
		(0.035)	(0.030)		
		-3.470	-8.858		
V8	- -	- -	0.022	- -	-0.065
			(0.026)		(0.017)
			0.873		-3.905
V9	0.007	-0.031	-0.021	-0.004	-0.037
	(0.024)	(0.023)	(0.020)	(0.019)	(0.013)
	0.298	-1.369	-1.085	-0.225	-2.875

Covariance Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.039	0.412				
V8	-0.022	-0.096	0.223			
V9	0.014	-0.058	0.052	0.128		
V1	0.022	-0.079	0.030	0.015	0.683	
V2	0.064	-0.137	0.024	-0.003	0.261	0.768
V3	0.012	-0.298	0.082	0.019	0.169	0.140
V4	-0.006	-0.021	0.005	-0.003	-0.008	-0.066
V5	0.006	-0.055	-0.116	-0.097	-0.153	0.073

Covariance Matrix of Y and X

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Mean Vector of Eta-Variables

V6	V7	V8	V9
3.366	1.041	2.433	3.705

PHI

	V1	V2	V3	V4	V5
V1	0.683				
	(0.052)				
	13.077				
V2	0.261	0.768			
	(0.042)	(0.059)			
	6.269	13.077			
V3	0.169	0.140	1.065		
	(0.047)	(0.049)	(0.081)		
	3.599	2.820	13.077		
V4	-0.008	-0.066	0.113	0.942	
	(0.043)	(0.046)	(0.055)	(0.072)	
	-0.193	-1.430	2.079	13.077	
V5	-0.153	0.073	0.172	0.045	2.047
	(0.064)	(0.068)	(0.080)	(0.075)	(0.156)
	-2.369	1.075	2.144	0.594	13.077

PSI
Note: This matrix is diagonal.

V6	V7	V8	V9
0.266	0.313	0.189	0.108
(0.020)	(0.024)	(0.014)	(0.008)
13.077	13.077	13.077	13.077

Squared Multiple Correlations for Structural Equations

V6	V7	V8	V9
0.020	0.241	0.154	0.159

Squared Multiple Correlations for Reduced Form

V6	V7	V8	V9
0.020	0.234	0.067	0.042

Reduced Form

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
		(0.032)			
		2.622			
V7	- -	-0.131	-0.263	- -	- -
		(0.035)	(0.030)		
		-3.736	-8.858		
V8	- -	0.022	0.084	- -	-0.065
		(0.011)	(0.024)		(0.017)
		2.010	3.522		-3.905
V9	0.007	-0.006	0.026	-0.004	-0.049
	(0.024)	(0.023)	(0.019)	(0.019)	(0.013)
	0.298	-0.275	1.351	-0.225	-3.729

ALPHA

V6	V7	V8	V9
3.161	2.651	3.128	3.458
(0.083)	(0.227)	(0.204)	(0.206)
38.046	11.687	15.368	16.770

Goodness of Fit Statistics

Degrees of Freedom = 10
Minimum Fit Function Chi-Square = 33.095 (P = 0.000263)
Normal Theory Weighted Least Squares Chi-Square = 32.280 (P = 0.000360)
Estimated Non-centrality Parameter (NCP) = 22.280
90 Percent Confidence Interval for NCP = (8.754 ; 43.403)

Minimum Fit Function Value = 0.0954
Population Discrepancy Function Value (F0) = 0.0651
90 Percent Confidence Interval for F0 = (0.0256 ; 0.127)
Root Mean Square Error of Approximation (RMSEA) = 0.0807
90 Percent Confidence Interval for RMSEA = (0.0506 ; 0.113)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.0471

Expected Cross-Validation Index (ECVI) = 0.352
90 Percent Confidence Interval for ECVI = (0.286 ; 0.387)
ECVI for Saturated Model = 0.263
ECVI for Independence Model = 1.213

Chi-Square for Independence Model with 36 Degrees of Freedom = 396.835
Independence AIC = 414.835
Model AIC = 120.280
Saturated AIC = 90.000
Independence CAIC = 458.505
Model CAIC = 333.777
Saturated CAIC = 308.349

Normed Fit Index (NFI) = 0.917
Non-Normed Fit Index (NNFI) = 0.770
Parsimony Normed Fit Index (PNFI) = 0.255
Comparative Fit Index (CFI) = 0.936
Incremental Fit Index (IFI) = 0.940
Relative Fit Index (RFI) = 0.700

Critical N (CN) = 244.357

Root Mean Square Residual (RMR) = 0.0264
Standardized RMR = 0.0443
Goodness of Fit Index (GFI) = 0.980
Adjusted Goodness of Fit Index (AGFI) = 0.909
Parsimony Goodness of Fit Index (PGFI) = 0.218

Fitted Covariance Matrix

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.039	0.412				
V8	-0.022	-0.096	0.223			
V9	0.014	-0.058	0.052	0.128		
V1	0.022	-0.079	0.030	0.015	0.683	
V2	0.064	-0.137	0.024	-0.003	0.261	0.768
V3	0.012	-0.298	0.082	0.019	0.169	0.140
V4	-0.006	-0.021	0.005	-0.003	-0.008	-0.066
V5	0.006	-0.055	-0.116	-0.097	-0.153	0.073

Fitted Covariance Matrix

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Fitted Means

V6	V7	V8	V9	V1	V2
3.366	1.041	2.433	3.705	1.368	2.457

Fitted Means

V3	V4	V5
3.653	1.741	2.331

Fitted Residuals

	V6	V7	V8	V9	V1	V2
V6	- -					
V7	-0.004	0.001				
V8	0.002	-0.009	0.004			
V9	0.001	-0.007	0.003	0.002		
V1	0.076	-0.024	0.034	0.013	- -	
V2	0.000	0.000	0.012	0.002	- -	- -
V3	0.013	-0.001	-0.001	0.001	- -	- -

```
      V4      0.012     -0.015      0.051      0.012       - -        - -
      V5     -0.014      0.135     -0.030     -0.023       - -        - -

        Fitted Residuals

                 V3         V4         V5
             --------   --------   --------
      V3        - -
      V4        - -         - -
      V5      0.000        - -         - -

        Fitted Residuals for Means

                 V6         V7         V8         V9         V1         V2
             --------   --------   --------   --------   --------   --------
                 - -       0.000        - -       0.000       - -        - -

        Fitted Residuals for Means

                 V3         V4         V5
             --------   --------   --------
                 - -        - -        - -

Summary Statistics for Fitted Residuals

 Smallest Fitted Residual =   -0.030
   Median Fitted Residual =    0.000
  Largest Fitted Residual =    0.135


 Stemleaf Plot

 - 2|043
 - 0|549741100000000000000000
   0|1112223422233
   2|4
   4|1
   6|6
   8|
  10|
  12|5

        Standardized Residuals

                 V6         V7         V8         V9         V1         V2
             --------   --------   --------   --------   --------   --------
      V6        - -
      V7     -0.471      0.471
      V8      0.605     -3.025      2.593
      V9      0.735     -3.155      2.363      2.909
      V1      3.556     -1.038      1.760      2.582       - -
      V2        - -       - -       0.582      0.582       - -        - -
      V3      0.471     -0.471     -0.471      0.471       - -        - -
      V4      0.441     -0.528      2.151      1.807       - -        - -
      V5     -0.341      3.132     -2.829     -3.081       - -        - -

        Standardized Residuals

                 V3         V4         V5
             --------   --------   --------
      V3        - -
      V4        - -         - -
      V5        - -         - -         - -

 Summary Statistics for Standardized Residuals

 Smallest Standardized Residual =   -3.155
   Median Standardized Residual =    0.000
  Largest Standardized Residual =    3.556
```

Stemleaf Plot

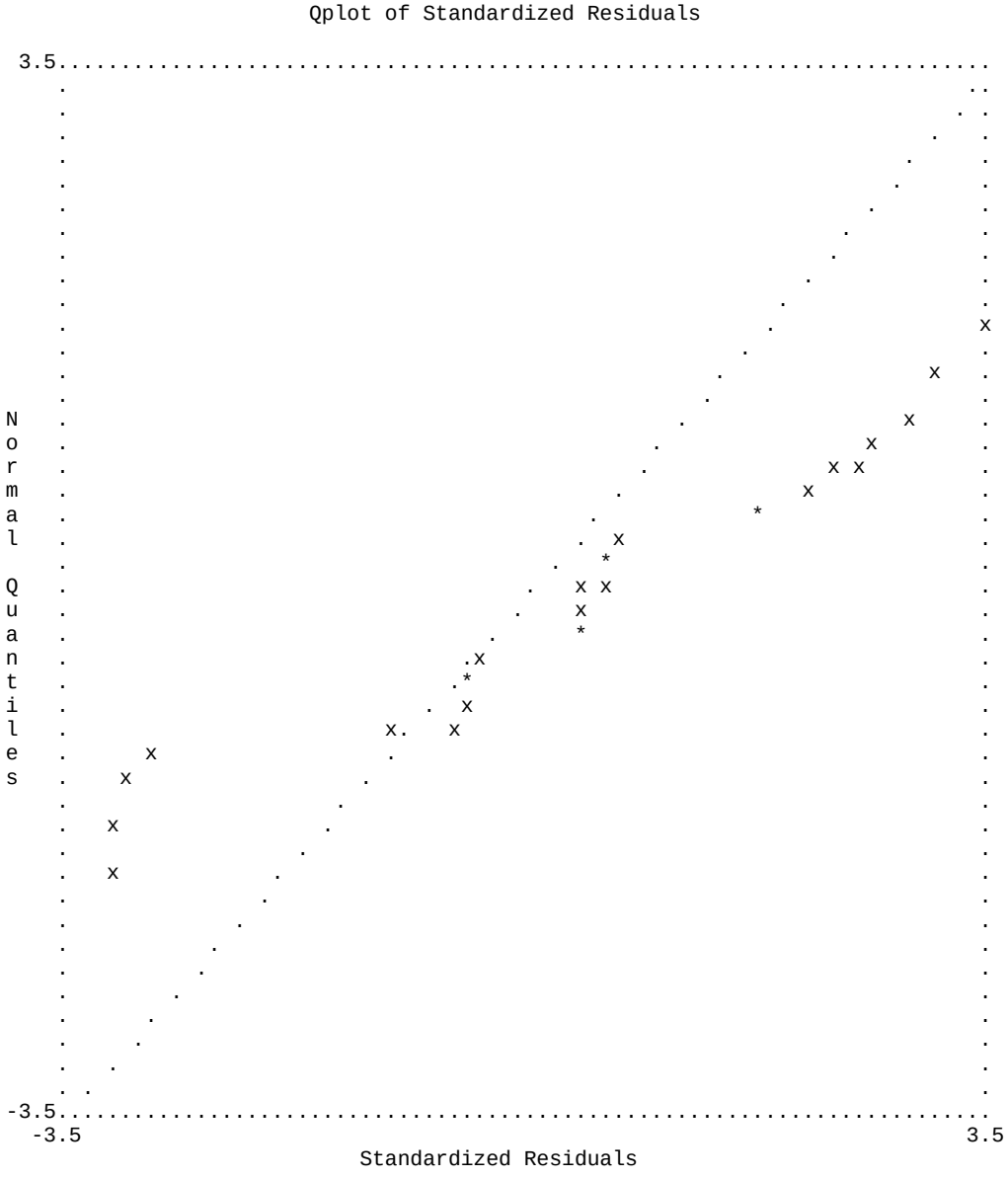
```
- 3|210
- 2|8
- 1|0
- 0|55553000000000000000000
  0|45556667
  1|88
  2|24669
  3|16
```

Largest Negative Standardized Residuals

Residual for	V8 and	V7	-3.025
Residual for	V9 and	V7	-3.155
Residual for	V5 and	V8	-2.829
Residual for	V5 and	V9	-3.081

Largest Positive Standardized Residuals

Residual for	V8 and	V8	2.593
Residual for	V9 and	V9	2.909
Residual for	V1 and	V6	3.556
Residual for	V1 and	V9	2.582
Residual for	V5 and	V7	3.132



Modification Indices and Expected Change

Modification Indices for BETA

	V6	V7	V8	V9
V6	- -	0.222	0.080	0.417
V7	- -	- -	3.851	8.445
V8	- -	- -	- -	0.260
V9	- -	- -	- -	- -

Expected Change for BETA

	V6	V7	V8	V9
V6	- -	-0.049	0.059	0.244
V7	- -	- -	-0.488	-1.223
V8	- -	- -	- -	-0.487
V9	- -	- -	- -	- -

Standardized Expected Change for BETA

	V6	V7	V8	V9
V6	- -	-0.147	0.241	1.308
V7	- -	- -	-1.609	-5.317
V8	- -	- -	- -	-2.877
V9	- -	- -	- -	- -

Modification Indices for GAMMA

	V1	V2	V3	V4	V5
V6	12.646	- -	0.222	0.195	0.116
V7	0.486	- -	- -	0.238	9.697
V8	4.001	0.339	- -	4.655	- -
V9	- -	- -	- -	- -	- -

Expected Change for GAMMA

	V1	V2	V3	V4	V5
V6	0.129	- -	0.013	0.013	-0.007
V7	-0.028	- -	- -	-0.015	0.066
V8	0.059	0.016	- -	0.053	- -
V9	- -	- -	- -	- -	- -

Standardized Expected Change for GAMMA

	V1	V2	V3	V4	V5
V6	0.204	- -	0.026	0.024	-0.018
V7	-0.036	- -	- -	-0.023	0.148
V8	0.103	0.030	- -	0.108	- -
V9	- -	- -	- -	- -	- -

No Non-Zero Modification Indices for PHI

Modification Indices for PSI

	V6	V7	V8	V9
V6	- -			
V7	- -	- -		
V8	0.339	0.339	- -	
V9	- -	- -	- -	- -

Expected Change for PSI

	V6	V7	V8	V9

V6	- -			
V7	- -	- -		
V8	-0.052	0.042	- -	
V9	- -	- -	- -	- -

Standardized Expected Change for PSI

	V6	V7	V8	V9
V6	- -			
V7	- -	- -		
V8	-0.210	0.137	- -	
V9	- -	- -	- -	- -

Modification Indices for THETA-EPS

	V6	V7	V8	V9
V6	0.339			
V7	0.339	0.339		
V8	0.339	0.339	- -	
V9	- -	- -	- -	- -

Expected Change for THETA-EPS

	V6	V7	V8	V9
V6	-0.527			
V7	-0.803	0.176		
V8	-0.060	0.042	- -	
V9	- -	- -	- -	- -

Modification Indices for THETA-DELTA-EPS

	V6	V7	V8	V9
V1	13.724	0.184	3.645	- -
V2	8.957	0.040	0.008	- -
V3	0.070	3.148	8.373	- -
V4	0.381	0.012	4.912	- -
V5	0.305	9.920	2.124	- -

Expected Change for THETA-DELTA-EPS

	V6	V7	V8	V9
V1	0.076	0.009	0.034	- -
V2	-0.162	-0.010	0.002	- -
V3	-0.007	-0.214	-0.306	- -
V4	0.016	0.003	0.050	- -
V5	0.021	0.133	0.255	- -

Modification Indices for THETA-DELTA

	V1	V2	V3	V4	V5
V1	- -				
V2	4.814	2.943			
V3	0.116	0.119	0.513		
V4	- -	0.459	0.637	- -	
V5	3.645	2.967	7.397	4.912	2.124

Expected Change for THETA-DELTA

	V1	V2	V3	V4	V5
V1	- -				
V2	-0.326	0.735			
V3	-0.029	-0.061	-0.341		
V4	- -	-0.129	-0.088	- -	
V5	0.520	0.343	0.434	0.773	3.957

No Non-Zero Modification Indices for ALPHA

No Non-Zero Modification Indices for KAPPA

Maximum Modification Index is 13.72 for Element (1, 1) of THETA DELTA-EPSILON

Factor Scores Regressions

Y

	V6	V7	V8	V9	V1	V2
V6	1.000	0.000	0.000	0.000	0.000	0.000
V7	0.000	1.000	0.000	0.000	0.000	0.000
V8	0.000	0.000	1.000	0.000	0.000	0.000
V9	0.000	0.000	0.000	1.000	0.000	0.000

Y

	V3	V4	V5
V6	0.000	0.000	0.000
V7	0.000	0.000	0.000
V8	0.000	0.000	0.000
V9	- -	0.000	0.000

X

	V6	V7	V8	V9	V1	V2
V1	0.000	0.000	0.000	0.000	1.000	0.000
V2	0.000	0.000	0.000	0.000	0.000	1.000
V3	0.000	0.000	0.000	0.000	0.000	0.000
V4	0.000	0.000	0.000	0.000	0.000	0.000
V5	0.000	0.000	0.000	- -	0.000	0.000

X

	V3	V4	V5
V1	0.000	0.000	0.000
V2	0.000	0.000	0.000
V3	1.000	0.000	0.000
V4	0.000	1.000	- -
V5	0.000	- -	1.000

Standardized Solution

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.084	- -	- -	- -
V8	-0.125	-0.321	- -	- -
V9	0.081	-0.221	0.231	- -

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.140	- -	- -	- -
V7	- -	-0.167	-0.422	- -	- -
V8	- -	- -	0.049	- -	-0.196
V9	0.016	-0.076	-0.062	-0.011	-0.149

Correlation Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	1.000					
V7	-0.117	1.000				
V8	-0.088	-0.317	1.000			
V9	0.075	-0.250	0.306	1.000		
V1	0.051	-0.148	0.076	0.051	1.000	
V2	0.140	-0.244	0.057	-0.009	0.360	1.000
V3	0.022	-0.450	0.168	0.051	0.198	0.154
V4	-0.011	-0.034	0.011	-0.008	-0.010	-0.078
V5	0.008	-0.060	-0.172	-0.189	-0.129	0.058

Correlation Matrix of Y and X

	V3	V4	V5
V3	1.000		
V4	0.113	1.000	
V5	0.117	0.032	1.000

PSI
Note: This matrix is diagonal.

V6	V7	V8	V9
0.980	0.759	0.846	0.841

Regression Matrix Y on X (Standardized)

	V1	V2	V3	V4	V5
V6	- -	0.140	- -	- -	- -
V7	- -	-0.179	-0.422	- -	- -
V8	- -	0.040	0.185	- -	-0.196
V9	0.016	-0.015	0.074	-0.011	-0.194

Total and Indirect Effects

Total Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
		(0.032)			
		2.622			
V7	- -	-0.131	-0.263	- -	- -
		(0.035)	(0.030)		
		-3.736	-8.858		
V8	- -	0.022	0.084	- -	-0.065
		(0.011)	(0.024)		(0.017)
		2.010	3.522		-3.905
V9	0.007	-0.006	0.026	-0.004	-0.049
	(0.024)	(0.023)	(0.019)	(0.019)	(0.013)
	0.298	-0.275	1.351	-0.225	-3.729

Indirect Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	- -	- -	- -	- -
V7	- -	-0.009	- -	- -	- -
		(0.006)			
		-1.470			
V8	- -	0.022	0.062	- -	- -
		(0.011)	(0.013)		
		2.010	4.808		
V9	- -	0.025	0.047	- -	-0.011
		(0.008)	(0.011)		(0.004)
		3.162	4.489		-2.885

Total Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.104	- -	- -	- -
	(0.059)			
	-1.775			
V8	-0.088	-0.236	- -	- -
	(0.047)	(0.041)		
	-1.876	-5.725		
V9	0.053	-0.165	0.175	- -
	(0.037)	(0.033)	(0.041)	
	1.454	-5.055	4.280	

Largest Eigenvalue of B*B' (Stability Index) is 0.084

Indirect Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	- -	- -	- -	- -
V8	0.025	- -	- -	- -
	(0.014)			
	1.695			
V9	-0.003	-0.041	- -	- -
	(0.014)	(0.012)		
	-0.195	-3.428		

Standardized Total and Indirect Effects

Standardized Total Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	0.140	- -	- -	- -
V7	- -	-0.179	-0.422	- -	- -
V8	- -	0.040	0.185	- -	-0.196
V9	0.016	-0.015	0.074	-0.011	-0.194

Standardized Indirect Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	- -	- -	- -	- -
V7	- -	-0.012	- -	- -	- -
V8	- -	0.040	0.136	- -	- -
V9	- -	0.060	0.136	- -	-0.045

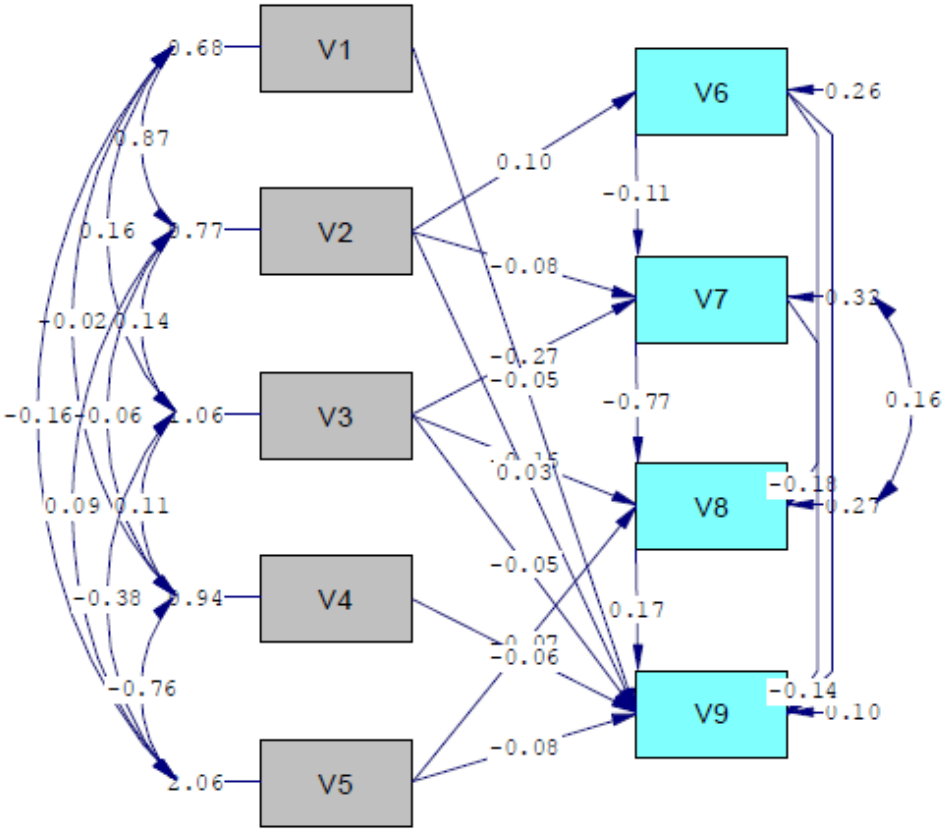
Standardized Total Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.084	- -	- -	- -
V8	-0.098	-0.321	- -	- -
V9	0.077	-0.295	0.231	- -

Standardized Indirect Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	- -	- -	- -	- -
V8	0.027	- -	- -	- -
V9	-0.004	-0.074	- -	- -

Final Model o medication adherence in post myocardial infarction patients



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TIME: 15:35

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BY

Karl G. J”reskog & Dag S”rbom

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The following lines were read from file C:\Users\CS670G-01\Desktop\Full model\JOB5.LPJ:

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V1 V2 V3 V4 V5 V6 V7 V8 V9
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-0.01041 -0.07756 0.11312 1.00000
-0.12914 0.05823 0.11673 0.03216 1.00000
0.22818 0.14038 0.04658 0.01267 -0.01004 1.00000
-0.19341 -0.24391 -0.45173 -0.05857 0.08733 -0.12749 1.00000
0.16325 0.08415 0.16406 0.12201 -0.21485 -0.07890 -0.34178 1.00000
0.09469 -0.00210 0.05239 0.02477 -0.23151 0.08206 -0.27782 0.31607 1.00000
ME
1.36782 2.45690 3.65254 1.74138 2.33072 3.36638 1.04071 2.43280 3.70460
SD
.82630 .87612 1.03215 .97034 1.43056 .52127 .64247 .47629 .36136
SE
6 7 8 9 1 2 3 4 5 /
MO NX=5 NY=4 BE=FU GA=FI PS=SY TD=SY
FR BE(2,1) BE(3,1) BE(3,2) BE(4,1) BE(4,2) BE(4,3) GA(1,2) GA(2,2) GA(2,3)
FR GA(3,3) GA(3,5) GA(4,1) GA(4,2) GA(4,3) GA(4,4) GA(4,5)
FR PS(3,2)
FR TD(5,3) TD(5,4) TD(2,1)
PD
OU AM PC RS EF FS SS SC PT MR ND=3 MI
```

Number of Input Variables 9
Number of Y - Variables 4
Number of X - Variables 5
Number of ETA - Variables 4
Number of KSI - Variables 5
Number of Observations 348

Covariance Matrix

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.043	0.413				
V8	-0.020	-0.105	0.227			
V9	0.015	-0.064	0.054	0.131		
V1	0.098	-0.103	0.064	0.028	0.683	
V2	0.064	-0.137	0.035	-0.001	0.261	0.768
V3	0.025	-0.300	0.081	0.020	0.169	0.140
V4	0.006	-0.037	0.056	0.009	-0.008	-0.066
V5	-0.007	0.080	-0.146	-0.120	-0.153	0.073

Covariance Matrix

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Means

V6	V7	V8	V9	V1	V2
3.366	1.041	2.433	3.705	1.368	2.457

Means

V3	V4	V5
3.653	1.741	2.331

Parameter Specifications

BETA

	V6	V7	V8	V9
V6	0	0	0	0
V7	1	0	0	0
V8	2	3	0	0
V9	4	5	6	0

GAMMA

	V1	V2	V3	V4	V5
V6	0	7	0	0	0
V7	0	8	9	0	0
V8	0	0	10	0	11
V9	12	13	14	15	16

PHI

	V1	V2	V3	V4	V5
V1	17				
V2	18	19			
V3	20	21	22		
V4	23	24	25	26	
V5	27	28	29	30	31

PSI

	V6	V7	V8	V9
V6	32			
V7	0	33		
V8	0	34	35	
V9	0	0	0	36

ALPHA

V6	V7	V8	V9
40	41	42	43

Initial Estimates (TSLS)

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.268	- -	- -	- -
V8	0.361	-0.129	- -	- -
V9	0.056	-0.123	0.175	- -

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
V7	- -	-0.109	-0.261	- -	- -
V8	- -	- -	0.042	- -	-0.069
V9	0.007	-0.031	-0.021	-0.004	-0.037

Covariance Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.083	0.434				
V8	0.109	-0.147	0.326			
V9	0.042	-0.072	0.083	0.137		
V1	0.022	-0.078	0.036	0.016	0.683	
V2	0.064	-0.137	0.042	0.000	0.261	0.768
V3	0.012	-0.296	0.075	0.017	0.169	0.140
V4	-0.006	-0.021	0.002	-0.003	-0.008	-0.066
V5	0.006	-0.055	-0.124	-0.098	-0.153	0.073

Covariance Matrix of Y and X

	V3	V4	V5
V3	1.065		
V4	0.113	0.942	
V5	0.172	0.045	2.047

Mean Vector of Eta-Variables

V6	V7	V8	V9
3.366	1.041	2.433	3.705

PHI

	V1	V2	V3	V4	V5
V1	0.683				
V2	0.261	0.768			
V3	0.169	0.140	1.065		
V4	-0.008	-0.066	0.113	0.942	
V5	-0.153	0.073	0.172	0.045	2.047

PSI

	V6	V7	V8	V9
V6	0.266			
V7	- -	0.320		
V8	- -	-0.052	0.250	
V9	- -	- -	- -	0.108

Squared Multiple Correlations for Structural Equations

V6	V7	V8	V9
0.020	0.263	0.235	0.213

Squared Multiple Correlations for Reduced Form

V6	V7	V8	V9
0.020	0.219	0.050	0.039

Reduced Form

	V1	V2	V3	V4	V5
V6	- -	0.084	- -	- -	- -
		(0.056)			
		1.496			
V7	- -	-0.131	-0.261	- -	- -
		(0.053)	(0.077)		
		-2.483	-3.369		
V8	- -	0.047	0.076	- -	-0.069
		(0.023)	(0.120)		(0.158)
		2.061	0.631		-0.436
V9	0.007	-0.002	0.024	-0.004	-0.049
	(0.136)	(0.149)	(0.184)	(0.160)	(0.238)
	0.052	-0.012	0.130	-0.026	-0.208

ALPHA

V6	V7	V8	V9
3.161	3.164	1.359	3.458

Number of Iterations = 39

LISREL Estimates (Maximum Likelihood)

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.107	- -	- -	- -
	(0.058)			
	-1.830			
V8	-0.182	-0.773	- -	- -
	(0.068)	(0.311)		
	-2.693	-2.482		
V9	0.055	-0.144	0.168	- -
	(0.035)	(0.034)	(0.042)	
	1.552	-4.205	4.021	

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.101	- -	- -	- -
		(0.028)			
		3.538			
V7	- -	-0.078	-0.268	- -	- -
		(0.029)	(0.030)		
		-2.673	-8.963		
V8	- -	- -	-0.163	- -	-0.068
			(0.092)		(0.019)

			-1.779		-3.557
V9	-0.047	0.028	-0.055	-0.063	-0.079
	(0.079)	(0.073)	(0.029)	(0.065)	(0.040)
	-0.588	0.389	-1.888	-0.962	-1.954

Covariance Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.039	0.412				
V8	-0.022	-0.105	0.228			
V9	0.014	-0.066	0.055	0.131		
V1	0.087	-0.121	0.062	0.030	0.682	
V2	0.077	-0.106	0.039	-0.004	0.869	0.768
V3	0.014	-0.298	0.080	0.018	0.165	0.142
V4	-0.006	-0.025	0.053	0.006	-0.015	-0.062
V5	0.009	0.095	-0.153	-0.123	-0.162	0.089

Covariance Matrix of Y and X

	V3	V4	V5
V3	1.065		
V4	0.112	0.941	
V5	-0.385	-0.756	2.062

Mean Vector of Eta-Variables

V6	V7	V8	V9
3.366	1.041	2.433	3.705

PHI

	V1	V2	V3	V4	V5
V1	0.682				
	(0.052)				
	13.091				
V2	0.869	0.768			
	(0.215)	(0.059)			
	4.037	13.077			
V3	0.165	0.142	1.065		
	(0.046)	(0.049)	(0.081)		
	3.550	2.878	13.077		
V4	-0.015	-0.062	0.112	0.941	
	(0.043)	(0.046)	(0.054)	(0.072)	
	-0.362	-1.350	2.066	13.078	
V5	-0.162	0.089	-0.385	-0.756	2.062
	(0.064)	(0.068)	(0.188)	(0.391)	(0.158)
	-2.534	1.314	-2.040	-1.931	13.089

PSI

	V6	V7	V8	V9
V6	0.264			
	(0.020)			
	13.152			
V7	- -	0.320		
		(0.024)		
		13.142		
V8	- -	0.164	0.272	
		(0.100)	(0.104)	
		1.637	2.604	

V9	- -	- -	- -	0.105
				(0.010)
				10.562

Squared Multiple Correlations for Structural Equations

V6	V7	V8	V9
0.029	0.224	-0.194	0.200

Squared Multiple Correlations for Reduced Form

V6	V7	V8	V9
0.029	0.217	0.070	0.068

Reduced Form

	V1	V2	V3	V4	V5
V6	- -	0.101	- -	- -	- -
		(0.028)			
		3.538			
V7	- -	-0.089	-0.268	- -	- -
		(0.030)	(0.030)		
		-2.979	-8.963		
V8	- -	0.050	0.044	- -	-0.068
		(0.023)	(0.031)		(0.019)
		2.222	1.405		-3.557
V9	-0.047	0.055	-0.009	-0.063	-0.090
	(0.079)	(0.076)	(0.030)	(0.065)	(0.039)
	-0.588	0.722	-0.295	-0.962	-2.306

ALPHA

V6	V7	V8	V9
3.119	2.571	4.606	3.749
(0.075)	(0.224)	(0.812)	(0.357)
41.455	11.499	5.671	10.509

Goodness of Fit Statistics

Degrees of Freedom = 6
Minimum Fit Function Chi-Square = 5.921 (P = 0.432)
Normal Theory Weighted Least Squares Chi-Square = 5.872 (P = 0.438)
Estimated Non-centrality Parameter (NCP) = 0.0
90 Percent Confidence Interval for NCP = (0.0 ; 9.894)

Minimum Fit Function Value = 0.0171
Population Discrepancy Function Value (F0) = 0.0
90 Percent Confidence Interval for F0 = (0.0 ; 0.0289)
Root Mean Square Error of Approximation (RMSEA) = 0.0
90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0694)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.824

Expected Cross-Validation Index (ECVI) = 0.272
90 Percent Confidence Interval for ECVI = (0.272 ; 0.301)
ECVI for Saturated Model = 0.263
ECVI for Independence Model = 1.213
Chi-Square for Independence Model with 36 Degrees of Freedom = 396.835
Independence AIC = 414.835
Model AIC = 101.872
Saturated AIC = 90.000
Independence CAIC = 458.505
Model CAIC = 334.778
Saturated CAIC = 308.349
Normed Fit Index (NFI) = 0.985

Non-Normed Fit Index (NNFI) = 1.001
Parsimony Normed Fit Index (PNFI) = 0.164
Comparative Fit Index (CFI) = 1.000
Incremental Fit Index (IFI) = 1.000
Relative Fit Index (RFI) = 0.910

Critical N (CN) = 986.266

Root Mean Square Residual (RMR) = 0.00861
Standardized RMR = 0.0143
Goodness of Fit Index (GFI) = 0.996
Adjusted Goodness of Fit Index (AGFI) = 0.972
Parsimony Goodness of Fit Index (PGFI) = 0.133

Fitted Covariance Matrix

	V6	V7	V8	V9	V1	V2
V6	0.272					
V7	-0.039	0.412				
V8	-0.022	-0.105	0.228			
V9	0.014	-0.066	0.055	0.131		
V1	0.087	-0.121	0.062	0.030	0.682	
V2	0.077	-0.106	0.039	-0.004	0.261	0.768
V3	0.014	-0.298	0.080	0.018	0.165	0.142
V4	-0.006	-0.025	0.053	0.006	-0.015	-0.062
V5	0.009	0.095	-0.153	-0.123	-0.162	0.089

Fitted Covariance Matrix

	V3	V4	V5
V3	1.065		
V4	0.112	0.941	
V5	0.172	0.049	2.062

Fitted Means

V6	V7	V8	V9	V1	V2
3.366	1.041	2.433	3.705	1.368	2.457

Fitted Means

V3	V4	V5
3.653	1.741	2.331

Fitted Residuals

	V6	V7	V8	V9	V1	V2
V6	0.000					
V7	-0.004	0.001				
V8	0.003	0.000	-0.001			
V9	0.002	0.001	0.000	0.000		
V1	0.011	0.019	0.002	-0.002	0.001	
V2	-0.013	-0.031	-0.004	0.003	0.000	0.000
V3	0.011	-0.002	0.001	0.001	0.004	-0.003
V4	0.013	-0.012	0.003	0.003	0.007	-0.004
V5	-0.016	-0.015	0.007	0.003	0.009	-0.016

Fitted Residuals

	V3	V4	V5
V3	0.001		
V4	0.001	0.001	
V5	0.000	-0.005	-0.015

Fitted Residuals for Means

V6	V7	V8	V9	V1	V2
0.000	0.000	- -	- -	0.000	- -

Fitted Residuals for Means

V3	V4	V5
- -	0.000	0.000

Summary Statistics for Fitted Residuals

Smallest Fitted Residual = -0.031
Median Fitted Residual = 0.001
Largest Fitted Residual = 0.019

Stemleaf Plot

```
- 3|1
- 2|
- 2|
- 1|6655
- 1|32
- 0|5
- 0|44432210000000
  0|1111111122333334
  0|779
  1|113
  1|9
```

Standardized Residuals

	V6	V7	V8	V9	V1	V2
V6	- -					
V7	-0.468	0.468				
V8	0.667	0.277	-0.638			
V9	0.697	1.390	-0.336	-0.995		
V1	1.328	1.971	0.275	-0.961	0.387	
V2	-1.228	-2.180	-0.282	1.199	- -	- -
V3	0.378	-0.548	0.234	0.656	0.645	-1.063
V4	0.470	-0.403	0.365	0.531	0.894	-1.063
V5	-0.413	-1.794	1.430	1.184	0.848	-2.214

Standardized Residuals

	V3	V4	V5
V3	1.063		
V4	1.063	1.063	
V5	- -	-0.337	-2.289

Summary Statistics for Standardized Residuals

Smallest Standardized Residual = -2.289
Median Standardized Residual = 0.275
Largest Standardized Residual = 1.971

Stemleaf Plot

```
- 2|322
- 1|8
- 1|21100
- 0|655
- 0|443330000
  0|233444
  0|555677789
  1|11122344
  1|
  2|0
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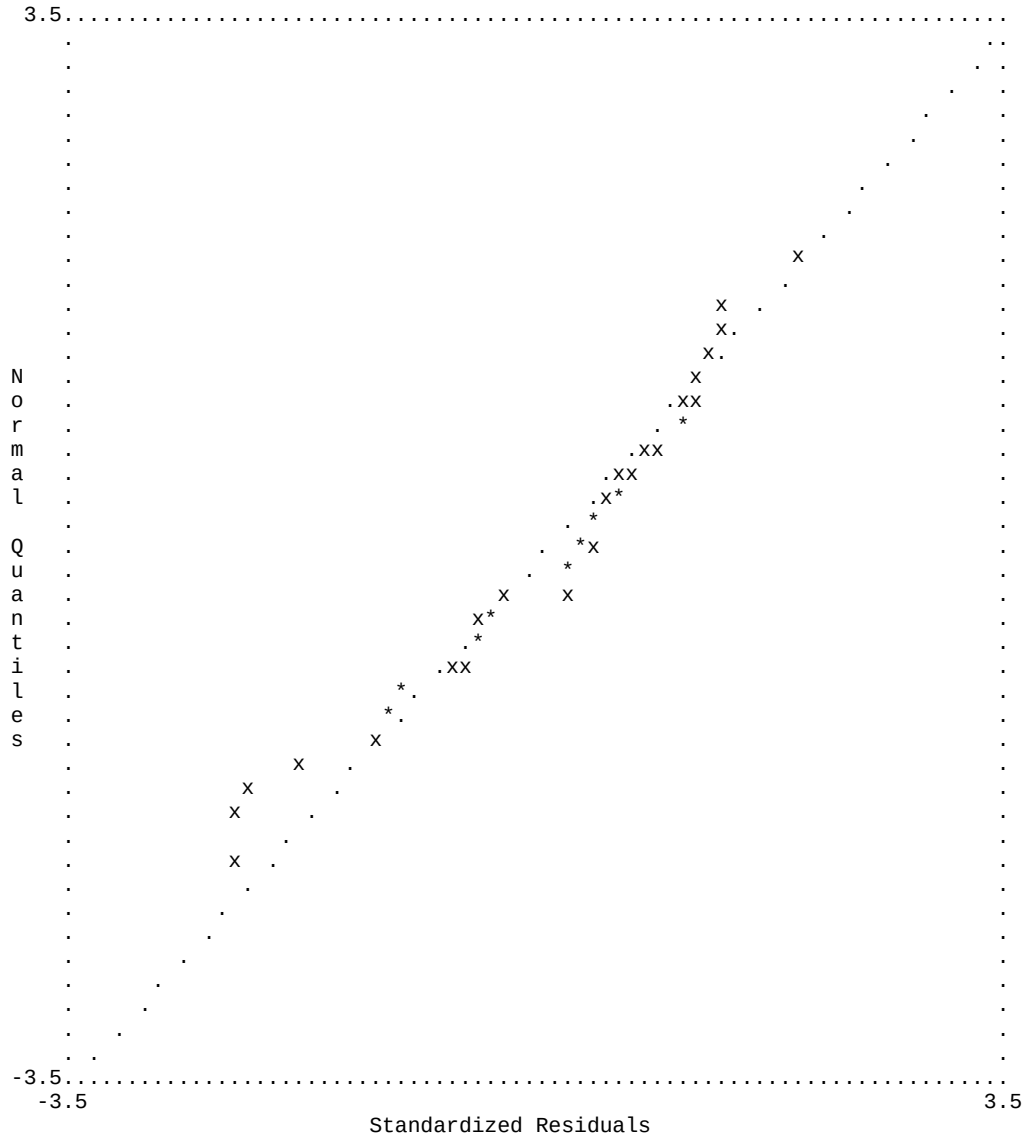
Qplot of Standardized Residuals



Modification Indices and Expected Change

Modification Indices for BETA

	V6	V7	V8	V9
V6	- -	0.219	0.445	0.486
V7	- -	- -	0.057	3.352
V8	- -	- -	- -	1.129
V9	- -	- -	- -	- -

Expected Change for BETA

	V6	V7	V8	V9
V6	- -	-0.044	0.125	0.212
V7	- -	- -	0.139	2.045
V8	- -	- -	- -	1.523
V9	- -	- -	- -	- -

Standardized Expected Change for BETA

	V6	V7	V8	V9
V6	- -	-0.132	0.503	1.126
V7	- -	- -	0.454	8.802
V8	- -	- -	- -	8.824
V9	- -	- -	- -	- -

Modification Indices for GAMMA

	V1	V2	V3	V4	V5
V6	0.287	- -	0.219	0.324	0.424
V7	1.262	- -	- -	0.092	0.057
V8	1.129	- -	- -	1.129	- -
V9	- -	- -	- -	- -	- -

Expected Change for GAMMA

	V1	V2	V3	V4	V5
V6	-0.052	- -	0.012	0.014	-0.011
V7	-0.118	- -	- -	-0.010	-0.009
V8	-0.083	- -	- -	-0.665	- -
V9	- -	- -	- -	- -	- -

Standardized Expected Change for GAMMA

	V1	V2	V3	V4	V5
V6	-0.083	- -	0.023	0.026	-0.029
V7	-0.151	- -	- -	-0.015	-0.021
V8	-0.144	- -	- -	-1.353	- -
V9	- -	- -	- -	- -	- -

No Non-Zero Modification Indices for PHI

No Non-Zero Modification Indices for PSI

Modification Indices for THETA-DELTA-EPS

	V6	V7	V8	V9
V1	2.789	5.017	1.129	- -
V2	2.679	5.184	1.129	- -
V3	0.134	0.185	1.129	- -
V4	0.119	0.206	- -	- -
V5	0.089	1.129	1.129	- -

Expected Change for THETA-DELTA-EPS

	V6	V7	V8	V9
V1	0.071	0.075	0.028	- -
V2	-0.060	-0.067	-0.024	- -
V3	0.010	0.106	0.566	- -
V4	0.009	-0.013	- -	- -
V5	-0.012	2.863	0.204	- -

Modification Indices for THETA-DELTA

	V1	V2	V3	V4	V5
V1	- -				
V2	- -	0.002			
V3	4.903	5.056	0.123		
V4	- -	0.338	0.206	- -	
V5	1.129	0.431	- -	- -	1.129

Expected Change for THETA-DELTA

	V1	V2	V3	V4	V5
V1	- -				
V2	- -	-0.058			
V3	0.301	-0.252	0.320		
V4	- -	-0.126	-0.050	- -	
V5	0.410	-0.162	- -	- -	2.982

Factor Scores Regressions

Y

	V6	V7	V8	V9	V1	V2
V6	1.000	0.000	0.000	0.000	0.000	0.000
V7	0.000	1.000	0.000	0.000	0.000	0.000
V8	0.000	0.000	1.000	0.000	0.000	0.000
V9	0.000	0.000	0.000	1.000	0.000	0.000

Y

	V3	V4	V5
V6	0.000	0.000	0.000
V7	0.000	0.000	0.000
V8	0.000	0.000	0.000
V9	0.000	0.000	- -

X

	V6	V7	V8	V9	V1	V2
V1	-0.163	0.133	-0.127	0.174	0.671	0.965
V2	-0.264	0.082	-0.129	-0.040	1.130	0.671
V3	0.021	0.056	-0.158	-0.193	-0.089	0.065
V4	0.031	0.081	-0.228	-0.279	-0.129	0.095
V5	-0.032	-0.459	0.290	-0.142	0.085	-0.072

X

	V3	V4	V5
V1	-0.028	0.074	-0.071
V2	-0.111	0.013	0.097
V3	1.084	0.021	-0.313
V4	0.122	1.030	-0.453
V5	-0.606	-0.820	1.114

Standardized Solution

BETA

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.087	- -	- -	- -
V8	-0.199	-1.040	- -	- -
V9	0.079	-0.255	0.221	- -

GAMMA

	V1	V2	V3	V4	V5
V6	- -	0.169	- -	- -	- -
V7	- -	-0.107	-0.431	- -	- -
V8	- -	- -	-0.354	- -	-0.206
V9	-0.107	0.069	-0.156	-0.168	-0.313

Correlation Matrix of Y and X

	V6	V7	V8	V9	V1	V2
V6	1.000					
V7	-0.116	1.000				
V8	-0.090	-0.343	1.000			
V9	0.073	-0.284	0.316	1.000		
V1	0.203	-0.229	0.158	0.101	1.000	
V2	0.169	-0.189	0.093	-0.012	1.201	1.000
V3	0.027	-0.450	0.162	0.050	0.193	0.157
V4	-0.012	-0.040	0.115	0.016	-0.019	-0.073
V5	0.012	0.103	-0.224	-0.237	-0.136	0.071

Correlation Matrix of Y and X

	V3	V4	V5
V3	1.000		
V4	0.112	1.000	
V5	-0.260	-0.543	1.000

PSI

	V6	V7	V8	V9
V6	0.971			
V7	- -	0.776		
V8	- -	0.536	1.194	
V9	- -	- -	- -	0.800

Regression Matrix Y on X (Standardized)

	V1	V2	V3	V4	V5
V6	- -	0.169	- -	- -	- -
V7	- -	-0.121	-0.431	- -	- -
V8	- -	0.093	0.094	- -	-0.206
V9	-0.107	0.133	-0.025	-0.168	-0.358

Total and Indirect Effects

Total Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	0.101	- -	- -	- -
		(0.028)			
		3.538			
V7	- -	-0.089	-0.268	- -	- -
		(0.030)	(0.030)		
		-2.979	-8.963		
V8	- -	0.050	0.044	- -	-0.068
		(0.023)	(0.031)		(0.019)
		2.222	1.405		-3.557
V9	-0.047	0.055	-0.009	-0.063	-0.090
	(0.079)	(0.076)	(0.030)	(0.065)	(0.039)
	-0.588	0.722	-0.295	-0.962	-2.306

Indirect Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	- -	- -	- -	- -
V7	- -	-0.011	- -	- -	- -
		(0.007)			
		-1.636			

V8	- -	0.050	0.207	- -	- -
		(0.023)	(0.087)		
		2.222	2.368		
V9	- -	0.027	0.046	- -	-0.011
		(0.009)	(0.011)		(0.004)
		3.078	4.021		-2.797

Total Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.107	- -	- -	- -
	(0.058)			
	-1.830			
V8	-0.099	-0.773	- -	- -
	(0.047)	(0.311)		
	-2.113	-2.482		
V9	0.053	-0.273	0.168	- -
	(0.037)	(0.064)	(0.042)	
	1.450	-4.267	4.021	

Largest Eigenvalue of B*B' (Stability Index) is 0.648

Indirect Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	- -	- -	- -	- -
V8	0.082	- -	- -	- -
	(0.058)			
	1.427			
V9	-0.001	-0.130	- -	- -
	(0.015)	(0.061)		
	-0.090	-2.112		

Standardized Total and Indirect Effects

Standardized Total Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	0.169	- -	- -	- -
V7	- -	-0.121	-0.431	- -	- -
V8	- -	0.093	0.094	- -	-0.206
V9	-0.107	0.133	-0.025	-0.168	-0.358

Standardized Indirect Effects of X on Y

	V1	V2	V3	V4	V5
V6	- -	- -	- -	- -	- -
V7	- -	-0.015	- -	- -	- -
V8	- -	0.093	0.448	- -	- -
V9	- -	0.065	0.131	- -	-0.045

Standardized Total Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	-0.087	- -	- -	- -
V8	-0.109	-1.040	- -	- -
V9	0.077	-0.485	0.221	- -

Standardized Indirect Effects of Y on Y

	V6	V7	V8	V9
V6	- -	- -	- -	- -
V7	- -	- -	- -	- -
V8	0.090	- -	- -	- -
V9	-0.002	-0.230	- -	- -

Time used: 0.047 Seconds

BIOGRAPHY

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