PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION

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ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

นางสุชาดา เรืองรัตนอัมพร

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาพยาบาลศาสตรดุษฎีบัณฑิต
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Thesis Title	PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION
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สุชาดา เรืองรัตนอัมพร : ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล. (PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: รศ. ดร. จินตนา ยูนิพันธุ์, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ผศ. ดร. ชนกพร จิตปัญญา, 226, หน้า.

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษากิจกรรมทางกายและปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่ช่วงสามเดือนแรกภายหลังจำหน่ายจากโรงพยาบาล กลุ่มตัวอย่างคือผู้ป่วยที่ได้รับการวินิจฉัยโดยการตรวจสวนหลอดเลือดหัวใจเป็นครั้งแรก ที่กลับมารับการตรวจรักษาตามปกติแบบผู้ป่วยนอกที่แผนกอายุรกรรมของโรงพยาบาลที่จัดเป็นศูนย์หัวใจ 10 แห่งจาก 38 แห่งทั่วประเทศ จำนวน 160 ราย คัดเลือกโดยการสุ่มเป็นขั้นตอนและเป็นสัดส่วน เก็บรวบรวมข้อมูลโดยแบบสอบถามข้อมูลส่วนบุคคล แบบวัดอาการไม่สุขสบายทางกายต่อการทำกิจกรรมทางกาย แบบวัดประสบการณ์เชิงอัตนัยในการมีกิจกรรมทางกาย แบบวัดการสนับสนุนจากครอบครัวและเพื่อนต่อการมีกิจกรรมทางกาย แบบวัดความเชื่อมั่นในตนเองในการมีกิจกรรมทางกาย และ แบบสอบถามการมีกิจกรรมทางกาย โดยมีค่าความเที่ยงของเครื่องมือเท่ากับ .96, .72, .93, .97, และ .63 ตามลำดับ วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนาและวิเคราะห์การถดถอยโดยวิธี Robust Maximum likelihood estimation

ผลการวิจัยพบว่า ผู้ป่วยใช้เวลาในการทำกิจกรรมทางกายเฉลี่ย 1,800 นาทีต่อสัปดาห์ และในการนั่ง1,260 นาทีต่อสัปดาห์ โดยคิดเป็นความหนักของกิจกรรมเฉลี่ยเท่ากับ 6,048 MET-min ต่อสัปดาห์ ผู้ป่วยเพศชายทำกิจกรรมที่มีระดับความหนักระดับสูง (>3,000 MET-min/wk.) (ร้อยละ 33.75) ระดับปานกลาง (600-3,000 MET-min/wk.) (ร้อยละ 22.50) และระดับต่ำ (<600 MET-min/wk.) (ร้อยละ 7.50) มากกว่าเพศหญิงในทุกระดับ (ร้อยละ 11.25, 20.62 และ 4.38, ตามลำดับ) เมื่อจำแนกการมีกิจกรรมทางกายของผู้ป่วยตามกลุ่มกิจกรรม พบว่าผู้ป่วยจำนวนมากที่สุด มีกิจกรรมเพื่อการเดินทาง (ร้อยละ95.63) รองลงมาคือ มีกิจกรรมเพื่อการพักผ่อน งานบ้าน และการทำงานอาชีพ (ร้อยละ 73.75, 65.00 และ 41.87 ตามลำดับ)

จากการศึกษาพบว่า ปัจจัยที่มีความสัมพันธ์ทางบวกอย่างมีนัยสำคัญกับการมีกิจกรรมทางกาย คือ ความเชื่อมั่นในตนเอง และเพศ (r = .33 และ .18 ตามลำดับ) ส่วนปัจจัยที่มีความสัมพันธ์ทางลบอย่างมีนัยสำคัญกับการมีกิจกรรมทางกาย คือ อายุ อาการไม่สุขสบายทางกาย และการศึกษา (r = -.21, -.18 และ -.16 ตามลำดับ) ในขณะที่ โรคร่วม ประสบการณ์เชิงอัตนัยต่อการมีกิจกรรมทางกาย และการสนับสนุนจากครอบครัวและเพื่อนต่อการมีกิจกรรมทางกาย ไม่มีความสัมพันธ์กับการมีกิจกรรมทางกาย ท้ายที่สุด ปัจจัยทั้งหมดสามารถร่วมกันทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาลได้ ร้อยละ 13.50

สาขาวิชา พยาบาลศาสตร์ ลายมือชื่อนิสิต .....

ปีการศึกษา 2556 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก .....

ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม .....

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SUCHADA RAUNGRATANAAMPORN: PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION. ADVISOR: ASSOC. PROF. JINTANA YUNIBHAND, Ph.D., CO-ADVISOR: ASST. PROF. CHANOKPORN JITPANYA, Ph.D., 226 pp.

The purposes of this study were to investigate the physical activity (PA) and to identify the predicting factors of PA among new coronary artery disease patients. One hundred and sixty participants who were first diagnosed by coronary angiography and had actual appointment to out-patients of medical clinic within three months were recruited from 10 of 38 hospitals of all regions in Thailand by a proportional randomized sampling. Data were collected by questionnaires including demographic data form, symptom frequency and symptom distress scale (SFSDS, α=0.96), subjective PA experiences scale (SPAES, α=0.73), family and friend support for PA scale (FFSPAS, α=0.93), self-efficacy for PA scale (SEPAS, α=0.97), and international PA questionnaire (IPAQ, α=0.63). Data were analyzed by descriptive statistics and the LISREL with Robust Maximum Likelihood estimation.

The findings revealed that participants spent time for PA average 1,800 min/wk. and sitting 1,260 min/wk., while the PA intensity was 6,048 MET-min/wk.. The male participants performed PA with high intensity (>3,000 MET-min/wk.) (33.75 percent) moderate intensity (600-3,000 MET-min/wk.) (22.50 percent) and low intensity level (<600 MET-min/wk.) (7.50 percent) more than female participants (11.25, 20.62, and 4.38 percent, respectively). Considering number of participants who had PA in each domain, it was revealed that the majority of them performed PA in transportation domain (95.63 percent), in leisure-time, domestic and work domain (73.75, 65.00 and 41.87 percent, respectively).

Self-efficacy and gender were positively and significantly correlated to PA (r = .33, p<.01, .18, respectively). Age, education, and symptom distress were negatively and significantly correlated to PA (r = -.21, -.18, -.16, respectively). While, comorbidity, subjective experience of PA, and family/friend support for PA were not correlated to PA (r = .04, -.15, and -.08, respectively). Nevertheless, all factors could collectively predict PA among participants with 13.50% of variance.

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

Academic Year: 2013 Advisor's Signature .....

Co-Advisor's Signature .....

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CHAPTER I
INTRODUCTION

Background and significance of the study

Coronary artery disease (CAD) is an important public health problem in Thailand as in other countries of the world. Each year, an estimated around 620,000 Americans have a new coronary attack and 295,000 have a recurrent attack (Mozaffarian, et al., 2014). In Thailand, the past 5 year rate of Thai patients with heart disease increased for two folds, from 318 to 682 per 100,000 populations (Department of Health, Ministry of Public Health, 2008). The majority of those patients were young adult aged between 35 and 54 years old (Tatsanavivata, Klungboonkrong, Chirawatkul, et al., 1998). Last decade, CAD was an important cause of death among Thai patients both men and women (Bureau of Policy and Strategy, Ministry of Public Health, 2009), number of death and death rate of ischemic heart disease per 100,000 population among age between 15 and 59 years were 3,644 of 13,124 patients and death rate was 8.4 of 20.4 (Health Information Unit, Bureau of Health Policy and Strategy, 2011).

Etiology of CAD pathogenesis is the atherosclerosis which produces the stenosis of coronary artery. Coronary angiography (CAG) is the gold standard of diagnosis the narrowing of those coronary arteries and also provides the Percutaneous Coronary Intervention (PCI) for revascularization. Actually, the CAD patients spent only few days for hospital admission after revascularization. This intervention provides safety and good outcomes but the coronary artery restenosis may be occurred at any time. Therefore, those patients were appointed to hospital

periodically after hospital discharge. As the European Society of Cardiology (ESC) produced the guidelines on the Management of Stable CAD (Montalescot, et al., 2013) which stated that in order to reduce symptoms and improve prognosis, the management of CAD patients encompasses lifestyle modification, control of CAD risk factors, evidence-based pharmacological therapy and patient education. Physical activity (PA) is one of lifestyle modification which associated with a decrease in cardiovascular morbidity and mortality in patients with established CAD and PA should be incorporated into daily activities. Aerobic exercise should be offered to patients with known CAD.

Over the past 50 years, the benefits of physical activity (PA) have well-established among cardiovascular patients (Witt, Jacobsen, Weston, et al., 2004; Taylor, Brown, Ebrahim, & et al., 2004) in order to prevent the restenosis of coronary artery (Dangas, & Kuepper, 2002), to enhance cardiac health during the recovery process (Furukawa, Miyatake, Kinsho, & Keda, 2005), and to reduce mortality rate of cardiovascular disease (Bijnen, Caspersen, Feskens, et al., 1998; Oguma, & Shinoda-Tagawa, 2004). Conversely, physical inactivity is an important risk of health deviation that impacts to Disability Adjusted Life Years (DALYs) (The International Health Program of Thailand, 2006).

The definition of physical activity is as any bodily movement produced by skeletal muscle which results in energy expenditure (Caspersen, Powell, & Christenson, 1985) and involves significant movement of body and limbs that causes the body to work harder than normal activity (Egger, Donovan, Swinburn, Giles-Corti, & Bull, 1999). PA is closely related to, but distinct from exercise. Exercise is a subset of physical activity that is planned, structured, repetitive bodily movement done to

improve or maintain of physical fitness (Caspersen, Powell, & Christenson, 1985; WHO, 2010). PA includes recreational of leisure-time, transportation, occupation, household chores, play games, sports and planned exercise (WHO, 2010). PA can be described into three components; frequency, duration, and intensity, and are graded into low, moderate, and high levels (U.S. Department of Health and Human Services, 2008).

Physical activity is the best medicine for the overall prevention and treatment of common chronic diseases as in patients with cardiovascular disease risk factors that enhancing the physical activity are needed (Oberg, 2007). Moreover, the conclusion of a systematic review and meta-analysis indicated that cardiac mortality was reduced by exercise (Taylor, Brown, Ebrahim, & et al., 2004). The most common form of PA is walking which sufficient walking could provide health benefits (Murphy, Nevill, Murtagh, & Holder, 2007). Only a small increase in walking was associated with meaningful health benefits among adults aged 65 years and older (Diehr, & Hirsch, 2010) and the brisk walking on a flat surface can provide cardiorespiratory and health benefits for cardiac patients (Quell, Porcari, Franklin, Foster, Andreuzzi, & Anthony, 2002).

The evidences from previous studies showed that PA level after hospital discharge among coronary artery disease (CAD) patients declined (Reid, Morrin, Pipe, et al., 2006) and also among acute coronary syndrome patients the score of physical functioning was significantly decreased after discharge from hospital (Failde & Soto, 2006). Most new CAD patients did not follow the minimal recommendation for health enhancing PA, even though their health status were excellent or very good and also they were informed the importance of PA related to cardiovascular

condition but only 27.8% of them was regularly performed their PA (Arrigo, & Luscher, 2007). Among myocardial infarction patients after hospitalization had the feeling of disabilities and a low level of vigor that impacted to their physical activities (Huijbrechts, Erdman, Duivenvoorden, & et al., 1997).

A study among acute myocardial infarction patients (n=89) showed that less than 40% of them were engaged in at least 30 minutes of PA every day and only 20% showed a daily mean number of 10,000 steps or more (Brandstrom, Brink, Grankvist, Alsen, Herlitz, & Karlson, 2009) meanwhile among women patients with ischemic heart disease (n=12) their mean daily footsteps was 3,628 ± 2,114 at the first month and was 3,545 ± 1,920 at the third months after hospitalization (Furukawa, Miyatake, Kinsho, & Keda, 2005).

Previous studies revealed that exercise behaviors among Thai patients with CAD after hospitalization was at a fair level (Saiseesub, 2000); (Ngasomskul, 2000) and at a good level (Namphonkrung, 2004) but some study proposed that only 39% of Thai CAD patients remained their exercise performance as they did before being diagnosed with the CAD and 51.2% of them did not perform exercise after the diagnosis (Tammatisthan, 2000). After hospital discharge, patients with coronary heart disease had the lowest score in physical and recreational activities (Liangchawangwong, 1998) and as similar as another study (Darr, Astin, & Aikin, 2008) which purposed that many coronary heart disease patients did not exercise after hospitalization because they had some comorbidity, some physical symptoms, and lack of time. Surprisingly, they thought the vigorous exercise was not necessary and they could not have done anything to prevent the disease since they have already had it.

Literature review on PA and CAD patients revealed the related factors to perform PA. Based on the Social Cognitive Theory (Bandura, 1986; 1997), those factors can be organized into personal factor, environmental factor, and behavioral factor as depicted as Figure 1 (Theoretical substruction diagram). Personal factor consists of the cognitive factor, the affective factor, and the biological event. Empirical indicators of the Cognitive factors are education, symptom distress, and self-efficacy; the Affective factor is subjective experience of physical activity; and the Biological events are age, gender, and comorbidity. Environmental factor is the social support which an empirical factor is the family and friend support for physical activity. An empirical indicator of the behavioral factor in this study is physical activity.

Personal factors known to be related to PA determined as follows;

The cognitive factors are 1) **Education** related to PA among CAD patients (Reid, Morrin, Pipe, & et al., 2006). Information was given at the hospital to improve patients' knowledge and to change their attitude toward PA and was a factor for patients to continue their PA (Stahle, Lindquist, & Mattsson, 2000), 2) **Symptom distress;** in order to diagnose the occlusion of coronary by angiography, percutaneous transluminal coronary angioplasty (PTCA) is always used for approaching as the treatment of choices and also the improvement of the occlusion. A study among patients with post PTCA found that they felt low in energy and tiring, and the lack of energy considerable limited their physical activities (Higgin, Dunn, & Thebald, 2000). Physical symptom distress will inhibit patients to perform PA (Yates, Price-Fowlkes, and Agrawal, 2003). From the study among CAD patients after hospitalization it was found that majority of their physical symptoms were chest pain

(Tammatisthan, 2000), tiredness, headache, and felt fainting (Saiseesub, 2000), and the abnormal cardiac symptoms were mainly related to their activities (Phonphet, 2000). Furthermore, there was a study revealed that CAD patients who were waiting for coronary artery surgery had symptoms distress at a low level (McCormick, Naimack, & Tates, 2002). It was congruence to a study showed that women patients with heart disease also presented cardiac symptom which disrupted their ability to perform household task (Kimble, 2001), 3) **Self-efficacy for physical activity;** Self-efficacy had an effect on health behaviors (Kang, Yang, & Kim, 2010; D'Angelo, Reid, & Pelletier, 2007). Perceived self-efficacy and the ability to perform PA positively related to exercise behaviors and also could predict the exercise behaviors (Saiseesub, 2000; Namphonkrung, 2004; D'Angelo, Reid, & Pelletier, 2007; Stahle, Lindquist, & Mattsson, 2000; Sarkar, Ali, & Whosley, 2007; Sullivan, LaCroix, Russo, & Katon, 1998). In addition, self-efficacy was positively correlated to pre-hospital level of physical function (LaPier, Cleary, & Kidd, 2009).

The affective factor is 4) **Subjective experiences** of physical activity positively related to exercise behavior (Namphonkrung, 2004), well-being, body and mind, comfort and health (Stahle, Lindquist, & Mattsson, 2000). Among older people (Lee, Avis, & Arthur, 2007) the positive feeling they experienced with PA as walking; feeling stronger, less uncomfortable on their legs led them to decide to initiate and maintain their PA.

The biological events are 5) **Age;** many studies stated that age related to PA among CAD patients (Namphonhrung, 2004; Reid, Morrin, Pipe, & et al., 2006; Yates, Price-Fowlkes, and Agrawal, 2003), 6) **Gender** has a correlation with PA among CAD patients (Ngaosomsakul, 2000; Reid, Morrin, Pipe, & et al., 2006) which man had a

higher daily activity score than woman (Kim & Park, 1989). Moreover, men were more physically active than women (Saiseesub, 2000; Stahle, Lindquist, & Mattsson, 2000). Men had a higher exercise capacity than women had and also had the higher level of those activities than baseline (Yates, Price-Fowlkes, and Agrawal, 2003); while women tended to report lower level of PA (cited in Yates, Price-Fowlkes, & Agrawal, 2003; King, 2001), 7) **Comorbidity** was an important factor that always found among patients who had percutaneous coronary intervention (Singh, Rihal, & Roger, 2008) and was a factor of physical inactive (Darr, Astin, & Atkin, 2008). Congestive heart failure was one of an important comorbidity among CAD patients that affected their PAs. (Reid, Morrin, Pipe, & et al., 2006).

Environment factor is; 8) **Family and friend support** for physical activity is as an interpersonal influence that support PA related to exercise behaviors and the support from a physical active partner was an important factor for continuing to be physically active (Stahle, Lindquist, & Mattsson, 2000) and the spousal supporting may be a more important factor in influencing men's exercise behaviors (Lieberman, Meana, & Stewart, 1998). From a study about peers group (Furze, Roebuck, Bull, & et al, 2002) it was found that peers were more likely to believe that people with angina should take life easy, not have exercise and avoid excitement.

Among those patients with CAD, after the diagnosis had discovered they returned to their home with the newly experience of disease with the coronary artery. Besides, they obtained the health information from providers for self-caring and living with the disease, such as food, exercise, life style, and stress management, they were appointed back to hospital periodically during the first three months for medication adjustment and for physical examination. After hospitalization, there was

not only the medication but also the health performance of patients which impact to treatment outcome. During these three months, they obtained the suggestion from medical providers at the same time they got the observational learning from the other patients as they are. Actually, only 2 or 3 times that they were appointed to hospital so, they spent their time for a moment were as the observation while they were waiting for physician approaching. Then, they transformed all those information into their performances which based on the individual differences i.e., personal factors and environmental factors. Nowadays, the number of CAD patients continuously increase and majority of them are the age of working group that produce the principle of productivity of the nation. In addition, the modernized sciences advancing improved the treatment outcome thus, the survival of the new CAD patient indicates to the increasing of the number of CAD patients, more and more. PA is the body movement which everyone could easily perform and with the daily activities. PA provides highly health benefit among CAD patients. The study of factors associated to physical activity and predictable factors of physical activity among new CAD patients will emerge the specific knowledge to explain the phenomena of activities among them, for the guided health promotion, and for the further study.

Research questions

1. What do new CAD patients perform their physical activities during the first three months after hospitalization?

2. Which factors can predict physical activities among new CAD patients during the first three months after hospitalization?

Purposes of the study

1. To study physical activities among new CAD patients during the first three month after hospitalization.

2. To investigate the predictable factors of physical activities among new CAD patients during the first three month after hospitalization.

Conceptual framework

The conceptual framework of this study is guided by the Social Cognitive Theory purposed by Albert Bandura (1986, 1997) in order to explain and predict the PA among new CAD patients after hospitalization during the first three months.

The hypothesized model based on the Social Cognitive Theory and the significant variables extracted from literature review as follows,

Personal factors consist of the cognitive aspect (education, symptom distress, and self-efficacy), the affective aspect (subjective experience of physical activity), and the biological event factors (age, gender, and comorbidity). Environmental factor is the family and friend support for physical activity. Behavioral factor is the physical activity. The proposed relationship among those variables is depicted in Figure 2.

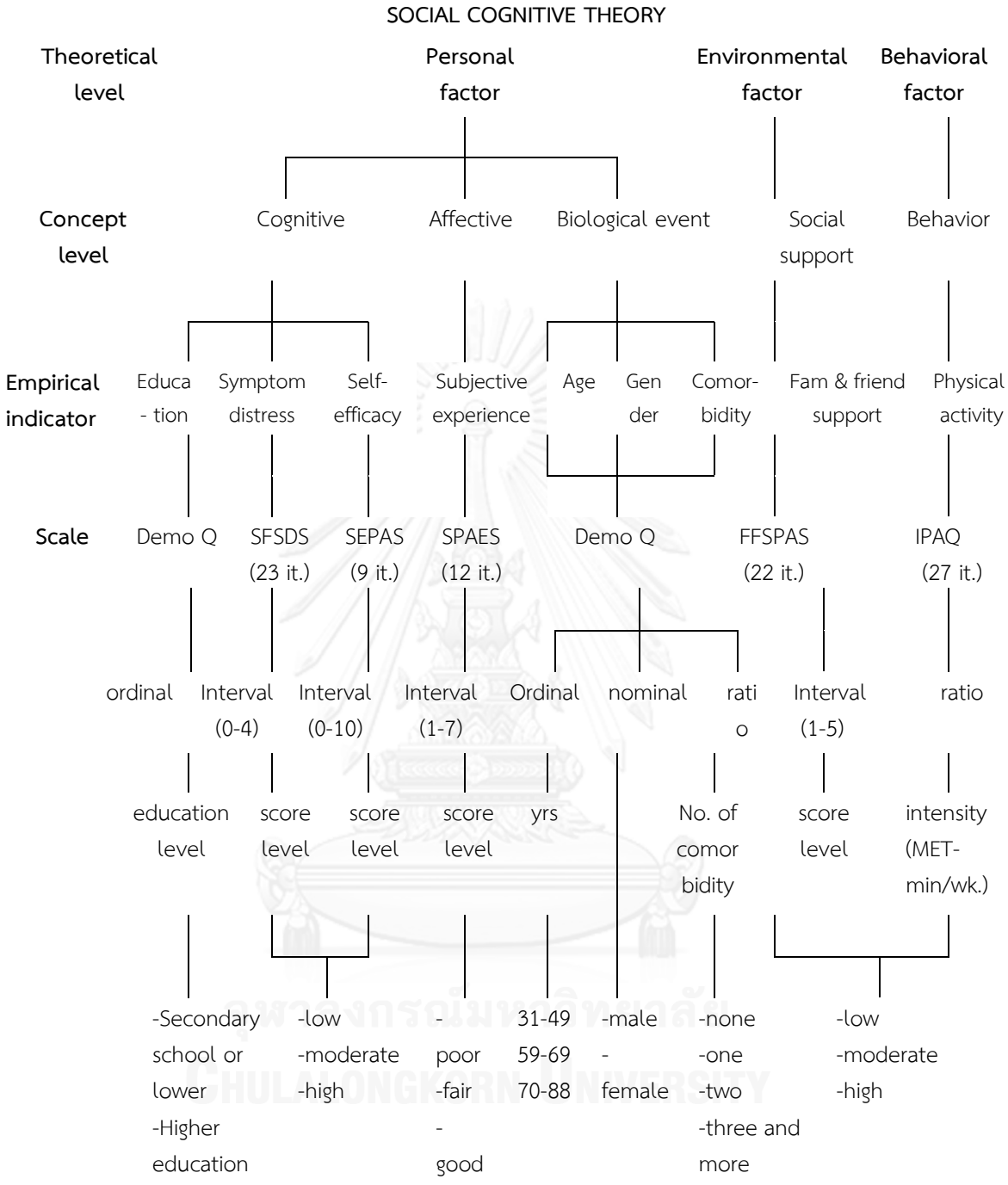

Figure 1 Theoretical substruction diagram: the Social Cognitive Theory of physical activity among new Coronary Artery Disease patients after hospitalization

Note. Demo Q = Demographic Questionnaire, SFSDS = Symptom frequency and symptom distress scale, SEPAS = Self-efficacy for physical activity scale, SPAES = Subjective physical activity of experiences scale, FFSPAS = Family

and friend support for physical activity scale, and IPAQ_L form = International physical activity questionnaire long form.

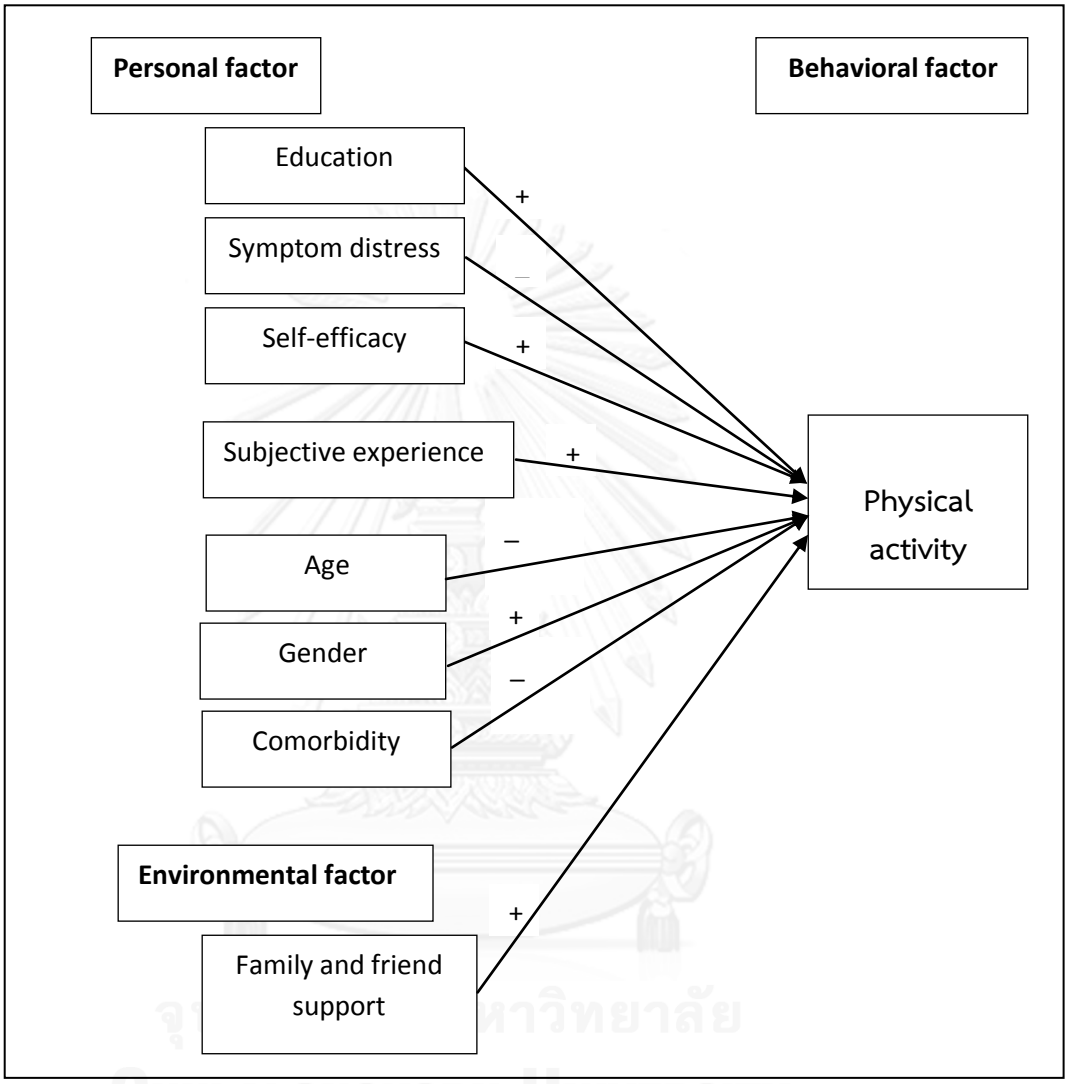

Figure 2 Hypothesized model of PA among new CAD patents after hospitalization

Research hypotheses and rationales

The research hypotheses are listed in the following 8 statements:

1. Age had a negatively correlated to physical activity

Age impacted on PA and on daily activity levels after a cardiac event. Age was a related important factor to continue the physical activity among patients with myocardial infarction (Stahle, Lindquist, & Mattsson, 2000). There was a significant difference of mobilization and exercise capacity between cardiac patients who were younger and older. Cardiac patients who were older had reduced exercise capacities and more limitations in mobility and had a higher rate of disability than younger cardiac patients (Yates, Price-Fowlkes, & Agrawal, 2003).

2. Gender had a positively correlated to physical activity

Gender had an impact on PA. After hospitalization, majority of patients with myocardial infarction patients (80.00%) had their footsteps per day unmet criteria of health benefit (Brandstrom, Brink, Grankvist, & et al., 2009) especially among women patients with ischemic heart disease (Furukawa, Miyatake, Kinsho, & et al., 2005). Walking is a basic of PA. Female patients tended to report lower level of PA and higher level of disruption in function ability (Yates, Price-Fowlkes, & Agrawal, 2003). Among heart disease patients and after hospitalization, men were more active than women (Reid, Morrin, Pipe, & et al., 2006). Men had more exercise intention and motivation with exercise planning (D'Angelo, Reid, & Pelletier, 2007) and had a higher baseline of an activity level and a higher exercise capacity than women (Yates, Price-Fowlkes, & Agrawal, 2003). However, after hospitalization male patients performed their PA less than they did before they were diagnosed (Huijchrechts, Erdman, Duivenvoorden, & et al., 1997).

3. Education had a positively correlated to physical activity.

Education had a correlation with PA among CAD patients (Reid, Morrin, Pipe, & et al., 2006). However, there was a study stated that level of education was not associated with exercise among coronary heart disease patients in cardiac rehabilitation program (Petter, Blandchard, Kemp, & et al.. 2009). Female patients with coronary heart disease who had low educational attainment had a higher significant drop-out rate of cardiac rehabilitation program than male patients (Brezinka & Kittel, 1996). Information were given at the hospital could provide knowledge and change their attitude to PA. The changing attitude was also a factor to maintain their PA. (Stahle, Lindquist, & Mattsson, 2000).

4. Comorbidity had a negatively correlated to physical activity

Comorbidity conditions were defined as the concurrent presence of two or more medically diagnosed diseases in the same person (Singh, Rihal, Roger, & et al., 2008). From a study review (Petter, Blanchard, Kemp, & et al., 2009) indicated that an intrapersonal factor (i.e. fewer comorbidities, less severe cardiac illness) related to increase exercise level. Comorbidity was a factor of physical inactivity (Darr, Astin, & Atkin, 2008) and also was a risk of disability and mortality but from a study of health behaviors in patients with CAD (Kang, Yang, & Kim, 2010) the study results did not mention any comorbidity among those patients.

5. Symptom distress had a negatively correlated to physical activity

Physical symptom distress inhibited to perform PA (Yates, Price-Fowlkes, & Agrawal, 2003). Thai CAD patients (24.4%) afraid their exercise might lead to chest pain (Tammatisthan, 2000), and they did not exercise because they were tired, had a headache or felt faint (Saiseesub, 2000). Symptom distress was a subjective symptom

and defined as the barriers to perform PA and might lead to fearful or lack of interest and desire to engage in PA (Yates, Price-Fowlkes, & Agrawal, 2003). Heart disease patients did not exercise after hospitalization because their physical symptoms (Darr, Astin, & Atkin, 2008), some patients experienced with chest pain (Tammatisthan, 2000), tiredness, headache or felt fainting after exercise (Saiseesub, 2000).

6. Subjective experiences of physical activity had a positively correlated to physical activity.

Among general Thai population, 29.2% did not interest in PA (National Statistical Office, 2007). Some CAD patients thought that vigorous exercise was unnecessary and coronary heart disease could not have done anything to prevent it (Darr, Astin, & Atkin, 2008). Response to PA participation among the first diagnosis of myocardial infarction patients after hospitalization revealed that they had a feeling of disability and anxiety (Huijchrechts, Erdman, Duivenvoorden, & et al., 1997) while some of them reported that activity-related affect positively related to exercise behavior (Namphonkrung, 2004), and another one study reported well-being, body and mind, comfort and health related to PA (Stahle, Lindquist, & Mattsson, 2000).

7. Family and friend support for physical activity had a positively correlated to physical activity.

Among myocardial infarction patients, the support from a physical active partner and the good information at hospital were the important factors for inducing PA (i.e. intention to maintain the physical fitness) and for continuing to be physically active (Stahle, Lindquist, & Mattsson, 2000). From a study review (Petter, Blanchard, Kemp, & et al., 2009) indicated that the confidence in cardiac rehabilitation staff to assist in performing exercise behaviors were not associated with exercise, among patients who

received education or exercise consultation sessions reported higher exercise levels and also patients who received more social support reported higher exercise levels whereas marital status and subjective norm (i.e. perceived social pressure to engage in exercise) were not related to exercise. Moreover, this review indicated that higher perceived behavioral control (i.e. perceived ease of participating in exercise) related to increase exercise.

8. Self-efficacy for physical activity had a positively correlated to physical activity.

Self-efficacy reflects one's confidence in the ability to perform a behavior in a given situation (Bandura, 1986). There is substantial empirical support for the premise that people's confidence in their ability to enact a behavior positively predicts subsequent behavior and that successful enactment increases people's confidence in their behavior (Bandura, 1997). A study of Kang, Yang, and Kim (2010) on health behaviors in patients with CAD found that cardiac self-efficacy significantly affected health behaviors, and had the greatest effect on health behaviors. Additionally, D'Angelo, Reid, and Pelletier (2007) studied an exercise behavior change regulation in patients with heart disease shown that self-efficacy strongly relevant to exercise intentions and motivation to exercise planning.

Scope of the study

This study intended to determine the physical activity performances among new coronary artery disease persons who were firstly diagnosed by coronary angiography within three months. Data were collected by 6 questionnaires when they were normally appointed to the hospital at heart clinic of outpatient departments. The process of collection conducted during at the 10th week and the

14th week after those persons were hospital discharged. Ten of 38 cardiac centers / hospitals were randomized by proportion from all region of Thailand.

Operational definitions

1. New CAD patient was defined as the patients who are recently diagnosed to have the disease by coronary angiography (CAG), and had been medication treated for CAD as the patients at the medical clinic of outpatient department after hospitalization during the first three months.

2. Physical activity (PA) was defined as any bodily movement of the new CAD patient in moderate and in vigorous intensity through a daily accumulation of self-assessed activities lasting at least 10 minutes per instance. Moderate activities refer to activities that make moderate physical effort and make the breath somewhat harder than normal. Vigorous activities refer to activity that make hard physical effort and make the breath much harder than normal. Those activities are divided into 4 domains and the time spent for sitting on a weekday and on a weekend. An activity of each domain consists of the movement with the intensity, the duration on time, and the frequency, as fellows.

Work domain or Job related physical activity referred to the participation in all forms of occupational activities, either paid or unpaid jobs, and inside or outside of his/her home.

Active transportation domain or Transportation physical activity referred to the participation in traveling from place to another place, either walking or using the labor saving devices as bicycles, automobile, and any other vehicles.

Domestic and garden domain or Housework, house maintenance, and caring for family referred to the participation in and around his/ her home, either housekeeping or caring for family members.

Leisure-time domain or Recreation and sport referred to the participation in leisure time activity, either for recreation or for health, and inside or outside his/her home.

The physical activity of 4 domains and the time spent sitting would measure over the last 7 days by the International Physical Activity Questionnaire-Long form (IPAQ-L), the originally developed by Craig, Marshall, Sjostrom, and others (2003). Thai version of this instrument had been used by Leethong-in (2009). The total volume of physical activity was assessed by ask about the timing (minute) for each activity performed then calculated to metabolic equivalent time per week or MET-min/wk by using compendium of physical activities (Ridley, Ainsworth, & Olds, 2008; Ainsworth, Haskell, Hermann, & et al., 2011) (Appendix: H). The total summation of MET-min/wk was divided into 3 levels, low (< 600 MET-min/wk.), moderate (600-3,000 MET-min/wk.), and high (> 3,000 MET-min/wk.) levels.

3. Age was defined to the full year of age of the new CAD patients from the day of birth to the day of the study, if the remainder exceeds for 6 months, it was counted as one year.

4. Gender was defined to the male and female of the new CAD patients.

5. Education was defined to secondary school and lower (i.e., none formal education, primary school, and secondary school), and higher education (i.e., apprenticeship diploma, Bachelor's degree, and above Bachelor's degree).

6. Comorbidity was defined to health condition that is the coexisting medical problem with vascular disease among the new CAD patient, such as hyperlipidemia, high blood pressure, diabetes, renal disease, heart failure, peripheral vascular disease, and stroke/paralysis. Comorbidity condition would classify by none of comorbidity, and the number of conditions that those patients got as one, two, and three and greater than three conditions.

7. Symptom distress was defined to symptom distress experience which this physical feeling impact/ influence to psychological feeling. Symptom distress would measure by the Symptom Frequency and Symptom Distress Scale (SFSDS) that researcher developed from the Symptom Frequency and Symptom Distress Scale (SFSDS) by McCormick, Naimark, and Tate (2002), under permitted from authors and also had been performed the process of translation into Thai language. The score was calculated by multiplying between frequency and severity of each physical symptom. The summation of those scores was divided into 3 levels, low, moderate, and high level. The high score referred to highly level of physical symptom.

8. Subjective experiences of physical activity were defined to the feeling experience on physical activity in dimension of positive well-being, psychological distress, and fatigue which would measure by the Subjective Physical Activity Experiences Scale (SPAES) that researcher developed from the Subjective Exercise Experiences Scale (SEES) by McAuley and Courneya (1994), under permitted from authors and also had been performed the process of translation into Thai language. The summation of all score was divided into 3 levels, poor, fair, and good level. The high score means highly level of positive feeling to PA.

9. Family and friend support for physical activity was defined to the perception of assistance and encouragement from family or the person(s) who was (were) living with and also from friends or coworker(s) for initiating, practicing, and continuing participation in PA during the last month. The supportive level would measure by the Family and Friend Support for Physical Activity Scale (FFSPAS) that was developed from the Social Support for Physical Activity (SSPA) Thai version by Leethong-in (2009), the originally developed from the Social Support for Exercise (SSE) by Sallis, Grossman, Pinski and others (1987). The summation of all scores was divided into 3 levels, low, moderate, and high level. The high score referred good social support for physical activity.

10. Self-efficacy for physical activity was defined to the perception of confident level or belief in the ability of new CAD patients to perform physical activity for at least 10 minutes per time, 3 times a day. The confident level would be measured by the Self-Efficacy for Physical Activity Scale (SEPAS) that was developed from the version of Leethong-in (2009), the originally developed by Resnick and Jenkins (2000). There are 3 domains as follows

Self-efficacy for low obstacles referred to the perception of his/her ability to engage in PA at least 10 minutes per time, 3 times a day when faced with inconvenient weather, boredom with the activity, loneliness during PA, and depression.

Self-efficacy for moderate obstacles referred to the perception of his/her ability to engage PA at least 10 minutes per time, 3 times a day when faced with the un-enjoyment, too busy with other activities, feeling tired, and feeling stressed.

Self-efficacy for high obstacle referred to the perception of his/her ability to perform PA at least 10 minutes per, 3 times a day when faced with pain upon performance.

The summation of all scores was divided into 3 levels, low, moderate, and high level. The high score means good self-efficacy for physical activity.

Expected usefulness of the study

1. Emerging of specified knowledge to explain the phenomena of physical activity among new CAD Thai patients after hospitalization.

2. Health care providers with multidisciplinary team and policy makers can use the findings developed scientifically guidelines to promote physical activity policy to support and encourage the health promotion of CAD patients.

3. The study findings will encourage nurses and researchers to develop further intervention to enhance the engagement in PA among new CAD patients

CHAPTER II
LITERATURE REVIEW

The present study is aimed to determine physical activity and investigating predicting factors of those physical activities among new coronary artery disease patients during the first three months after hospitalization. A critical review of the existing literature describes the phenomena of physical activity among coronary artery disease patients and the factors related to those physical activities. The review was divided into four parts:

1. Physical activity
    a. Definition of physical activity
    b. Type of physical activity intensity
    c. Measurement of physical activity
2. Coronary artery disease and physical activity
    a. Guidelines for the management coronary artery disease
    b. Recommendations for physical activity
    c. Benefits of physical activity
    d. Harmful effects on an inappropriate physical activity
    e. Physical activity in patients with coronary artery disease
3. Social cognitive theory
4. Factors related to physical activity among patients with coronary artery disease after hospitalization

Physical activity

Physical activity; Ancient physicians – including those from China in 2600 BC, and Hippocrates around 400 BC- believed in the value of physical activity (PA) for health. As Plato presented "Lack of activity destroys the good condition of every human being while movement and methodical physical exercise save it and preserve it" (cited in Das., & Horton, 2012). The first systematic studies of health and PA emerged in the year 1873 by John E. Morgan (Boreham, 2006) a distinguished English physician and a former oarsman, compared the longevity of athletes with that of the general population. He found that men who rowed in the Oxford-Cambridge boat races between 1829 and 1869 lived about two years longer than the "average" insured English-man.

The earliest records of organized exercise as a formal means of health promotion are from the ancient China approximately 2500 BC (cited in MacAuley, 1994). Physical health was one of an important for youth and wider application in health where exercise was seen as a means of treating disease and disability. Medical treatment included diet and daily exercise.

And also in the ancient time, "Hippocrates and Galen believed that competition in the sports arena brought an early death" (cited in Montoye, 1967). Since Hippocrates first advised us more than 2000 years ago that 'exercise though not too much of it – was good for health' (Paffenbarger, Blair, & Lee, 2001). Vigorous exercise can lead to sudden cardiac death due to undiagnosed heart disease and injuries leading to osteoarthritis (Kujala, 2005).

Definition of physical activity

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that result in energy expenditure (Caspersen, Powell, & Christenson, 1985) and is any activity that involves significant movement of the body and limbs that is all human movement in everyday life including work, recreation, exercise and sporting activities (Eggar, Donovan, Swinburn, Giles-Corti, & Bull, 1999).

PA describes as an aerobic activity in which people move their large muscles in a rhythmic manner for a sustained period e.g. running, brisk walking, and bicycling (U.S. Department of Health and Human Services, 2008) and as all form of large muscle movements, including sports, dance, games, work, lifestyle activities, and exercise for fitness. An active aerobic activity with the enough intensity can produce an improvement in cardiovascular fitness (Corbin, Welk, Corbin, & Welk, 2009).

PA is a global term and the activity may occur on the job, in the home, during leisure and recreational periods, and in getting from place to place (Caspersen, 1989). Therefore, PA includes all form of movement done in occupational, exercise, home and family care, transportation, and leisure setting (Caspersen, 1989; Caspersen, Powell, & Christenson, 1985). Each physical activity focuses on 4 characters, i.e., type, intensity, duration, and frequency.

The changing of traditional lifestyle to be modern western lifestyle associated with the PA transition; such as, the labour-intensive occupations and the sedentary service-oriented occupation, walking most common form of transportation and the door-to-door motorized transport predominates, and the little leisure time available and more leisure time dominated by sedentary pursuits, and these produced to health consequences (Katzmarzyk, & Marson, 2009).

Type of physical activity intensity

Physical activity can be classified into various types. An intensity associated with physical activity has been accomplished using several methods, including percentages of maximal oxygen consumption (VO_{2max}), oxygen consumption reserve (VO_2R), heart rate reserve (HRR), maximal heart rate (HR_{max}), or metabolic equivalents (METs) (American College of Sports Medicine, 2010). The intensity of Physical activity is divided into intensity levels as presented at table 1.

Table 1: Classification of physical activity intensity

Intensity	Relative intensity		Absolute intensity ranges (METs) Across fitness levels			
	VO_2R(%) HRR(%)	Maximal HR(%)	12 MET VO_{2max}	10 MET VO_{2max}	8 MET VO_{2max}	6 MET VO_{2max}
Very light	<20	<50	<3.2	<2.8	<2.4	<2.0
Light	20-39	50-63	3.2-5.3	2.8-4.5	2.4-3.7	2.0-3.0
Moderate	40-59	64-76	5.4-7.5	4.6-6.3	3.8-5.1	3.1-4.0
Hard (vigorous)	60-84	77-93	7.6-10.2	6.4-8.6	5.2-6.9	4.1-5.2
Very hard	≥85	≥94	≥10.3	≥8.7	≥7.0	≥5.3
Maximal	100	100	12	10	8	6

METs, metabolic equivalent units (1MET -3.5 $ml*kg^{-1}*min^{-1}$); VO_2R, oxygen uptake reserve; HRR, heart rate reserve; HR, heart rate.

Source: American College of Sports Medicine (2010).

Ainsworth, Corbin, Pangrazi, and Franks (2003) stated that the term MET is an abbreviation for metabolic equivalent and is defined as the ratio of the associated metabolic rate for a specific activity divided by the resting metabolic rate. The resting

metabolic rate is an approximately 1 MET and reflects the energy cost of sitting quietly. Activities can be used to estimate the energy expended during physical activities. Kilocalories (kcal) energy expenditure at rest is roughly equal to 1 MET per kilogram body weight (BW) per hour.

Equation:

Kcal per week = METs X sessions per week X hours per session X body weight (Kg.)

Moderate intensity activity is an increase the body resting metabolic rate by 3 to 6 fold (3-6 METs) and is characterized by an increase in one's heart rate and breathing depth and frequency but is not to levels that restrict conversation during the physical activity event.

METs are useful and fit for describing the intensity of physical activities. The light physical activity was defined as requiring lower than 3 METs, moderate activity was between 3 and 6 METs, and vigorous activity was greater than 6 METs (Haskell, Lee, Pate, & et al., 2007).

Physical activity is 5 different types (Brannon, & Feist, 2007), e.g.

1) **Isometric type** is the means of muscles contraction with against an immovable object. This type of physical activity can improve muscle strength which is important for older people in preserving independent living.

2) **Isotonic type** is the means of muscle contraction and the movement of joints such as weight lifting and many forms of calisthenics. This type of physical activity can improve muscle strength and muscle endurance which also need sufficiently lengthy.

3) **Isokinetic type** is the means that required specialized equipment to increase the resistance force. This type of physical activity can restore muscle strength, muscle endurance, and flexibility.

4) **Anaerobic type** is the means of an intensive burst of energy within short timing and do not require an increased amount of oxygen use that may be dangerous for people with coronary heart disease.

5) **Aerobic type** is the means of physical activity that the bodily movement required dramatically increased oxygen consumption. The important of aerobic physical activity impacts to cardiorespiratory health.

Measurement of physical activity

Physical activity is measured in epidemiology studies e.g. the intensity, duration, frequency, and dose of volitional physical activities performed at some period. The intensity of activity refers to the difficulty of an activity and is generally classified as light, moderate, or vigorous level. The duration of activity refers to the time spent in a specific activity as hour or minutes per session. The frequency of activity refers to the number of times per day, per week, or others that one is physically active. The dose of activity refers to combination of intensity, duration, and frequency of activity and is expressed as kcal/day, MET-hours/day, minutes on a treadmill graded exercise test, or other units (Pates, et al., 1995).

Vanhees, Lefevre, Philippaerts, and others (2005) proposed that physical activity assessment methods had 3 types, i.e., criterion, objective, and subjective methods. *Criterion methods* are the gold standard for physical activity measurement which includes Doubly Labeled Water (DLW), indirect calorimetry, and direct observation. Those methods are accurate and valid measurement of energy

expenditure which actually produces by bodily movement but the costs are high-price and need time consuming. *Objective methods* are the motion sensor of body and monitor heart rate by devices, include the step-counting by Pedometers, monitor complex movements (in more than one plane) accelerometers, and heart rate recording for estimates of energy expenditure for several hours and days. Those methods are quite good and inexpensive devices. *Subjective methods* are physical activity questionnaires or surveys which are inexpensive tools and easily applicable to large population. The results of measurements rely on the questionnaire interpretation and perception of the participant itself. Those methods are self-reporting, interviewing, proxy-report, and diaries.

Laporte, Montoye, and Caspersen (1985) proposed the physical activity assessment can be measured more than 30 different methods and categorized into 7 major groups, as fellows, 1) calorimetry, 2) job classification, 3) surveys, 4) physiological markers, 5) behavioral observation, 6) mechanical and electronic monitoring, and 7) dietary measures.

1) **Calorimetry**: This assessment is divided into direct and indirect methods that based on the physical activity as defined in relation to overall energy expenditure. Direct method required an expert personal who well-trained that limited to specific tasks. Indirect method measured the consumption of oxygen that closely correlated to heat production of body. This method required the cooperation of participants in order to collecting the expired air while their physical activity with holding facemask or mouthpiece and nose clip. Although Calorimetry is an accurate assessment but it is not an impractical assessment for the study of usual

daily and for the large representative population (Dauncey, Murgatroyd, & Cole, 1978).

2) **Job classification**: This assessment can be employed in large representative population with at minimal cost. Each job was ranked by activity levels and assessed by the estimation of energy expenditure. The limitation of this method was the validity and reliability for an epidemiological use. Laporte, Montoye, and Caspersen (1985) stated that this limitation included with job classification variability, job intensity misclassification, secular change and / or seasonal change in job requirement, possible selection bias, and omission of leisure and non-occupational physical activity.

3) **Surveys**: There are 4 components of survey procedures. e.g. 1) the time frame of the physical activity, 2) the nature and detail of the physical activities, 3) the data collection that was personal interview, telephone interview, self-administration, mail survey or combination of those methods. Then, the summary index by calculated estimated of kilocalories expended or an ordinal scale that rank-orders person according to their level of physical activity. The survey procedure consists of diary surveys, recall surveys, quantitative history surveys, and general surveys (Laporte, Montoye, & Caspersen, 1985).

4) **Physiological markers**: This assessment is an intensity of physical activity which an influence cardio-respiratory endurance and produced using the maximum of oxygen consumption to estimate the physical activity. This method appropriates to small group of representative population. Another method is a doubly labeled water technique that measured the energy expenditure overtime by isotope

measuring. The cost for the isotopes was very high making impractical on large representative population (Laporte, Montoye, & Caspersen, 1985).

5) **Behavioral observation**: This assessment is an approach to the monitoring of physical activity, e.g., 1) a watching observation for an individual then rated that observed activity at specific time intervals and estimated of physical activity level by rating, 2) random photograph and judgment of activity. This method is an impractical on the participant bias (Laporte, Montoye, & Caspersen, 1985).

6) **Mechanical and electronic monitoring**: This method assesses the body movement by the motion sensors that may accurately measure than the estimate energy of expenditure. Movement per session may be highly complex itself and require in depth analysis of type, frequency, and intensity to determine its physiological effects. The pedometer is a primary type of body movement measuring that specifically designed to evaluate walking behavior (measurement of steps) while an in-shoe step counter measures the step frequency. Besides, the electronic motion sensors can be assess the quantitative and intensity of movement, such as an Accelerometer and the Large Scale Integrated motion activity monitor (LSI) that can be placed on various body location. The mechanical and electronic monitors may be highly useful in assessing physical activity but only in a small group of participant however it seems does not interfere or influence physical activity and seem to be personally and socially acceptable (Laporte, Montoye, & Caspersen, 1985).

7) **Dietary measures**: The caloric value of food intake may be used as an estimated of energy expenditure but the total caloric intake is influenced by the persons' physical activity level and also by the total of their body weight moreover,

dietary measure is unable to identify the types, frequency, or duration of physical activity.

Coyne and Allen (1998) purposed the measurement issues of functional status among cardiac disease patients. That is the objective and the subjective methods. Objective methods are typical rated by and external observer, such as the New York Heart Association classification (NYHA), the Canadian Cardiovascular Society (CCS), the 6-min walk test, and Exercise stress test (EST). Subjective methods focus on functional capability and by the various instruments, such as the Duke Activity Scale Index (DASI), the Specific Activity Scale (SAS), the Beth Israel Functional Status Questionnaire (FSQ), the Seattle Angina Questionnaire (SAQ).

Besides, in clinical practice the Borg Rating of Perceived Exertion (RPE) is a subjective method of physical intensity measurement which focused on the perception of an exertion at that moment. It is based on a person experiences during physical activity, including increased heart rate, increased respiration or breathing rate, increased sweating, and muscle fatigue. The rating scale ranges from 6 to 20, where 6 refer to "no exertion at all" and 20 refer to "maximal exertion." Choose the number from the scale that best describes the level of exertion (Borg, 1998).

Table 2: Category scale of the Borg Rating of Perceived Exertion (RPE)

Category scale	
6	No exertion at all
7	Extremely light (7.5)
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	Extremely hard
20	Maximal exertion

Table 3: Physical activity intensity The Borg RPE scale

Physical activity intensity	The Borg RPE scale	METs	Energy expenditure kg.*Cal-1*min-1	Physical activity
Light	<11	<3	<3.5	Normal activity, walking slowly
Moderate	12-14	3-6	3.5-7	Somewhat hard, increased rate of breathing, increased sweating, and muscle fatigue
Vigorous	≥15	>6	>7	Very heavy, very tired

Source: The Borg's rating of perceived exertion and pain scales (Borg, 1998).

Coronary artery disease and physical activity

Guidelines for the management Coronary artery disease

Coronary artery disease (CAD) is a broad term that includes chronic stable angina and acute coronary syndromes and is a leading cause of mortality and morbidity in the developing country. It affects the arteries that provide blood, oxygen, and nutrients to the myocardium (Brownrigg, Walicek, & Ignatavicius, 2010). Coronary artery disease (CAD) or coronary heart disease refers to the stenosis of coronary artery that produces the decreasing of myocardial blood supply. The higher degree of coronary stenosis with the longer timing impacts to myocardial damage. As a result, an ischemic myocardium will turn to myocardial infarction. The symptom typically include angina on exertion or at rest, shortness of breath, fatigue and sudden dead.

The managements for patient with CAD can divided into two major categories which prevention and treatments (Guidelines for the management of coronary artery disease, 2004), as follows;

1) CAD Prevention is the significant procedure both primary and secondary preventions. Reduction of all major risk factors, e.g., quit smoke, using chemical and diet controls to reduce the total and low density of lipoprotein (LDL) cholesterol levels, to control the blood pressure and also blood sugar level to target levels and finally, to increase the exercise or physical activity performance, are the significant procedures that are not only reduction the occurring and severity of the disease progression but also reduction the morbidity and mortality of the patients. Weight reduction is also importance to prevent comorbidity in patient with CAD.

2) Treatments are composed of medications, interventions, and coronary artery surgery as coronary artery bypass graft (CABG). The significant medications, e.g. reduction of mortality, that are anti-thrombolysis, antiplatelet, beta blocking agents, ACE inhibitors and cholesterol lowing agents, and especially among statin group. Because of the medications is a lifelong therapy, thus one should observe and find the inverse effect of those medications, such as muscle, liver and kidney injuries and also bleeding tendencies.

In case of patients who were suspected to have coronary artery disease would be investigated by coronary angiography (CAG) (2013 ESC guidelines on the management of stable coronary artery disease, 2013) as known as that is the percutaneous coronary intervention (PCI). Coronary angiography (CAG) is one of an investigation test for suspected coronary occlusion. Cardiologists actually use CAG to determine precisely whether a patient needs treatment through angioplasty as percutaneous transluminal coronary angioplasty (PTCA), stent placement, bypass surgery, and simply medication treatment.

PCI is a less-invasive and widely accepted therapy for CAD. The cardiac catheterization laboratory is a setting in which elective, urgent, and emergent percutaneous procedures are performed. Cardiac catheterization and coronary intervention are the process of the “best practice” which covers since before procedure starting throughout after procedure finishing with the high quality care and patient safety are the goal. All physicians who are interventionists should maintain their competence; technician should obtain the Registered Cardiovascular Invasive Specialist (RCIS) certification; and nursing staffs should have a minimum of one year critical care experience. On the process of the investigation, all patients who undergo

cardiac catheterization must have a history taking and physical examination prior to the procedure. Planning of each procedure and caring provide benefit for patients in order to prevent the complications that may be occur throughout the process (King, Aversano, Ballard, & et al., 2007; Naidu, Rao, Blankenship, & et al., 2012).

Abbas, Brodie, Stone, and others (2004) studied among patients after percutaneous coronary intervention for acute myocardial infarction (n=450, age between 53 and greater than 70 years) they were asked about the returning to work, early return to work was determined by the number of narrowed coronary arteries and history of tobacco use.

CAG could exactly determine the location and the most accuracy way to measure the severity of those coronaries stenosis. This intervention is the catheter using via coronary artery which is threaded into the opening of the patient's coronary arteries from a blood vessels in either their arm or their groin, then a small amount of iodine is injected in the coronary artery and making the person's artery visible on the X-ray screen. The pictures show the coronary arteries and the blockage intra coronary arteries. This is also the method of revascularization by using balloon dilatation (Percutaneous transluminal coronary angioplasty, PTCA) and stenting in order to increase the coronary artery luminal diameter. CABG is the method to shunt the blood of the coronary artery proximal to the obstructed lumen to the distal part after the obstructed lesion via the anastomosis vessels, both artery and vein. Occasionally, those treatment options are used together as a combine process in the treatment of one patient who has had CAD, e.g. initiation by medication following with intervention and finally with surgery if the severity of the disease is

progressed or the medication cannot control the symptoms of the patient and come back to intervention if the graft is occluded.

CAG is the gold standard of diagnosis those coronaries stenosis. As other invasive interventions, any complication may be occurred. A prospective study among outpatients (1009 procedures, n=1005, mean age=64.5 years, 62% was men) who underwent CAG with one hour ambulation after bed rest (Doyle, Konz, Lenon, & et al., 2006) found the minor vascular complications occurred in 33 procedures (3.3%), including 14 (1.4%) less than 4 cm. in diameter, and 19 cases of re-bleeding (1.95), only one patient (0.1%) had a hematoma greater than 4 cm. in diameter.

CAD is the most common cause of sudden death (Thomas, Knapman, Krikler, & Davies, 1988) and also the most reason for death of men and women over 20 years of age (American Heart Association, 2007). And also the incidence of coronary restenosis after successful coronary angioplasty still occurs within six months after initial procedure as the study result of Serruys, Luijten, Beatt and others (1988) that conducted in 342 consecutive patients. In addition, there were the other studies stated that the comparative with balloon angioplasty alone where the chance of restenosis was 40% stents reduce the chance of restenosis to 25% (Serruys, de Jaegere, Kiemeneij, & et al., 1994; Fischman, Leon, Baim, et al., 1994).

The study of symptom perception among coronary heart disease patients after hospitalization (n = 253, age 65.3 ± 10.8 years) (Lau-Walker, Cowie, & Roughton, 2008) the results suggested that there were three illness belief components; an identity, be controllable, and the causes of those cardiac conditions. Among Thai CAD patients who undergoing PTCA (n = 30) (Tongin, 1999), data were collected by interview. The results stated that those patients perceived the illness on CAD was as

a life threatening disease (80.0%) and affected daily activities and work (70.0%). Meanwhile, among Thai CAD patients who underwent coronary stent implantation (n= 34, 25 men and 9 women, age 60.88± 9.24 years) (Polkanchanakorn, 1998) it was found that at three months after coronary stent implantation those patients improved their health status, severity and frequency of chest pain was significantly decreased ($p < .01$) and required less medication for relief symptoms ($p < .001$) similar to a result study among CAD patients after PTCA (n = 35) (Puengwongsamran, 1998) which revealed that at six weeks after the intervention those patients improved their quality of life and had significantly decreased severity and frequency of chest pain and also required less medication for relief symptom ($p < .005$).

From a grounded theory study among patients with post elective PTCA at one month after hospital discharge (8 men, and 3 women) (Higgin, Dunn, & Theobald, 1988) revealed that those patients had commented on feeling low in energy and tried. This lack of energy considerably limited their activities. Depressive symptom related to energy level but age did not.

From a prospective study among 132 patients who had suffered an acute coronary episode (Failde & Soto, 2006) 81.65% was man and their physical functioning score, general health, vitality and physical component significantly decrease. Moreover, the dimension of bodily pain increased among patients with revascularization and at 3 months of follow-up.

From a review study of exercise among coronary heart disease patients (Petter, Blanchard, Kemp, & et al., 2009) there were 121 of 2700 peer-reviewed studies between the year 1978 and 2009, participants were 18 years and over, all were 25217 participants, mean sample size was 208 participants and range between

18 and 1443, the conclusion reported that; 1) intrapersonal factor: higher task self-efficacy / confidence to perform the elemental aspects of a task such as walking related to higher exercise level, 2) higher functional status / performance on grade exercise tests / health status with fewer morbidities less severe cardiac illness related to increased exercise, (patients' health status was associated with exercise behavior),

3) age, BMI, and level of education were not associated with exercise, 4) interpersonal factor: increased social support related to higher exercise level, 5) institutional: receiving educational or exercise consultation sessions related to higher exercise, 6) community: an accessible location and seasoning (time of the year) were not related to exercise behavior.

From a Quasi experimental study that conducted among CAD patients for 1 year (intervention group, n=29; control group, n=33) the result concluded that the various intensity of leisure-time PA impact to cardiorespiratory fitness, in higher workloads were necessary to halt progressive of coronary atherosclerotic lesion (Hambrecht, Niebauer, Marburger, & et al., 1993).

CAD patients who could not refuse those occlusion coronary arteries neither medication nor PCI, coronary artery bypass surgery would be performed. As they were waiting for surgery they had experiences both physical and emotional states. From a descriptive, correlation and cross-sectional study among patients who waiting for the first-time CABG surgery (n=42, mean aged=64 years, men=38, w=4) (McCormick, Naimack, and Tates, 2002) found that the average score of uncertainty and anxiety were present at moderate levels, physical function limitation. Meanwhile, physical symptoms experienced and emotional distress caused by

symptoms was assessed by SFSDS the symptom distress score presented as a low level.

Recommendations for physical activity

An adequate physical activity is a part of the characteristics for healthy people (O'Kelly, Ryden, 2009). European Guidelines on cardiovascular disease prevention in clinical practice (version 2012) (Perk, Backer, Gohlke, Graham, Reiner, Verschuren, & et al., 2012) stated that physical activity involve not only sport-related activities but also lifestyle-common activities such as walking briskly, climbing stairs, ding more housework and gardening work, and engaging in active recreational pursuits. As the clarification of two types of activities, 1) a vigorous-intensity physical activity should be defined in relative terms as an activity performed at 60-85% of VO_2 or HR reserve or at a rate of perceived exertion of 7-8 in the CR10 Borg scale, and 2) a moderate-intensity physical activity should be defined in relative terms as an activity performed at 40-59% of VO_2 or HR reserve or at a rate of perceived exertion of 5-6 in the CR10 Borg scale.

In the year 2004, WHO (2006) endorsed the physical activity is a global strategy and recommended the physical activity on all of age then the year 2010, WHO (2010) recommended that adult aged 18 to 64 years should perform aerobic activity in bout of at least 10 minutes. The recommendation for cardiovascular health are to promote and to maintain the health for adult and older need moderate-intensity aerobic or endurance physical activity for a minimum of 30 minutes on five day a week of vigorous-intensity aerobic activity for a minimum of 20 minutes on three days each week (Haskell, Lee, Pate, & et al., 2007).

In order to improve cardiorespiratory and muscle fitness, bone health, and to reduce the risk of non-communicable disease, and depression WHO (2010) recommended that adult aged 18 to 64 years should be performed an aerobic activity in bout of at least 10 minutes duration and should do at least 150 minutes of moderate intensity aerobic activity throughout the week, and should increase to 300 minutes throughout the week and additional health benefits adult should increase the level of moderate intensity to vigorous intensity aerobic activity.

Among coronary artery disease patient after hospitalization are suggested to practice their physical activities. Patients should be encouraged to gradually return to general activities of daily living such as, household chores, yard work, shopping, hobbies, and sports. American College of Sports Medicine (ACSM) proposed the Guidelines for Exercise Testing and Prescription (2010) stated the suggestions for criteria to determine when a patient is appropriate for an independent exercise program are as follows: a) cardiac symptoms stable or absent, b) appropriate electrocardiography (ECG), blood pressure, and heart rate response to exercise, c) demonstrated knowledge of proper exercise principles and awareness of abnormal symptoms, and d) motivation to continue to exercise regularly without close supervision.

Walking is an actual activity of daily living which uses physical effort level lower than running uses. Walking with high dose intensity can provide health benefit (The Heart Association of Thailand under the Royal Patronage of H.M. The King, 2013). It was recommended that at least 30 minutes of moderate intensity physical activity on most days of the week and the brisk walking was suggested. The brisk walking is walking at an energetic pace that is not too hard because while walking

still allows conversation. Only 30 minutes per day and 5 days per week could be performed among adult persons. In addition, 30 minutes all at once or accumulated in bouts of 10 minutes or more was recommended also. Walking for 30 minutes/day equates to 3,000 to 4,000 steps. One mile (1.6 km.) walk equates to around 1500 to 2000 steps. A 10000 steps/day is minimally recommended for overall health/fitness.

Benefits of physical activity

1) Improvement in cardiovascular and respiratory function;

There is the fact that physical activity is universally acknowledged to be an important part of healthy functioning and wellbeing. The evidence includes the improvement of cardiorespiratory fitness, muscle fitness, bone health, body composition, cardiovascular and metabolic health biomarkers. Early physical activity perform in the life course can yield significant rewards, both at that time and for years to come. Physical activities provide a good cardiovascular workout and person can be done by oneself (Corbin, Welk, Corbin, & et al., 2009). The regular physical activity among coronary artery disease patients could be improved the endothelial function (Hambrecht, Adams, Erbs, & et al., 2003) and the increasing activity frequency associated with circulatory function (Ashton, Nanchahal, & Wood, 2000).

2) Reduction in cardiovascular risk factors;

Physical activity and exercise training delay the development of atherosclerosis and reduce the incidence of coronary heart disease events (Lee, & Paffenbarger, 2001). Regular physical activity can promote well-being, prevent chronic diseases, and is associated with longevity regardless of risk factors (Paffenbarger, Hyde, Wing, & et al., 1986). Press, Freestone, and George (2003) summarized the evidences of benefits of moderate intensity PA on prevention of coronary heart

disease and stated that an activity needed to be regularly and currently, lower blood pressure in normotensive and hypertensive people, reduces risk of developing type 2 diabetes by 50%, reduce overweight and obesity, and rises high density lipoprotein (HDL), but the accumulation of several shorter session of exercise gives the same benefits as one longer episode was not an enough supported evidence. Meanwhile, physical inactivity is as an importance of cardiovascular risk factors (Donahue, Abbott, Reed, & Yano, 1988; Blair, Kohl, Paffenbarger, & et al., 1989; Berlin, & Coldlitz, 1990; Bijnen, Feskens, Caspersen, & et al., 1996; World Health Organization, 2002; 2006; Yusuf, Hawken, & Qunpuu, 2004).

From a study of coronary risk factors related to Physical activity (Hickey, Mulcahy, Bourke, Graham, & Wilson-Davis, 1975) was conducted during the year 1969 to 1972 among 15171 men and age was between 25 and 74 years reported that heavy leisure activity in young and middle-aged men is associated with lower level of certain coronary risk factors and, a lower risk of coronary heart disease.

The increasing of physical activity over 5 years is favorably associated with changes in a major cardiovascular disease risk factors in men and women (Young, Haskel, Jatulin, & et al., 1993) and a 10 years could be protect mortality from cardiovascular disease and all causes among elderly men (Bijnen, Caspersen, Fesken, & et al., 1998). As the statement of the Council on Clinical Cardiology and the Council of Nutrition, Physical Activity, and Metabolism (Thompson, Buchner, Pina, & et al., 2003) it was recommended that a physical activity is able to prevent and help treat many established atherosclerotic risk factors causing coronary artery occlusion and any other vascular diseases.

A systematic review supported that increasing amounts of physical activities were associated with additional risk reduction cardiovascular disease in both men and women (Shiroma & Lee, 2010). As similar as a prospective 8-year followed up study among 72,488 women nurses, indicated that brisk walking and vigorous exercise were associated with reduction in the incidence of coronary events (Manson, Hu, Rich-Edwards, Colditz, Willett, & et al., 1999). From a meta-analysis between the year 1954 and 2007, the conclusion stated that walking should be prescribed as an evidence-based effective exercise modality for coronary heart disease prevention in the general population (Zheng, Orsini, Amin, & et al., 2009). A prospective 2-4 years followed up study, the risk of coronary heart disease is reduced with increase in distance walked (Hakim, Curb, Petrovitch, & et al., 1999).

3) Decreased morbidity and mortality

The physiological benefit of physical activity is inversely related to morbidity and mortality from cardiovascular disease, colon cancer, diabetes (Paffenbarger, Hyde, Wing, & et al., 1986; Blair, Kohl, Paffenbarger, & et al., 1989). Physical activity is as a health protection factor, from the longitudinal study between 1977 and 1985 (Paffenbarger, Hyde, Wing, & et al., 1993) reported that the beginning moderately vigorous sports activity was associated with a 23% lower risk of death.

The study among elderly men (Bijnen, Caspersen, Feskens, & et al., 1998) and among women (Oguma, Shinoda, & Tagawa, 2004) found that increased physical activity associated with reduced cardiovascular disease mortality and another study conducted among elderly men and women with coronary artery disease (n=1045) (Janssen & Jolliffe, 2006) pointed that there was an inverse graded relationship between physical activity and all-cause mortality of those participants. In addition, a

meta-analysis of 27 cohort study (Berlin, & Colditz, 1990) summarized that the consistent with an association between lack of physical activity and increased risk of coronary heart disease.

Importantly, physical inactivity is a modifiable risk factor for lifestyle related to chronic diseases and may track through adulthood. Physical inactivity is also associated with a higher all-cause mortality rate (Powell, Thompson, Caspersen, & et al, 1987; Bijnen, Caspersen, & Mosterd, 1994; Martinson, O'Conner, & Pronk, 2001).

From a study of physical activity at work and job responsibility as risk factors for fatal coronary heart disease and other causes of death (Menotti & Seccareccia, 1985) was conducted among 99,029 men with age between 40 and 59 years reported that people with sedentary of moderately active jobs showed an excess of deaths from myocardial infarction and heavy workers had an excess of deaths from other heart disease and from chronic bronchitis and allied conditions.

From a prospective study of British men (Yu, Yarnell, Stweetnam, & Murray, 2003) stated that heavy or vigorous leisure-time physical activity was independently associated with reduced risk of premature death from cardiovascular disease.

It has been proven that physical activity is as primary and secondary factors to prevent the cardiovascular conditions (WHO, 2006; Warburton, Nicol, & Bredin, 2006) which regular physical activity and high fitness level are associated with a reduced risk of premature death from cardiovascular and prevented cardiovascular disease both men and women.

A 5-year follow up cohort study demonstrated that increasing physical activity could change major cardiovascular risk factors i.e., increased HDL cholesterol, decreased in body mass index (Young, Haskell, Jatulis, & et al., 1993).

In the later life physical activity could reduce mortality (Hamer, & Chida, 2008), decrease functional limitation and improve mental health (Dunn, Trivedi, & O'Neal, 2001; Morgan, & Bath, 1998). Physical activity is a component of cardiac rehabilitation program, and proposed in the national guidelines and public health recommendation (Pate, Pratt, Blair, & et al., 1995; Haskell, Lee, Pate, & et al., 2007).

4) Other health benefits of physical activity

The psychological benefit is positively associated with psychological well-being and quality of life (U.S. Department of Health and Human Services, 2008) that shown the regular physical activity reduced depression, anxiety, and improved self-esteem. Mechanisms explaining the effects of exercise on psychological well-being have not been clearly identified but the 'feel-better' effect from physical activity may result from changes in physical self-worth and self-esteem from mastering new tasks, having a greater sense of personal control, or from time away from negative or more stressful aspects of our lives (Biddle & Mutrie, 2008).

A meta-analysis concluded that increasing physical activity could improve quality of life among chronic illness adults (Conn, Hafdahl, & Brown, 2009). A systematic review (15 studies) stated that physical activity had a beneficial effect on some attributes associated with psychological well-being in individual with schizophrenia (Holley, Crone, Tyson, & Lovell, 2011).

Physical activity could improve the cardio-circulatory parameters as well as a sign decrease in score on the fatigue scale (Fragoso, Santana, & Pinto, 2008). Increased physical activity impact satisfaction with life positively in men after hospitalization (m=604, w=197) (McDonnell, Riley, Blanchard, & et al., 2011)

Regular physical activity using the large muscle groups (e.g. walking, cycling and swimming) can improve symptom, functional capacity, mental health and quality of life, and reduced risk by lowing blood pressure, reducing insulin resistance, managing unhealthy body weight, and improving lipid profiles (Allan, 2006).

Regular physical activity helps people adopt a more active lifestyle as they begin to feel better physically and emotionally (Edelman, & Mandle, 2010).

From a systematical review the effect of exercise on purposed biomarker of cancer risk among populations with some risk factors for cancer and population who survive from cancer (Winzer, Whiteman, Reeves, & Paratz, 2011) the results from 18 manuscripts of 353 publications stated that exercise had a small to moderate effect on improving concentrations of several blood biomarkers implicated in breast and colon cancer pathways. In breast cancer survivors, exercise had a small to moderate effect on improving some biomarkers associated with prognosis. There were two trials presented exercise led to increase immune function, in order to increased NKC cytotoxicity and lymphocyte proliferation.

Physical activity contributes to health by reducing the heart rate, decreasing the risk for cardiovascular disease and reducing the amount of bone loss that is associated with age and osteoporosis. Besides, physical activity also helps the body use calories better thereby helping with weight loss and weight gain. It can increase basal metabolic rate, reduces an appetite and help in the reduction of body fat (Atkins, 2007).

Among volunteer (n=25639, age between 40 and 74 years) a 5-year follow up study the result presented that physical activity with highest level was associated

with a 70% decreased risk of symptomatic gallstone (Banim, Luben, Wareham, & et al., 2010).

Harmful effects on an inappropriate physical activity

In the ancient time there was a number of philosopher and physician thought about sports could harm both mind and body and believed that intense athletic competition had a harmful effect on the heart and other organs (cited in Kujala, 2005). Hippocrates (460 BC – 370 BC) and Galen (131-201) believed that competition in the sports arena brought an early death (Hartley & Llewellyn, 1939 cited in Montoye, 1967).

Although running is a good exercise but the speedy running with a long distance and as the competition race actually is inappropriate activity for coronary artery disease (CAD) patients. Those high level of physical efforts impact to myocardial function. In case of coronary arteries had some occlusion, the number of coronary blood flow could not increase the volume as rapid and enough as the requirement of myocardium which produce to myocardial ischemia and myocardial infarction.

Thompson and others (2003) proposed the scientific statement from American Heart Association that habitual physical activity reduced coronary heart disease events, but vigorous activity can acutely and transiently increased the risk of sudden cardiac death and acute myocardial infarction in susceptible persons. Similar as a study of Willich, Lewis, Lowel, and others (1993) concluded that a period of strenuous physical activity was associated with a temporary increased in the risk of having a myocardial infarction, particularly among patients who exercise infrequently.

Exercise associated acute cardiac events generally occur in an individuals with structural cardiac disease. The marathon running is a favorite activity among healthy and well-train runners but nowadays it is found that sudden death or heart attack among those runners always occurs.

Noakes (1987) proposed a study report of 36 documents cases of heart attacks or sudden death in marathon runners prior to 1984. Data of angiography, autopsy, and electrocardiography (ECG) were revealed that among 25 of 27 runners had some degree of CAD, sudden death occurred in 22 of 36 runners, 19 dead died during, immediately after, and within 24 hours after the running. As a story of Jim Fixx who was a famous marathon runner, he started running in 1967 at age 35 years and kept on running till at age 52 years. After his daily run he had a sudden heart attack. The autopsy indicated that atherosclerosis had blocked his all three coronary arteries with 95%, 85%, and 70%. The death of Jim Fixx convinced the world that running could result in sudden death (Emmett, 2007).

Besides, the high level of physical efforts as running may be trend to joints and muscle damage. Every time the foot hit the ground, a stresses 3 of 4 times of body weight is absorbed by the joints of ankles, knees, hips, and lower back. Each step many groups of muscles contract and relax in order to move the body. There are many commonly problems among persons who have very hard physical activity, e.g., knee pain, hamstring problem, quadriceps pain or cramps.

Physical activity in patients with coronary artery disease

There are many factors that related to the disease of coronary heart i.e., obesity, diabetes, high systolic blood pressure, high total cholesterol, smoking, and physical activity. Nowadays, physical activity is acceptable as one of the important

factors that related to coronary artery disease and also could prevent the coronary heart disease. Reduction of those risk factors effect to the prevention or postpone substantially more death from coronary heart disease (Capewell, Ford, Croft, & et al., 2010).

More than 50 years of research confirm an inverse relationship between physical activity and coronary heart disease (Batty & Lee, 2004). In 1958, the first empirical investigation the physical activity reduced the occurrence of coronary heart disease was published by Morris and Crowford (1958). A hypothesis was stated that "men in physically active jobs have a lower incidence of coronary (ischemic) heart disease in middle-age than men in physically inactive jobs. More important, the disease is not so severe in physically active workers, …". The characteristics of those physical activities referred to type of job and used a three-point scale: 'light' jobs as school-master, bus-driver, clerk of any description and included sedentary, 'active' jobs as postman, carpenter, or 'heavy; jobs as boilermakers, dock laborer, which heavy included the heaviest. This study was the co-operation among the pathologists of 206 hospitals, between the year 1944 and 1951 in the Pathological Institute of London hospital. The study focused on the deceased men with 45 – 70 years of age and no matter what the cause of death. The pathological data on each necropsy was approached by at least two and often three physicians. The evidence from 1,200 deaths from coronary heart disease of the 5,000 total deaths can be classified by occupations which physically active involved. The 1,148 deaths (some of them were excluded) there was the 482 deaths related conditions in light workers, the 436 inactive workers, and the 230 in heavy workers.

A cohort study of men matriculating as undergraduates at Harvard University between 1916 and 1950, Sesso, Paffenbarger, Lee and others (2000) presented that they followed 12,516 middle-aged and older men (mean age = 57.7 years, range between 39 and 88 years) from 1977 through 1993. Physical activities were assessed from blocks walked, flights climbed, and participation in sport or recreational activities. The study results indicated that total sports or recreational activities and vigorous activities were inversely associated with the risk of coronary heart disease.

A study of Donahue, Abbott, Reed, and Yano (1988) conducted among Japanese men (n = 8,006) between 1965 and 1968 and 12 years of follow-up. Those participants were asked the average hours per day spent in basal (sleeping as lying down), sedentary (sitting or standing), slight (e.g., causal walking), moderate (e.g., gardening or carpentry), and heavy (e.g., lifting or shoveling) levels of activity. A weighting factor, based on the approximate Oxygen consumption needed for each level of effort, was multiplied by the member of hours engaged in that activity. The resulting products for all activities were then summed to yield an index of physical activity. The study results stated that physical activity related to the development of definite coronary heart disease and then 12 years past indicated that increased levels of physical activity were inversely related to the risk of definite coronary heart disease in group of middle-aged (45-64 years) and group of elderly men (65-69 years). Furthermore, low PA after myocardial infarction influence return to work negatively (n=88) (Brink, Brandstrom, Cliffordsson, 2008).

From a meta-analysis of physical activity and coronary heart disease, Berlin and Colditz (1990) summarized of the characteristics of and finding from 27 cohorts in which the relation between physical activity and coronary heart disease. Physical

activities were defined as occupational activity and other forms of activity, and divided into high activity group and low activity group. The result indicated that there was consistent with an association between lack of physical activity and increased risk of coronary heart disease. This association is generally stronger when the 'high activity' group in a study is compared with a sedentary group rather than when comparison group has a moderate activity level. This pattern was the support of a dose response relation between physical activity and protection from coronary heart disease.

According to the American Heart Association and American Stroke Association (2006) published the statistics of heart disease and stroke, cardiovascular disease remains the leading causes of mortality in the United States in men and women of every major ethic group.

According to summary of estimates of the prevalence of physical inactivity, worldwide physical inactivity causes 6% of the burden of disease from coronary heart disease as in Thailand the estimation is 3.2%. Besides, inactivity cause 9% of premature mortality or more than 5.3 million of the 57 million deaths occurred worldwide in 2008 (Lee, Shiroma, Lobelo, & et al., 2012).

A number of Thai patients with CAD tend to increase. CAD itself is an important cause of death in Thailand. Bureau of Policy and Strategy, Ministry of Public Health (2009) reported the number of population of whole kingdom who died from heart disease continuously increased every year. The total number of population who were ischemic heart disease or CAD was gradually increased and the majority of them were the older patients. Most of the Thai patients with coronary heart disease after hospital discharge (7 of 11 patients) had inappropriate lifestyles

such as performing heavy level activity with or without the isometric effects (Phonphet, 2000).

American Hospital Association and the Picker Institute (1997) stated that after discharged from hospital 23763 patients (37.00%) did not know when they could resume normal activity. As a study of Darr, Astin, and Atkins (2008) purposed that after discharged from hospital patients with coronary heart disease did not enough PA (n = 65, range aged between 40 and 83 years), many participants did not exercise because their co-morbidity or perceived lack of time and they thought that vigorous exercise was unnecessary while most participants had got some physical symptoms, e.g. dizziness, breathlessness, or swollen feet. Surprisingly, many older participants believed that they were fated to have coronary heart disease and could not have done anything to prevent it.

As a longitudinal follow-up study among myocardial infarction patients (n = 89, age was 65 years and lower, mean age was 57.2 years, S.D. = 7.2) (Brandstrom, Brink, Grankvist, & et al., 2009) stated that after 6 months with myocardial infarction lower than 40.00% of those patients were engaged in at least 30 min. of physical activity every day, and 30.00% of them performed such physical activity only once a week or less, by the pedometer recording presented that a daily mean number of footsteps of 6,719 (S.D. = 3771) and only 205 showed a daily mean number of steps of 10,000 or greater. Similar as a study of Jones and others (2007) studied the patients with post myocardial infarction and patients with revascularization after hospitalization found that these participants did not adhere to cardiac rehabilitation program because of many patients had others health problems, continuing cardiac

problems which prevented them from exercising, lack of motivate, and duties in women.

Social Cognitive Theory

In 1963, Bandura and Walters wrote *"Social Learning and Personality and Development"* broadening the frontiers of social learning theory with the principles of observational learning and vicarious reinforcement. By the 1970s, Bandura was becoming aware that a key element was missing from the theory. Then, in 1977, Bandura published *"Self-efficacy: Toward a unifying theory of behavioral change".* He firstly identified the important piece of that missing element that was the construct of self-efficacy and also in that year another publication was *"Social learning theory"* that in the social learning view of interaction was as a process of reciprocal determinism, behavior, other personal factors, and environmental factors all operate as interlocking determinants of each other (Bandura, 1977).

In 1986, Bandura published *"Social foundations of thought and action: A social cognitive theory"* which purposed the conception of *"reciprocal determinism"*, the view that consisted of; a) personal factors in form of cognitive, affective, and biological events, b) behavior, and c) environmental influences created bidirectionally interactions that result in a *triadic reciprocality* (cited in Pajares, 2002). As shown in the figure 3.

Regarding to the Social cognitive theory of Bandura this theory refers to a psychological model of behavior which focus on the learning occurs in a social context and that much of what is learned is gained through observation. Each person has an agency or ability to influence his/or her behavior and the environment in a purposeful, goal-directed fashion (Bandura, 2001). Based on the theory, Denler,

Wolters, and Benzon (2014) stated that learning can occur without an immediate change in behavior because of the learning process of each person that can through forethought, self-reflection, and self-regulation.

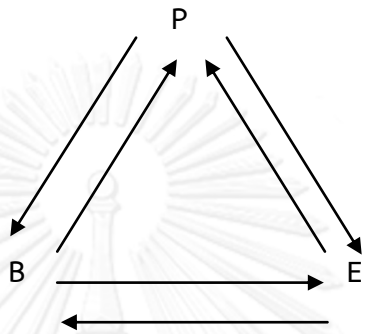

Figure 3 The relationship between the three major classes of determinants in triadic reciprocal causation, B represents behavior; P the internal factors in the form of cognitive, affective, and biological events; and E the external environment (Bandura, 1997)

Based on those relationships among behavior, internal factors, and external environment were used to determine health behavior of patients with coronary artery disease. Pajares (2002) supported that Bandura's social cognitive theory stood in clear contrast to theories of human functioning that overemphasized the role that environmental factors played in the development of human behavior and learning and the external stimuli produced human functioning. For Bandura, a psychology without introspection could not aspire to explain the complexities of human functioning. Social cognitive theory is rooted in a view of human agency in which individuals are agents proactively engaged in their own development and can make things happen by their actions, such as what people think, believe, and feel affects how they behave (Bandura, 1986).

Factors related to physical activity among patients with coronary artery disease after hospitalization

From the previous studies found that there are many factors related to physical activity among coronary artery disease patients, as follows;

Age: From a study of physical activity among persons with CAD after hospitalization (Reid, Morrin, Pipe, and et al., 2006) stated that participants who were younger age their physical activities level declined from 2 months after hospitalization. There was a study conducted among adults Japanese volunteers (n = 507) by measured-accelerometer step-count stated that time spent in moderate to vigorous intensity physical activity significantly decreased with aging ($p < .01$) (Ayabe, Yahiro, Yoshika, & et al., 2009).

As the most of study of physical activity had been done in men and much less research had been done in women (Kujala, 2005) and studied about the risk factors of cardiovascular events. For example, the study of PA and risk of cardiovascular events conducted among middle-aged subjects (45-60 years) (U.S. Department of Health and Human Services, 2008), another the research studied among the participants aged over 60 years and aged 80 and older (Shiroma & Lee, as cited in Lee, 2010). These studies suggested that higher levels of physical activities are related to lower rates of cardiovascular events among person younger and older than age 60 years.

On the other hand, there was a study of physical inactivity that conducted among the older adult (Kruger, Ham, & Sanker, 2008) which found that the prevalence of physical inactivity during leisure time was 30% and the age between

50 and 64 years was the lowest and those more 85 years of age was the highest prevalence of inactivity.

Gender: From a semi-structured interviews, the meaning of illness with coronary heart disease in women (n = 6) was evolved over time in a process of seeking understanding. After the onset of symptoms, there was a process, not sequence but repeated and iterative that consisted into denial, acknowledging, and being scared (Rosenfeld & Gilkerson, 2000).

Results from the NHBLI-Sponsored Women's Ischemia Syndrome Evaluation (WISE) Study (Shaw, Merz, Pepine, & et al., 2006) conducted in women with suspected myocardial ischemia (n = 914) concluded that functional impairment estimated by the Duke Activity Scale Index (DASI) correlates with determinant exercise test results (and is associated with an adverse prognosis). i.e., average DASI-estimated functional capacity was 5.7 ± 4.2 METs and for exercise women, 6.0 ± 2.6 METs.

As the majority of study always conducted among men, there was few study among women such as a study of Oguma and Shinoda-Tagawa (2004) reported that the increasing PA could be decreased the mortality rate and the other previous studies conducted among women with coronary artery/heart disease, and cardiovascular disease patients (Manson, Hu, Rich-Edwards, & et al., 1999; Manson, Greenland, LaCroix, & et al., 2002; Lee, Rexrode, Cook, & et al., 2001; Sesso, Paffenbarger, Ha, & et al., 1999) found that physically active women demonstrated lower coronary heart disease rates than sedentary women and also reported that only 27% of women exercise regularly and the study of the post-menopausal

women (Hsia, Wu, Allen, & et al., 2005) reported that a less likely to engage in moderate-to-strenuous PA.

The competence of PA between men and women are not different. From a pilot study conducted among the CAD patients (Radke, King, Blair, & et al,. 2005) reported that male (aged 54 to 74 year, mean 66 ± 3) and female (aged 53 to 77 year, mean 66 ± 3) could walk for the full 6-minutes of the test and none experienced any symptoms during the walk nor did they stop and rest. There was also no significantly difference in the distance between them. There was no significant gender difference for the change in exercise-induced cardiovascular responses.

From a study review of the psychosocial risk factors for coronary heart disease in women over the period 1980-1994 (Brezinka & Kittel, 1996) found that low social class, low educational attainment, the double loads of work and family, chronic troubling emotions and lack of social support emerge as documented risk factors in women and also the participation of rehabilitation program report poorer program uptake, poorer adherence, and significantly higher drop-out rates for women than for men, yet those women who complete cardiac rehabilitation show the same or even greater functional improvements than men.

Age and gender have an impact on daily activity level after cardiac events, as a study of Nickel and Chirikos (1990) stated that the comparison between young cardiac patients and older patients have a reduced exercise capacity, more limitations in mobility, and higher rates of disability.

Women who were diagnosed with heart disease presented that cardiac symptoms disrupted their ability to perform household task (Kimble, 2001) and they

tended to report lower levels of physical activity and higher levels of disruption in functional abilities (King, 2001).

Education: From a study of physical activity among CAD patient after hospitalization (Reid, Morrin, Pipe, and et al., 2006) concluded that among specific subgroup as less education declined their PAs levels.

Comorbidity: Comorbidity diseases may affect multiple clinical outcomes, including mortality, functional capacity, quality of life, and cost. Comorbidity conditions increase the risk of disability and mortality over and above the risk from individual disease (Fried, Kronmal, Newman, & et al., 1998). Most patients have more than one health condition, and therefore the assessment of co-morbidity is an important for caring those patients. Comorbidity conditions in a patient with CAD may effects outcome directly and indirectly by reducing the patient's physiological reserve and thereby increasing the risk of adverse outcome of CAD.

From a descriptive correlation study among older myocardial infarction women (n = 84, range age between 65 and 88 years) indicated that comorbidity was significantly associated with participation in PA (Crane, 2005).

Symptoms distress: Thai CAD patients (n = 11) after hospitalization most of them (8 of 11) had abnormal cardiac symptoms which mainly related to their activity (Phonphet, 2011). From a study of physical activity among elderly person with one year after acute myocardial infarction experienced (Stahle, Lindquist, & Mattsson, 2000) stated that there was significantly negative correlation between their activities levels and the somatic limitation of physical activity at three months ($r = -.045$, $p = 0.03$).

Subjective experiences of physical activity: From a study of physical activity among elderly patients with one year after acute myocardial infarction experienced (Stahle, Lindquist, & Mattsson, 2000) found that one of six important factors for inducing physical activity was the positive attitude with subjective experience to the exercise which effected to their body and mind. Besides, in order to maintained the fitness after they finished training program those participants had positive attitude to the exercise and wanted to keep on it. From the another study that study of physical activity among CAD patients (Arrigo & Luscher, 2007) the results presented that one factor that motivated them in a regular physical activity was positive effects of physical activity on health and fun during those activities.

Family and friend support for physical activity: supporting from family and from friend is as an emotional, informational, and tangible aid provided by a social network and received by a person. A social network is thought to include family members, friends, neighbors, co-workers and other close persons and professional helpers whom the person in question perceives to be supportive. From a study of Yates (1995) found that heart patients' spouses provided the most emotional and tangible aid, whereas healthcare professionals provided the most informational support while Koivula, Paunonen-Ilmonen, Tarkka, and others (2002) purposed the study results in patients who were waiting for the first Coronary Artery Bypass Graft (CABG) (n = 206, 166 men, 40 women) and stated that low emotional support from the social network was associated with high anxiety.

From a postal survey the illness among 132 people with angina and 94 friends who do not suffer from angina (Furze, Roebuck, Bull, & Thompson, 2002) the study result presented that peers were more likely to believe that people with

angina should take life easy (p <.01) and avoid exercise (p = .04) and excitement (p <.01).

Self-efficacy: Self-efficacy reflects one's confidence in the ability to execute a behavior in a given situation (Bandura, 1986). Self-efficacy is a context-related judgment of personal ability to organize and execute a course of action to attain designated levels of performance (Bandura, 1995; p 218). There is substantial empirical support for the premise that people's confidence in their ability to enact a behavior positively predicts subsequent behavior and that successful enactment increases people's confidence in their behavior (Bandura, 1997).

From a study of health behaviors in patients with CAD (Kang, Yang, & Kim, 2010), 157 participants were recruited, age was 59.38 ± 10.04 years, 75.20% was male and the study reported that age, education, smoking status, experience of receiving patient education, and cardiac self-efficacy significantly affected health behaviors, and cardiac self-efficacy had the greatest effect on health behaviors. However, cardiac knowledge had no statistically significant influence on health behaviors after controlling for the other factors.

From a study of LaPier, Cleary, and Kidd (2009) was conducted among 50 patients with coronary heart disease, the age was 60 ± 1.6 years studied an exercise self-efficacy and habitual PA by the Self Efficacy of Exercise Behavioral Scale (Sallis, Grossman, Pinski, & et al., 1987) and the Barnason Self Expectation Scale (Barnason, Zimmerman, Atwood, & et al., 2002) found that these participants reported higher level of cardiac self-efficacy and there was a positive correlation between cardiac self-efficacy and pre-hospitalization level of physical function.

D'Angelo, Reid, and Pelletier (2007) studied an exercise behavior change regulation in patients with heart disease, 200 participants who had documented CAD were recruited, self-efficacy was assessed by the Barrier self-efficacy scale (Bandura, 1997) stated that 81% were male, age between 37 and 93 year (mean was 64 years), were well educated, and two-thirds of them being unemployed or retired and the result of this study showed self-efficacy to be more relevant to exercise intentions and motivation to exercise planning.

From a cross-sectional study of 1,024 outpatients with coronary heart disease, data were drawn from the Heart and Soul study (Sarkar, Ali, & Whooley, 2007) (men = 839, range age was 67 ± 11 years) result study stated that decrease in self-efficacy score was independently associated with greater symptom burden, greater physical limitation, worse quality of life, and worse overall health, in addition depressive symptoms and poor treadmill exercise capacity were associated with poor health status, but LVEF and ischemia were not.

A six-month prospective study among coronary heart disease patients who had demonstrated clinically significant coronary disease (164 men, 34 women, range age between 45 and 80 years, mean age was 62.6 ± 8.9 years) (Sullivan, LaCroix, Russo, & Katon, 1998) proposed that self-efficacy scales significantly predicted physical function. Those physical functions referred to activities of daily living.

A descriptive and correlation cross-sectional study among 285 Thai CAD patients (range age between 31 and 85 years, mean age was 63 ± 9.47 years, 69.00% of them was men (n = 198) stated that social support was positively influenced self-efficacy to self-care requirement (Khuwatsamrit, 2006).

From a study self-efficacy and PA in older adults (n=309, mean age was73.23 ± 5.10 years) (Warner, Schuz, Knittle, 2011) stated that past experiences, vicarious experiences, and subjective health had significant direct effects on self-efficacy and indirect effects on exercise through self-efficacy while persuasive argument did not predict self-efficacy. Similar as a three-round Delphi technique among older adults (age ≥ 50 years) suggested that the determination of awareness, initiation and maintenance of PA were the previous exercise behavior, current exercise behavior, physical health status, self-efficacy to change or maintain PA behavior and perceived barriers (van Stralen, Lechner, Mudde, & et al., 2010).

From a critical literature review of barriers to participation and adherence to cardiac rehabilitation program (CRP) (Daly, et al., 2002) found some of relevant factors were associated with illness, self-efficacy, perceived benefit, distance and transportation, self-concept, self-motivation, family composition, social support, self-esteem, and occupation. Some factor was associated with non-adherence included being older, female gender, few year of formal education, perceiving the benefit of CRP, having angina, and being less physically active during leisure time. Because of physical activity is as a health behavior that the patients must to do by themselves.

There is only few study of physical activity in coronary artery disease (CAD) Thai patients. Most studies of physical activity focused on older Thai people. Physical activity is a part of cardiac rehabilitation program that is an important part because of Guidelines for the management of CAD (2004) strongly recommended that every patients with heart disease particularly patients with CAD who underwent percutaneous coronary intervention (PCI) or were treated by PTCA and /or cardiac surgery will be appointed to attend the cardiac rehabilitation program (CRP). This

program provides in the tertiary hospital and Cardiac Center or Cardiac Catheterization Laboratory. Cardiac rehabilitation nurse will be informed and helping patients recover from heart disease and also work with them to help plan and restructure their life style after their experienced with heart disease into a more heart-healthy manner. Those factors which related to physical activity in CAD patients should be explored in order to clearly clarify among new CAD patients with their physical activity after hospitalization.

CHAPTER III
METHODOLOGY

This chapter describes the research design and methodology used in the present study. The research design, population, sampling technique and sample selection, instruments, protection of human subjects, data collection and data analysis procedure were included.

Research design

This study used a cross-sectional, descriptive correlation research design using self-reported questionnaires. The study purposes were to determine physical activity performance and to investigate the predictable factors of those physical activities among new coronary artery disease patients during the first three months after hospitalization.

Population and sample

Population of the study

The target population was the patients with newly diagnosed coronary artery disease (CAD) considering by coronary angiography.

Sample and setting

A multistage random sampling technique was used among 38 cardiac centers that were stated in all regions of Thailand (The Heart Association of Thailand under the Royal Patronage of H.M. the King, 2013). Those cardiac centers were divided into 6 regions as follows: 23 centers of Bangkok, 2 centers of vicinity, 4 centers of the North, and 3 centers of the Northeast, of the East, and of the South equally. (Appendix C: Name list of Cardiac Center, updated on July 2009).

Sample size determination; The optimum sample size of this study needed to reject null hypothesis, provided the estimation of the number of predictors, alpha level, desired power, and effect size or specific level of R^2. A desired ratio of 15 respondents for each independent variable had been recommended (Hair, Black, Babin, Anderson, & Tatham, 2006; Polit & Beck, 2004). In addition, 10% of the total sample size was added to take into account from drop outs. This study has 8 independent variables so total number of sample should be 132. According to the recommendation of physical activity committee, it was stated that the scores of physical activity will skew thus the sample size should be increased and added up to 20%, therefore the final total number was 150. The preliminary study with 150 participants found that data of physical activity scores still skew and also leptokurtosis (skewness=1.671, S.E. = .198; Kurtosis=2.606, S.E. = .394), so another 10% of participant added up then the total participants should be 167. After deletion of the extreme outliers of physical activity score out. Lastly, the participant of this study was 160. However, the issues of non-normality distribution of dependent variable and also among some of independent variables (table 22) still presented. The transformation to Logarithm could not correct therefore, the Regression analysis of the study turned from Multiple Regression Analysis with enter method to LISREL with Robust Maximum Likelihood estimation (Boomsma, 1983).

The estimation of power values for the two statistical analyses was considered for avoiding the seriousness of Type I and Type II errors. A sample size of 160 still maintained the predetermination on statistical criterion of .05 and medium effect size (r = .30) which had the ability to detect an effect at the desired power around .90 (Cohen, 1992).

Sampling technique; The following steps of selection participants aimed to maximize the normal distribution of the samples. The setting of this study was 10 cardiac centers from all regionals of Thailand. The stratified sampling technique and the ratio sampling were done. The number of cardiac center to the total number of cardiac center of each regional; a Bangkok area was 5:23, a vicinity area was 1:2, North region was 1:4, Northeast region, East region, and South region were equally 1:3. As shown in the Figure 4.

The cardiac centers of the current study were as follows, Bangkok area: 1) Siriraj hospital, 2) Vajira hospital, 3) Phramongkutklao hospital, 4) Piyavate hospital, and 5) Bhumibol Adulyadej hospital; Vicinity area: 6) Thammasat University hospital; North region: 7) Maharaj Nakorn Chiang Mai hospital; Northeast region: 8) Maharat Nakhonratchasima hospital; East region: 9) Chonburi hospital; and South region: 10) Suratthani hospital.

Inclusion criteria

1. Patients with new diagnosis of coronary artery disease (CAD) considering by coronary angiography and attending the medical clinic during the first three months after hospitalization.

2. Having no cognitive dysfunction or disorientation of time, person, and place.

3. Able to read and write the Thai language.

4. Willing to participate in the current study.

Exclusion criteria

1. Status posted coronary artery bypass surgery.
2. On the process with psychiatrist approach and follow up.

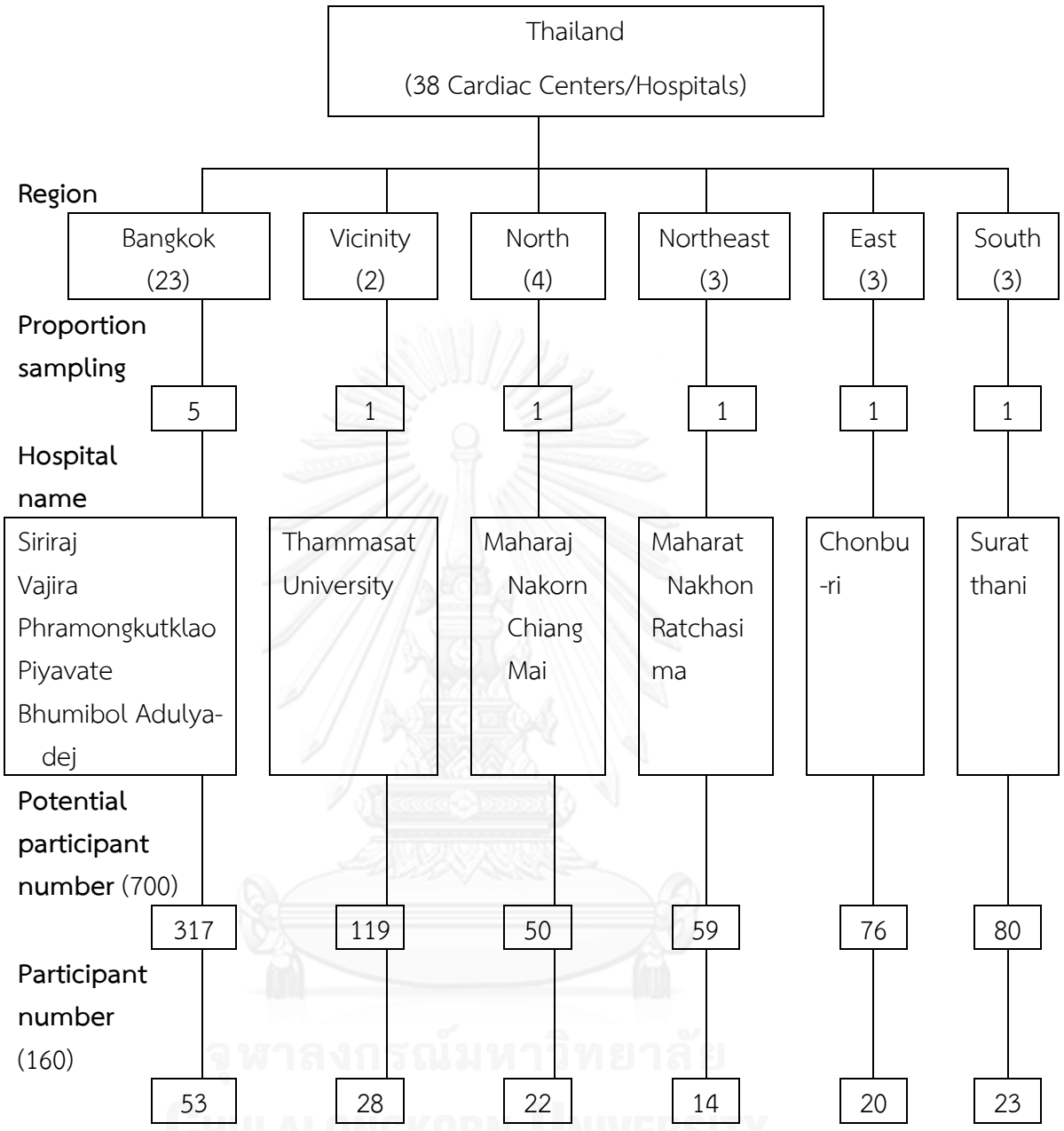

Figure 4 Sampling technique

Instrumentation

The instruments for data collection of this study were questionnaires, i.e. 1) Demographic Questionnaire, 2) Symptom Frequency and Symptom Distress Scale (SFSDS), 3) Subjective Physical Activity Experiences Scale (SPAES), 4) Family and Friend Support for Physical Activity Scale (FFSPAS), 5) Self-Efficacy for Physical Activity Scale (SEPAS), and 6) International Physical Activity Questionnaire – Long form (IPAQ-L).

All of the variables of this study and the indicators/ instruments were presented in Table 4. This section addressed; 1) instrument permission asking: translation and data collection, 2) instrument refinement, 3) instrument validation, and 4) instrument description.

Table 4: Variables and indicators/ instruments

	Variable	Indicator / Instrument
1	Age	Demographic Questionnaire
2	Gender	
3	Education	
4	Comorbidity	
5	Symptom distress	Symptom Frequency and Symptom Distress Scale (SFSDS)
6	Subjective experiences	Subjective Physical Activity Experiences Scale (SPAES)
7	Family and friend support	Family and Friend Support for Physical Activity Scale (FFSPAS)
8	Self-efficacy	Self-efficacy for PA scale (SEPAS)
9	Physical activity	International PA Questionnaire-Long form(IPAQ-L)

Instrument permission asking; The permission asking was done by sending e-mail letters to the owners to use the instruments in current study (Appendix D: Permission letters for instruments using). Details were follows:

1) Permission asking for translation and for data collection

a) the Symptom Frequency and Symptom Distress Scale (SFSDS) was modified by McCormick, Naimark, and Tate (2002). (Authorized: Kim M. McCormick, at Red River College, C608-2055 Notre Dame Ave, Winnipeg, Manitoba, Canada MB R3H 019)

b) the Subjective Physical Activity Experiences Scale (SPAES) was the Subjective Exercise Experiences Scale (SEES) which was modified by McAuley and Courneya (1994). (Authorized: McAuley, at the Department of Kinesiology at the University of Illinois)

After obtaining the e-mail letters permission, those instruments were sent to the Institute Language of Chulalongkorn University. The process of translation included back-translation to an original language by native speaker both Thai translator and English translator who had taught English to student of Chulalongkorn University. Then, the researcher consult advisors, talked and discussed about the difference and the refinement, and produced the final consensus version of each translated instrument.

2) Permission asking for data collection

a) the Family and Friend Support for Physical Activity Scale (FFSPAS) was developed from the Social Support for Physical Activity (SSPA), the version of Leethong-in (2009) which was an originally developed by Sallis, Grossman, Pinski, and others (1987).

b) the Self-efficacy for Physical Activity Scale (SEPAS) was developed from Self-Efficacy for Physical Activity (SEPA), the version of Leethong-in (2009) which was an originally developed by Resnick and Jenkins (2000).

According to the IPAQ Research Committee, it was stated that the IPAQ is publically available, it is open access, and no permissions are required to use it. An International physical activity questionnaire-long form (IPAQ_L) was adapted from the version of Leethong-in (2009) (25 items). It was developed from Booth and the International Consensus Group for the Development of an International Physical Activity Questionnaire at the WHO in 1998. This IPAQ_L was designed for research that required a comprehensive evaluation of daily physical activity (Craig, Marshall, Sjostrom, and others (2003). Researcher completely used 27 items as an original questionnaire in this current study.

Those three instruments in Thai language version were adapted and used for data collection by Leethong-in (2009) of her Dissertation which were copyright of Chulalongkorn University. All current instruments and the original instruments were shown as table 6.

Instrument refinement; The Thai version of all instruments, 6 questionnaires were refined by pre-pilot study focused on 4 new coronary artery disease patients; two men and two women were recruited. The informal interviews were used for verifying the meaning of those instruments by researcher. Two male and two female were recruited for instrument refinement. Both of males were 66 years old and females were 74 and 38 years old. Education of two male patients was primary school and secondary school. Education of an older female was a primary school and of a younger female was an apprentice school. The CAD diagnosis of older

female was the double vessels disease and others were the triple vessels disease. Only one man has 5 comorbid conditions while others have 3 comorbidities. They stated that they did not have any seriously health problem limited to perform the physical activity both before and after the diagnosis and also three out of them could perform physical activities as they had done before CAD were discovered. All of them lived with their families. They obtained the information of health from medical personal before discharging from hospital but did not join with cardiac rehabilitation program at all.

They understood that physical activities refer to the exercise performance and also it was an uneasily to answer what the physical activity performance was and how much to perform. They needed more explain about the meaning of physical activity or body movement and were concluded that “physical activity” or “body movement” was as the Thai-term “git-ja-gam-taang-gaai” (**กิจกรรมทางกาย**) or “karn-kleuan-wai-raang-gaai” **(การเคลื่อนไหวร่างกาย)**.

The current study, physical activity or “karn-kleuan-wai-raang-gaai” **(การเคลื่อนไหวร่างกาย)** was assessed during the last 7 days by the IPAQ_L form which consisted of 4 domains and the spending time for sitting. All 4 domains could cover all physical activities of everyone who had done as follows: work-related, transport-related, domestic and gardening (yard) activities, and leisure-time. They had a concerning point out cycling of transportation domain. Even though cycling provided health benefits and were officially promoted by government and private sectors but the cycling was unable to replace as an alternative of transportation. It seemed the cycling was as a kind of recreation among kids and healthy younger people. The cycling transportation was triggered by expert of instrument validity tests. They

confirmed that at present cycling was not a performance as a type of transportation really.

The scale of symptom frequency and symptom distress mostly were cleared and very easily to respond which were different from the subjective physical activity experiences scale. The subjective experiences of physical activity must be focused on moderate intensity of activity performance by themselves and responded as what they felt after performance. The scores were graded from not at all (1) through moderately (4) to very much so (7). The participants spent quite a bit time to think in order to respond to each item.

There was an issue of a support from friend for physical activity. Among old and older people who stayed with their family and did not go outside for work they always supposed that they had not any friend. Thus, the part of friend support for physical activity must be clarified first by the meaning of "friend" was the person who is (are) not the family member (s) but provided the support for physical activity. The similar issue also occurred in case of the participant who stayed alone.

There were some items of self-efficacy for physical activity that might make the participant feel a little uncertain because some situation of each item never happened in their real lives. The response of each item must be focused on the degree of confidence by own feeling.

Instrument validation; Validation testing of all instruments was determined by two characteristics, i.e.

- Content validation; All instruments were determined by 7 experts, i.e., an interventional cardiologist, two physicians of physical medicine and rehabilitation, a physical therapist of physical medicine and rehabilitation, two

nursing lecturers, and an advanced practice nurse who experience with cardiac rehabilitation performance. They were asked to rate the level of relevance between the item and the definition of the concept as proposed. The content validation index (CVI) was calculated for each instrument based on a 4-point Likert scale ranging from strongly relevance (4) to strongly irrelevance (1). Some items needed to be corrected by following the recommendations of experts and dissertation advisors. The total scores and the item scores of content validation index were as shown in table 3.2. (Appendix E: Name list of the Experts)

- Face validation; All instruments were determined by 7 experts, as the content validation. They were asked to share their opinion or commentary to refine the item of each questionnaire. Some items were redundant or inappropriate wording, distortion that would make the misinterpretation that must be corrected by following an expertise and dissertation advisors' recommendations.

Table 5: Calculation the content validation index (CVI) of the instruments

Instrument	T-CVI*	I-CVI**
1Demographic Questionnaire	-	-
2 Symptom Frequency and Symptom Distress Scale (SFSDS)	1.00	1.00-1.00
3 Subjective Physical Activity Experiences Scale (SPAES)	0.75	0.71-1.00
4 Family and Friend Support for Physical Activity Scale (FFSPAS)	1.00	1.00-1.00
5 Self-Efficacy for Physical Activity Scale (SEPAS)	1.00	1.00-1.00
6 International Physical Activity Questionnaire-Long form (IPAQ-L)	0.74	0.86-1.00

Note. *** Total Content validation index, **Item-Content validation index**

Instrument description;

1) Demographic questionnaire: This questionnaire was developed by researcher. Eighteen items were used for personal data collection; i.e. age, body weight, height, waist circumference, gender, living with (whom), education, workplace and characteristics of routine activities, income and expense, family earning, comorbidity (addressed the history of hyperlipidemia, high blood pressure, diabetes, renal disease, heart failure, peripheral vascular disease, and stroke or paralysis), number of coronary artery stenosis, health information perceiving, cardiac rehabilitation program participation, sportsmanship, cardiac symptom(s) worsening and number of returning back to the hospital, health problems, and physical ability to perform physical activity.

2) Symptom Frequency and Symptom Distress Scale (SFSDS): This instrument was developed from the Symptom Frequency and Distress Scale (SFSDS) which used for heart transplant recipients by Lough, Lindsey, Shinn, & Stotts, 1987 (cited in Yates, Price-Fowlhes, & Agrawal., 2003) and used for coronary artery bypass graft patients by McCormick, Naimark, and Tate (2002). Symptom Frequency and Symptom Distress Scale (SFSDS) measured physical symptom experienced and emotional distress caused by symptoms consisted of 23 symptoms/ items. A 5 – point Likert scales ranking from 0 to 4 (never to always) was used for measure subjectively assessed symptom frequency, while a parallel scale of 0 to 4 (not at all upsetting to extremely upsetting) was used for measure the perceived level of associated with distress.

This instrument originally modified by Lough, Lindsey, Shinn, and Stotts (1987). Later, McCormick, Naimark, and Tate (2002) modified this instrument and

conducted among cardiac patients who were waiting for CABG. The components of SFSDS are somatization, irritability-over sensitivity, cognitive-performance difficulty, depression, and fear-anxiety. This modified scale consisted of 23 items. Each item asked the frequency of symptoms and the severity of distress. The score of each item was calculated by multiplying the symptom frequency score with the symptom severity score then added up to be the total score. The internal consistency was .87.

This current study, the scores presented both symptom frequency and symptom severity which possible range of scores was between 0 and 92, equally. The total score of physical symptom indicated the symptom distress in a possible range between 0 and 368. Scores were classified into three categories, using a proportional method and determined the symptom distress was low (scores were 0 - 122), was moderate (scores were 123 - 245), and was high (scores were 246 - 368) level.

3) Subjective Physical Activity Experiences Scale (SPAES): The scale was developed from the Subjective Exercise Experiences Scale (SEES) which Edward McAuley and Kerry S. Courneya (1994) proposed their study, the development and preliminary validation of SEES. This scale was a measure of the global psychological responses to the stimulus properties of exercise which consists of three factors i.e., positive well-being, psychological distress, and fatigue. Twelve items of SPAES used for ask feeling of the subjective experience with physical activity performance. A 7 – point scale rankings from 1 to 7 (not at all, moderately, and throughout to very much so) was used for measure those feelings.

This current study, the total score indicated the subjective response to physical activity performance in a range between 12 and 84. Scores were classified

into three categories, using a proportional method and determined the response to subjective experience with physical activity performance was poor (scores were 12-36), was fair (scores were 37-60), and was good (scores were 61-84) level.

4) Family and Friend Support for Physical Activity Scale (FFSPAS): the original of this instrument was the Social Support for Exercise behavior (SSE) which developed by Sallis, Grossman, Pinski, and others (1987). Kaewthummanukul (2006) translated this instrument into Thai and used to collect data among female hospital nurses and the test-retest reliability for the Family and Friend Support subscale was 0.77 and 0.79, respectively. Then, Leethong-in (2009) developed this instrument and used to collect data among older Healthy Thai population. The internal consistency was 0.86.

The current study adopted the instrument of Leethong-in's version. The scale included part of family support for 12 items and part of friends support for 10 items. Both parts can be used to assess how often family and friends provided the support for physical activity perform during the last one month. A 5 – point scale rankings from 1 to 5 (none, rarely, a few time, often, and very often) was used for measure those supports.

The current study presented the scores of family support and scores of friend support. The possible ranges of scores were between 12 and 60, and 10 and 50, respectively. The total score indicated the support from family and friend in a possible range between 22 and 110. Scores were classified into three categories, using a proportional method and determined the support from family and friend were low (scores were 22-51), were moderate (scores were 52-81), and were high (scores were 82-110) level.

5) Self-Efficacy for Physical Activity Scale (SEPAS): the original of this instrument was the self-efficacy-barriers-to-exercise which McAuley developed in 1990, based on the concept of Bandura's self-efficacy theory. In 1990 Resnick and Jenkins (2000) developed this instrument and used to collect data among older adults and internal consistency was 0.92. Then, Harnirattisai, Johnson, & Kawinwonggowit (2006) translated this instrument into Thai and used to collect data among patients with knee replacement surgery and internal consistency was 0.84. Later, Leethong-in (2009) developed this instrument and used to collect data among older Healthy Thai population. The internal consistency was 0.92. Nine items of SEPA would be asked on the last 7 days on the CAD patients' ability to maintain participation in physical activity and the confidence to perform the activity. A 10 – point scale rankings from 0 to 10 (no confidence throughout total confidence) was used for measure the self-efficacy.

This current study adopted the instrument of Leethong-in's version for data collection. The total score of SEPAS (9 items) was categorized into low, moderate, and high obstacles. The low obstacle was the item number 1, 2, 4, and 9; the moderate obstacle was the item number 5, 6, 7, and 8; and the high obstacle was the item number 3. The possible ranges of scores were between 0 and 40 of low obstacle, 0 and 40 of moderate obstacle, and 0 and 10 of high obstacle, respectively. Total score indicated the level of self-efficacy on physical activity which in a possible range of score between 0 and 90. Scores were classified into three categories, using a proportional method and determined the self-efficacy was low (scores were 0-30), was moderate (scores were 31-60), and was high (scores were 61-90) level.

6) International Physical Activity Questionnaire-Long form (IPAQ-L): This instrument was developed from the version of Leethong-in (2009) that was an originally developed from Booth and the International Consensus Group for the Development of an International Physical Activity Questionnaire at the WHO in 1998 (as cited in Craig, et al., 2003).

Physical activity was divided into 4 domains (with 12 subdomains) and the spending time for sitting. Those 4 domains were as follows 1) the work domain, 2) an active transportation domain, 3) the domestic and garden (yard work) domain, 4) the leisure-time domain, and 5) the time spent sitting. The total score of the summation of all 4 domains with 12 subdomains calculated to minute/week and 11 subdomains (excluded the subdomain of the travelling in a motor vehicle) calculated to MET-minutes/week. The time spent sitting presented as the number of minutes/week.

Each item of this questionnaire asked about the time spent for the activity of each sub domain i.e. “How many day did you do (type of activity) per week?” and “How much time did you spent on (that activity) per day?” From those answers, data were collected into minutes per week. Then, those numbers of minutes per week were transformed to be MET-minutes/week. The calculation was computed by weighting each type of activity. (Appendix H: Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ).

As there are no established thresholds for presenting MET-minutes/week, so the IPAQ Research Committee, November 2005 (www.ipaq.ki.se) suggested that the study results should be presented as median minutes per week or median MET-minutes per week rather than means (such as mean minutes/week or mean MET-

minutes/week) and also reported as comparisons of median values and interquartile ranges (IQR) because of the Skewness of those physical activities measurement.

This current study, the total score indicated the physical activity in a range between lower than 600 METs and higher than 3000 METs. Scores were classified into three categories as follows: low level of physical activity (scores were lesser than 600 METs-min/week), moderate level (scores were between 600 and 3000 METs-min/week), and high level (scores were greater than 3000 METs-min/week). Also the time spent sitting was proposed by minutes per week.

Table 6: Current instruments, authorized instruments, and translation

Current instrument	Authorities	Thai version	Translation
Demographic questionnaire	-	Developed by researcher	
Symptom frequency and symptom distress scale (SFSDS)	McCormick, Naimark, & Tate (2002)	-	Translated into Thai by Language institution Chulalongkorn University
Subjective PA experiences scale (SPAES)	McAuley & Courneya (1994)	-	
Family and Friend Support for Physical Activity Scale (FFSPAS)	Sallis, Grossmann, Pinski, & et al. (1987)	Leethong-in (2009)	
Self-efficacy for PA scale (SEPAS)	Resnick & Jenkins (2000)	Leethong-in (2009)	
International PA Questionnaire-Long form(IPAQ-L)	Craig, Marshall, Sjostrom, & et al. (2003)	Leethong-in (2009)	

Right Protection of Human Subject

This study was conducted with an approval of Institution Review Board (IRB) of each hospital /setting for a pilot study and the data collection (Appendix B: Certificate of Approval by Ethic Committee of 10 hospitals). The informed consent form was explained the objectives of the study, benefits, risks, the kind of the questionnaires, the timing for complete these questionnaires, and asked for the co-operation from the participants. The permission was obtained before the data collection process. If a patient chooses not to answer the questionnaires, he/she had right to withdraw from this study at any time without penalty. His/her name did not appear in the data; rather a code number was used to ensure confidentiality. There did not harm to the participants in this study. There neither cost nor any payment to participants in the study.

A pilot study was conducted at the beginning of the data collection among participants who were convenience samples, employed to recruited 30 participants. Researcher made self-introduction and explained the study objectives and asked for willing to cooperation to this Pilot study and signed a consent form. They were asked to complete the questionnaires together with the reconsidered about the clarity and suitability among those questions. All 30 participants spent as 30 to 45 minutes to complete the questionnaires and also in case of added the opinions or commentary of the question item.

Cronbach's alpha was used for calculated reliability of the instruments using SPSS-PC both of the pilot study at the beginning and the total of study at the end. The results showed in Table 7.

Table 7: Psychometric properties of the instruments using in the pilot study (N = 30) and total study (N = 160)

Instruments	Coefficient alpha N=30	Coefficient alpha N= 160
1 Demographic Questionnaire	-	-
2 Symptom Frequency and Symptom Distress Scale (SFSDS)	.95	.96
3 Subjective PA Experiences Scale (SPAES)	.70	.72
4 Family and Friend Support for Physical Activity Scale (FFSPAS)	.89	.93
5 Self-Efficacy for PA Scale (SEPAS)	.94	.97
6 International PA Questionnaire-Long form(IPAQ-L)	.71	.63

Data collection

The permission letters for data collection of Faculty of Nursing, Chulalongkorn University were sent to the Hospital Director and the IRB committee of all 10 hospitals. After obtained the permission from those hospitals, researcher started the process of data collection. Data were collected from November 2013 through April 2014.

Firstly, making the appointment with physician and head nurse of an out-patient department of each hospital and/or each cardiac center to self-introduction, asked for cooperation, searched for research assistants, and informed them about the objectives and process of this study.

Secondly, inspection the participants' name from the procedure record of cardiac catheterization laboratory during the last 3 months. This survey focused on the participants who were the newly approached for coronary artery detection by

coronary angiography. In case of the coronary artery occlusion, the coronary artery disease (CAD) diagnosis was indicated. Around 700 patients' name were recruited as the potential participants of this study. Actually, those CAD patients were periodically assigned back to see physician after hospital discharge.

Lastly, the preparation the research assistant with 10 registered nurses, five nurses were graduated Master degree of Nursing Science, two were studying the Master of Nursing Science, and three nurses were graduated Bachelor's degree of Nursing Science. All of them worked either at cardiac center or out-patient of medical department. Researcher provided the objectives of this study and the detail of each questionnaire, how to approached the participants, asked for inform consent signing, and asked for complete the questionnaires.

Data analysis

Data were analyzed by descriptive and inferential statistics as follows

1. Descriptive statistics including frequency, percentage, range, mean, median, standard deviation, and interquartile range were used to describe the characteristics of variables.

2. The assumptions underlying were determined including normality of distribution, linearity of relationship, homogeneity of variance, multicollinearity, and homoscedasticity.

3. The LISREL with Robust Maximum Likelihood estimation was used to explore the relationship between independent variables and dependent variable.

CHAPTER IV
RESULTS

The purposes of this correlation research were to determine physical activities and to investigate the predicting factors of physical activity among new coronary artery disease (CAD) patients after hospitalization. The data analysis is presented as follows;

Part 1: Characteristics of the study participants

Part 2: Characteristics of the study variables

Part 3: Analyses

Part 4: Study results

Characteristics of the study participants

The participants of this study were 160 new CAD patients who were diagnosed by the coronary angiography and had discharged from hospital already. The potential participants were patients who actually revisited hospital for routine physical examination during the first three months or between the 10^{th} week and the 14^{th} week. All participants had drawn from the name lists of 10 hospitals of all parts of Thailand. Around 700 new CAD patients were recruited as the potential participants. The patients who were met the inclusion criterions, willing to share their information, and completely responded the questionnaires were the study participants. The LISREL with Robust Maximum Likelihood estimation was used for determination of the predicting factors of physical activity among those participants.

Demographic characteristics: Table 8, the results showed that 63.75% were male and 36.25% were female. More than half of them (63.75%) aged between 50

and 69 years (mean = 62.24, SD = 10.94). Most participants completed the secondary school or lower (83.13%), lived with the family/ relative(s) (94.37%), still earned wage for living either as partial earnings (33.76%) and breadwinner (33.12%). In addition, they stated that the incomes and the expenses of their family were adequate for living (58.75%) and moreover some of them even had for savings (23.75%). Majority of them (86.76%) proposed that they had got the health information such as food, exercise, life style, and stress management but there had only 18.13% participated to cardiac rehabilitation program.

The characters of routine activities among participants were standing or walking (46.88%) and sitting (39.37%). Only a small group (13.75%) did the extreme force performing. Most participants (81.25%) were not the sportsman and had never done any of competitive games or sports at all. There was 18.75% who had done some competitive games or sports playing. Only 3.12% still regularly perform. Around one third of the participants (36.88%), the Body Mass Index (BMI) was in normal range (18.50-22.99 kg/m^2). Only 5.00% were in the underweight range but the majority was in the overweight range (24.37%) and in the obese (33.75%). These were different from the waist circumference which more than half of them was in the normal range i.e. 48.75% of male (n=78) and 19.38% of female (n=31).

Table 8: Demographic characteristics; personal data of the study participants (N=160)

Demographic characteristics		N	%
Age (years);	(Range 31-88 years, mean=62.24, SD=10.94)		
	31 – 49	18	11.25
	50 – 69	102	63.75
	70 – 88	40	25.00

Table 8 Demographic characteristics; personal data of the study participants (N=160) (cont.)

Demographic characteristics			N	%
Gender	Male		102	63.75
	Female		58	36.25
Education	Secondary school or lower		133	83.13
	Higher education		27	16.87
Living with	Family / relative(s)		151	94.37
	Friend(s)/ other(s)		1	0.63
	Live alone		8	5.00
Family earnings	Breadwinner		53	33.12
	Partial earnings		54	33.76
	None		53	33.12
Income and expense	Inadequate		28	17.50
	Adequate		94	58.75
	Adequate and savings		38	23.75
Perceived health information before hospital discharge;		No	21	13.13
		Yes	139	86.87
Participated in cardiac rehabilitation program;		No	131	81.87
		Yes	29	18.13
Characteristics of routine activities				
	Mostly sit		63	39.37
	Mostly stand or walk		75	46.88
	Mostly extreme force performing		22	13.75
Sportsmanship: before CAD was discovered;		No	130	81.25
		Yes	30	18.75
	Regularly performed		5	3.12
	Irregularly performed		8	5.00
	Give up at all		17	10.63

Table 8 Demographic characteristics; personal data of the study participants (N=160) (cont.)

Demographic characteristics		N	%
Body mass index (kg./m^2);	(B.M.I. range 14.22-47.47 kg./m^2, mean=24.16, SD=4.16)		
	Under weight: < 18.50	8	5.00
	Normal weight: 18.50 – 22.99	59	36.88
	Over weight: 23.00 – 24.99	39	24.37
	Obese : 25.00 – >30.00	54	33.75
Waist circumference (inches)	Male ≤ 36	78	48.75
	Male: > 36	24	15.00
	Female: ≤ 32	31	19.38
	Female: > 32	27	16.87

Table 9, around a quarter of the participants had got the coronary artery disease with triple vessels occlusion (24.37%) the others were double vessels and single vessel occlusion (40.00% and 30.00%, respectively). Only 5.63% stated that they did not know how many coronary artery occlusion they had. Most participants had some of comorbidity, 26.25% had one condition and had two conditions equally, and 23.75% had three conditions and greater than three conditions. After hospitalization, 82.50% of participants did not have any worse cardiac symptom worsening which led them return back to the hospital besides as the routine appointment. However, 16.25% and 1.25% returned back to hospital by 1 to 3 times, and 4 to 6 times, respectively. Among those participants who were unexpected to return back to hospital, 10.62% presented with chest discomfort.

Table 9: Demographic characteristics; health data of the study participants (N=160)

Demographic characteristics		N	%
Number of coronary artery occlusion;	Single vessel	48	30.00
	Double vessels	64	40.00
	Triple vessels	39	24.37
	Unknown	9	5.63
Comorbidity*;	None	38	23.75
	One condition	42	26.25
	Two conditions	42	26.25
	Three and greater than three conditions	38	23.75
Number of the time returning back to the hospital with cardiac symptom(s) worsening			
	No	132	82.50
	Yes; 1 - 3 times	26	16.25
	4 – 6 times	2	1.25
The Cardiac symptom(s)**;	Chest discomfort	8	5.00
	Dyspnea on exertion	1	0.63
	Shortness of breath	1	0.63
	Couldn't lie down	1	0.63
	Syncope	1	0.63
	Other	1	0.63
	2 symptoms	10	6.25
	More than 2 symptoms	5	3.12

Note. *****hyper-lipidemia, high blood pressure, diabetes, renal disease, heart failure, peripheral vascular disease, stroke;
**Multiple responses

Most of participant (60.00%) had not any health problem or the limitation regarding their physical activities while 34.38% had mild problems. Only 5.63% had serious problem(s) which they stated that against their activities participation. Among

group of mild problem, the problems were dyspnea on exertion (15.00%), body pain (14.38%), and chest discomfort (2.5%). Body pain and dyspnea exertion were the problem of the serious problem group (4.38%, and 1.25%, respectively). As shown in Table 10.

Table 10: Number of participants who had health problem against the physical activities participation after hospitalization (N = 160)

Health problem after hospitalization	N	%
Not at all	**96**	**60.00**
Mild	**55**	**34.38**
Dyspnea on exertion	24	15.00
Body pain	23	14.38
Chest discomfort	4	2.50
Other(s)	4	2.50
Serious	**9**	**5.63**
Body pain	7	4.38
Dyspnea on exertion	2	1.25

Characteristics of the study variables

Physical activity was a dependent variable in this current study. Eight independent variables were categorized into personal factor, i.e. age, gender, education, comorbidity, symptom distress, subjective experiences of physical activity self-efficacy for physical activity, and; and environmental factor which was family and friend support for physical activity. In this part, the characteristics of those variables would be described as follows;

1) Physical activity of this study focused on all physical activities that participants did during the last 7 days. Those activities were divided into 4 domains

which consisted of 12 sub-domains and time spent sitting. The study results presented into 2 characters; 1) the time spent for those activities and time spent for sitting (minutes/week), and 2) the activity intensity (MET-minutes/week) and intensity level (vigorous, and moderate activity intensity, and walking).

Table 11: Descriptive statistics of physical activity, differentiated by time spent activities (minutes/week) and by activity intensity (MET-minutes/week) (N=160)

Physical activity	**Possible Range**	**Actual range**	**Mean (SD)**	**Median**	**IQR**	**Skewness** (SE=.192)	**Kurtosis** (SE=.381)
Total time* (min/wk.)	0-highest possible	40-4950	1361.69 (1263.22)	987.50	1800.00	1.105	.351
Intensity** (MET-min/wk.)	0-highest possible	132-21102	4703.37 (4971.63)	2564.50	6048.00	1.410	1.192

*****12 sub-domains

**11 sub-domains; travelling in a motor vehicle was excluded

As the Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ) (www.ipaq.ki.se) (Appendix: H) proposed that the physical activity score can be reported as a continuous measure and “one measure of the volume of activity can be computed by weighing each type of activity by its energy requirement defined in METs to yield a score in MET-minutes. METs are multiples of the resting metabolic rates and a MET-minute is computed by multiplying the MET score of an activity by the minutes performed”.

Table 11 demonstrated that the skewness coefficient of the time spent activity (min/wk.) and of the activity intensity (MET-min/wk.) scores were positively skewness (1.105, and 1.410, respectively) and the activity intensity (MET-min/wk.) scores highly peaked as presented as the leptokurtic (1.192). Therefore, the results presentation of those activity scores were reported by the median value and interquartile ranges (IQR) as follows; the time spent physical activity ranged between 40 and 4,950 minutes/week with a median value of 987.50 minutes/week (IQR = 1,800.00 min/wk.) and the physical activity intensity ranged between 132 and 21,102 MET-minutes/week with a median value of 2,564.50 MET-minutes/week (IQR = 6,048 MET-min/wk.).

Based on the IPAQ Research Committee Recommendations, majority of the study participants met the aim, i.e., 43.12% of moderate level and 45.00% of high level. Only 11.88% was in the low level of activity intensity (Table 12).

Table 12: Level of physical activity as the Recommendations of IPAQ Research Committee, differentiated by gender (N = 160)

	Level of activity intensity (MET-min/wk.)					
	Low (<600)		**Moderate** (600-3000)		**High** (>3000)	
	N	%	N	%	N	%
Male (N = 102)	12	7.50	36	22.50	54	33.75
Female (N = 58)	7	4.38	33	20.62	18	11.25
Total (N=160)	19	11.88	69	43.12	72	45.00

Table 13: Descriptive statistics of the time spent for physical activity (min/wk.) differentiated by 4 domains of physical activity and sitting time (N = 160)

Activity domain	Physical activity (Min/wk.) (N= 160)				
	Range	Mean	SD	Median	IQR
Work*	0-3360	329.34	614.55	.00	357.50
Transportation*	0-1960	440.72	420.70	275.00	562.50
Domestic*	0-3840	337.78	542.18	115.00	435.00
Leisure-time*	0-1740	253.84	377.53	120.00	295.00
Sitting time	90-5280	1910.59	1020.18	1800.00	1260.00

* Multiple responses

All participants spent their time for sitting (weekday and weekend) between 90 and 5,280 minutes/week, with a median value was 1,800 minutes/week (IQR = 1,260). They spent their time for transportation domain (travelling by motor vehicle, by cycling, and by walking), for domestic domain, for work domain, and for leisure-time domain (IQR = 562.50, 435.00, 357.50, and 295.00, respectively). As shown in Table 13.

The highest activity intensity was the activity of work domain which were performed by 67 participants (41.87%), with median of 1,813 MET-minutes/week (IQR = 5,202.00). The activity intensities of domestic domain were performed by 104 participants (65.00%), with median of 1,135.00 MET-min/wk. (IQR = 2,408.75) and the leisure-time domain were performed by 118 participants (73.75%), with median of, and 693.00 MET-min/wk., (IQR = 1.042.50). The lowest activity intensity was the activity of transportation domain were performed by 153 participants (95.63%), with median of 594.00 MET-min/wk. (IQR = 792.00). As shown in Table 14.

Table 14: Descriptive statistics of the physical activity intensity (MET-min/wk.), differentiated by 4 domains of physical activity (N = 160)

Activity domain*	N (%)	Activity intensity (MET-min/wk.)				
		Range	Mean	S.D.	Median	IQR
Work	67 (41.87)	120-17232	3630.20	3849.20	1813.00	5202.00
Transportation**	153 (95.63)	33-6426	1013.03	1161.39	594.00	792.00
Domestic	104 (65.00)	30-14460	1921.97	2179.31	1135.00	2408.75
Leisure-time	118 (73.75)	33-7038	1308.80	1592.68	693.00	1042.50

* Multiple responses

** 2 sub-domains: by cycling, and by walking

Physical activity was divided into 3 kinds of the intensity which vigorous activity was assessed by activity performance of work, domestic, and leisure-time domains. Moderate activity was assessed by activity performance of work, transportation, domestic, and leisure-time domains whereas walking was assessed by activity performance of work, transportation, and leisure-time.

Table 15, it illustrated data of each type of activity intensity. Statistics demonstrated that the majority of participants engaged their physical activities by walking when travelling (n=153), and on their leisure-time (n = 112). And also majority participants engaged their physical activities in domestic domain, by moderate activity intensity both inside the home and in the garden (n = 90, and 82, respectively). There was small number of participants who had activity in work domain, i.e., 38 of vigorous intensity, 61 of moderate intensity, and 63 of walking.

Table 15: Number of participants who participated physical activity in each domain (N = 160)

Domain	Intensity and activity	N
Work (N=67)	Vigorous	38
	Moderate	61
	Walking	63
Transportation (N=153)	Bicycling	25
	Walking	153
Domestic (N=104)	Vigorous in the garden/ yard	44
	Moderate in the garden/ yard	82
	Moderate inside the home	90
Leisure-time (N=118)	Vigorous	26
	Moderate	35
	Walking	112

2) Age

Data in table 4.12 presented that the age range of participants was between 31 and 88 years, with an average age of 62.24 (SD = 10.94) years. The Skewness of data (.032) was positive and close to zero which indicated that the age of most participants were in moderate range with normal distribution. The Kurtosis of data (-.396) was negative that indicated that it was the widening distribution however, it was reasonably normally distribution.

3) Gender

Majority of participants was male (n = 102, 63.75%), and it was two folds of female (n = 58, 36.25%). Since gender was the nominal scale, therefore the dummy

coding was needed. In the analysis process, 1 was equal to male and 0 was equal to female.

4) Education

Majority of participants finished secondary school or lower (n = 133, 83.13%). Approximately 16.87 percent finished higher education (n = 27). Since education level was the nominal scale, therefore the dummy coding was needed. In the analysis process, 1 was equal to secondary school or lower and 0 was equal to higher education.

5) Comorbidity

Based on the number of comorbidity, it was divided into 4 groups, i.e. none of comorbidity, one, two, and three and greater than three comorbidity. The participant number of each group was similarity. By an average, the participants had got the greater than one comorbidity. The Skewness of data (.00) indicated that normal distribution while the Kurtosis of data (-1.311) indicated that it was leptokurtic with an extremely flat distribution.

Table 16: Descriptive statistics for age, and comorbidity (N=160)

Variable	Possible Range	Actual range	Mean (SD)	Median	Skewness (S.E.=.192)	Kurtosis (S.E.=.381)
Age (years)	-	31-88	62.24 (10.94)	62.00	.032	-.396
Comorbidity	0 - 3	0-3	1.5 (1.10)	1.50	.00	-1.311**

6) Symptom distress

Symptom distress was computed by the multiplying with each item between the frequency of symptom and the severity of symptom. The scores of symptom

frequency ranged between 0 and 51, with a mean of 13.61 (SD = 11.44, median = 10.00). This set of data, the Skewness (1.134) presented positively and as similar as the symptom severity scores which the range was between 0 and 50, with a mean of 12.04 (SD = 10.90, median = 10.00). The Skewness (1.135) and the Kurtosis (1.097) presented positively too. Total score of symptom distress ranged between 0 and 140, the Skewness (2.258) and the Kurtosis (5.581) were extremely positive both Skewness and Leptokurtic which far from the normal distribution. (Table 22)

The current study, the score of symptom distress of the most participants (98.75%) was at the low level. Only 1.25% was at the moderate level and none had a high level.

Table 17: Descriptive statistics for symptom distress, differentiated by distress level (N=160)

Symptom distress	Possible range	Actual range	N	%	Mean (SD)	Median
Low level	(0-122)	0-104	158	98.75	19.52 (22.48)	13.50
Moderate level	(123-245)	130-140	2	1.25	135.00 (7.07)	135.00
High level	(246-368)	-	-	-	-	-
Total	(0-368)	0-140	160	100.00	20.96 (25.79)	14.00

7) Subjective experiences of physical activity

The total scores of the subjective experiences of physical activity ranged between 12 and 63, with a mean of 38.42 (SD = 9.06, median = 38.00). This set of data was a normal distribution (Skewness = .063, Kurtosis = .076). The subjective experience of physical activity score of the majority of participants was at the fair level (56.25%). Only 1.25% had a high score level.

Table 18: Descriptive statistics for subjective experiences of physical activity, differentiated by the level of experiences (N=160)

Subjective experiences	Possible Range	Actual range	N	%	Mean (SD)	Median
Poor level	12-36	12-36	68	42.50	30.26 (5.22)	31.50
Fair level	37-60	37-58	90	56.25	44.06 (5.53)	43.00
Good level	61-84	61-63	2	1.25	62.00 (1.41)	62.00
Total	12-84	12-63	160	100.00	38.42 (9.06)	38.00

8) Family and friend support for physical activity

The scores of family and friend support ranged between 22 and 93, with a mean of 51.69 (SD = 11.07, median = 53.00). This set of data, the Skewness (.081) indicated normal distribution but the Kurtosis of data (-.831) indicated that it was leptokurtic. (Table 22)

The majority of participants had family and friend support at the moderate level (50.62%). Only 3.75% had this support in the high level.

Table 19: Descriptive statistics of family and friend support for physical activity, differentiated by support level (N=160)

Family and friend support	Possible range	Actual range	N	%	Mean (SD)	Median
Low level	22-51	22-51	73	45.63	34.92 (8.504)	35.00
Moderate level	52-81	52-81	81	50.62	63.94 (7.86)	65.00
High level	82-110	87-93	6	3.75	90.50 (2.08)	90.50
Total	22-110	22-93	160	00.00	51.69 (18.07)	53.00

9) Self-efficacy for physical activity

The total scores of self-efficacy ranged between 0 and 90, with a mean of 47.68 (SD = 23.27, median = 47.00). The Skewness (.054) indicated normal distribution but the Kurtosis of data (-.647) indicated that it was platykurtic. (Table 4.18) The majority of the participants had self-efficacy score at the moderate level (49.38%) while the low level and the high level had been occupied by participants in similarity number (23.12%, and 27.50%, respectively).

As the self-efficacy score was categorized by obstacle level, the study presented that sum score of self-efficacy for low obstacle and for moderate level ranged between 0 and 40, and high level ranged between 0 and 10. The mean of low, moderate, and high obstacle scores were 22.19 (SD = 10.49), 20.84 (SD = 11.07), and 4.64 (SD = 2.75), respectively. Self-efficacy for moderate value and low value were normally skewed (.068 and -.055, respectively) which indicated that the most participants had a moderate level and a low level of self-efficacy. Moreover, the

kurtosis of self-efficacy for moderate level and low level had a platykurtic distribution (-.718 and -.676, respectively). Besides, the self-efficacy for high obstacle level was highly positive skewed (1.312), which indicated that most of the participants had a low level of self-efficacy.

Table 20: Descriptive statistics for self-efficacy for physical activity level (n=160)

Self-efficacy	Possible range	Actual range	N	%	Mean (SD)	Median
Low level	0-30	0-30	37	23.12	17.00 (9.27)	18.00
Moderate level	31-60	31-60	79	49.38	45.54 (8.14)	45.00
High level	61-90	61-90	44	27.50	77.32 (9.68)	76.00
Total	0-90	0-90	160	100.00	47.68 (23.27)	47.00

Table 21: Descriptive statistics for self-efficacy for physical activity (n=160)

Self-efficacy	Possible Range	Actual range	N (%)	Mean (SD)	Median	Skewness SE=.192	Kurtosis SE=.381
Low obstacle	0-40	0-40	160 (100)	22.19 (10.49)	21.00	-.055	-.676
Moderate obstacle	0-40	0-40	160 (100)	20.84 (11.06)	20.00	.068	-.718
High obstacle	0-10	0-10	160 (100)	4.64 (2.75)	5.00	1.312	.654

Analyses

1) Normality

In preliminary analysis found that the data were not normal distribution both dependent variable (physical activity) and some of the predictor variables. The transformation to Logarithm could not correct therefore, the Regression analysis of the current study turned from Multiple Regression with Enter method to LISREL with Robust Maximum likelihood estimation

2) Multicollinearity

Regarding the multicolinearity testing stated this issues should not occur if the correlation of any variable is not greater than .85, the tolerance value ($1-R^2$) were greater than .10, the variance inflation factor (VIF) values was less than 10, and the condition index is less than 30 for two or more coefficients in the same dimension with the value greater than .90 (Hair, et al., 2006). The current study had not any the evidences of multicollinearity (table 23, Appendix I, respectively).

Table 22: Descriptive statistics for symptom distress, subjective experiences, family and friend support, and self-efficacy (N=160)

Variables	Actual range	Mean (SD)	Median	Skewness (SE=.192)	Kurtosis (SE=.381)	Interpretation
Symptom Distress	0-140	20.96 (25.79)	14.00	2.258	5.581	Low
Frequency	0-51	13.61 (11.44)	10.00	1.134	1.108	
Severity	0-50	12.04 (10.90)	10.00	1.135	1.097	
Subjective experience	12-63	38.42 (9.06)	38.00	.063	.076	Fair
Family and friend support	22-93	51.69 (18.07)	53.00	.081	-.831	Moderate
Family support	12-60	33.87 (13.65)	33.00	-.022	-1.105	
Friend support	12-46	17.83 (8.82)	15.50	1.185	.838	
Self-efficacy	0-90	47.68 (23.27)	47.00	.054	-.647	Moderate
Physical activity	132-21102	4703.37 (4971.63)	2564.50	1.410	1.192	High

Table 23: Correlations between independent variables and physical activity (N=160)

Variables	1	2	3	4	5	6	7	8	9
1. Age	1								
2. Gender	-.136	1							
3. Education	.243**	-.166*	1						
4. Comorbidity	.025	-.190*	.023	1					
5. Symptom distress	-.037	-.216**	-.006	.243**	1				
6. Subjective experiences	-.042	-.056	.071	-.164*	.341**	1			
7. Fam- friend support	-.061	-.003	.056	-.196*	.043	.266**	1		
8. Self-efficacy	-.107	.201*	-.052	-.163*	-.167*	.131	.094	1	
9. Physical activity	-.213**	.183*	-.175*	.039	-.162*	-.146	-.075	.331**	1

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

* Correlation is significant at the 0.05 level (2-tailed)

3) Homoscedasticity and linearity

Homoscedasticity refers to the variance of error is the same across all levels of the independent variables (Hair, et al., 2010) which was tested by the visual examination of the plot of regression of the standardized predicted dependent variable against the regression standardized residual. Linearity was indicated by the Residuals scatter plots (Munro, 2005). The current study was reasonably accepted.

Study results

Table 24: Regression analysis of Physical Activity (1,000 Met) among new coronary artery disease (CAD) patients after hospitalization with Robust Maximum likelihood estimation

Predictors	b	Se	t	β	p-value
Age	-.079*	.031	-2.51	-0.173	0.013
Gender	.556	.768	0.72	0.054	0.473
Education	-.932	1.069	-0.87	-0.070	0.386
Comorbidity	.218	.392	0.56	0.048	0.576
Symptom distress	-.008	.013	-0.61	-0.042	0.543
Subjective experiences	-.037	.044	-0.85	-0.068	0.397
Family and friend support	.006	.006	0.23	0.021	0.818
Self-efficacy	.055**	.055	3.48	0.256	<0.001
Dependent Variable: Physical Activity (1,000 Met) R^2 = 0.135, **χ^2= 0, df=1, p=1.00**					

* p < 0.05, ** p < 0.01

Table 25: Parsimonious regression model of Physical Activity (1,000 Met) among new coronary artery disease (CAD) patients after hospitalization with Robust Maximum likelihood estimation

Predictors	b	Se	t	β	p-value
Age	-.087**	.033	-2.61	-0.192	<0.01
Self-efficacy	.056**	.014	3.99	0.261	<0.001
Dependent Variable: Physical Activity (1,000 Met) R^2 = 0.116, **χ^2= 3.49, df=7, p= 0.836**					

* p < 0.05, ** p < 0.01

The correlation among all variables presented in Table 23. There were five of eight variables had a significant correlated to PA. 1) Age had a significantly negative correlated to PA (r = -.21; P<.01). Self-efficacy had a significantly positive correlated to PA (r = .33; p<.01). Gender had a significantly positive correlated to PA (r = .18; p<.05). Education had a significantly negative correlated to PA (r = -.18; p<.05). Symptom distress had a significantly negative correlated to PA (r = -.16; p<.05). Comorbidity, Subjective experiences of PA, and Family and friend support for PA had correlation to PA but not significant (r = .04, -.15, and -.08, respectively). The overall regression equation is shown in Table 24. The R^2 (.135) is presented, and the predicted equation as follows;

Equation: Raw score

Physical Activity' = -.079age* + 0.556gender - 0.932education + 0.218comorbidity - 0.008symptom distress -0.037subjective PA experiences + 0.006family and friend support + 0.055self-efficacy**

Equation: Standardizes score

$Z'_{\text{physical activity}} = -0.173Z^{*}_{\text{age}} + 0.054_{\text{gender}} - 0.070Z_{\text{education}} + 0.048Z_{\text{comorbidity}} -0.042Z_{\text{symptom distress}} -0.068_{\text{subjective PA experiences}} + 0.021Z_{\text{family and friend support}} + 0.256Z^{**}_{\text{self-efficacy}}$

CHAPTER V
DISCUSSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter discussed the study findings which included the conclusion, discussion, implications, and recommendations for future research.

Conclusion

The purposes of this descriptive cross-sectional study were to investigate the physical activity (PA) and to identify the predictable factors of PA among new coronary artery disease (CAD) patients. Participants were drawn from 10 tertiary hospitals and selected by randomized proportional sampling of all regions of Thailand. Data were collected by using self-reported questionnaires, i.e. Demographic questionnaire, Symptom frequency and symptom distress scale (SFSDS), Subjective physical activity experiences scale (SPAES), Family and friend support for physical activity scale (FFSPAS), Self-efficacy for physical activity scale (SEPAS), and International physical activity long form (IPAQ-L form). The instruments had content validated by experts and tested for reliability. The Cronbach's alpha coefficients were 0.96, 0.72, 0.93, 0.97, and 0.63, respectively. Data were analyzed by descriptive statistic i.e., percentage, range, mean, standard deviation, median, interquartile range (IQR), and the LISREL with Robust Maximum likelihood estimation.

Results

The participants, 63.75% were male, 63.75% had age range between 50 and 69 years, 83.13% completed secondary school or lower, 94.37% lived with their family, 58.75% had adequate incomes and 23.75% had for savings. The majority knew their

number coronary vessel disease and had comorbidity, 94.37%, and 76.25%, respectively. They had an overweight (24.37%) and obesity (33.75%), 36.88% had normal BMI and only 5.00% had low BMI. The waist circumference more than upper limit was found in 24 males (15.00%) and 27 females (16.87%).

All participants admitted and underwent their first coronary angiogram and 86.87% perceived health information before hospital discharge but only 18.13% of all had participated in cardiac rehabilitation program. After hospitalization, 82.50% had not any health problem but 16.25% had cardiac symptom(s) worsening which led them returning back to hospital before the appointment with the most frequency of 1 to 3 times. The most cardiac symptom was chest discomfort (5.00%). Regarding to health problem or the limitation against their physical activity participation found that 60.00% had not any problem, 34.38% had mild problem(s) and only 5.63% had serious problem(s). Dyspnea on exertion (15.00%) was the main of mild problem and body pain was also the main of problem of both mild problem (14.38%) and serious problem (4.38%).

Most participants (81.25%) were not the sportsman. There were 18.75% of sportsman and only 3.12% of this group had regularly performed physical activity. The routine activities of participants were related to standing or walking (46.88%), sitting (39.37%), and extreme force performing only 13.75%.

The median and IQR of time spent activities and activity intensity in our participants were 987.50, and 1,800.00 minutes/week (Skewness = 1.105, S.E. = .192, Kurtosis = .351, S.E. = .381), and 2,564.50, and 6,048.00 MET-minutes/week (Skewness = 1.410, S.E. = .192, Kurtosis = 1.192, S.E. = .381), respectively. (Table 11)

Participants spent their time for sitting more than other activity (median = 1,800.00, IQR = 1,260.00 minutes/week) and spent their time in the domain of transportation, domestic, work, and leisure-time (IQR = 562.50, 435.00, 357.50, and 295.00, respectively). (Table 13)

Regarding physical activity intensity, the highest intensity was work domain (median = 1,813.00, IQR = 5,202.00 MET-minutes/week) followed by domestic, leisure-time, and transportation domains (median = 1,135.00, = 693.00, and = 594.00, IQR = 2,408.75, = 1,042.50, and 792.00 MET-minutes/week, respectively). (Table 14)

From the IPAQ Research Committee Recommendations, majority of participants met the aim of recommendation i.e., 45.00% had a high level and 43.12% had a moderate level of activity intensity (> 3,000 and 600 – 3,000 MET-min/wk., respectively). Only 11.88% did not meet the aim (< 600 MET-min/wk.). (Table 12) All participants performed walking as the main of their activities and performed other activity domains as follows: transportation (N = 153), leisure-time (N = 118), domestic (N = 104), and work (N = 67) (Table 15).

Predicting factors to physical activity

There were five out of eight variables had a significant correlated to physical activity. 1) Age had a significantly negative correlated to physical activity ($r = -.21$; $p < .01$). 2) Self-efficacy had a significantly positive correlated to physical activity ($r = .33$; $p < .01$). 3) Gender had a significantly positive correlated to physical activity ($r = .18$; $p < .05$). 4) Education had a significantly negative correlated to physical activity ($r = -.18$; $p < .05$). 5) Symptom distress had a significantly negative correlated to physical activity ($r = -.16$; $p < .05$).

Comorbidity, subjective experiences of physical activity, and family and friend support for physical activity had correlation to physical activity but not significant (r = .04, -.15, and -.08, respectively). The overall regression equation is shown in Table 24. The R^2 was 0.135 and the predicted equation, raw score and standard score as follows;

Physical Activity' = -.079age* + 0.556gender - 0.932education + 0.218comorbidity - 0.008symptom distress -0.037subjective PA experiences + 0.006family and friend support + 0.055self-efficacy**

$Z'_{\text{physical activity}} = -0.173Z^{*}_{\text{age}} + 0.054_{\text{gender}} - 0.070Z_{\text{education}} + 0.048Z_{\text{comorbidity}} - 0.042Z_{\text{symptom distress}} - 0.068_{\text{subjective PA experiences}} + 0.021Z_{\text{family and friend support}} + 0.256Z^{**}_{\text{self-efficacy}}$

Discussion

Participants were new CAD patients in their older adults who had age range between 50 and 69 years. Most of them were male, lived with their families and had adequate incomes. They also knew the severity of their disease and perceived health information. Even though they had comorbidity and health problems, they still performed physical activity in moderate to vigorous activities at moderate to high level. Their physical activities mostly related to standing or walking in all activity domains. The intensity of activity was highest in work domain, followed by domestic, leisure-time and transportation. The results of current study revealed some factors determined the physical activity performing.

Age had a significantly negative correlated to physical activity (r = -.21; p < .01), similar to the study in myocardial infarction patients (Stahle, Lindquist, & Mattsson, 2000). There was a significant difference of mobilization and exercise capacity between cardiac patients who were younger and older. Cardiac patients

who were older had reduced exercise capacities and more limitations in mobility and had a higher rate of disability than younger cardiac patients (Yates, Price-Fowlkes, & Agrawal, 2003).

Gender had a significantly positive correlated to physical activity ($r = .18$; $p < .05$). Gender had an impact on physical activity performance. Male patients ($n = 54$) had a high level of activity intensity which was greater than female patients ($n = 18$). (Table 12) This finding is congruence to the study of Yates and others (2003) which revealed the female patients tended to report lower level of their activities and higher level of disruption in function ability while men had a higher baseline of an activity level and a higher exercise capacity than women. Also the study among heart disease patients after hospitalization, it was found that men were more active than women (Reid et al., 2006), and had more exercise intention and motivation with exercise planning (D'Angelo & Reid, 2007). As the walking is a basic of usual physical activity After hospitalization, majority of patients with myocardial infarction (80.00%) had their footsteps per day unmet criteria of health benefit (Brandstrom et al., 2009). However, after hospitalization male patients performed their physical activity less than they did before they were diagnosed (Huijbrechts et al., 1997).

Self-efficacy had a significantly positive correlated to PA ($r = .33$; $p < .01$). Self-efficacy reflects one's confidence in the ability to perform a behavior in a given situation (Bandura, 2001). There is substantial empirical support for the premise that people's confidence in their ability to enact a behavior positively predicts subsequent behavior and that successful enactment increases people's confidence in their behavior (Bandura, 2001). A study of Yang, and Kim Kang et al. (2010) on health behaviors in patients with CAD found that cardiac self-efficacy significantly

affected health behaviors, and had the greatest effect on health behaviors. Additionally, D'Angelo and Reid (2007) studied an exercise behavior change regulation in patients with heart disease shown that self-efficacy strongly relevant to exercise intentions and motivation to exercise planning.

Education had a significantly negative correlated to physical activity ($r = - .18$; $p < .05$). Even though, education had a correlation with physical activity among CAD patients (Reid et al., 2006) but another study stated that level of education was not associated with exercise among CAD patients in cardiac rehabilitation program (Petter, Blanchard, Kemp, Mazoff, & Ferrier, 2009). Female patients with CAD who had low educational attainment had a higher significant drop-out rate of cardiac rehabilitation program than male patients (Brezinka & Kittel, 1996). Information were given at the hospital could provide knowledge and change their attitude to physical activity. The changing attitude was also a factor to maintain their physical activity (Stahle et al., 2000). The current study, majority participants (83.13%) completed secondary school or lower but found that only 11.88%, physical activity intensity were at low level which unmet the aim of Recommendation. During three months after hospitalization might be the chance for informal learning by observation and by themselves. Because of more than a half the study participants (63.50%) were 50 – 69 years although 81.87% did not participated in cardiac rehabilitation program but 86.87% were received health information before hospital discharge.

Symptom distress had a significantly negative correlated to physical activity ($r = -.16$; $p < .05$). Physical symptom distress inhibited to perform activities (Yates et al., 2003). Thai CAD patients (24.4%) afraid their exercise might lead to chest pain (Tammatisthan, 2000), and they did not exercise because they were tired, had a

headache or felt faint (Saiseesub, 2000). Symptom distress was a subjective symptom and defined as the barriers to perform physical activity and might lead to fearful or lack of interest and desire to engage in activity (Yates et al., 2003). Heart disease patients did not exercise after hospitalization because their physical symptoms (Darr et al., 2008), some patients experienced with chest pain (Tammatisthan, 2000), tiredness, headache or felt fainting after exercise (Saiseesub, 2000). The current study 98.75% of participants had a low level of symptom distress. The possible range of total score was 0 to 368 but the actual range was 0 to 140 (Table 17), and the mean score of symptom frequency and symptom severity were 13.61 (SD = 11.44) and 12.04 (SD = 10.90), respectively.

The other factors were not correlated to physical activity. **Comorbidity** (r = .04) was defined as the concurrent presence of two or more medically diagnosed diseases in the same person (Singh et al., 2008). From a study review (Petter et al., 2009) indicated that an intrapersonal factor (i.e. fewer comorbidities, less severe cardiac illness) related to increase exercise level, similar to our study. Our participants had overweight and obesity (58.12%). They increased health problem after hospitalization but they still performed physical activity in moderate to vigorous activities at moderate to high level. However, comorbidity was a factor of physical inactivity (Darr, Astin, & Atkin, 2008) and also was a risk of disability and mortality but from a study of health behaviors in patients with CAD (Kang, Yang, & Kim, 2010) the study results did not mention any comorbidity among those patients. The current study found participants who had not any comorbidity and had three and greater than three conditions were 23.75%, equally. As the participants who had one

condition of comorbidity and who had two conditions of comorbidity were 26.25%, equally. (Table 9)

Subjective experiences of physical activity (r = -.15) had a positive relation with PA but did not meet statistical significance. The correlation between subjective experiences was varied among the studies. Some CAD patients thought that vigorous exercise was unnecessary and CAD patient could not have done anything to prevent it (Darr et al., 2008). The first episode of myocardial infarction patients after hospitalization had feeling of disability and anxiety (Huijbrechts et al., 1997). While another reported that activity-related affect positively related to exercise behavior (Namphonkrung, 2004). And other one study reported well-being, body and mind, comfort and health related to PA (Stahle et al., 2000). The participants of this study, 81.25% were not sportsman and had never done any of competitive games or sports at all. In addition, only 5 of 30 who were sportsman still had regularly performed their physical activities, 8 of 30 had irregularly performed their physical activities, and 17 of 30 had given up their physical activities at all. (Table 8)

Family and friend support for physical activity had positive correlation to PA but not significant (R = -.08). This predicting factor was varied result of correlation, similar to subjective experiences of physical activity. In myocardial infarction patients, the support from a physical active partner and the good information at hospital were the important factors for inducing physical activity (i.e. intention to maintain the physical fitness) and for continuing to be physically active (Stahle et al., 2000). From a study review (Petter et al., 2009) indicated that the confidence in cardiac rehabilitation staff to assist in performing exercise behaviors were not associated with

exercise. Among patients who received education or exercise consultation sessions reported higher exercise levels and also patients who received more social support reported higher exercise levels whereas marital status and subjective norm (i.e. perceived social pressure to engage in exercise) were not related to exercise. Moreover, this review indicated that higher perceived behavioral control (i.e. perceived ease of participating in exercise) related to increase exercise. The participants of this study, majority (94.37%) lived with family. The mean score of family support were higher than of friend support (33.87, SD = 13.65; and 17.83, SD = 8.82, respectively). (Table 22) Total score of family and friend support indicated that 50.62% had a moderate level and 45.63% had a low level. (Table 19) Because of the disease of coronary artery might produce the threaten feeling both patients and family member. Moreover, this was the first experience with CAD diagnosis which was the first experience among participants and also among the participants' family member too. Thus, those family members might not encourage patients to perform the physical activities.

Finally, the study results presented that among new coronary artery disease patients after hospitalization, personal factor i.e., age, gender, education, symptom distress, and self-efficacy effected to physical activity performance more than the support from family and friend. Age, gender, education, comorbidity, symptom distress, subjective experience of physical activity, family and friend support for physical activity, and self-efficacy could predict physical activity among new coronary artery disease patients after hospitalization (r^2 = .135).

Equation (raw score);

Physical Activity' = -.079age* + 0.556gender - 0.932education + 0.218comorbidity -0.008symptom distress -0.037subjective PA experiences + 0.006family and friend support + 0.055self-efficacy**

Equation (standardized score);

$Z'_{\text{physical activity}} = -0.173Z^{*}_{\text{age}} + 0.054_{\text{gender}} - 0.070Z_{\text{education}} + 0.048Z_{\text{comorbidity}} - 0.042Z_{\text{symptom distress}} -0.068_{\text{subjective PA experiences}} + 0.021Z_{\text{family and friend support}} + 0.256Z^{**}_{\text{self-efficacy}}$

Implications to nursing

1) Emerging of specified knowledge to explain the phenomena of physical activity among new CAD Thai patients after hospitalization.

2) Health care providers with multidisciplinary team and policy makers can use this finding developed scientifically guidelines to promote physical activity policy to support and encourage the health promotion of CAD patients.

3) The study findings will encourage nurses and researchers to develop further intervention to enhance the engagement in PA among new CAD patients.

4) Female monitoring after hospitalization will promote the daily physical activity.

Limitation of the study

1. Characteristics of participants, as follows,
    1.1 Number of male was greater than of female for 2 folds,
    1.2 Twenty-five percent (n = 40) of participants, the age ranged 70 to 88 years,
    1.3 Majority of participants (83.13%) completed secondary school or lower.

2. Unable access all of the official reports of each the participants, i.e., report of angiography and exercise stress test.

Recommendations for future research

1. To explore perspectives on PA and leisure-time PA or PA under taken during non-work time assessing a cross-sectional study CAD patients with nearly diagnosis, and with the patients who had got CAD diagnosis.

2. To determine daily PA patterns among CAD patients by accelerometer and to estimate total energy expenditure (TEE) and PA related – energy expenditure in daily living conditions.

3. To compare self-reported and objectively measured PA (pedometer, accelerometer) among a cohort study of CAD patients at multiples time points during after hospitalization in six months and twelve months.

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APPENDICES

APPENDIX A

Approval of dissertation proposal

ประกาศ
คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
เรื่อง การอนุมัติหัวข้อดุษฎีนิพนธ์ ครั้งที่ 1/2556 ประจำปีการศึกษา 2556

ตามที่คณะพยาบาลศาสตร์ ได้มีประกาศ เรื่อง การอนุมัติหัวข้อดุษฎีนิพนธ์ ครั้งที่ 4/2554 ประจำปีการศึกษา 2554 ประกาศ ณ วันที่ 26 กรกฎาคม 2555 และครั้งที่ 3/2555 ประจำปีการศึกษา 2555 ประกาศ ณ วันที่ 17 พฤษภาคม 2556 แล้วนั้น เนื่องจากมีการปรับแก้บางส่วน จึงขอยกเลิกประกาศหัวข้อวิทยานิพนธ์ ของ **นางสุชาดา เรืองรัตนอัมพร, นางวัชรินทร์ วุฒิรณฤทธิ์ และนาวาตรีหญิง อรวรรณ ช้องต้อ** ในประกาศฉบับดังกล่าว และใช้ประกาศฉบับนี้แทนดังนี้

นิสิตผู้ทำวิจัยและอาจารย์ที่ปรึกษาดุษฎีนิพนธ์

รหัสนิสิต	5177976836
ชื่อ-นามสกุล	นางสุชาดา เรืองรัตนอัมพร
สาขาวิชา	พยาบาลศาสตร์ (นานาชาติ)
อาจารย์ที่ปรึกษาหลัก	**รองศาสตราจารย์ ดร. จินตนา ยูนิพันธุ์**
อาจารย์ที่ปรึกษาร่วม	**ผู้ช่วยศาสตราจารย์ ดร. ชนกพร จิตปัญญา**
ประธานกรรมการสอบฯ	รองศาสตราจารย์ ดร. สุรีพร ธนศิลป์
กรรมการสอบฯ	รองศาสตราจารย์ ดร. สิริพันธ์ สุวรรณมรรคา
กรรมการสอบฯ	ผู้ช่วยศาสตราจารย์ ดร. สุนิดา ปรีชาวงษ์
กรรมการสอบฯ	ศาสตราจารย์ นายแพทย รุ่งโรจน์ กฤตยพงศ์
ชื่อหัวข้อดุษฎีนิพนธ์	ปัจจัยทำนายการมีกิจกรรมทางกายภาพของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล (PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION)
ครั้งที่อนุมัติ	1/2556
ระดับ	ปริญญาเอก

นิสิตผู้ทำวิจัยและอาจารย์ที่ปรึกษาดุษฎีนิพนธ์

รหัสนิสิต	5177974536
ชื่อ-นามสกุล	นางวัชรินทร์ วุฒิรณฤทธิ์
สาขาวิชา	พยาบาลศาสตร์ (นานาชาติ)
อาจารย์ที่ปรึกษาหลัก	**รองศาสตราจารย์ ดร. จินตนา ยูนิพันธุ์**
อาจารย์ที่ปรึกษาร่วม	**รองศาสตราจารย์ ดร. วราภรณ์ ชัยวัฒน์**
ประธานกรรมการสอบฯ	รองศาสตราจารย์ ร.ต.อ.หญิง ดร. ยุพิน อังสุโรจน์
กรรมการสอบฯ	รองศาสตราจารย์ ดร. สิริพันธ์ สุวรรณมรรคา
กรรมการสอบฯ	รองศาสตราจารย์ ดร. สุรีพร ธนศิลป์
กรรมการสอบฯ	ผู้ช่วยศาสตราจารย์ ดร. ชนกพร จิตปัญญา
กรรมการสอบฯ	รองศาสตราจารย์ ดร. ยาใจ สิทธิมงคล
ชื่อหัวข้อดุษฎีนิพนธ์	การมีปัญหาพฤติกรรมร่วมกับภาวะซึมเศร้าในวัยรุ่นไทย (CO-OCCURRENCE OF DISRUPTIVE BEHAVIOR AND DEPRESSION AMONG THAI ADOLESCENTS)
ครั้งที่อนุมัติ	1/2556
ระดับ	ปริญญาเอก

24 ก.ค. 56

APPENDIX B

Approval of the Ethical Committee Boards

1 Siriraj Hospital

2 Vajira Hospital

3 Phramongkutklao Hospital

4 Piyavate Hospital

5 Bhumibol Adulyadej Hospital

6 Thammasat University Hospital

7 Maharaj Nakorn Chiang Mai Hospital

8 Maharaj Nakhonratchasima Hospital

9 Chonburi Hospital

10 Suratthani Hospital

2 PRANNOK Rd. BANGKOKNOI
BANGKOK 10700

Tel. +66 2419 2667-72
Fax. +66 2411 0162

Siriraj Institutional Review Board

Certificate of Approval

COA no. Si 748/2013

Protocol Title : Predicting factors of physical activity among new coronary artery disease patients after hospitalization

Protocol number : 646/2556(EC4)

Principal Investigator/Affiliation : Mrs. Suchada Raungratanaamporn / Faculty of Nursing, Chulalongkorn University

Research site : Faculty of Medicine Siriraj Hospital

Approval includes :

1. SIRB submission form
2. Proposal Thai and English version
3. Participant Information Sheet
4. Informed Consent Form
5. Physician Information Sheet
6. Research Assistant Instructions Sheet
7. Questionnaire
8. Principle Investigator's curriculum vitae

Approval date : December 20, 2013

Expired date : December 19, 2014

This is to certify that Siriraj Institutional Review Board is in full Compliance with international guidelines for human research protection such as the Declaration of Helsinki, the Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP).

(Prof. Jarupim Soongswang, M.D.)
Chairperson

- 3 JAN 2014
date

(Clin. Prof. Udom Kachintorn, M.D.)
Dean of Faculty of Medicine Siriraj Hospital

- 6 JAN 2014
date

พิมพ์ที่หน่วยพิมพ์โรงพยาบาลศิริราช 2341 / 3,000 แผ่น / มิ.ย.55 / M / Mat.10023252

All Siriraj Institutional Review Board Approved Investigators must comply with the Following :

1. Conduct the research as required by the Protocol ;
2. Use only the Consent Form bearing the Siriraj Institutional Review Board "APPROVED" stamp ;
3. Report to Siriraj Institutional Review Board all of serious illness of any study subject ;
4. Promptly report to Siriraj Institutional Review Board any new information that may adversely affect the safety of the subjects or the conduct of the trial ;
5. Provide reports to Siriraj Institutional Review Board concerning the progress of the research, when requested ;
6. Conduct the informed consent process without coercion or undue influence, and provide the potential subject sufficient opportunity to consider whether or not to participate.

๖๘๑ ถนนสามเสน เขตดุสิต กรุงเทพฯ ๑๐๓๐๐
โทรศัพท์ ๐-๒๒๔๔-๓๘๔๐
โทรสาร ๐-๒๒๔๔-๓๘๔๓

COA 72/2556

คณะกรรมการพิจารณาจริยธรรมการวิจัย
คณะแพทยศาสตร์วชิรพยาบาล
เอกสารรับรองโครงการวิจัย

คณะกรรมการพิจารณาจริยธรรมการวิจัย คณะแพทยศาสตร์วชิรพยาบาล ดำเนินการให้การรับรองโครงการวิจัยตามแนวทางหลักจริยธรรมการวิจัยในคนที่เป็นมาตรฐานสากลได้แก่ Declaration of Helsinki, The Belmont Report, CIOMS Guideline และ International Conference on Harmonization in Good Clinical Practice หรือ ICH-GCP

ชื่อโครงการภาษาไทย : ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

ชื่อโครงการภาษาอังกฤษ : Predicting factors of physical activity among new coronary artery disease patients after hospitalization

เลขที่โครงการ : ๐๗๒/๕๖

ผู้วิจัยหลัก : นางสุชาดา เรืองรัตนอัมพร

สังกัดหน่วยงาน : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

เอกสารที่รับรอง :

- แบบเสนอโครงร่างการวิจัย **Version 2 ลงวันที่ ๑๘ พฤศจิกายน ๒๕๕๖**
- เอกสารชี้แจงอาสาสมัครผู้เข้าร่วมโครงการวิจัยโดยการตอบแบบสอบถามและการพิทักษ์สิทธิผู้เข้าร่วมการวิจัย **Version 2 ลงวันที่ ๑๘ พฤศจิกายน ๒๕๕๖**
- เอกสารชี้แจงแพทย์เจ้าของไข้ **Version 2 ลงวันที่ ๑๘ พฤศจิกายน ๒๕๕๖**
- แบบสำรวจรายชื่อผู้ป่วยที่อยู่ในเกณฑ์เป็นกลุ่มตัวอย่าง **Version 2 ลงวันที่ ๑๘ พฤศจิกายน ๒๕๕๖**
- แบบสอบถามที่ใช้ในการวิจัย **Version 2 ลงวันที่ ๑๘ พฤศจิกายน ๒๕๕๖**
  - ชุดที่ ๑ แบบสอบถามข้อมูลส่วนบุคคล
  - ชุดที่ ๒ แบบวัดอาการไม่สุขสบายทางกายต่อการทำกิจกรรมทางกาย
  - ชุดที่ ๓ แบบวัดประสบการณ์เชิงอัตนัยในการมีกิจกรรมทางกาย
  - ชุดที่ ๔ แบบวัดการสนับสนุนจากครอบครัวและเพื่อนต่อการมีกิจกรรมทางกาย
  - ชุดที่ ๕ แบบวัดความเชื่อมั่นในตนเองในการมีกิจกรรมทางกาย
  - ชุดที่ ๖ แบบสอบถามการมีกิจกรรมทางกาย

ลงนาม.....
(รองศาสตราจารย์พิเศษนายแพทย์สมชาย เอื้อรัตนวงศ์)
ประธาน
คณะกรรมการพิจารณาจริยธรรมการวิจัย

ลงนาม.....
(นางสาวบุษบา ศุภวัฒน์ธนบดี)
กรรมการและเลขานุการ
คณะกรรมการพิจารณาจริยธรรมการวิจัย

วันที่รับรอง : **๒๑/๑๑/๒๕๕๖**
วันหมดอายุ : **๒๐/๑๑/๒๕๕๗**

ทั้งนี้ การรับรองนี้มีเงื่อนไขดังที่ระบุไว้ด้านหลังทุกข้อ (ดูด้านหลังของเอกสารรับรองโครงการวิจัย)

สำนักงานคณะกรรมการพิจารณาจริยธรรมการวิจัย (ตึกไอลดาธรรม ชั้น ๒
คณะแพทยศาสตร์วชิรพยาบาล มหาวิทยาลัยกรุงเทพมหานคร
๖๘๑ ถนนสามเสน แขวงวชิรพยาบาล เขตดุสิต กรุงเทพฯ ๑๐ ๓๐๐
โทรศัพท์: ๐-๒๒๔๔-๓๕๒๒ โทรสาร: ๐-๒๖๖๘-๗๐๘๘

RL 01_2555

ที่ IRB/RTA[illegible]/2556

คณะอนุกรรมการพิจารณาโครงการวิจัย กรมแพทย์ทหารบก

317 ถนนราชวิถี เขต ราชเทวี กรุงเทพฯ 10400

รหัสโครงการ: Q017h/56

ชื่อโครงการวิจัย : "ปัจจัยการทำนายมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล"
[Predicting factors of physical activity among coronary artery disease patients after hospitalization.]

เลขที่โครงการวิจัย : -

ชื่อผู้วิจัยหลัก: นางสุชาดา เรืองรัตนอัมพร

สังกัดหน่วยงาน : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

สถานที่ทำการวิจัย: โรงพยาบาลที่จัดเป็น "ศูนย์หัวใจ" จำนวน 10 แห่ง

เอกสารรับรอง :

(1) โครงร่างการวิจัยฉบับภาษาไทย ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(2) แบบบันทึกข้อมูล(แบบสำรวจรายชื่อผู้ป่วยที่อยู่เกณฑ์เป็นกลุ่มตัวอย่าง) ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(3) เอกสารชี้แจงแพทย์เจ้าของไข้ ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(4) แบบสอบถาม ฉบับที่ 2 วันที่ พฤศจิกายน 2556
(5) เอกสารชี้แจงข้อมูลแก่ผู้เข้าร่วมโครงการวิจัย ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(6) หนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(7) ประวัติย่อ นางสุชาดา เรืองรัตนอัมพร ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556
(8) ประวัติย่อ รศ.ดร.จินตนา ยูนิพันธุ์ ฉบับที่ 2 วันที่ 27 พฤศจิกายน 2556

ขอรับรองว่าโครงการดังกล่าวข้างต้นได้ผ่านการพิจารณารับรองจากคณะอนุกรรมการพิจารณาโครงการวิจัย กรมแพทย์ทหารบก ว่าสอดคล้องกับปฏิญญาเฮลซิงกิ และแนวปฏิบัติ ICH GCP

วันที่รับรองด้านจริยธรรมของโครงร่างการวิจัย: 2 ธันวาคม 2556
วันสิ้นสุดการรับรอง: 1 ธันวาคม 2557
ความถี่ของการส่งรายงานความก้าวหน้าของการวิจัย: รายงานความก้าวหน้าทุก 1 ปี

พันเอกหญิง.....
(เยาวนา ธนะพัฒน์)
ประธานคณะอนุกรรมการพิจารณาโครงการวิจัย พบ.

พันเอก.....
(สหพล อนันต์นำเจริญ)
เลขานุการและอนุกรรมการพิจารณาโครงการวิจัย พบ.

Perfect Heart Institute
at Piyavate

PHI001/102013

11 ตุลาคม 2556

ใบรับรองโครงการวิจัย

ชื่อเรื่องวิจัย ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล
Predicting factors of physical activity among new coronary artery disease patients after hospitalization

ผู้วิจัยหลัก นางสุชาดา เรืองรัตนอัมพร นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต

หน่วยงาน คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน สถาบันหัวใจเพอร์เฟคฮาร์ท โรงพยาบาลปิยะเวท พิจารณาแล้ว อนุมัติให้ดำเนินการวิจัยเรื่องดังกล่าวได้

Perfect Heart Institute
at Piyavate

ลงนาม.....
(นายไพศาล บุญศิริคำชัย)
ผู้อำนวยการสถาบันหัวใจเพอร์เฟคฮาร์ท
ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในคน

วันที่รับรอง. 11 ตุลาคม 2556 วันหมดอายุ 10 ตุลาคม 2557

เอกสารที่กรรมการรับรอง

1. โครงการวิจัย
2. เอกสารชี้แจงและหนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย
3. เครื่องมือที่ใช้ในการวิจัย

หมายเหตุ : ขอให้ส่งผลงานวิจัยฉบับสมบูรณ์ให้สถาบันหัวใจเพอร์เฟคฮาร์ท โรงพยาบาลปิยะเวท จำนวน 1 ชุด

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน สถาบันหัวใจเพอร์เฟคฮาร์ท โรงพยาบาลปิยะเวท
998 ถนนริมคลองสามเสน แขวงบางกะปิ เขตห้วยขวาง กรุงเทพฯ 10240
โทรศัพท์ 02-736-2470-2 โทรสาร 02-736-2473 e-mail : perfect_heart06@yahoo.com

เอกสารรับรองโครงการวิจัย

โดย

คณะกรรมการจริยธรรมการวิจัย โรงพยาบาลภูมิพลอดุลยเดช

กรมแพทย์ทหารอากาศ

ขอรับรองว่า

โครงการ ปัจจัยทำนายการมีกิจกรรมทางกายภาพของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

โดย นางสุชาดา เรืองรัตนอัมพร

สังกัด นิสิตปริญญาเอก
คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

เอกสารที่พิจารณา: ๑. โครงร่างงานวิจัย
๒. เอกสารข้อมูลสำหรับผู้ป่วย และ เอกสารแสดงความยินยอมเข้าร่วมการวิจัย ฉบับภาษาไทย

คณะกรรมการจริยธรรม โรงพยาบาลภูมิพลอดุลยเดช กรมแพทย์ทหารอากาศ ได้พิจารณารายละเอียดโครงร่างงานวิจัย เอกสารข้อมูลสำหรับผู้ป่วย เอกสารแสดงความยินยอมเข้าร่วมการวิจัยภาษาไทยแล้วเห็นว่าไม่ขัดต่อสวัสดิภาพหรือก่อให้เกิดภยันตรายแก่ผู้ถูกวิจัยแต่ประการใด

จึงเห็นสมควรให้ดำเนินการวิจัยในขอบข่ายของโครงการที่เสนอได้ ณ วันที่ *31* มกราคม ๒๕๕๗

นาวาอากาศเอก

(สันติ ศรีเสริมโภค)
ประธานคณะกรรมการจริยธรรมการวิจัย

พลอากาศตรี

(สุชิน บุญมา)
ผู้อำนวยการโรงพยาบาลภูมิพลอดุลยเดช
กรมแพทย์ทหารอากาศ

คณะกรรมการพัฒนากระบวนการวิจัยโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ

ชื่อเรื่องวิจัย ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล
(PREDICTING FACTORS OF PHYSICAL ACTIVITY AMONG NEW CORONARY ARTERY DISEASE PATIENTS AFTER HOSPITALIZATION)

ผู้วิจัย นางสุชาดา เรืองรัตนอัมพร

หน่วยงาน นิสิตพยาบาลศาสตรดุษฎีบัณฑิต
คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพัฒนากระบวนการวิจัยโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติพิจารณาแล้ว อนุญาตให้ดำเนินการวิจัยในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติได้

ลงนาม.....
(รองศาสตราจารย์ นายแพทย์ดิลก ภิยโยทัย)
ประธานคณะกรรมการพัฒนากระบวนการวิจัยฯ

ได้รับเมื่อ 7 ตุลาคม 2556

หมายเหตุ : ขอให้ส่งผลงานวิจัยฉบับสมบูรณ์ให้โรงพยาบาลธรรมศาสตร์ฯ จำนวน 1 ชุด

No. 405 /2013

Certificate of Approval

Name of Ethics Committee : Research Ethics Committee **4,** Faculty of Medicine, Chiang Mai University **Address of Ethics Committee :** 110 Intavaroros Rd., Amphoe Muang, Chiang Mai, Thailand 50200	
Principal Investigator: Suchada Raungratanaamporn. Faculty of Nursing, Chulalongkorn University.	
Protocol title: Predicting factors of physical activity among new coronary artery disease patients after hospitalization. **STUDY CODE:** NONE-2556-...../ Research ID :..... **Sponsor:** -	
Documents filed	**Document reference**
Research protocol	Version date 25 November 2013
Patient information sheet/ Informed consent documents	Version date 25 November 2013
Data Record Form	Version date 25 November 2013
Principal Investigator Curriculum vitae	Version date 25 November 2013

DECISION : [ ] By expedited review

[✓] By full committee meeting 1/2012 Date : 17 January 2012

Opinion of the Ethics Committee/Institutional Review Board : PLS. CHECK ONE
___✓___ Approval
_____Conditional approval (Specify on space below)

Progress report submit every	☐ 3 months	☐ 6 months
	☑ 1 year	☐ Other.....

Date of Approval: 25 November 2013 **Expiration Date:** 24 November 2014

This Ethics Committee is organized and operates according to GCPs and relevant international ethical guidelines, the applicable laws and regulations.

Signed : P. Kulapongs

(Emeritus Professor Panja Kulapongs, M.D.)

Chairperson, Faculty of Medicine

GENERAL CONDITION OF APPROVAL:

- Please refer to www.med.cmu.ac.th/research/ethics/inv_sop_announce.pdf article 13.
- Please submit the progress report at least once a year except where required more frequent by the REC.
- In particular, approval of this study must be renewed at least three months before the expiration date if work is to continue.
- Prior Research Ethics Committee approval is required before implementing any changes in the consent documents or protocol unless those changes are required urgently for the safety of subjects.
- Any event or new information that may affect the benefit/risk ratio of the study must be reported to the REC promptly
- Any protocol deviation/violation must be reported to the REC

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน โรงพยาบาลมหาราชนครราชสีมา
สำนักงานสนับสนุนการศึกษาวิจัยทางคลินิก: ศูนย์แพทยศาสตรศึกษาชั้นคลินิก โรงพยาบาลมหาราชนครราชสีมา 49 ถ.ช้างเผือก ต.ในเมือง อ.เมือง จ.นครราชสีมา 30000
Maharat Nakhon Ratchasima Hospital Institutional Review Board (MNRH IRB)
Clinical Research Support Office: Medical Education Center. Maharat Nakhon Ratchasima Hospital, 49 Chang Phueak Rd,. Mueang District, Nakhon Ratchasima Province, 30000, THAILAND. Tel. & Fax. + 66 44 295614-5 E-mail irb@mnrh.in.th

เลขที่ใบรับรอง 009/2014

เอกสารรับรองจริยธรรมการวิจัยในคน

โครงการวิจัยเรื่อง : ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

ผู้วิจัย : นางสุชาดา เรืองรัตนอัมพร

หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน โรงพยาบาลมหาราชนครราชสีมา ได้ผ่านการรับรองในแง่จริยธรรม โดยยึดหลักเกณฑ์ตามคำประกาศเฮลซิงกิ (Declaration of Helsinki) และหลักเกณฑ์การปฏิบัติการวิจัยทางคลินิกที่ดี (ICH-GCP) โดยให้ดำเนินการศึกษาวิจัยเรื่องข้างต้นได้

โดยให้ผู้วิจัยรับเงื่อนไขที่เสนอดังต่อไปนี้

1. ให้ส่งรายงานความก้าวหน้าทุก 6 เดือน
2. ให้แจ้งคณะกรรมการพิจารณาจริยธรรมการวิจัยในคนในกรณีที่แก้ไขเปลี่ยนแปลงโครงการวิจัยหรือหยุดโครงการก่อนกำหนด
3. รายงานเหตุการณ์ที่ไม่พึงประสงค์ที่ร้ายแรงหรือที่ไม่คาดคิด
4. รายงานเหตุการณ์ที่ไม่คาดคิด
5. รายงานข้อมูลข่าวสารที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคนควรได้รับระหว่างดำเนินการวิจัย
6. ส่งรายงานฉบับสมบูรณ์เมื่อเสร็จสิ้นโครงการวิจัย

รับรองวันที่ : 23 มกราคม 2557

หมดอายุวันที่ : 22 มกราคม 2558

.....

(นายนิพัทธ์ สีมาขจร)

ประธานคณะกรรมการพิจารณาจริยธรรมการวิจัยในคน

.....

(นายสมอาจ ตั้งเจริญ)

ผู้อำนวยการโรงพยาบาลมหาราชนครราชสีมา

เอกสารเลขที่ ๖๗ /๒๕๕๖

เอกสารรับรองโครงการวิจัย
โดย คณะกรรมการวิจัย โรงพยาบาลชลบุรี

.....

โครงการวิจัย : ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล
Predicting factors of physical activity among new coronary artery disease patients after hospitalization

ผู้ดำเนินการวิจัยหลัก : นางสุชาดา เรืองรัตนอัมพร

หน่วยงานที่รับผิดชอบ : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการวิจัยโรงพยาบาลชลบุรีได้พิจารณาแล้วเห็นว่าสมควรให้ดำเนินการวิจัยในขอบข่ายของโครงการวิจัยที่เสนอได้ ตั้งแต่วันที่ ๑ กันยายน ๒๕๕๖ จนถึงวันที่ ๓๑ ธันวาคม ๒๕๕๖

ออกหนังสือ ณ วันที่ ๒๘ ตุลาคม ๒๕๕๖

ลงนาม
(นายแพทย์พงษ์เทพ ไชยประสิทธิ์)
ประธานคณะกรรมการวิจัย

ลงนาม
(นายแพทย์อัษฎา ตียพันธ์)
นายแพทย์ทรงคุณวุฒิ
รักษาการในตำแหน่ง ผู้อำนวยการโรงพยาบาลชลบุรี

เอกสารรับรองจริยธรรมทางการวิจัย

เอกสารฉบับนี้ เพื่อแสดงว่า โครงการวิจัย
เรื่อง ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจาก โรงพยาบาล

ผู้วิจัย คือ นางสุชาดา เรืองรัตนอัมพร
หน่วยงาน คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ได้ผ่านการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสุราษฎร์ธานีแล้ว และเห็นว่าผู้วิจัยต้องดำเนินการตามโครงการวิจัยที่ได้กำหนดไว้แล้ว หากมีการปรับเปลี่ยนหรือแก้ไขใด ๆ ควรผ่านความเห็นชอบหรือแจ้งต่อคณะกรรมการจริยธรรมทางการวิจัยอีกครั้ง

ออกให้ ณ วันที่ ๑๖ เดือนกันยายน **พ.ศ.** ๒๕๕๖

ลงชื่อ
(นายดามพ์ มุกด์มณี)
นายแพทย์ ระดับชำนาญการ
ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์

ลงชื่อ
(นายอดิเกียรติ เอี่ยมวรนิรันดร์)
ผู้อำนวยการ

ลำดับที่ ๕๒/๒๕๕๖

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสุราษฎร์ธานี ถ.ศรีวิชัย อ.เมือง จ.สุราษฎร์ธานี ๘๔๐๐๐
โทร. (๐๗๗) ๒๗๒๒๓๑ ต่อ๒๔๖๔, โทรสาร (๐๗๗) ๒๘๓๒๕๗

APPENDIX C

List of the Cardiac Center/hospital

รายชื่อศูนย์หัวใจ ทั่วประเทศไทย

รายชื่อ โรงพยาบาล ที่จัดตั้งเป็น "ศูนย์หัวใจ" ทั่วประเทศไทย (ปรับปรุงล่าสุด กค 2552)

รพ.ศิริราช	**รัฐบาล**	**รพ.เซ็นหลุยส์**	**เอกชน**
รพ.จุฬา	**รัฐบาล**	**รพ.บางกอก 9**	**เอกชน**
รพ.วชิรพยาบาล	**รัฐบาล**	**รพ.รามคำแหง**	**เอกชน**
สถาบันโรคทรวงอก	**รัฐบาล**	**รพ.กรุงเทพภูเก็ต**	**เอกชน**
รพ.รามาธิบดี	**รัฐบาล**	**รพ.กรุงเทพพัทยา**	**เอกชน**
รพ.ภูมิพลอดุลยเดช	**รัฐบาล**	**รพ.พระราม 9**	**เอกชน**
รพ.มหาราชนครราชสีมา	**รัฐบาล**	**รพ.ปิยะเวท**	**เอกชน**
รพ.สงขลานครินทร์	**รัฐบาล**	**รพ.วิชัยยุทธ**	**เอกชน**
รพ.สรรพสิทธิประสงค์	**รัฐบาล**	**รพ.เจ้าพระยา**	**เอกชน**
รพ.พระปกเกล้าจันทบุรี	**รัฐบาล**	**รพ.ราชวิถี**	**รัฐบาล**
รพ.สุราษฎร์ธานี	**รัฐบาล**	**รพ.พญาไท 2**	**เอกชน**
รพ.มหาวิทยาลัยขอนแก่น	**รัฐบาล**	**รพ.สมิติเวช**	**เอกชน**
รพ.พุทธชินราช	**รัฐบาล**	**รพ.ธนบุรี 1**	**เอกชน**
รพ.พระมงกุฎเกล้า	**รัฐบาล**	**รพ.มหาวิทยาลัยนเรศวร**	**รัฐบาล**
รพ.ตำรวจ	**รัฐบาล**	**รพ.ธรรมศาสตร์**	**รัฐบาล**
รพ.มหาราชนครเชียงใหม่	**รัฐบาล**	**รพ.พญาไท 3**	**เอกชน**
รพ.บำรุงราษฎร์	**เอกชน**	**รพ.เชียงใหม่ราม**	**เอกชน**
รพ.หัวใจกรุงเทพ	**เอกชน**	**รพ.วิภาวดี**	**เอกชน**

ที่มา: www.thaiheartweb.com

APPENDIX D

Permission letters for research instrument using

Re: Ask for permission: the Symptom Frequency and Symptom Distress Scale

From: **Kimberley Mitchell** (KMMitchell@RRC.CA)
Sent: Saturday, April 13, 2013 6:38:41 AM
To: suchada raungratanaamporn (sucha_cr@hotmail.com)

No problem at all. I think you can get the items from it in the article I published in the Canadian Journal of Nursing research. Naturally you will acknowledge me in all writings about your translation.

Good luck with your work

Kim Mitchell McCormick
Red River College

Kim Mitchell RN MN
Nursing Instructor
Red River College
C608-2055 Notre Dame Ave.
Winnipeg, Mb Canada R3H 0J9

Sent from my iPhone

On 2013-04-12, at 5:11 PM, suchada raungratanaamporn <sucha_cr@hotmail.com<mailto:sucha_cr@hotmail.com>> wrote:

Suchada Raungratanaamporn
Faculty of Nursing, Chulalongkorn University
Boromarajonani Srisatapat Building, Floor 11th
Rama 1 Road, Pathumwan, Bangkok 10330
Thailand
Cell phone: (+66)819105710
Email: sucha_cr@hotmail.com<mailto:sucha_cr@hotmail.com>

April 13th, 2013
Dear Kim M. McCormick
Red River College,
C608-2055 Notre Dame Ave,
Winnipeg, Manitoba, Canada
MB R3H 019

Dear McCormick:
My name is Suchada Raungratanaamporn and I am a PhD student in Faculty of Nursing at Chulalongkorn University, Bangkok, Thailand. The title of my PhD dissertation is "Predicting factors of physical activity among new coronary artery disease patients after hospitalization". My advisers are Assoc. Prof. Dr.Jintana Yunibhand and Assist. Prof. Dr. Chanokporn Jitpunya.

I am developing my dissertation proposal and I have decided to use

the Symptom Frequency and Symptom Distress Scale developed by you and your colleagues. Your questionnaire is very useful instrument to measure the symptom distress which is one of variable included in my study.

The Symptom Frequency and Symptom Distress Scale will be translated into Thai language. The process of translation will be followed by the step of the Language Institute of Chulalongkorn University. Then, some of the items might be adapt to increase the situational relevancy for adult patients with coronary artery disease in my study under supervision of experts and my Dissertation advisors. Therefore, I would like to ask your permission to translate the Symptom Frequency and Symptom Distress Scale and then use this scale to data collection for my study.

Thank you very much in advance. I'm looking forward to hearing from you.

Sincerely yours.
Suchada Raungratanaamporn

Suchada Raungratanaamporn, MNS (Adult Nursing)
Candidate PhD student,
Faculty of Nursing, Chulalongkorn University,
Bangkok 10330, Thailand.

Re: Ask for permission: the Subjective Physical Activity Experiences Scale

From: **McAuley, Edward** (emcauley@illinois.edu)
Sent: Saturday, April 13, 2013 9:32:09 PM
To: suchada raungratanaamporn (sucha_cr@hotmail.com)

Permission granted.

Sent from my iPad

On Apr 12, 2013, at 6:22 PM, "suchada raungratanaamporn" <sucha_cr@hotmail.com> wrote:

Suchada Raungratanaamporn
Faculty of Nursing, Chulalongkorn University
Boromarajonani Srisatapat Building, Floor 11th
Rama 1 Road, Pathumwan, Bangkok 10330
Thailand
Cell phone: (+66)819105710
Email: sucha_cr@hotmail.com

April 13th, 2013
Dear Dr McAuley
Department of Kinesiology at the University of Illinois

Dear Dr. McAuley:
My name is Suchada Raungratanaamporn and I am a PhD student in Faculty of Nursing at Chulalonkorn University, Bangkok, Thailand. The title of my PhD dissertation is "Predicting factors of physical activity among new coronary artery disease patients after hospitalization". My advisers are Assoc. Prof. Dr.Jintana Yunibhand and Assist. Prof. Dr. Chanokporn Jitpunya.

I am developing my dissertation proposal and I have decided to use the Subjective Physical Activity Experiences Scale developed by you and your colleagues. Your questionnaire is very useful instrument to measure the self-efficacy for physical activity which is one of variable included in my study.

The Subjective Physical Activity Experiences Scale will be translated into Thai language. The process of translation will be followed by the step of the Language Institute of Chulalongkorn University. Then, some of the items might be adapt to increase the situational relevancy for adult patients with coronary artery disease in my study under supervision of experts and my Dissertation advisors.

Therefore, I would like to ask your permission to translate the Subjective Physical Activity Experiences Scale and then use this scale to data collection for my study.

Thank you very much in advance. I'm looking forward to hearing from you.

Sincerely yours.
Suchada Raungratanaamporn

Suchada Raungratanaamporn, MNS (Adult Nursing)
Candidate PhD student,
Faculty of Nursing, Chulalongkorn University,
Bangkok 10330, Thailand.

RE: Ask for permission: the Social Support from Family and Friend for Exercise Survey

From: **Sallis, Jim** (jsallis@ucsd.edu)
Sent: Sunday, April 14, 2013 3:43:40 AM
To: suchada raungratanaamporn (sucha_cr@hotmail.com)
Cc: Assoc.Prof.Dr.Jintana Yunibhand (yuni_jintana@hotmail.com); อ.ดร.ชนกพร จิตปัญญา CU (jchanokp@hotmail.com); Geremia, Carrie (cgeremia@ucsd.edu)

Suchada,

Thank you for the nice letter. It was good to be reminded of how this social support scale has been used in Thailand. You have permission to use this measure or any others posted on my website.

I see that the Thai version of the social support measure is not posted on my website. Are you able to contact Mr.Thanee Kaewthummanukul and ask him to arrange with Carrie Geremia to post the Thai version? This would make the measure available to more investigators. Carrie is copied on this email.

Best wishes with your study.

Jim Sallis

James F. Sallis, Ph.D.

Distinguished Professor of Family and Preventive Medicine

Chief, Division of Behavioral Medicine

University of California, San Diego, mail code 0824

Director, Active Living Research

3900 Fifth Avenue, Suite 310

San Diego, CA 92103

ph: 619-260-5535; fax 619-260-1510

Email: jsallis@ucsd.edu ; Website: http://sallis.ucsd.edu/

I CAN'T KEEP UP! DON'T ASSUME I WILL READ YOUR EMAIL

www.activelivingresearch.org

From: suchada raungratanaamporn [mailto:sucha_cr@hotmail.com]
Sent: Friday, April 12, 2013 4:02 PM
To: Sallis, Jim
Cc: Assoc.Prof.Dr.Jintana Yunibhand; อ.ดร.ชนกพร จิตปัญญา CU
Subject: Ask for permission: the Social Support from Family and Friend for Exercise Survey

Suchada Raungratanaamporn

Faculty of Nursing, Chulalongkorn University

Boromarajonani Srisatapat Building, Floor 11th

Rama 1 Road, Pathumwan, Bangkok 10330

Thailand

Cell phone: (+66)819105710

Email: sucha_cr@hotmail.com

April 13th, 2013

Dr. James F. Sallis

Department of Psychology

San Diego State University

3900 Fifth Avenue, Suite 310

San Diego, CA 92103

Dear Dr. Sallis:

My name is Suchada Raungratanaamporn and I am a PhD student in Faculty of Nursing at Chulalongkorn University, Bangkok, Thailand. The title of my PhD dissertation is "Predicting factors of physical activity among new coronary artery disease patients after hospitalization".

My advisers are Assoc. Prof. Dr.Jintana Yunibhand and Assist. Prof. Dr. Chanokporn Jitpunya.

I am developing my dissertation proposal and I have decided to use the Social Support from Family and Friend for Exercise Survey developed by you and your colleagues. Your questionnaire is very useful instrument to measure the supporting from family and friend which is one of variables included in my study.

The Social Support from Family and Friend for Exercise Survey was translated into Thai language by Mr.Thanee Kaewthummanukul while he was a doctoral student in University of Alabama at Birmingham. He received permission from you to translate and use the scale then Mayuree Leethong-in while she was a doctoral student in Faculty of Nursing at Chulalonkorn University, asked for permission from you to use this instrument in Thai version and she received permission from you too.

Therefore, I would like to ask your permission to use the Social Support from Family and Friend for Exercise Survey in the Thai version by Mayuree Leethong-in and to adapt some of the items to increase the situational relevancy for adult patients with coronary artery disease in my study.

Thank you very much in advance. I'm looking forward to hearing from you.

Sincerely yours.

Suchada Raungratanaamporn

Suchada Raungratanaamporn, MNS (Adult Nursing)

Candidate PhD student,

Faculty of Nursing, Chulalongkorn University,

Bangkok 10330, Thailand.

RE: Ask for permission: the Self-efficacy for Exercise Scale

From: **Resnick, Barbara M.** (Resnick@son.umaryland.edu)
Sent: Saturday, April 13, 2013 8:00:01 AM
To: suchada raungratanaamporn (sucha_cr@hotmail.com)
Cc: Assoc.Prof.Dr.Jintana Yunibhand (yuni_jintana@hotmail.com); อ.ดร.ชนกพร จิตปัญญา CU (jchanokp@hotmail.com)

feel free to use this as you desire and adapt as appropriate. Best of luck. Barb

---

From: suchada raungratanaamporn [sucha_cr@hotmail.com]
Sent: Friday, April 12, 2013 7:07 PM
To: Resnick, Barbara M.
Cc: Assoc.Prof.Dr.Jintana Yunibhand; อ.ดร.ชนกพร จิตปัญญา CU
Subject: Ask for permission: the Self-efficacy for Exercise Scale

Suchada Raungratanaamporn
Faculty of Nursing, Chulalongkorn University
Boromarajonani Srisatapat Building, Floor 11th
Rama 1 Road, Pathumwan, Bangkok 10330
Thailand
Cell phone: (+66)819105710
Email: sucha_cr@hotmail.com

April 13th, 2013
Dr.Barbara Resnick
University of Maryland School of Nursing
655 West Lombard Street, Room 375,
Baltimore, MD 21201.

Dear Dr. Resnick:
My name is Suchada Raungratanaamporn and I am a PhD student in Faculty of Nursing at Chulalongkorn University, Bangkok, Thailand. The title of my PhD dissertation is "Predicting factors of physical activity among new coronary artery disease patients after hospitalization". My advisers are Assoc. Prof. Dr.Jintana Yunibhand and Assist. Prof. Dr. Chanokporn Jitpunya.

I am developing my dissertation proposal and I have decided to use the Self-efficacy for Exercise Scale developed by you and your colleagues. Your questionnaire is very useful instrument to measure the self-efficacy for physical activity which is one of variables included in my study.

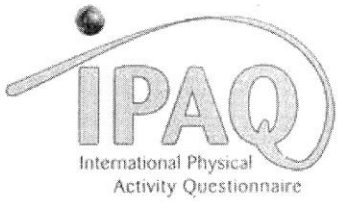
The Self-efficacy for Exercise Scale was translated into Thai language by Ms.Teeranut Harnirattisai while she was a student at School of Nursing, University of Missouri. She received permission from you to translate and use the scale then Mayuree Leethong-in while she was a doctoral student in Faculty of Nursing at Chulalonkorn University, asked for permission from you to use this instrument in Thai version and she received permission from you too.

Therefore, I would like to ask your permission to use the Self-efficacy for Physical Activity Scale in the Thai version by Mayuree Leethong-in and to adapt some of the items to increase the situational relevancy for adult patients with coronary artery disease in my study.

Thank you very much in advance. I'm looking forward to hearing from you.

Sincerely yours.
Suchada Raungratanaamporn

Suchada Raungratanaamporn, MNS (Adult Nursing)
Candidate PhD student,
Faculty of Nursing, Chulalongkorn University,
Bangkok 10330, Thailand.



Search this site

Menu

- Home
- **Background**
- **IPAQ scoring protocol**
- **Cultural adaptation**
- **References**
- **Downloadable questionnaires**

Dear colleague,

Welcome to the website for the **International Physical Activity Questionnaire**. Here you will find information about the use of the questionnaire and links to the **questionnaire** itself, in multiple languages.

This physical activity questionnaire is publically available, it is open access, and no permissions are required to use it. So we encourage any researchers to use it where it will be an appropriate measure of physical activity, particularly in large population studies or in the context of physical activity surveillance for which this measure was designed.

Regarding Scoring of the IPAQ: Over the past 10 years, we have had many requests that have asked for support with the IPAQ algorithm or **scoring protocol**, and other methodological issues. For many years a group of four or five of us that initially developed and tested the IPAQ measure have responded to all these enquiries, but the volume of them has continued to increase in recent years. Most of the requests come from students or graduates doing pieces of research using the IPAQ, and where students are able to ask a local senior researcher for help, particularly one with physical activity experience or a local biostatistician, they usually find that the scoring problems can be resolved.

After many hundreds of such enquiries we have decided that we have served the IPAQ measure and its development well, but that we no longer can provide the individual support to answer all these queries, and we would prefer to refer students to their local statisticians and physical activity experts. We are happy to collaborate in IPAQ projects that answer innovative and population-focused research questions, but it is difficult for us to continue to provide an un-funded advisory service.

It's not that we don't want to help, it's just that we don't have the time to answer each of these requests individually in the detail that they

require. We think that the IPAQ measure **protocols** are reasonably straight forward and most researchers manage to use them , but if you have continuing problems, please consult your local research experts.

We hope that IPAQ is a useful measure for you, and one that meets your needs,

Yours sincerely,

The IPAQ group

APPENDIX E

List of the experts

List of the experts

1 Professor Rungroj Krittayaphong, M.D.

Head of Division of Cardiology, Department of Medicine,

Faculty of Medicine Siriraj Hospital, Mahidol University

2 Colonel, Assistant Professor Patrawut Intarakemhang, M.D.

Department of Rehabilitation Medicine,

Phramongkutklao College of Medicine

3 Piyanuj Ruckpanich, M.D.

Physical Medicine and Rehabilitation, Cardiac Rehabilitation (Heart),

Perfect Heart Institute, Piyavate Hospital, Bangkok

4 Assistant Professor Premchit Charoenkul

Physical Therapy Unit, Department of Orthopaedic Surgery,

Faculty of Medicine Siriraj Hospital, Mahidol University

5 Assistant Prof. Saovaluck Jirathummakoon

Department of Fundamental Nursing,

Faculty of Nursing, Mahidol University

6 Lect. Dr Sarinrut Sriprasong

Department of Medical Nursing,

Faculty of Nursing, Mahidol University

7 Ms. Phermsuk Ua-Aree

Cardiac Rehabilitation Unit, Ramaihibodi Hospital

APPENDIX F

Physician Information and Research Assistant Information sheet

เอกสารชี้แจงแพทย์เจ้าของไข้

เรื่อง ขออนุญาตเก็บรวบรวมข้อมูลการวิจัยจากผู้ป่วยที่อยู่ในการดูแลของท่าน

เรียน แพทย์เจ้าของไข้ผู้ป่วยโรคหลอดเลือดหัวใจทุกท่าน

เนื่องด้วย ดิฉันนางสุชาดา เรืองรัตนอัมพร นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย กำลังดำเนินการเก็บข้อมูลประกอบการทำดุษฎีนิพนธ์เรื่อง "ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล" กลุ่มตัวอย่างเป็นผู้ป่วยที่ได้รับการดูแลรักษาจากท่าน วัตถุประสงค์ของการวิจัยครั้งนี้เพื่อศึกษาการมีกิจกรรมทางกายและปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่ช่วงสามเดือนแรกหลังจำหน่ายจากโรงพยาบาล ประโยชน์ที่คาดว่าจะได้รับคือข้อมูลการมีกิจกรรมทางกายและปัจจัยที่เกี่ยวข้องกับการมีกิจกรรมทางกายในผู้ป่วยกลุ่มนี้

การเก็บข้อมูลทำโดยการตอบแบบสอบถาม โดยการเก็บข้อมูลจะเริ่มหลังจากโครงการวิจัยได้รับการอนุมัติจากคณะกรรมการการวิจัยในคนแล้ว พยาบาลผู้ช่วยวิจัยจะสำรวจรายชื่อผู้ที่มารับการตรวจวินิจฉัยโรคหลอดเลือดหัวใจโดยการใส่สายสวนหัวใจที่ศูนย์โรคหัวใจฯ ในช่วง 12 สัปดาห์ที่ผ่านมา ผลการตรวจพบการอุดตันหรือตีบแคบของหลอดเลือดหัวใจ **เกณฑ์การคัดเลือกผู้ป่วยเข้าเป็นผู้ร่วมวิจัย/อาสาสมัครคือ** เป็นผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่ ไม่มีความผิดปกติทางการรับรู้ด้านเวลา บุคคลและสถานที่ เข้าใจภาษาไทย อ่านเขียนภาษาไทยได้ และยินดีเข้าเป็นผู้ร่วมวิจัย/อาสาสมัคร **เกณฑ์การคัดออกจากการเป็นผู้ร่วมวิจัย/อาสาสมัคร** คือ เป็นผู้ป่วยที่ได้รับการรักษาโรคหลอดเลือดหัวใจโดยการผ่าตัด ได้รับการวินิจฉัยว่ามีปัญหาด้านจิตใจหรือมีความผิดปกติเกี่ยวกับจิตใจซึ่งต้องได้รับการติดตามดูแลจากจิตแพทย์หรือเข้ารับการรักษาเป็นผู้ป่วยในของโรงพยาบาล

ผู้ร่วมวิจัย/อาสาสมัครในครั้งนี้เป็นผู้ป่วยจาก โรงพยาบาลศิริราช โรงพยาบาลวชิรพยาบาล โรงพยาบาลพระมงกุฎเกล้า โรงพยาบาลปิยะเวท โรงพยาบาลภูมิพลอดุลยเดช โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ โรงพยาบาลมหาราชนครเชียงใหม่ โรงพยาบาลมหาราชนครราชสีมา โรงพยาบาลชลบุรี และโรงพยาบาลสุราษฎร์ธานี การเก็บข้อมูลใช้เวลาประมาณ 3 เดือน จะเริ่มต้นประมาณเดือนธันวาคม 2556 จนกว่าจะได้กลุ่มตัวอย่างครบตามต้องการ

จึงเรียนมาเพื่อทราบและโปรดให้ความอนุเคราะห์

.....

นางสุชาดา เรืองรัตนอัมพร ผู้วิจัย

นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คำแนะนำสำหรับผู้ช่วยวิจัย

1. การคัดเลือกผู้ป่วยเข้าเป็นผู้ร่วมวิจัย/อาสาสมัคร ผู้ร่วมวิจัย/อาสาสมัครคือ ผู้ป่วยรายใหม่ที่ได้รับการวินิจฉัยว่าเป็นโรคหลอดเลือดหัวใจโดยการตรวจสวนหัวใจซึ่งอาจได้รับหรือไม่ได้รับการรักษาด้วยหัตถการทางหลอดเลือดหัวใจก็ได้ หลังการตรวจวินิจฉัยผู้ป่วยออกจากโรงพยาบาลกลับไปอยู่บ้าน ช่วงสามเดือนแรกที่กลับไปอยู่บ้านหรือระหว่าง 10 - 14 สัปดาห์หลังทราบว่าเป็นโรคหลอดเลือดหัวใจนี้ ผู้ป่วยดังกล่าวต้องไม่มีความผิดปกติทางการรับรู้ด้านเวลา บุคคลและสถานที่ ไม่มีความผิดปกติทางร่างกายที่เป็นอุปสรรคต่อการมีกิจกรรมทางกาย เข้าใจภาษาไทยและอ่านเขียนภาษาไทยได้ นอกจากนี้ยังต้องไม่เป็นผู้ที่ได้รับการรักษาโรคหลอดเลือดหัวใจโดยการผ่าตัด ต้องไม่เป็นผู้ที่ได้รับการวินิจฉัยว่ามีปัญหาทางด้านจิตใจหรือมีความผิดปกติเกี่ยวกับจิตใจที่ต้องได้รับการติดตามและดูแลจาก จิตแพทย์ และต้องไม่มีปัญหาสุขภาพด้านร่างกายจนต้องเข้ารับการรักษาเป็นผู้ป่วยในของโรงพยาบาล

2. คำอธิบายเพื่อเชิญเข้าเป็นผู้ร่วมวิจัย/อาสาสมัคร ผู้ป่วยที่มีคุณสมบัติเป็นผู้ร่วมวิจัย/อาสาสมัครจำเป็นจะต้องได้รับทราบถึงวัตถุประสงค์ของการวิจัย การดำเนินการวิจัย ประโยชน์ที่จะได้รับและสิ่งที่ต้องการความร่วมมือคือการตอบแบบสอบถามจำนวน 6 ชุด กรุณาชี้แจงยืนยันว่าการตัดสินใจเข้าเป็นผู้ร่วมวิจัย/อาสาสมัครเป็นสิทธิอันชอบธรรมของผู้ป่วย การปฏิเสธหรือการถอนตัวออกจากการวิจัยจะไม่มีผลกระทบต่อการมารับการรักษาหรือมารับการบริการที่โรงพยาบาลแต่อย่างใด รายละเอียดคำอธิบายอยู่ใน **"เอกสารชี้แจงผู้เข้าร่วมการวิจัย"** หลังการอธิบายชี้แจงจนเป็นที่เข้าใจดีแล้ว จึงขอให้ผู้ร่วมวิจัย/อาสาสมัครลงนามในหนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัย และในช่อง วันที่ เดือน พ.ศ. ของหนังสือแสดงเจตนาฯ ต้องเป็นลายมือของผู้ร่วมวิจัย/อาสาสมัคร จากนั้นมอบ **"เอกสารชี้แจงผู้เข้าร่วมการวิจัย"** ให้ผู้ร่วมวิจัย/อาสาสมัครคนละ 1 ชุด และบอกย้ำด้วยว่าหากมีคำถามอื่นใดที่เกี่ยวกับการวิจัยครั้งนี้ กรุณาติดต่อผู้วิจัยได้โดยตรงและได้ตลอดเวลา

ในการตอบแบบสอบถาม ผู้ช่วยวิจัยจะต้องเปิดโอกาสให้ผู้ร่วมวิจัย/อาสาสมัครใช้เวลาอย่างเพียงพอกับการอ่านและกับการพิจารณาเพื่อตอบคำถามด้วยตนเอง ระหว่างการตอบแบบสอบถามอาจหยุดพักได้บ้างหากผู้ร่วมวิจัย/อาสาสมัครต้องการ หลังการตอบแบบสอบถามแล้ว ผู้ช่วยวิจัยต้องตรวจสอบอีกครั้งว่าคำถามทุกข้อมีคำตอบเรียบร้อยครบถ้วน

หากมีข้อสงสัยใดๆ กรุณาติดต่อผู้วิจัยได้ที่ 081-910-5710 ตลอด 24 ชั่วโมง

.....

นางสุชาดา เรืองรัตนอัมพร ผู้วิจัย

นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต

คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX G

Document for data collection

1) Name list of Potential participants,
2) Participant Information sheet and Informed Consent form, and
3) Questionnaires for the Data collection

แบบสำรวจรายชื่อผู้ป่วยที่อยู่ในเกณฑ์เป็นกลุ่มตัวอย่าง*

เดือน .....

วันที่ฉีดสี	ชื่อ- สกุล ผู้ป่วย (เบอร์โทรฯ ติดต่อ)	น้ำหนัก (ก.ก.)	ส่วนสูง (ซ.ม.)	โรคที่พบร่วม / ปัญหาสุขภาพอื่นๆ **	ผลการฉีดสี				ชื่อแพทย์เจ้าของไข้
					LAD	RCA	Lt Cx	LVEF(%), LV angiogram, and others	

หมายเหตุ

*** ผู้ป่วยที่อยู่ในเกณฑ์เป็นกลุ่มตัวอย่าง** หมายถึง ผู้ที่มารับการใส่สายสวนเพื่อฉีดสีดูหลอดเลือดหัวใจเป็นครั้งแรก และผลการวินิจฉัยพบการอุดตันหรือการตีบของหลอดเลือดที่ไปเลี้ยงกล้ามเนื้อหัวใจ เส้นใดเส้นหนึ่งหรือหลายเส้น

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ข้อมูลและคำแนะนำสำหรับผู้ป่วยหรืออาสาสมัคร

(Research Subject Information sheet)

ชื่อโครงการวิจัย ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

วันที่ชี้แจง ..... เดือน..... พ.ศ.....

ชื่อผู้วิจัย นางสุชาดา เรืองรัตนอัมพร นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ผู้ให้ทุนวิจัย -ไม่มี-

ท่านได้รับการเชิญชวนให้เข้าร่วมในโครงการวิจัยนี้ แต่ก่อนที่ท่านจะตกลงใจเข้าร่วมหรือไม่ โปรดอ่านข้อความในเอกสารนี้ทั้งหมด เพื่อให้ทราบว่าเหตุใดท่านจึงได้รับเชิญให้เข้าร่วมในโครงการวิจัยนี้และโครงการวิจัยนี้ทำเพื่ออะไร หากท่านเข้าร่วมโครงการวิจัยนี้ท่านจะต้องทำอะไรบ้าง รวมทั้งข้อดีและข้อเสียที่อาจจะเกิดขึ้นในระหว่างการวิจัย

ในเอกสารนี้ อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามผู้วิจัยหรือผู้ช่วยวิจัยให้อธิบายจนกว่าท่านจะเข้าใจ ท่านจะได้รับเอกสารนี้ 1 ชุด กลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนหรือแพทย์ที่ท่านรู้จัก ให้ช่วยตัดสินใจว่าควรจะเข้าร่วมโครงการวิจัยนี้หรือไม่ การเข้าร่วมในโครงการวิจัยครั้งนี้จะต้องเป็น**ความสมัครใจ**ของท่าน ไม่มีการบังคับหรือชักจูง ถึงแม้ท่านจะไม่เข้าร่วมในโครงการวิจัย ท่านก็จะได้รับการรักษาพยาบาลตามปกติ การไม่เข้าร่วมหรือถอนตัวจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการได้รับบริการ การรักษาพยาบาลหรือผลประโยชน์ที่พึงจะได้รับของท่านแต่อย่างใด

โปรดอย่าลงลายมือชื่อของท่านในเอกสารนี้จนกว่าท่านจะแน่ใจว่ามีความประสงค์จะเข้าร่วมในโครงการวิจัยนี้ คำว่า "ท่าน" ในเอกสารนี้หมายถึงผู้เข้าร่วมโครงการวิจัยในฐานะเป็นอาสาสมัครในโครงการวิจัย หากท่านเป็น**ผู้แทนโดยชอบธรรม**ของผู้ที่จะเข้าร่วมในโครงการวิจัย และลงนามแทนในเอกสารนี้ โปรดเข้าใจว่า "ท่าน" ในเอกสารนี้หมายถึงผู้เข้าร่วมในโครงการวิจัยเท่านั้น

เหตุผลและความจำเป็นที่ต้องทำโครงการวิจัยนี้ มีหลักฐานทางวิทยาศาสตร์ที่พิสูจน์ได้แน่นอนแล้วว่า การมีกิจกรรมทางกายเป็นประโยชน์ต่อสุขภาพของผู้ป่วยโรคหลอดเลือดหัวใจ โดยสามารถเพิ่มประสิทธิภาพการทำงานของหัวใจ ป้องกันการกลับตีบซ้ำของหลอดเลือดหัวใจและลดอัตราการตาย ในขณะที่การมีกิจกรรมทางกายที่ไม่เพียงพอหรือขาดการออกกำลังจะเป็นสาเหตุสำคัญต่อปัญหาสุขภาพที่ร้ายแรงต่างๆ ได้

แม้ความก้าวหน้าทางการแพทย์ สามารถวินิจฉัยและรักษาโรคหลอดเลือดหัวใจได้อย่างรวดเร็ว ปลอดภัย และช่วยบรรเทาอาการไม่สุขสบายต่างๆ ที่เกิดขึ้นได้เป็นอย่างดี แต่จากสถิติพบว่าคนไทยทั้งชายและหญิงป่วยด้วยโรคนี้มากและเพิ่มขึ้นอย่างต่อเนื่องโดยเฉพาะช่วงห้าปีที่ผ่านมา

จากการศึกษาที่ผ่านมาพบว่าผู้ป่วยโรคหลอดเลือดหัวใจส่วนใหญ่เมื่อกลับไปอยู่บ้านแล้วมักมีกิจกรรมทางกายลดลง ปฏิบัติตัวไม่ได้ตามคำแนะนำที่ได้รับ มีเพียงบางส่วนเท่านั้นที่ยังคงมีกิจกรรมทางกายอยู่บ้าง โดยพบว่ามีหลายปัจจัยที่เกี่ยวข้องกับการตัดสินใจของผู้ป่วยที่จะทำหรือไม่ทำกิจกรรมทางกาย การค้นหาปัจจัยเหล่านี้จะเป็นความรู้เบื้องต้นในการวางแนวทางเพื่อแก้ไข ส่งเสริมและพัฒนาการมีกิจกรรมทางกายสำหรับผู้ป่วยโรคหลอดเลือดหัวใจเพื่อการมีสุขภาพที่ดีและอยู่กับโรคนี้ได้อย่างเป็นสุข

วัตถุประสงค์ของโครงการวิจัย เพื่อศึกษาว่าผู้ป่วยที่เพิ่งทราบว่าตนเองเป็นโรคหลอดเลือดหัวใจในช่วงสามเดือนแรกที่กลับไปอยู่บ้าน มีกิจกรรมทางกายหรือทำกิจกรรมการเคลื่อนไหวออกแรงอย่างไรบ้าง และศึกษาว่ามีปัจจัยใดที่สามารถจะบอกหรือจะทำนายได้ว่าทำให้ผู้ป่วยตัดสินใจที่จะมีกิจกรรมทางกายหรือจะทำกิจกรรมการเคลื่อนไหวออกแรง

ท่านได้รับเชิญให้เข้าร่วมโครงการวิจัยนี้เพราะ ผลการตรวจหลอดเลือดหัวใจโดยการใส่สายสวนและฉีดสีดูในช่วง 2-3 เดือนที่ผ่านมาพบว่าท่านเป็นโรคหลอดเลือดหัวใจและไม่มีความผิดปกติทางร่างกายที่เป็นอุปสรรคต่อการมีกิจกรรมทางกาย **ท่านไม่สามารถเข้าร่วมโครงการวิจัยนี้หากท่าน** ได้รับการรักษาโรคหลอดเลือดหัวใจโดยการผ่าตัดหรือต้องได้รับการติดตามและดูแลอาการทางด้านจิตใจจากจิตแพทย์หรือมีปัญหาสุขภาพอื่นๆ ที่ต้องเข้ารับการรักษาเป็นผู้ป่วยในของโรงพยาบาล

โครงการวิจัยนี้ ทำการศึกษากับผู้ป่วยโรคหลอดเลือดหัวใจจำนวน 220 คน จาก 10 โรงพยาบาล โดย 22 คน จะเป็นผู้ป่วยที่โรงพยาบาลภูมิพลอดุลยเดช หากท่านตัดสินใจเข้าร่วมโครงการวิจัย **สิ่งที่จะขอให้ท่านปฏิบัติคือ** การตอบแบบสอบถาม 1 ครั้ง มี 6 ชุด ประกอบด้วย 1) แบบสอบถามข้อมูลส่วนบุคคล 2) แบบวัดอาการไม่สุขสบายทางกายต่อการทำกิจกรรม 3) แบบวัดประสบการณ์เชิงอัตนัยในการมีกิจกรรมทางกาย 4) แบบวัดการสนับสนุนจากครอบครัวและเพื่อนต่อการมีกิจกรรมทางกาย 5) แบบวัดความเชื่อมั่นในตนเองในการมีกิจกรรมทางกาย และ 6) แบบสอบถามการมีกิจกรรมทางกาย รวมคำถามทั้งหมด 111 ข้อ ใช้เวลาในการตอบประมาณ 30 ถึง 40 นาที

ความไม่สุขสบายหรือความเสี่ยงต่ออันตรายที่อาจเกิดขึ้นเมื่อเข้าร่วมโครงการวิจัย เนื่องจากการศึกษาครั้งนี้เป็นการตอบแบบสอบถาม จึงไม่มีความเสี่ยงหรือผลข้างเคียงใดๆ ด้านร่างกาย แต่บางคำถามอาจกระทบความรู้สึกของท่าน ท่านจึงมีสิทธิ์ที่จะปฏิเสธการตอบแบบสอบถามหรือสามารถที่จะถอนตัวจากการศึกษาครั้งนี้ได้ทุกเวลาที่ต้องการ

อย่างไรก็ตาม การตอบแบบสอบถามอาจทำให้ท่านรู้สึกไม่สะดวกสบายหรือเสียเวลา ดังนั้นในการขอให้ท่านตอบแบบสอบถามจึงจะเลือกช่วงที่รบกวนเวลาของท่านให้น้อยที่สุด อาจเป็นช่วงที่ท่านรอรับการตรวจหรือระหว่างรอรับยา ท่านไม่ต้องรีบตอบแบบสอบถามทั้งหมดในทันที ท่านสามารถพักระหว่างตอบแบบสอบถามได้ และหากท่านรู้สึกเหนื่อยล้าจากการตอบแบบสอบถาม ผู้วิจัยจะหยุดการสอบถามและประสานงานกับพยาบาลประจำตึกเพื่อช่วยเหลือทันที การตอบแบบสอบถามจะเริ่มใหม่อีกครั้งเมื่อท่านพร้อม

ประโยชน์ที่คาดว่าจะได้รับจากโครงการวิจัย ท่านจะไม่ได้รับประโยชน์โดยตรงใดๆ จากการเข้าร่วมโครงการวิจัยครั้งนี้ แต่ผลการศึกษาที่ได้จะนำไปสู่การวิเคราะห์ปัจจัยที่บอกหรือทำนายได้ถึงการมีกิจกรรมทางกายหรือการทำกิจกรรมการเคลื่อนไหวออกแรงของผู้ป่วยโรคหลอดเลือดหัวใจเมื่อกลับไปอยู่บ้าน อันจะเป็นแนวทางสำคัญให้พยาบาลและบุคลากรในทีมสุขภาพนำไปวิเคราะห์หาแนวทางแก้ไขและส่งเสริมการมีกิจกรรมทางกายเพื่อการมีสุขภาวะที่ดีแม้จะป่วยเป็นโรคหลอดเลือดหัวใจ และพัฒนารูปแบบการดูแลตนเองเมื่อป่วยด้วยโรคหลอดเลือดหัวใจทั้งในด้านการดูแลเชิงป้องกันและการรักษา

การเข้าร่วมโครงการวิจัยครั้งนี้ ไม่มีค่าใช้จ่ายที่ท่านต้องรับผิดชอบ และไม่มีค่าตอบแทนที่ท่านจะได้รับ การเข้าร่วมโครงการวิจัยครั้งนี้จะเป็นไปด้วยความสมัครใจ ท่านมีสิทธิ์ที่จะถอนตัวออกจากโครงการวิจัยเมื่อใดก็ได้โดยไม่ต้องให้เหตุผลและไม่ต้องแจ้งให้ทราบล่วงหน้า แม้ว่าท่านจะไม่เข้าร่วมในโครงการวิจัยนี้ ท่านก็จะยังคงได้รับการตรวจเพื่อการวินิจฉัยและรักษาโรคของท่านตามวิธีการที่เป็นมาตรฐานต่อไปตามปกติ **และการถอนตัวออกจากโครงการวิจัยนี้ จะไม่มีผลกระทบต่อการบริการและการรักษาที่ท่านสมควรจะได้รับตามมาตรฐานแต่ประการใด**

ข้อมูลส่วนตัวของท่านจะถูกเก็บรักษาไว้เป็นความลับและจะไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล ผลการศึกษาจะรายงานเป็นภาพรวมของผู้ป่วยโรคหลอดเลือดหัวใจ ข้อมูลส่วนตัวของท่านอาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ เช่น ผู้กำกับดูแลการวิจัย หรือคณะกรรมการจริยธรรมการวิจัยในคน โดยต้องไม่เป็นการละเมิดสิทธิตามขอบเขตที่กฎหมายอนุญาตไว้

หากเกิดอันตรายที่เกี่ยวข้องกับโครงการวิจัยนี้ หรือมีข้อสงสัยที่จะสอบถามเกี่ยวข้องกับการวิจัย ท่านสามารถติดต่อ นางสุชาดา เรืองรัตนอัมพร โทรศัพท์หมายเลข 081-910-5710 ได้ตลอดเวลา 24 ชั่วโมง หรือที่ รองศาสตราจารย์ ดร.จินตนา ยูนิพันธุ์ อาจารย์ที่ปรึกษาวิทยานิพนธ์ คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย โทรศัพท์ที่ทำงาน 0-2218-1153 โทรศัพท์มือถือ 081-922-5863

ท่านจะได้รับสำเนาของเอกสารฉบับนี้และหนังสือแสดงเจตนายินยอมเข้าร่วมการวิจัยเก็บไว้ 1 ชุด หากท่านรู้สึกว่าได้รับการปฏิบัติอย่างไม่เป็นธรรมในระหว่างโครงการวิจัยนี้ ท่านอาจแจ้งเรื่องได้ที่ โรงพยาบาลภูมิพลอดุลยเดช กรมแพทย์ทหารอากาศ เลขที่ 171 ถนนพหลโยธิน แขวงคลองถนน เขตสายไหม กรุงเทพมหานคร 10220 โทร 0-2534-7000 ในเวลาราชการ

หนังสือแสดงความยินยอมการเข้าร่วมโครงการวิจัย (Informed Consent)

ชื่อโครงการวิจัย ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล

วันที่ลงนาม..... เดือน..... พ.ศ.....

- ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้ ข้าพเจ้าได้รับการอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการวิจัย วิธีการวิจัย อันตราย หรืออาการที่อาจเกิดขึ้นจากการวิจัย หรือจากยาที่ใช้ รวมทั้งประโยชน์ที่คาดว่าจะเกิดขึ้นจากการวิจัยอย่างละเอียด และมีความเข้าใจดีแล้ว
- ผู้วิจัยรับรองว่าจะตอบคำถามที่ข้าพเจ้าสงสัยด้วยความเต็มใจ และไม่ปิดบังซ่อนเร้น จนข้าพเจ้าพอใจ
- ข้าพเจ้าเข้าร่วมในโครงการวิจัยนี้ด้วยความสมัครใจ โดยปราศจากการบังคับหรือชักจูง
- ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมในโครงการวิจัยเมื่อใดก็ได้ และการบอกเลิกนี้จะไม่มีผลต่อการรักษาพยาบาลที่ข้าพเจ้าจะพึงได้รับในปัจจุบันและในอนาคต
- ผู้วิจัยรับรองว่าจะเก็บข้อมูลเกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยเฉพาะในรูปของสรุปผลการวิจัยโดยไม่มีการระบุชื่อนามสกุลของข้าพเจ้า การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆ ที่เกี่ยวข้อง จะกระทำด้วยเหตุผลทางวิชาการเท่านั้น
- ผู้วิจัยรับรองว่าหากเกิดอันตรายใดๆ จากการวิจัย ข้าพเจ้าจะได้รับการรักษาพยาบาล ตามที่ระบุในเอกสารชี้แจงข้อมูลแก่ผู้เข้าร่วมโครงการวิจัย
- ข้าพเจ้าจะได้รับเอกสารชี้แจงข้อมูลและคำแนะนำสำหรับผู้ป่วยหรืออาสาสมัคร ที่เข้าร่วมโครงการวิจัย เก็บไว้ 1 ชุด
- ข้าพเจ้าได้รับทราบข้อความข้างต้น มีความเข้าใจดี และลงนามในใบยินยอมด้วยความเต็มใจ

ลงชื่อ.....ผู้เข้าร่วมโครงการวิจัย

(.....ชื่อ-นามสกุล ตัวบรรจง)

ลงชื่อ.....ผู้ดำเนินโครงการวิจัย

(.....ชื่อ-นามสกุล ตัวบรรจง)

ลงชื่อ.....พยาน

(.....ชื่อ -นามสกุล ตัวบรรจง)

ลงชื่อ.....พยาน

(.....ชื่อ -นามสกุล ตัวบรรจง)

วันที่ตอบแบบสอบถาม ..... รหัสผู้ให้ข้อมูล .....

แบบสอบถามที่ใช้ในการวิจัย

เรื่อง "ปัจจัยทำนายการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล"

ของ

นางสุชาดา เรืองรัตนอัมพร

นิสิตหลักสูตรพยาบาลศาสตรดุษฎีบัณฑิต คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คำชี้แจง

แบบสอบถามฉบับนี้ทำขึ้นเพื่อใช้ในการเก็บรวบรวมข้อมูลเกี่ยวกับการมีกิจกรรมทางกายและปัจจัยที่เกี่ยวข้องกับการมีกิจกรรมทางกายของผู้ป่วยโรคหลอดเลือดหัวใจรายใหม่หลังจำหน่ายจากโรงพยาบาล โดยแบ่งเป็น 6 ชุด ดังนี้

ชุดที่ 1 แบบสอบถามข้อมูลส่วนบุคคล	จำนวน 18 ข้อ
ชุดที่ 2 แบบวัดอาการไม่สุขสบายทางกายต่อการทำกิจกรรมทางกาย	จำนวน 23 ข้อ
ชุดที่ 3 แบบวัดประสบการณ์เชิงอัตนัยในการมีกิจกรรมทางกาย	จำนวน 12 ข้อ
ชุดที่ 4 แบบวัดการสนับสนุนจากครอบครัวและเพื่อนต่อการมีกิจกรรมทางกาย	จำนวน 22 ข้อ
ชุดที่ 5 แบบวัดความเชื่อมั่นในตนเองในการมีกิจกรรมทางกาย	จำนวน 9 ข้อ
ชุดที่ 6 แบบสอบถามการมีกิจกรรมทางกาย	จำนวน 27 ข้อ

วันที่ตอบแบบสอบถาม ..... รหัสผู้ให้ข้อมูล.....

ชุดที่ ๑ แบบสอบถามข้อมูลส่วนบุคคล

คำชี้แจง: โปรดทำเครื่องหมาย ✓ ลงใน ( ) หน้าข้อความ หรือเติมข้อความลงในช่องว่าง

1. อายุ ..... ปี 2. น้ำหนัก ..... ก.ก. ส่วนสูง .....ซ.ม.
3. เส้นรอบเอว ..... นิ้ว 4. เพศ ( ) ชาย ( ) หญิง
5. ภูมิลำเนาเดิมของท่านคือจังหวัด ..... อยู่นานเป็นเวลา .....ปี ..... เดือน
6. ผู้ที่พักอาศัยอยู่ด้วยกันคือ ( ) ครอบครัวหรือญาติ ( ) เพื่อนหรือคนรู้จัก ( ) อยู่คนเดียว
7. ระดับการศึกษา
   ( ) ประถมศึกษา ( ) มัธยมศึกษา ( ) ประกาศนียบัตรวิชาชีพ หรือวิชาชีพชั้นสูง
   ( ) ปริญญาตรี ( ) สูงกว่าปริญญาตรี
8. การประกอบอาชีพ ( ) ทำงานอยู่กับบ้าน ( ) เดินทางออกมาทำงานนอกบ้าน
9. โดยปกติ ลักษณะงานอาชีพหรือกิจวัตรประจำวันที่ท่านทำส่วนใหญ่คือ
   ( ) นั่งทำงานหรือนั่งอยู่กับที่ ( ) ยืนหรือเดิน ( ) ต้องใช้แรง
10. รายได้และค่าใช้จ่ายที่เป็นความรับผิดชอบของท่าน ในแต่ละเดือน
    ( ) ไม่เพียงพอ ( ) เพียงพอ ( ) เพียงพอและมีเหลือเก็บ
11. ในครอบครัว ท่านคือ
    ( ) ผู้หารายได้หลัก ( ) ผู้หารายได้บางส่วน ( ) ไม่มีรายได้
12. นอกจากโรคหลอดเลือดหัวใจแล้ว ท่านมีปัญหาสุขภาพอื่นร่วมด้วยคือ
    ( ) ไม่มีปัญหาสุขภาพ
    ( ) ไขมันในเลือดสูง ( ) ความดันโลหิตสูง ( ) เบาหวาน
    ( ) โรคไต ( ) อาการหัวใจล้มเหลว ( ) โรคหลอดเลือดส่วนปลาย
    ( ) อัมพฤกษ์ อัมพาต หรือแขนขาอ่อนแรง
    ( ) อื่นๆ (กรุณาระบุ) .....
13. จากการฉีดสีดูหลอดเลือดหัวใจพบว่าการตีบของหลอดเลือดหัวใจของท่านเป็นแบบ
    ( ) ตีบหนึ่งเส้น ( ) ตีบสองเส้น ( ) ตีบสามเส้น

เฉพาะผู้วิจัย: ( ) Left main ( ) RCA ( ) Left Cx. ( ) LVEF = ... %, LV angiogram .....

อื่นๆ (หากมี กรุณาระบุ).....

14. หลังทราบว่าเป็นโรคหลอดเลือดหัวใจ

14.1ท่านได้รับคำแนะนำต่างๆ เช่น การกินอาหาร การออกกำลังกาย การใช้ชีวิตประจำวัน หรือการผ่อนคลายความเครียดหรือไม่

( ) ไม่ได้รับคำแนะนำ

( ) ได้รับคำแนะนำ

14.2 ท่านได้เข้าร่วมโปรแกรมฟื้นฟูสมรรถภาพหัวใจหรือไม่

( ) ไม่ได้เข้าโปรแกรมฯ เนื่องจาก (กรุณาระบุรายละเอียด).....

( ) เข้าโปรแกรมฯ สัปดาห์ละ ..... ครั้ง

( ) ปฏิบัติได้ครบตามโปรแกรม

( ) ปฏิบัติไม่ครบตามโปรแกรม เนื่องจาก (กรุณาระบุเหตุผล) .....

.....

15. การเป็นนักกีฬาที่มีการแข่งขัน และการเล่นกีฬาเพื่อความสนุกสนาน

15.1 **ก่อนจะรู้ว่าเป็นโรคหลอดเลือดหัวใจ** ท่านเคยเป็นนักกีฬาหรือเล่นกีฬามาก่อนหรือไม่

( ) ไม่เคยเป็นนักกีฬาและไม่เคยเล่นกีฬา (กรุณาข้ามไปตอบข้อ 16)

( ) เคยเป็นนักกีฬา ( ) เคยเล่นกีฬา

กีฬาที่เล่นคือ ..... เป็นระยะเวลาประมาณ ..... ปี.....เดือน

15.2 กรณีที่ท่านเป็นนักกีฬาหรือเคยเล่นกีฬามาก่อน **ก่อนจะรู้ว่าเป็นโรคหลอดเลือดหัวใจ**

( ) ท่านยังคงเล่นกีฬาอยู่อย่างสม่ำเสมอ ( ) ท่านยังคงเล่นกีฬาอยู่บ้างเป็นครั้งคราว

( ) ไม่ได้เล่นกีฬาแล้ว เลิกมานานประมาณ ..... ปี ..... เดือน ..... วัน

16. **ก่อนป่วยเป็นโรคหลอดเลือดหัวใจ**

16.1 ท่านทำกิจกรรมการเคลื่อนไหวร่างกายหรือออกกำลังกายบ้างหรือไม่

( ) ไม่ได้ทำ

( ) ทำ โดยกิจกรรมทางกายหรือการออกกำลังกาย ที่ทำส่วนใหญ่ 3 อันดับแรกคือ

1) ..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

2) ..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

3) ..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

16.2 ท่านมีปัญหาสุขภาพที่เป็นอุปสรรคต่อการเคลื่อนไหวร่างกายหรือการออกกำลังกายบ้างหรือไม่

( ) ไม่มีเลย ( ) มีปัญหาบ้างแต่ยังคงมีกิจกรรมทางกายได้ ปัญหาคือ .....

.....

( ) มีปัญหามากและปัญหานั้นส่งผลต่อการมีกิจกรรมทางกาย ปัญหาคือ .....

.....

17. **ช่วง 3 เดือนหลังจากจำหน่ายออกจากโรงพยาบาล** ท่านกลับมาที่โรงพยาบาลอีก

17.1 เป็นจำนวน ..... ครั้ง เพื่อพบแพทย์ตามนัด

17.2 เป็นจำนวน ..... ครั้ง เนื่องจากมีอาการของโรคหลอดเลือดหัวใจ ดังนี้คือ

( ) ไม่สบาย อึดอัด แน่นหน้าอก ( ) เหนื่อยหอบเมื่อออกแรง

( ) นอนราบไม่ได้ ( ) หน้ามืด เป็นลม

( ) ใจสั่น ( ) หายใจไม่อิ่ม เหนื่อย

( ) อาการอื่นๆ (กรุณา ระบุ) .....

.....

.....

.....

18. **ช่วง 3 เดือนหลังจำหน่ายจากโรงพยาบาล**

18.1 ท่านทำกิจกรรมการเคลื่อนไหวร่างกายหรือออกกำลังกายบ้างหรือไม่

( ) ไม่ได้ทำ

( ) ทำ โดยกิจกรรมทางกายหรือการออกกำลังกาย ที่ทำส่วนใหญ่ 3 อันดับแรกคือ

1) ..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

2) ..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

3)..... ทำสัปดาห์ละ ..... ครั้ง เป็นเวลานาน ..... ชั่วโมง ..... นาที

18.2 ท่านมีปัญหาสุขภาพที่เป็นอุปสรรคต่อการเคลื่อนไหวร่างกายหรือการออกกำลังกายบ้างหรือไม่

( ) ไม่มีเลย ( ) มีปัญหาบ้างแต่ยังคงมีกิจกรรมทางกายได้ ปัญหาคือ .....

.....

( ) มีปัญหามากและปัญหานั้นส่งผลต่อการมีกิจกรรมทางกาย ปัญหาคือ .....

.....

ชุดที่ ๒ แบบวัดอาการไม่สุขสบายทางกายที่มีผลต่อการทำกิจกรรม

คำชี้แจง ขอให้ท่านทบทวนว่า **ในช่วง 1 เดือนที่ผ่านมา** อาการหรือความรู้สึกต่อไปนี้เกิดขึ้นบ่อยและมีความรุนแรงมากน้อยเพียงใด โปรดทำเครื่องหมาย ✓ ลงในช่องทางขวามือ โดยเลือกคำตอบที่ใกล้เคียงกับความรู้สึกของท่านมากที่สุด

อาการ	ความถี่ของการเกิดอาการ					ความรุนแรงของอาการ				
	ไม่เคยเลย	เล็กน้อย	ปานกลาง	พอสมควร	ตลอดเวลา	ไม่ทำให้กังวลเลย	เล็กน้อย	ปานกลาง	พอสมควร	รุนแรงมาก
1. ไม่สบาย อึดอัด แน่นหน้าอก										
2. เจ็บไหล่ หรือ แขน										
3. ปวดคอ หรือ หลัง										
4. ปวดขากรรไกร เจ็บคอ ปวดฟัน										
5. อาหารไม่ย่อย										
6. ไม่สบายตัว										
7. หายใจหอบหลังกิจกรรม										
8. หายใจหอบเมื่อนอนราบ										
9. หายใจหอบตอนกลางคืน										
10. หน้ามืด วิงเวียนศีรษะ										
11. ใจสั่น										
12. หัวใจเต้นผิดปกติ										
13. อ่อนเพลีย										
14. อาการบวมน้ำ										
15. นอนไม่หลับ										
16. คลื่นไส้										
17. ไม่อยากอาหาร										
18. อารมณ์ซึมเศร้า										
19. ประหม่า สั่น										
20. รู้สึกหวาดกลัว										
21. รู้สึกเครียด										
22. รู้สึกตื่นตระหนก										
23. รู้สึกกระวนกระวาย										

ชุดที่ ๓ แบบวัดประสบการณ์เชิงอัตนัยในการมีกิจกรรมทางกาย

คำชี้แจง ขอให้ท่านทบทวนว่า **ด้วยประสบการณ์ของตัวท่านเองต่อการทำกิจกรรมทางกาย** ท่านมีความรู้สึกต่อไปนี้มากน้อยเพียงใด โปรดทำเครื่องหมาย ✓ ลงบนหมายเลขในแต่ละข้อ โดยเลือกคำตอบที่ใกล้เคียงกับความรู้สึกของท่านมากที่สุด

"การมีกิจกรรมทางกาย" ทำให้ข้าพเจ้ารู้สึกว่า

1. ดีเยี่ยม	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
2. แย่มาก	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
3. หมดแรง	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
4. อารมณ์ดี	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
5. ไม่ดี	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
6. เหนื่อยมาก	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
7. เข้มแข็ง	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
8. ท้อแท้	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
9. อ่อนเพลีย เหน็ดเหนื่อย	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
10. ดีอย่างมหัศจรรย์	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
11. เศร้าโศก	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด
12. เหนื่อย	1 ไม่เลย	2	3	4 ปานกลาง	5	6	7 มากที่สุด

ชุดที่ ๔ แบบวัดการสนับสนุนจากครอบครัวและเพื่อนเพื่อการมีกิจกรรมทางกาย

คำชี้แจง: การมีกิจกรรมทางกายหมายถึง การเคลื่อนไหวร่างกายและการออกแรงที่ท่านทำในงานอาชีพ งานบ้าน/งานสวน การเดินทาง และกิจกรรมยามว่าง โดยท่านมีการออกแรงทั้งในระดับปานกลางและ/หรือหนักเพื่อทำกิจกรรมนั้นต่อเนื่องนานอย่างน้อย 10 นาทีต่อครั้ง **ขอให้ท่านทบทวนว่า ในช่วง 1 เดือนที่ผ่านมา** บุคคลในครอบครัวของท่านหรือเพื่อนของท่านมีการปฏิบัติในแต่ละข้อคำถามมากน้อยเพียงใด **โปรดทำเครื่องหมาย ✓ ลงในช่องที่กำหนด โดยช่องทางซ้ายมือหมายถึงการปฏิบัติโดยบุคคลในครอบครัวของท่าน และ ช่องทางขวามือหมายถึงการปฏิบัติโดยเพื่อนของท่าน**

ครอบครัว					ข้อความ	เพื่อน				
ไม่เคยทำเลย	นานๆ ครั้ง	2-3 ครั้ง	บ่อยๆ	เป็นประจำ	ช่วงหนึ่งเดือนที่ผ่านมา ครอบครัวหรือเพื่อนๆ ของท่าน	ไม่เคยทำเลย	นานๆ ครั้ง	2-3 ครั้ง	บ่อยๆ	เป็นประจำ
					1. ทำการเคลื่อนไหวออกแรงในกิจกรรมต่างๆ ร่วมกับท่าน					
					2. อาสาที่จะทำกิจกรรมในการเคลื่อนไหวออกแรงร่วมกับท่าน					
					3. ให้ความช่วยเหลือหรือช่วยเตือนในเรื่องการเคลื่อนไหวออกแรง					
					4. ให้กำลังใจ สนับสนุนให้ท่านเคลื่อนไหวออกแรงตามแผนที่ท่านวางไว้					
					5. เปลี่ยนแปลงเวลาการทำงานของพวกเขาเพื่อให้มีเวลาเคลื่อนไหวออกแรงร่วมกับท่าน					
					6. พูดคุยกับท่านในเรื่องการเคลื่อนไหวออกแรง					
					7. วางแผนการเคลื่อนไหวออกแรงเพื่อการทำกิจกรรมนันทนาการนอกบ้าน					
					8. ช่วยวางแผนทำกิจกรรมอย่างอื่นๆ ให้ท่าน เพื่อท่านจะได้มีการเคลื่อนไหวออกแรง					
					9. ขอคำแนะนำจากท่านว่า ทำอย่างไรเขาจะสามารถเคลื่อนไหวออกแรงได้เพิ่มขึ้น					
					10. พูดคุยเรื่องความชอบในการทำกิจกรรมการเคลื่อนไหวออกแรงของพวกเขากับท่าน					
					11. วิพากษ์วิจารณ์หรือพูดประชด เมื่อท่านทำกิจกรรมการเคลื่อนไหวออกแรง					
					12. ให้รางวัลท่านด้วยคำพูด การกระทำหรือสิ่งของ เมื่อท่านมีการเคลื่อนไหวออกแรง					

ชุดที่ ๕ แบบวัดความเชื่อมั่นของตนเองในการมีกิจกรรมทางกาย

คำชี้แจง: กิจกรรมทางกายหมายถึง การเคลื่อนไหวร่างกายและการออกแรงที่ท่านทำในงานอาชีพ งานบ้านงานสวน การเดินทาง หรือกิจกรรมยามว่าง ที่ท่านทำต่อเนื่องอย่างน้อย 10 นาทีต่อครั้ง อย่างน้อย 3 ครั้งต่อวัน **ขอให้ท่านทบทวนว่าในช่วง 7 วันที่ผ่านมา ในการมีกิจกรรมทางกายดังกล่าวนั้นท่านมีความมั่นใจเพียงใด โปรดทำเครื่องหมาย ✓ ลงบนหมายเลขในแต่ละข้อ โดยเลือกคำตอบที่ใกล้เคียงกับความรู้สึกมั่นใจของท่านมากที่สุด**

1. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านต้องเผชิญกับอากาศที่ไม่เป็นใจ

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

2. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านรู้สึกเบื่อหน่าย

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

3. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านรู้สึกเจ็บปวด

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

4. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านต้องทำตามลำพัง

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

5. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านไม่รู้สึกสนุก

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

6. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านยุ่งหรือไม่มีเวลา

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

7. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านรู้สึกเหน็ดเหนื่อยหรือเมื่อยล้า

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

8. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านรู้สึกเครียด

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

9. ท่านมั่นใจเพียงใดว่า ท่านสามารถเคลื่อนไหวร่างกายถึงแม้ว่าท่านรู้สึกซึมเศร้าหรือไม่สบายใจ

   ไม่มั่นใจ.....**มั่นใจเต็มที่**

   0 1 2 3 4 5 6 7 8 9 10

ชุดที่ ๖ แบบสอบถามการมีกิจกรรมทางกาย

คำชี้แจง: ขอให้ท่านทบทวนว่า **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลามากน้อยเพียงใด กับการเคลื่อนไหวร่างกายเพื่อทำกิจกรรมประจำวันใน ๕ ประเภท คือ

๑) กิจกรรมในการทำงานประกอบอาชีพ

๒) กิจกรรมในการเดินทาง

๓) กิจกรรมในงานบ้าน งานซ่อมบำรุงและการดูแลสมาชิกในครอบครัว

๔) กิจกรรมยามว่าง

๕) การใช้เวลาในการนั่ง

โดยการทำกิจกรรมดังกล่าวนั้น ทำต่อเนื่องนานอย่างน้อย ๑๐ นาทีต่อครั้ง แบ่งเป็นสองลักษณะคือ

กิจกรรมการเคลื่อนไหวร่างกายที่ออกแรงปานกลาง หมายถึง การทำกิจกรรมนั้น ท่านต้องออกแรงเพิ่มมากกว่าปกติ ทำให้ท่านต้องหายใจเร็วกว่าปกติ แต่ไม่ทำให้รู้สึกหอบเหนื่อย

กิจกรรมการเคลื่อนไหวร่างกายที่ออกแรงหนักมาก หมายถึง การทำกิจกรรมนั้น ท่านต้องออกแรงอย่างมาก ทำให้ท่านต้องหายใจแรงและเร็วกว่าปกติมาก จนรู้สึกหอบเหนื่อย

แบบสอบถามชุดนี้ มี ๕ ตอน ดังนี้

ตอนที่ ๑ การมีกิจกรรมในการทำงานประกอบอาชีพ (มีคำถาม ๗ ข้อ)

ขอให้ท่านทบทวนว่า **ในช่วง ๗ วันที่ผ่านมา** ท่านมีการทำงานซึ่งต้องมีการเคลื่อนไหวร่างกายที่ทำนอกบ้านหรือไม่ ไม่ว่าการทำงานดังกล่าวนั้นจะได้รับหรือไม่ได้รับค่าจ้าง (ได้แก่ ทำไร่ ทำสวน ค้าขาย รับจ้างแบกหรือขนย้ายสิ่งของ) ทั้งนี้ไม่รวมงานที่ทำในบริเวณบ้านซึ่งไม่มีค่าจ้าง (ได้แก่ งานบ้าน งานสวน งานซ่อมบำรุง และการดูแลสมาชิกในครอบครัว)

๑ ปัจจุบันท่านมีอาชีพหรือทำงานนอกบ้านที่อาจได้รับหรือไม่ได้รับจ้างหรือไม่

( ) มี

( ) ไม่มี (กรุณาข้ามไปตอบ **ตอนที่ ๒ การมีกิจกรรมในการเดินทาง**)

ต่อไปนี้ เป็นคำถามเกี่ยวกับการทำงานที่ต้องเคลื่อนไหวร่างกายที่ท่านปฏิบัติ **ในช่วง ๗ วันที่ผ่านมา** ขอให้ท่านนึกถึงเฉพาะ **กิจกรรมการเคลื่อนไหวร่างกายที่ท่านทำต่อเนื่องนานอย่างน้อย ๑๐ นาทีต่อครั้ง** ไม่ว่าการทำงานดังกล่าวนั้นจะได้รับหรือไม่ได้รับค่าจ้าง

๒ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน **ทำงานที่ต้องมีการเคลื่อนไหวออกแรงหนักมาก** เช่น ยกของหนัก ขุดดิน งานก่อสร้างหรือการเดินขึ้นบันไดหลายชั้น ซึ่งต้องทำต่อเนื่องนานอย่างน้อย ๑๐ นาที

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๔)

๓ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**ทำงานที่ต้องมีการเคลื่อนไหวออกแรงหนักมาก**รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน **____ นาที ต่อวัน**

๔ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน **ทำงานที่ต้องมีการเคลื่อนไหวออกแรงปานกลาง** เช่น ถือของเบาๆ ซึ่งทำต่อเนื่องนานอย่างน้อย ๑๐ นาที ทั้งนี้ไม่รวมถึงการเดิน

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๖)

๕ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา **ทำงานที่ต้องมีการเคลื่อนไหวออกแรงปานกลาง**รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน **____ นาที ต่อวัน**

๖ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน **ทำงาน**ด้วย**การเดิน**ที่ทำต่อเนื่องนานอย่างน้อย 10 นาทีต่อครั้ง ทั้งนี้ไม่รวมถึงการเดินที่ใช้ในการเดินทางไปหรือกลับจากที่ทำงาน

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ **ตอนที่ ๒ การมีกิจกรรมในการเดินทาง**)

๗ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลาทำงานด้วย **การเดิน** รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน **____ นาที ต่อวัน**

ตอนที่ ๒ การมีกิจกรรมในการเดินทาง (มีคำถาม ๖ ข้อ)

ต่อไปนี้ เป็นคำถามเกี่ยวกับการเดินทางจากสถานที่หนึ่งไปยังสถานที่หนึ่ง ที่ท่านปฏิบัติ **ในช่วง ๗ วันที่ผ่านมา** ได้แก่ การเดินทางไปทำงาน ไปซื้อของ ไปท่องเที่ยวและทำธุระ

๘ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วันในการ**เดินทางด้วยยานพาหนะ** ได้แก่ รถยนต์ รถจักรยานยนต์ รถโดยสาร รถไฟ และรถอื่นๆ

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๑๐)

๙ โดยปกติในแต่ละวันเหล่านั้น ท่าน**เดินทางด้วยยานพาหนะ** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาที ต่อวัน**

ต่อไปนี้ ขอให้ท่านนึกถึงเฉพาะ**การถีบจักรยาน**และ**การเดิน** เพื่อทำธุระซึ่งท่านใช้ในการเดินทางไปกลับจากสถานที่หนึ่งไปยังสถานที่หนึ่ง

๑๐ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน เดินทางโดยการ**ถีบจักรยาน** ต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๑๒)

๑๑ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลาเดินทางโดยการ**ถีบจักรยาน** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาที ต่อวัน**

๑๒ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน เดินทางโดยการ **เดิน** ต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ **ตอนที่ ๓ การมีกิจกรรมในงานบ้านฯ**)

๑๓ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลาในการเดินทางโดยการ **เดิน** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาที ต่อวัน**

ตอนที่ ๓ การมีกิจกรรมในงานบ้าน งานซ่อมบำรุงและการดูแลสมาชิกในครอบครัว (มีคำถาม ๖ ข้อ)

ต่อไปนี้ เป็นคำถามเกี่ยวกับกิจกรรมการเคลื่อนไหวร่างกายที่ท่านทำในบ้านและบริเวณบ้าน **ในช่วง ๗ วันที่ผ่านมา** ขอให้ท่านนึกถึงเฉพาะกิจกรรมการเคลื่อนไหวร่างกายที่ท่านทำต่อเนื่องนานอย่างน้อย ๑๐ นาทีต่อครั้ง ได้แก่ งานบ้าน งานครัว งานสวน งานซ่อมแซมบ้าน งานดูแลสมาชิกในครอบครัวและงานดูแลสัตว์เลี้ยง

๑๔ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วันในการเคลื่อนไหวร่างกายทำกิจกรรมที่**หนักมาก**ในบริเวณ**สวนหรือสนามรอบบ้าน** เช่น พรวนดินปลูกต้นไม้ หรือตัดกิ่งไม้ใหญ่ ซึ่งทำต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๑๖)

๑๕ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**เคลื่อนไหวร่างกายทำกิจกรรมที่หนักมาก**บริเวณ**สวนหรือสนามรอบบ้าน** รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน ____ นาที ต่อวัน

๑๖ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน ในการ**เคลื่อนไหวร่างกายทำกิจกรรมที่หนักปานกลาง** บริเวณ **สวนหรือสนามรอบบ้าน** ได้แก่ การเก็บกวาดใบไม้ รดน้ำต้นไม้ด้วยสายยาง ยกของเบาๆ กวาดพื้น ทำความสะอาดกระจกหน้าต่าง ซึ่งทำต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๑๘)

๑๗ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**เคลื่อนไหวออกแรงทำกิจกรรมที่หนักปานกลาง** บริเวณ**สวนหรือสนามรอบบ้าน** รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน ____ นาที ต่อวัน

๑๘ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วัน**เคลื่อนไหวออกแรงทำกิจกรรมที่หนักปานกลางภายในบ้าน** เช่น ยกของเบาๆ ทำความสะอาดกระจกหน้าต่าง ขัดถูพื้นบ้าน กวาดบ้านละดูแลสมาชิกในครอบครัว ซึ่งทำต่อเนื่องกันนานอย่างน้อย ๑๐ นาที

____ วัน ต่อสัปดาห์

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ **ตอนที่ ๔ การมีกิจกรรมยามว่าง**)

๑๙ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**เคลื่อนไหวออกแรงทำกิจกรรมที่หนักปานกลาง** ภายในบ้าน รวมเป็นระยะเวลานานเท่าใด

____ ชั่วโมง ต่อวัน ____ นาที ต่อวัน

ตอนที่ ๔ การมีกิจกรรมยามว่าง (มีคำถาม ๖ ข้อ)

ต่อไปนี้เป็นคำถามเกี่ยวกับการเคลื่อนไหวร่างกายที่ท่านปฏิบัติ **ในช่วง ๗ วันที่ผ่านมา** ขอให้ท่านนึกถึงเฉพาะกิจกรรม**การเคลื่อนไหวร่างกายที่ทำในเวลาว่างเพื่อการพักผ่อนหย่อนใจ** โดยทำต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง ได้แก่ การออกกำลังกาย การเล่นกีฬา ทั้งนี้ไม่รวมกิจกรรมต่างๆ ที่กล่าวมาก่อนหน้านี้แล้ว

๒๐ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วันใน **ช่วงเวลาว่าง เดิน** ต่อเนื่องกันนานอย่างน้อย ๑๐ นาทีต่อครั้ง

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๒๒)

๒๑ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**เดินในช่วงเวลาว่าง** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาที ต่อวัน**

๒๒ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วันใน**ช่วงเวลาว่าง** เคลื่อนไหวร่างกายทำกิจกรรม**ที่หนักมาก** เช่น การเต้นแอโรบิก การวิ่ง การถีบจักรยานหรือการว่ายน้ำแบบเร็วๆ ซึ่งทำต่อเนื่องนานอย่างน้อย ๑๐ นาที

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ (กรุณาข้ามไปตอบ ข้อที่ ๒๔)

๒๓ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**ในช่วงเวลาว่าง** เคลื่อนไหวร่างกายออกแรงทำกิจกรรม**ที่หนักมาก** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาที ต่อวัน**

๒๔ **ในช่วง ๗ วันที่ผ่านมา** ท่านใช้เวลากี่วันใน**ช่วงเวลาว่าง**เคลื่อนไหวร่างกายออกแรงทำกิจกรรม**ที่หนักปานกลาง** เช่น การถีบจักรยานหรือว่ายน้ำด้วยความเร็วปกติ การรำไม้พลองหรือการรำชี่กง ซึ่งทำต่อเนื่องนานอย่างน้อย ๑๐ นาที

_____ **วัน ต่อสัปดาห์**

( ) ไม่ได้ทำ

๒๕ โดยปกติในแต่ละวันเหล่านั้น ท่านใช้เวลา**ในช่วงเวลาว่าง** เคลื่อนไหวร่างกายทำกิจกรรม**ที่หนักปานกลาง** รวมเป็นระยะเวลานานเท่าใด

_____ **ชั่วโมง ต่อวัน** _____ **นาทีต่อวัน**

ตอนที่ ๕ การใช้เวลาในการนั่ง (มีคำถาม ๒ ข้อ)

คำถามช่วงสุดท้ายนี้เป็นคำถามเกี่ยวกับเวลาที่ท่านใช้กับ **การนั่ง** ซึ่งเป็นการนั่งขณะอยู่ที่ทำงาน อยู่ที่บ้าน หรือการนั่งระหว่างช่วงเวลาของการพักผ่อนหย่อนใจ รวมถึงระยะเวลากับการนั่งโต๊ะ นั่งพูดคุยกับเพื่อน นั่งอ่านหนังสือ หรือการที่นั่งๆ นอนๆ ดูโทรทัศน์ ทั้งนี้ไม่รวมการนั่งในยวดยานพาหนะที่ได้กล่าวมาก่อนหน้านี้แล้ว

๒๖ **ช่วง ๗ วันที่ผ่านมา** โดยปกติท่านใช้เวลากับ **การนั่งในวันธรรมดาที่ไม่ใช่วันเสาร์หรือวันอาทิตย์** รวมเป็นระยะเวลานานเท่าใด

_____ ชั่วโมง ต่อวัน

_____ นาทีต่อวัน

๒๗ **ช่วง ๗ วันที่ผ่านมา** โดยปกติท่านใช้เวลากับ **การนั่งในวันสุดสัปดาห์ คือวันเสาร์หรือวันอาทิตย์** รวมเป็นระยะเวลานานเท่าใด

_____ ชั่วโมง ต่อวัน

_____ นาทีต่อวัน

ขอบพระคุณเป็นอย่างสูง ที่กรุณาตอบแบบสอบถาม

Approach date …….. Participant code ……

Part 1 Demographic questionnaire

Direction: Please answer the following questions, by marking X or completing the sentences.

1. Age …….. Years
2. Body weight …….. Kg. Height …….. cms.
3. Waist circumference …….. inches
4. Gender ( ) Male ( ) Female
5. Your hometown is (province) …….. How long do you stay? …….. year(s) ..… month(s)
6. Currently, you are living with
   ( ) Relative(s) ( ) Friend(s) ( ) Alone
7. Your education is
   ( ) Primary school ( ) Secondary school
   ( ) Apprenticeship diploma ( ) Bachelor's degree
   ( ) Above Bachelor's degree
8. Your workplace is
   ( ) At home ( ) Outside home
9. Actually, the characters of your occupation or your routine activities are
   ( ) Majority of activity is sitting
   ( ) Majority of activity is walking or standing
   ( ) Majority of activity is forcible activity
10. The balance of your income and your expense is
    ( ) Inadequate ( ) Adequate ( ) Adequate and savings
11. In family, you are
    ( ) Breadwinner ( ) Partial earning ( ) Not at all
12. Unless coronary artery disease, have you got any other co-morbidity condition?
    ( ) History of Hyper-lipidemia ( ) High blood pressure ( ) Diabetes Mellitus
    ( ) Renal disease ( ) Heart failure ( ) Peripheral vascular disease
    ( ) Stroke / paralysis ( ) Not at all
13. From coronary angiography, it was found that the severity of your coronary artery stenosis is
    ( ) Single vessel ( ) Double vessels ( ) Triple vessels

Researcher only: CAG impression: ( ) Left main ( ) RCA ( ) Left Cx ( ) LVEF = ……..%
LV angiogram ……
Other(s) (please specify) ……

14. After you have got the coronary artery disease;

a. Have you got any health information, such as food, exercise, life style, and stress management?

( ) No, I have not. .

( ) Yes, I have.

b. Did you join the cardiac rehabilitation program?

( ) No, I did not because (please specify) ……..

( ) Yes, I did and joined ……time per week

( ) I completely attended for 3 months.

( ) I did but incompletely attended because (please specify) ……..……

15. According to the sportsman with competition and sports playing for fun,

15.1 Before the CAD diagnosis was discovered, are you a sportsman?

( ) No, I was not a sportsman and never been played at any kind of sport (skip to question 16)

( ) Yes, I was a sportsman. ( ) Yes, I had been played

The sport/the game is (The kind of sports) …… Time was spent for ……Years(s)/Month(s).

15.2 If you were a sportsman or had been played some sport, before you have got the CAD

( ) Yes, I still regularly play. ( ) Yes, I did but I irregularly play

( ) No, I did not play at all for ……..…..... Year(s)/Month(s).

16. Before you have got the disease of coronary artery,

16.1 Did you have any physical activity?

( ) No, I did not.

( ) Yes, I did (please inform more details below)

1) The first rank is (type of activity)…… the time is ……./wk. …..hr. ……. min.
2) The second rank is (type of activity)…… the time is ……./wk. …..hr. ……. min
3) The third rank is (type of activity)…… the time is ……./wk. …..hr. ……. min

16.2 Did you have any health problem(s) or the limitation(s) regarding physical activity or bodily movement?

( ) No, I have not.

( ) Yes, I have mild problem but I still have physical activity. That problem(s) or the limitation(s) is(are) ……..……..……

( ) Yes, I have a serious problem and I could not do any activity. That problem(s) or the limitation(s) is (are) ……..……..……

17 During the first 3 months after hospitalization, you returned back to hospital again for

( ) ..... time(s) as was appointed to see physician

( ) ..... time(s) because of worsening of cardiac symptom(s) e.g. (please specify)

( ) chest discomfort/ pain at chest top ( ) dyspnea on exertion

( ) could not lie down ( ) syncope/ fainting

( ) palpitation ( ) shortness of breath

( ) Other(s) (please specify) .....

18 During the first 3 months after hospitalization,

18.1 Did you have any physical activity?

( ) No, I did not.

( ) Yes, I did. (please inform more details below)

1) The first rank is (type of activity)..... the time is ...../wk. .....hr. ..... min.
2) The second rank is (type of activity)..... the time is ...../wk. .....hr. ..... min
3) The third rank is (type of activity)..... the time is ...../wk. .....hr. ..... min

18.2 Did you have any health problem(s) or the limitation(s) regarding physical activity or bodily movement?

( ) No, I have not.

( ) Yes, I have mild problem but,I still have physical activity. That problem(s) or the limitation(s) is(are) .....

( ) Yes, I have a serious problem and I could not do any activity. That problem(s) or the limitation(s) is (are) .....

Part 2 Symptom Frequency and Symptom Distress Scale (SFSDS)

Below is a list of feeling. Would you please to tell which of the answer on the name list that the best described how you feel? **During the past one month** about how much were you distressed or bothered by:

Frequency: Never, A little, Moderately, Quite a bit, and Always.

Severity: Not at all upsetting, A little, Moderately, Quite a bit, and Extremely upsetting.

Symptoms	Frequency					Severity				
	Never	A little	Moderately	Quite a bit	Always	Not at all	A little	Moderately	Quite a bit	Extremely
1.Chest discomfort										
2.Arm / shoulder discomfort										
3.Back / neck discomfort										
4.Jaw / throat / tooth discomfort										
5.Indigestion										
6.Generalized discomfort										
7.SOB with activity										
8.SOB with flat										
9.Nocturnal SOB										
10.Dizziness / lightheadedness										
11.Palpitations										
12.Irregular heart rate										
13.Fatigue										
14.Edema										
15.Difficulty sleeping										
16.Nausea										
17.Loss of appetite										
18.Depressed mood										
19.Nervousness / shakiness										
20.Feeling fearful										
21.Feeling tense										
22.Panic spells										
23.Restlessness										

Part 3 Subjective Physical Activity Experiences Scale (SPAES)

Direction: By circling a number on the scale below each of the following items, please indicate the degree to which you are experiencing each feeling now, at this point in time, after physical activity.

I FEEL:

1. Great:						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
2. Awful:						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
3. Drained						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
4. Positive						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
5. Crummy						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
6. Exhausted						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
7. Strong						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
8. Discouraged						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
9. Fatigued						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
10. Terrific						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
11. Miserable						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so
12. Tired						
1	2	3	4	5	6	7
Not at all			Moderately			Very much so

Part 4 Family and friend support for physical activity scale (FFSPA)

Below is a list of things people might do or say to someone who is trying to physical activity regularly. If you are not trying to physical activity, then some of the questions may not apply to you, but please read and give an answer to every question.

Please marks ✓ for rate each question twice. Under **family,** rate how often anyone living in your household has said or done what is described during the **last** month. Under **friends,** rate how often your friends, acquaintances, or coworkers have said or done what is described during the **last** month.

Family					During the last month, your family (or members of your household) or friends	Friends				
None	Rarely	A few times	Often	Very often		None	Rarely	A few times	Often	Very often
					1. Participating physical activity with you.					
					2. Offered to physical activity with you.					
					3. Gave you helpful reminders to physical activity ("Are you going to physical activity tonight?").					
					4. Gave you encouragement. To stick with your physical activity program.					
					5. Changed their schedule so we could physical activity together.					
					6. Discussed physical activity with you.					
					7. Planned for physical activity on recreational outings.					
					8. Helped plan activities around your physical activity.					
					9. Asked you for ideas on how they can get more physical activity.					
					10. Talked about how much they like to physical activity.					
					11. Criticized you or made fun of you for performing.					
					12. Gave you rewards for performing (bought you something or gave you something you like).					

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (October 2002)

LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health–related physical activity.

Background on IPAQ

The development of an international measure for physical activity commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

Translation from English and Cultural Adaptation

Translation from English is encouraged to facilitate worldwide use of IPAQ. Information on the availability of IPAQ in different languages can be obtained at www.ipaq.ki.se. If a new translation is undertaken we highly recommend using the prescribed back translation methods available on the IPAQ website. If possible please consider making your translated version of IPAQ available to others by contributing it to the IPAQ website. Further details on translation and cultural adaptation can be downloaded from the website.

Further Developments of IPAQ

International collaboration on IPAQ is on-going and an ***International Physical Activity Prevalence Study*** is in progress. For further information see the IPAQ website.

More Information

More detailed information on the IPAQ process and the research methods used in the development of IPAQ instruments is available at www.ipaq.ki.se and Booth, M.L. (2000). *Assessment of Physical Activity: An International Perspective.* Research Quarterly for Exercise and Sport, 71 (2): s114-20. Other scientific publications and presentations on the use of IPAQ are summarized on the website.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

   ☐ Yes

   ☐ No → ***Skip to PART 2: TRANSPORTATION***

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

   _____ **days per week**

   ☐ No vigorous job-related physical activity → ***Skip to question 4***

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

   _____ **hours per day**
   _____ **minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

   _____ **days per week**

   ☐ No moderate job-related physical activity → ***Skip to question 6***

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ **days per week**

☐ No job-related walking → ***Skip to PART 2: TRANSPORTATION***

7. How much time did you usually spend on one of those days **walking** as part of your work?

_____ **hours per day**
_____ **minutes per day**

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **days per week**

☐ No traveling in a motor vehicle → ***Skip to question 10***

9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **hours per day**
_____ **minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No bicycling from place to place → ***Skip to question 12***

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**
_____ **minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No walking from place to place → ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. How much time did you usually spend on one of those days **walking** from place to place?

_____ **hours per day**
_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **days per week**

☐ No vigorous activity in garden or yard → ***Skip to question 16***

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

☐ No moderate activity in garden or yard → ***Skip to question 18***

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **days per week**

☐ No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**
_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐ No walking in leisure time → ***Skip to question 22***

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**
_____ **minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐ No vigorous activity in leisure time → ***Skip to question 24***

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **hours per day**
_____ **minutes per day**

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **days per week**

☐ No moderate activity in leisure time → ***Skip to PART 5: TIME SPENT SITTING***

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?
_____ **hours per day**
_____ **minutes per day**

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ **hours per day**
_____ **minutes per day**

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

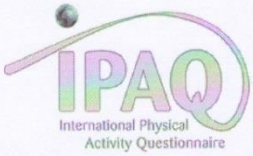
_____ **hours per day**
_____ **minutes per day**

This is the end of the questionnaire, thank you for participating.

APPENDIX H

Guidelines for Data Processing and Analysis

of the International Physical Activity Questionnaire (IPAQ)



Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ)

– Short and Long Forms

November 2005

Contents

1. Introduction

This document describes recommended methods of scoring the data derived from the telephone / interview administered and self-administered IPAQ short and long form instruments. The methods outlined provide a revision to earlier scoring protocols for the IPAQ short form and provide for the first time a comparable scoring method for IPAQ long form. Latest versions of IPAQ instruments are available from www.ipaq.ki.se.

Although there are many different ways to analyse physical activity data, to date there is no formal consensus on a 'correct' method for defining or describing levels of physical activity based on self–report population surveys. The use of different scoring protocols makes it very difficult to compare within and between countries, even when the same instrument has been used. Use of these scoring methods will enhance the comparability between surveys, provided identical sampling and survey methods have been used.

2. Uses of IPAQ Instruments

IPAQ short form is an instrument designed primarily for population surveillance of physical activity among adults. It has been developed and tested for use in adults (age range of 15-69 years) and until further development and testing is undertaken the use of IPAQ with older and younger age groups is not recommended.

IPAQ short and long forms are sometimes being used as an evaluation tool in intervention studies, but this was not the intended purpose of IPAQ. Users should carefully note the range of domains and types of activities included in IPAQ before using it in this context. Use as an outcome measure in small scale intervention studies is not recommended.

3. Summary Characteristics of IPAQ Short and Long Forms

1. IPAQ assesses physical activity undertaken across a comprehensive set of domains including:
    a. leisure time physical activity
    b. domestic and gardening (yard) activities
    c. work-related physical activity
    d. transport-related physical activity;

2. The IPAQ **short** form asks about three specific types of activity undertaken in the four domains introduced above. The specific types of activity that are assessed are walking, moderate-intensity activities and vigorous-intensity activities.

3. The items in the **short** IPAQ form were structured to provide separate scores on walking, moderate-intensity and vigorous-intensity activity. Computation of the total score for the short form requires summation of the duration (in minutes) and frequency (days) of walking, moderate-intensity and vigorous-intensity activities. Domain specific estimates cannot be estimated.

4. The IPAQ **long** form asks details about the specific types of activities undertaken within each of the four domains. Examples include walking for transportation and moderate-intensity leisure-time activity.

5. The items in the **long** IPAQ form were structured to provide separate domain specific scores for walking, moderate-intensity and vigorous-intensity activity within each of the work, transportation, domestic chores and gardening (yard) and leisure-time domains. Computation of the total scores for the long form requires summation of the duration (in minutes) and frequency (days) for all the types of activities in all domains. Domain specific scores or activity specific sub-scores may be calculated. Domain specific scores require summation of the scores for walking, moderate-intensity and vigorous-intensity activities within the specific domain, whereas activity-specific scores require summation of the scores for the specific type of activity across domains.

4. Overview of Continuous and Categorical Analyses of IPAQ

Both categorical and continuous indicators of physical activity are possible from both IPAQ forms. However, given the non-normal distribution of energy expenditure in many populations, it is suggested that the continuous indicator be presented as median minutes/week or median MET–minutes/week rather than means (such as mean minutes/week or mean MET-minutes/week).

4.1 Continuous Variables

Data collected with IPAQ can be reported as a continuous measure. One measure of the volume of activity can be computed by weighting each type of activity by its energy requirements defined in METs to yield a score in MET–minutes. METs are multiples of the resting metabolic rate and a MET-minute is computed by multiplying the MET score of an activity by the minutes performed. MET-minute scores are equivalent to kilocalories for a 60 kilogram person. Kilocalories may be computed from MET-minutes using the following equation: MET-min x (weight in kilograms/60 kilograms). MET-minutes/day or MET-minutes/week can be presented although the latter is more frequently used and is thus suggested.

Details for the computation for summary variables from IPAQ short and long forms are detailed below. As there are no established thresholds for presenting MET-minutes, the IPAQ Research Committee propose that these data are reported as comparisons of median values and interquartile ranges for different populations.

4.2 Categorical Variable: Rationale for Cut Point Values

There are three levels of physical activity proposed to classify populations:

1. Low
2. Moderate
3. High

The algorithms for the short and long forms are defined in more detail in Sections 5.3 and 6.3, respectively. Rules for data cleaning and processing prior to computing the algorithms appear in Section 7.

Regular participation is a key concept included in current public health guidelines for physical activity.[1] Therefore, both the total volume and the number of days/sessions are included in the IPAQ analysis algorithms.

The criteria for these levels have been set taking into account that IPAQ asks questions in all domains of daily life, resulting in higher median MET-minutes estimates than would have been estimated from leisure-time participation alone. The criteria for these three levels are shown below.

Given that measures such as IPAQ assess total physical activity in all domains, the "leisure time physical activity" based public health recommendation of 30 minutes on most days will be achieved by most adults in a population. Although widely accepted as a goal, in absolute terms 30 minutes of moderate-intensity activity is low and broadly equivalent to the background or basal levels of activity adult individuals would accumulate in a day. Therefore a new, higher cutpoint is needed to describe the levels of physical activity associated with health benefits for measures such as IPAQ, which report on a broad range of domains of physical activity.

'High'

This category was developed to describe higher levels of participation. Although it is known that greater health benefits are associated with increased levels of activity there is no consensus on the exact amount of activity for maximal benefit. In the absence of any established criteria, the IPAQ Research Committee proposes a measure which equates to approximately at least one hour per day or more, of at least moderate-intensity activity above the basal level of physical activity Considering that basal activity may be considered to be equivalent to approximately 5000 steps per day, it is proposed that "high active" category be considered as those who move at least 12,500 steps per day, or the equivalent in moderate and vigorous activities. This represents at least an hour more moderate-intensity activity over and above the basal level of activity, or half an hour of vigorous-intensity activity over and above basal levels daily. These calculations were based on emerging results of pedometers studies.[2]

This category provides a higher threshold of measures of total physical activity and is a useful mechanism to distinguish variation in population groups. Also it could be used to set population targets for health-enhancing physical activity when multi-domain instruments, such as IPAQ are used.

---

[1] Pate RR, Pratt M, Blair SN, Haskell WL , Macera CA, Bouchard C et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of American Medical Association* 1995; 273(5):402-7. and U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, The Presidents' Council on Physical Fitness and Sports: Atlanta, GA:USA. 1996.

[2] Tudor-Locke C, Bassett DR Jr. How many steps/day are enough? Preliminary pedometer indices for public health. Sports Med. 2004;34(1):1-8.

'Moderate'

This category is defined as doing some activity, more than the low active category. It is proposed that it is a level of activity equivalent to "half an hour of at least moderate-intensity PA on most days", the former leisure time-based physical activity population health recommendation.

'Low'

This category is simply defined as not meeting any of the criteria for either of the previous categories.

5. Protocol for IPAQ Short Form

5.1 Continuous Scores

Median values and interquartile ranges can be computed for walking (W), moderate-intensity activities (M), vigorous-intensity activities (V) and a combined total physical activity score. All continuous scores are expressed in MET-minutes/week as defined below.

5.2 MET Values and Formula for Computation of MET-minutes/week

The selected MET values were derived from work undertaken during the IPAQ Reliability Study undertaken in 2000-2001[3]. Using the Ainsworth et al. Compendium (*Med Sci Sports Med* 2000) an average MET score was derived for each type of activity. For example; all types of walking were included and an average MET value for walking was created. The same procedure was undertaken for moderate-intensity activities and vigorous-intensity activities. The following values continue to be used for the analysis of IPAQ data: Walking = 3.3 METs, Moderate PA = 4.0 METs and Vigorous PA = 8.0 METs. Using these values, four continuous scores are defined:

Walking MET-minutes/week = 3.3 * walking minutes * walking days
Moderate MET-minutes/week = 4.0 * moderate-intensity activity minutes * moderate days
Vigorous MET-minutes/week = 8.0 * vigorous-intensity activity minutes * vigorous-intensity days
Total physical activity MET-minutes/week = sum of Walking + Moderate + Vigorous MET-minutes/week scores.

5.3 Categorical Score

Category 1 Low

This is the lowest level of physical activity. Those individuals who not meet criteria for Categories 2 or 3 are considered to have a 'low' physical activity level.

[3] Craig CL,Marshall A , Sjostrom M et al. International Physical Activity Questionnaire: 12 country reliability and validity *Med Sci Sports Exerc* 2003;August

Category 2 Moderate

The pattern of activity to be classified as 'moderate' is either of the following criteria:

a) 3 or more days of vigorous-intensity activity of at least 20 minutes per day
OR
b) 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day
OR
c) 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum Total physical activity of at least 600 MET-minutes/week.

Individuals meeting at least one of the above criteria would be defined as accumulating a minimum level of activity and therefore be classified as 'moderate'. See Section 7.5 for information about combining days across categories.

Category 3 High

A separate category labelled 'high' can be computed to describe higher levels of participation.
The two criteria for classification as 'high' are:

a) vigorous-intensity activity on at least 3 days achieving a minimum Total physical activity of at least 1500 MET-minutes/week
OR
b) 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 3000 MET-minutes/week.

See Section 7.5 for information about combining days across categories.

5.4 Sitting Question in IPAQ Short Form

The IPAQ sitting question is an additional indicator variable of time spent in sedentary activity and is not included as part of any summary score of physical activity. Data on sitting should be reported as median values and interquartile ranges. To-date there are few data on sedentary (sitting) behaviours and no well-accepted thresholds for data presented as categorical levels.

6. Protocol for IPAQ Long Form

The long form of IPAQ asks in detail about walking, moderate-intensity and vigorous-intensity physical activity in each of the four domains. Note: asking more detailed questions regarding physical activity within domains is likely to produce higher prevalence estimates than the more generic IPAQ short form.

6.1 Continuous Score

Data collected with the IPAQ long form can be reported as a continuous measure and reported as median MET-minutes. Median values and interquartile ranges can be computed for walking (W), moderate-intensity activities (M), and vigorous-intensity activities (V) within each domain using the formulas below. Total scores may also be calculated for walking (W), moderate-intensity activities (M), and vigorous-intensity activities (V); for each domain (work, transport, domestic and garden, and leisure) and for an overall grand total.

6.2 MET Values and Formula for Computation of MET-minutes

Work Domain

Walking MET-minutes/week at work = 3.3 * walking minutes * walking days at work

Moderate MET-minutes/week at work= 4.0 * moderate-intensity activity minutes * moderate-intensity days at work

Vigorous MET-minutes/week at work= 8.0 * vigorous-intensity activity minutes * vigorous-intensity days at work

Total Work MET-minutes/week =sum of Walking + Moderate + Vigorous MET-minutes/week scores at work.

Active Transportation Domain

Walking MET-minutes/week for transport = 3.3 * walking minutes * walking days for transportation

Cycle MET-minutes/week for transport= 6.0 * cycling minutes * cycle days for transportation

Total Transport MET-minutes/week = sum of Walking + Cycling MET-minutes/week scores for transportation.

Domestic and Garden [Yard Work] Domain

Vigorous MET-minutes/week yard chores= 5.5 * vigorous-intensity activity minutes * vigorous-intensity days doing yard work (**Note**: the MET value of 5.5 indicates that vigorous garden/yard work should be considered a moderate-intensity activity for scoring and computing total moderate intensity activities.)

Moderate MET-minutes/week yard chores= 4.0 * moderate-intensity activity minutes * moderate-intensity days doing yard work

Moderate MET-minutes/week inside chores= 3.0* moderate-intensity activity minutes * moderate-intensity days doing inside chores.

Total Domestic and Garden MET-minutes/week =sum of Vigorous yard + Moderate yard + Moderate inside chores MET-minutes/week scores.

Leisure-Time Domain

Walking MET-minutes/week leisure = 3.3 * walking minutes * walking days in leisure

Moderate MET-minutes/week leisure = 4.0 * moderate-intensity activity minutes * moderate-intensity days in leisure

Vigorous MET-minutes/week leisure = 8.0 * vigorous-intensity activity minutes * vigorous-intensity days in leisure

Total Leisure-Time MET-minutes/week = sum of Walking + Moderate + Vigorous MET-minutes/week scores in leisure.

Total Scores for all Walking, Moderate and Vigorous Physical Activities

Total Walking MET-minutes/week = Walking MET-minutes/week (at Work + for Transport + in Leisure)

Total Moderate MET-minutes/week total = Moderate MET-minutes/week (at Work + Yard chores + inside chores + in Leisure time) + Cycling Met-minutes/week for Transport + Vigorous Yard chores MET-minutes/week

Total Vigorous MET-minutes/week = Vigorous MET-minutes/week (at Work + in Leisure)

Note: Cycling MET value and Vigorous garden/yard work MET value fall within the coding range of moderate-intensity activities.

Total Physical Activity Scores

An overall total physical activity MET-minutes/week score can be computed as:

Total physical activity MET-minutes/week = sum of Total (Walking + Moderate + Vigorous) MET-minutes/week scores.

This is equivalent to computing:

Total physical activity MET-minutes/week = sum of Total Work + Total Transport + Total Domestic and Garden + Total Leisure-Time MET-minutes/week scores.

As there are no established thresholds for presenting MET-minutes, the IPAQ Research Committee proposes that these data are reported as comparisons of median values and interquartile ranges for different populations.

6.3 Categorical Score

As noted earlier, regular participation is a key concept included in current public health guidelines for physical activity.[4] Therefore, both the total volume and the number of day/sessions are included in the IPAQ analysis algorithms. There are three levels of physical activity proposed to classify populations – 'low', 'moderate', and 'high'. The criteria for these levels are the same as for the IPAQ short [described earlier in Section 4.2]

Category 1 Low

This is the lowest level of physical activity. Those individuals who not meet criteria for Categories 2 or 3 are considered 'low'.

Category 2 Moderate

The pattern of activity to be classified as 'moderate' is either of the following criteria:

d) 3 or more days of vigorous-intensity activity of at least 20 minutes per day
OR
e) 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day
OR

[4] Pate RR, Pratt M, Blair SN, Haskell WL , Macera CA, Bouchard C et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of American Medical Association* 1995; 273(5):402-7. and U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, The Presidents' Council on Physical Fitness and Sports: Atlanta, GA:USA. 1996.

f) 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 600 MET-minutes/week.

Individuals meeting at least one of the above criteria would be defined as accumulating a moderate level of activity. See Section 7.5 for information about combining days across categories.

Category 3 High

A separate category labelled 'high' can be computed to describe higher levels of participation.
The two criteria for classification as 'high' are:

a) vigorous-intensity activity on at least 3 days achieving a minimum Total physical activity of at least 1500 MET-minutes/week

OR

b) 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 3000 MET-minutes/week.

See Section 7.5 for information about combining days across categories.

6.4 IPAQ Sitting Question IPAQ Long Form

The IPAQ sitting question is an additional indicator variable and is not included as part of any summary score of physical activity. To-date there are few data on sedentary (sitting) behaviours and no well-accepted thresholds for data presented as categorical levels. For the sitting question 'Minutes' is used as the indicator to reflect time spent in sitting rather than MET-minutes which would suggest an estimate of energy expenditure.

IPAQ long assesses an estimate of sitting on a typical weekday, weekend day and time spent sitting during travel (see transport domain questions).

Summary sitting variables include

Sitting Total Minutes/week = weekday sitting minutes* 5 weekdays + weekend day sitting minutes* 2 weekend days

Average Sitting Total Minutes/day = (weekday sitting minutes* 5 weekdays + weekend day sitting minutes* 2 weekend days) / 7

Note: The above calculation of 'Sitting Total' excludes time spent sitting during travel because the introduction in IPAQ long directs the responder to NOT include this component as it would have already been captured under the Transport section. If a summary sitting variable including time spent sitting for transport is required, it should be calculated by adding the time reported (travelling in a motor vehicle) under transport to the above formula. Care should be taken in reporting these alternate data to clearly distinguish the 'total sitting' variable from a 'total sitting – including transport' variable.

7. Data Processing Rules

In addition to a standardized approach to computing categorical and continuous measures of physical activity, it is necessary to undertake standard methods for the cleaning and treatment of IPAQ datasets. The use of different approaches and rules would introduce variability and reduce the comparability of data.

There are no established rules for data cleaning and processing on physical activity. Thus, to allow more accurate comparisons across studies IPAQ Research Committee has established and recommends the following guidelines:

7.1 Data Cleaning

I. Any responses to duration (time) provided in the hours and minutes response option should be converted from hours and minutes into minutes.
II. To ensure that responses in 'minutes' were not entered in the 'hours' column by mistake during self-completion or during data entry process, values of '15', '30', '45', '60' and '90' in the 'hours' column should be converted to '15', '30', '45', '60' and '90' minutes, respectively, in the minutes column.
III. In some cases duration (time) will be reported as weekly (not daily) e.g., VWHRS, VWMINS. These data should be converted into an average daily time by dividing by 7.
IV. If 'don't know' or 'refused ' or data are missing for time or days then that case is removed from analysis.

Note: Both the number of days *and* daily time are required for the creation of categorical and continuous summary variables

7.2 Maximum Values for Excluding Outliers

This rule is to exclude data which are unreasonably high; these data are to be considered outliers and thus are excluded from analysis. All cases in which the sum total of all Walking, Moderate and Vigorous time variables is greater than 960 minutes (16 hours) should be excluded from the analysis. This assumes that on average an individual of 8 hours per day is spent sleeping.

The 'days' variables can take the range 0-7 days, or 8, 9 (don't know or refused); values greater than 9 should not be allowed and those cases excluded from analysis.

7.3 Minimum Values for Duration of Activity

Only values of 10 or more minutes of activity should be included in the calculation of summary scores. The rationale being that the scientific evidence indicates that episodes or bouts of at least 10 minutes are required to achieve health benefits. Responses of less than 10 minutes [and their associated days] should be re-coded to 'zero'.

7.4 Truncation of Data Rules

This rule attempts to normalize the distribution of levels of activity which are usually skewed in national or large population data sets.

In IPAQ short - it is recommended that all Walking, Moderate and Vigorous time variables exceeding ' 3 hours' or '180 minutes' are truncated (that is re-coded) to be equal to '180 minutes' in a new variable. This rule permits a maximum of 21 hours of activity in a week to be reported for each category (3 hours * 7 days).

In IPAQ long – the truncation process is more complicated, but to be consistent with the approach for IPAQ short requires that the variables total Walking, total Moderate-intensity and total Vigorous-intensity activity are calculated and then, for each of these summed behaviours, the total value should be truncated to 3 hours (180 minutes).

When analysing the data as categorical variable or presenting median and interquartile ranges of the MET-minute scores, the application of the truncation rule will not affect the results. This rule does have the important effect of preventing misclassification in the 'high' category. For example, an individual who reports walking for 10 minutes on 6 days and 12 hours of moderate activity on one day could be coded as 'high' because this pattern meets the '7 day" and "3000 MET-min" criteria for 'high'. However, this uncommon pattern of activity is unlikely to yield the health benefits that the 'high' category is intended to represent.

Although using median is recommended due to the skewed distribution of scores, if IPAQ data are analysed and presented as a continuous variable using mean values, the application of the truncation rule will produce slightly lower mean values than would otherwise be obtained.

7.5 Calculating MET-minute/week Scores

Data processing rules 7.2, 7.3, and 7.4 deals first with excluding outlier data, then secondly, with recoding minimum values and then finally dealing with high values. These rules will ensure that highly active people remain classified as 'high', while decreasing the chances that less active individuals are misclassified and coded as 'high'.

Using the resulting variables, convert time and days to MET-minute/week scores [see above Sections 5.2 and 6.2; METS x days x daily time].

7.6 Calculating Total Days for Presenting Categorical Data on Moderate and High Levels

Presenting IPAQ data using categorical variables requires the total number of 'days' on which all physical activity was undertaken to be assessed. This is difficult because frequency in 'days' is asked separately for walking, moderate-intensity and vigorous-intensity activities, thus allowing the total number of 'days' to range from a minimum

of 0 to a maximum of 21'days' per week in IPAQ short and higher in IPAQ long. The IPAQ instrument does not record if different types of activity are undertaken on the same day.

In calculating 'moderately active', the primary requirement is to identify those individuals who undertake activity on at least '5 days'/week [see Sections 4.2 and 5.3]. Individuals who meet this criterion should be coded in a new variable called "*at least five days*" and this variable should be used to identify those meeting criterion b) at least 30 minutes of moderate-intensity activity and/or walking; and those meeting criterion c) any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of 600 MET-minutes/week.

Below are two examples showing this coding in practice:

i) an individual who reports '2 days of moderate-intensity' and '3 days of walking' should be coded as a value indicating "*at least five days*";
ii) an individual reporting '2 days of vigorous-intensity', '2 days of moderate-intensity' and '2 days of walking should be coded as a value to indicate "*at least five days*" [even though the actual total is 6].

The original frequency of 'days' for each type of activity should remain in the data file for use in the other calculations.

The same approach as described above is used to calculate total days for computing the 'high' category. The primary requirement according to the stated criteria is to identify those individuals who undertake a combination of walking, moderate-intensity and or vigorous-intensity activity on at least 7 days/week [See section 4.2]. Individuals who meet this criterion should be coded as a value in a new variable to reflect "*at least 7 days*".

Below are two examples showing this coding in practice:

i) an individual who reports '4 days of moderate-intensity' and '3 days of walking' should be coded as the new variable "*at least 7 days*".
ii) an individual reporting '3 days of vigorous-intensity', '3 days moderate-intensity' and '3 days walking' should be coded as "*at least 7 days*" [even though the total adds to 9] .

8. Summary algorithms

The algorithms in Appendix 1 and Appendix 2 to this document show how these rules work in an analysis plan, to develop the categories 1 [Low], 2 [Moderate], and 3 [High] levels of activity.

IPAQ Research Committee
November 2005

APPENDIX 1

At A Glance
IPAQ Scoring Protocol (Short Forms)

Continuous Score

Expressed as MET-min per week: MET level x minutes of activity/day x days per week

Sample Calculation

MET levels	**MET-minutes/week for 30 min/day, 5 days**
Walking = 3.3 METs	3.3*30*5 = 495 MET-minutes/week
Moderate Intensity = 4.0 METs	4.0*30*5 = 600 MET-minutes/week
Vigorous Intensity = 8.0 METs	8.0*30*5 = 1,200 MET-minutes/week
	TOTAL = 2,295 MET-minutes/week

Total MET-minutes/week = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days)

Categorical Score- three levels of physical activity are proposed

1. **Low**

   - No activity is reported **OR**
   - Some activity is reported but not enough to meet Categories 2 or 3.

2. **Moderate**

   Either of the following 3 criteria
   - 3 or more days of vigorous activity of at least 20 minutes per day **OR**
   - 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day **OR**
   - 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes/week.

3. **High**

   Any one of the following 2 criteria
   - Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**
   - 7 or more days of any combination of walking, moderate- or vigorous-intensity activities accumulating at least 3000 MET-minutes/week

Please review the full document "Guidelines for the data processing and analysis of the International Physical Activity Questionnaire" for more detailed description of IPAQ analysis and recommendations for data cleaning and processing [www.ipaq.ki.se].

APPENDIX 2

At A Glance
IPAQ Scoring Protocol (Long Forms)

Continuous Score

Expressed as MET-minutes per week: MET level x minutes of activity/day x days per week

Sample Calculation

MET levels	**MET-minutes/week for 30 min/day, 5 days**
Walking at work= 3.3 METs	3.3*30*5 = 495 MET-minutes/week
Cycling for transportation= 6.0 METs	6.0*30*5 = 900 MET-minutes/week
Moderate yard work= 4.0 METs	4.0*30*5 = 600 MET-minutes/week
Vigorous intensity in leisure= 8.0 METs	8.0*30*5 = 1,200 MET-minutes/week
	TOTAL = 3,195 MET-minutes/week

Domain Sub Scores
Total MET-minutes/week at **work** = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days) at work

Total MET-minutes/week for **transportation** = Walk (METs*min*days) + Cycle (METs*min*days) for transportation

Total MET-minutes/week from **domestic and garden** = Vig (METs*min*days) yard work + Mod (METs*min*days) yard work + Mod (METs*min*days) inside chores

Total MET-minutes/week in **leisure-time** = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days) in leisure-time

Walking, Moderate-Intensity and Vigorous-Intensity Sub Scores

Total **Walking** MET-minutes/week = Walk MET-minutes/week (at Work + for Transport + in Leisure)

Total **Moderate** MET-minutes/week = Cycle MET-minutes/week for Transport + Mod MET-minutes/week (Work + Yard chores + Inside chores + Leisure) + Vigorous Yard chores MET-minutes

Note: The above is a total moderate activities only score. If you require a total of all moderate-intensity physical activities you would sum Total Walking and Total Moderate

Total **Vigorous** MET-minutes/week = Vig MET-minutes/week (at Work + in Leisure)

Total Physical Activity Score
Total Physical Activity MET-minutes/week = **Walking** MET-minutes/week + **Moderate** MET-minutes/week + Total **Vigorous** MET-minutes/week

Continued.....

Also

Total Physical Activity MET-minutes/week = Total MET-minutes/week (at Work + for Transport + in Chores + in Leisure)

Categorical Score- three levels of physical activity are proposed

1. **Low**

   No activity is reported **OR**
   a. Some activity is reported but not enough to meet Categories 2 or 3.

2. **Moderate**

   Either of the following 3 criteria
   a. 3 or more days of vigorous-intensity activity of at least 20 minutes per day **OR**
   b. 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day **OR**
   c. 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-min/week.

3. **High**

   Any one of the following 2 criteria
   - Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**
   - 7 or more days of any combination of walking, moderate- or vigorous- intensity activities accumulating at least 3000 MET-minutes/week

Please review the full document "Guidelines for the data processing and analysis of the International Physical Activity Questionnaire" for more detailed description of IPAQ analysis and recommendations for data cleaning and processing [www.ipaq.ki.se].

APPENDIX I

Study results: statistics

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SYM01FRE	24.9063	456.6893	.4996	.9545
SYM01SEV	24.9750	455.4711	.5219	.9544
SYM02FRE	24.9188	462.3141	.3600	.9552
SYM02SEV	24.9750	463.1063	.3323	.9554
SYM03FRE	24.8063	459.0880	.4231	.9549
SYM03SEV	24.9563	457.8660	.4815	.9546
SYM04FRE	25.2563	464.6949	.3732	.9550
SYM04SEV	25.2938	465.8817	.3365	.9551
SYM05FRE	24.9563	457.9037	.4519	.9548
SYM05SEV	25.1500	460.0403	.4871	.9545
SYM06FRE	24.8688	449.5990	.6682	.9535
SYM06SEV	25.0250	451.2698	.6727	.9535
SYM07FRE	24.7875	451.0489	.5936	.9540
SYM07SEV	24.9250	452.0069	.6127	.9538
SYM08FRE	25.1625	451.5709	.6334	.9537
SYM08SEV	25.1813	452.7028	.6302	.9538
SYM09FRE	25.2000	455.2050	.6131	.9539
SYM09SEV	25.2313	455.3739	.6167	.9539
SYM10FRE	25.0188	457.2135	.5257	.9543
SYM10SEV	25.0938	457.4566	.5709	.9541
SYM11FRE	25.0625	454.1470	.6356	.9538
SYM11SEV	25.0500	451.0038	.6483	.9536
SYM12FRE	25.1750	456.3465	.5595	.9541
SYM12SEV	25.2313	458.0531	.5595	.9542
SYM13FRE	24.8188	454.0235	.5020	.9546
SYM13SEV	24.9938	455.4151	.5816	.9540
SYM14FRE	25.3938	458.9949	.5233	.9543
SYM14SEV	25.4688	463.4456	.5541	.9544
SYM15FRE	24.7313	452.2984	.4812	.9549
SYM15SEV	24.8313	451.4619	.5232	.9545
SYM16FRE	25.3125	461.3860	.5943	.9542
SYM16SEV	25.2938	460.4603	.5545	.9542
SYM17FRE	25.0500	453.5572	.5892	.9540
SYM17SEV	25.1125	456.4778	.5507	.9542
SYM18FRE	25.1938	455.2641	.5802	.9540
SYM18SEV	25.1938	453.8805	.6087	.9539
SYM19FRE	25.3063	459.7861	.5642	.9542
SYM19SEV	25.3188	460.1808	.5893	.9541
SYM20FRE	25.2313	457.8141	.5969	.9540
SYM20SEV	25.2438	458.5503	.6158	.9540
SYM21FRE	24.9125	451.4137	.5798	.9541
SYM21SEV	24.9500	453.9220	.5530	.9542
SYM22FRE	25.2000	452.0855	.6605	.9536
SYM22SEV	25.2750	456.1629	.6416	.9538
SYM23FRE	25.2125	451.3131	.6967	.9534
SYM23SEV	25.2813	455.7254	.6748	.9537

Reliability Coefficients N of Cases = 160.0 N of Items = 46 Alpha = .9551

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SPAES01	33.9438	79.8018	-.0022	.7479
SPAES02	36.0813	66.7166	.5470	.6769
SPAES03	35.8438	66.3842	.5482	.6762
SPAES04	33.8250	80.1830	-.0205	.7513
SPAES05	36.0250	67.9868	.4950	.6843
SPAES06	35.5063	65.3207	.5799	.6710
SPAES07	33.8438	77.0761	.0980	.7361
SPAES08	36.1000	65.2226	.5624	.6727
SPAES09	35.5125	66.5030	.5527	.6760
SPAES10	34.3188	74.8852	.1417	.7344
SPAES11	36.4063	67.0226	.5349	.6787
SPAES12	35.2000	70.9031	.3588	.7023

Reliability Coefficients

N of Cases = 160.0 N of Items = 12

Alpha = .7209

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
FAM01	49.0625	291.8703	.6357	.9229
FAM02	49.2000	293.1044	.6216	.9232
FAM03	48.5000	300.1635	.4824	.9260
FAM04	48.1750	295.4535	.5947	.9237
FAM05	48.9313	287.1965	.7225	.9211
FAM06	48.3250	290.1201	.7194	.9212
FAM07	48.8750	288.2233	.7092	.9214
FAM08	48.8313	288.5185	.6950	.9217
FAM09	49.0250	287.4459	.6933	.9217
FAM10	48.8500	285.3987	.7671	.9201
FAM11	49.7500	305.3711	.3810	.9279
FAM12	48.9313	294.7688	.5650	.9244
FRI01	50.1063	310.9886	.4298	.9263
FRI02	50.0125	308.5785	.4560	.9260
FRI03	49.8438	304.2081	.5164	.9250
FRI04	49.6938	303.8490	.5000	.9253
FRI05	50.0250	306.6409	.5532	.9247
FRI06	49.7125	303.1244	.5351	.9247
FRI07	49.9375	305.7319	.5384	.9248
FRI08	49.9500	304.9157	.5747	.9243
FRI09	50.0000	307.7484	.5387	.9249
FRI10	49.8313	301.4116	.5907	.9239

Reliability Coefficients

N of Cases = 160.0 N of Items = 22

Alpha = .9271

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SEPA1	42.0313	435.6908	.8192	.9658
SEPA2	42.0125	434.1634	.8643	.9639
SEPA3	43.0375	442.3382	.7948	.9668
SEPA4	41.7563	431.9842	.8266	.9656
SEPA5	42.2375	431.2388	.8935	.9627
SEPA6	42.3875	421.6602	.9047	.9620
SEPA7	42.7250	428.2258	.8679	.9637
SEPA8	42.5313	418.6531	.9057	.9620
SEPA9	42.7313	423.4556	.8801	.9631

Reliability Coefficients

N of Cases = 160.0 N of Items = 9

Alpha = .9678

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
TI_OCVIG	1106.0625	1179799.1785	.1936	.6263
TI_OCMOD	1044.4063	1064958.2930	.3201	.6005
TI_OCWAL	1055.1250	1111506.2736	.3442	.5944
TI_TRBIK	1134.0625	1236786.5369	.2687	.6138
TI_TRWAL	965.2188	1160561.7443	.3162	.6018
TI_HOVIG	1125.8125	1209433.9269	.2779	.6104
TI_H_OUT	1073.6250	1141106.5881	.4052	.5877
TI_HO_IN	997.7188	960679.1971	.3312	.6078
TI_RECWA	984.1875	1043263.4866	.3086	.6057
TI_REVIG	1156.8750	1279237.6572	.3530	.6176
TI_REMOD	1140.0313	1241142.2946	.3904	.6073

Reliability Coefficients

N of Cases = 160.0 N of Items = 11

Alpha = .6295

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SYM01FRE	27.6333	456.5851	.4428	.9444
SYM01SEV	27.7667	453.4954	.5011	.9440
SYM02FRE	27.9000	469.1966	.1888	.9457
SYM02SEV	27.9000	468.7138	.1586	.9462
SYM03FRE	27.4667	469.2920	.1312	.9465
SYM03SEV	27.7333	468.2023	.1682	.9462
SYM04FRE	28.1000	468.6448	.1846	.9458
SYM04SEV	28.2667	470.9609	.1709	.9455
SYM05FRE	27.6333	459.4126	.3581	.9450
SYM05SEV	27.9000	463.6793	.3217	.9450
SYM06FRE	27.4333	446.3920	.7102	.9426
SYM06SEV	27.6667	451.1954	.6867	.9429
SYM07FRE	27.2667	446.8230	.7607	.9423
SYM07SEV	27.3333	447.1264	.6815	.9427
SYM08FRE	27.8333	459.3851	.4488	.9443
SYM08SEV	27.7000	454.1483	.4929	.9441
SYM09FRE	27.9333	464.0644	.3801	.9447
SYM09SEV	27.8667	462.4644	.3576	.9448
SYM10FRE	27.6333	453.4126	.5443	.9437
SYM10SEV	27.7333	455.4437	.5207	.9439
SYM11FRE	27.7000	452.3552	.5837	.9434
SYM11SEV	27.5333	446.6713	.5839	.9434
SYM12FRE	27.9333	447.3057	.6664	.9428
SYM12SEV	27.9667	446.9299	.6762	.9428
SYM13FRE	27.2333	451.8402	.4334	.9448
SYM13SEV	27.4667	450.8782	.5231	.9439
SYM14FRE	28.0667	451.5816	.5898	.9434
SYM14SEV	28.1333	460.8092	.5175	.9440
SYM15FRE	27.4000	443.4207	.6521	.9429
SYM15SEV	27.6333	453.6885	.5371	.9437
SYM16FRE	28.1333	460.4644	.6512	.9436
SYM16SEV	28.0000	454.0000	.6825	.9431
SYM17FRE	27.9333	455.0989	.5407	.9437
SYM17SEV	28.0333	463.7575	.3954	.9446
SYM18FRE	27.9667	448.9989	.6792	.9428
SYM18SEV	28.0000	451.1724	.6221	.9432
SYM19FRE	28.1333	456.1195	.6364	.9434
SYM19SEV	28.2000	462.7862	.5839	.9440
SYM20FRE	28.0000	461.3793	.4411	.9443
SYM20SEV	28.0333	465.2057	.3771	.9447
SYM21FRE	27.6000	445.1448	.6626	.9428
SYM21SEV	27.6333	449.1368	.5839	.9434
SYM22FRE	27.8667	443.7057	.6826	.9427
SYM22SEV	28.0333	449.9644	.6894	.9428
SYM23FRE	28.0333	450.1713	.6835	.9428
SYM23SEV	28.1333	455.5678	.6552	.9433

Reliability Coefficients N of Cases = 30.0 N of Items = 46 Alpha = .9451

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SPAES01	32.7000	72.9759	-.0327	.7264
SPAES02	34.8333	57.5920	.6153	.6389
SPAES03	34.6000	60.4552	.4662	.6622
SPAES04	32.6000	70.5931	.0472	.7218
SPAES05	34.8667	61.7057	.3858	.6745
SPAES06	34.5000	59.8448	.5369	.6528
SPAES07	32.7000	73.2517	-.0555	.7330
SPAES08	35.2667	57.8575	.6000	.6412
SPAES09	34.7667	59.2885	.5571	.6494
SPAES10	33.8000	60.7172	.3052	.6913
SPAES11	35.8000	63.2000	.5381	.6618
SPAES12	34.2333	67.7713	.1746	.7043

Reliability Coefficients

N of Cases = 30.0 N of Items = 12

Alpha = .7011

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
FAM01	50.7000	193.2517	.6041	.8823
FAM02	51.1000	196.7138	.5326	.8845
FAM03	50.4000	208.1793	.1910	.8955
FAM04	49.6000	202.4552	.4060	.8881
FAM05	50.9000	189.6793	.7406	.8783
FAM06	49.9667	190.8609	.7018	.8794
FAM07	50.7667	199.1506	.4574	.8868
FAM08	50.6333	202.8609	.3441	.8903
FAM09	50.8667	194.3954	.5677	.8835
FAM10	50.8000	191.8897	.7024	.8796
FAM11	52.3000	213.5276	.2170	.8912
FAM12	50.7333	203.3747	.3221	.8912
FRI01	51.7667	201.7713	.4797	.8861
FRI02	51.8000	203.6828	.4768	.8863
FRI03	51.4000	198.4552	.5033	.8854
FRI04	51.3333	201.4023	.4873	.8859
FRI05	51.8000	200.3034	.6235	.8832
FRI06	51.4000	203.1448	.4132	.8878
FRI07	51.6667	200.5057	.5059	.8854
FRI08	51.7000	203.3207	.4708	.8864
FRI09	51.7667	203.9782	.5133	.8857
FRI10	51.5000	197.7069	.6219	.8825

Reliability Coefficients

N of Cases = 30.0 N of Items = 22

Alpha = .8904

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
SEPA1	41.7333	308.6161	.6450	.9410
SEPA2	41.7667	305.1506	.7339	.9361
SEPA3	43.1333	301.4989	.7595	.9347
SEPA4	40.9000	301.3345	.6937	.9386
SEPA5	41.5000	310.7414	.7213	.9369
SEPA6	42.1000	280.8517	.8640	.9285
SEPA7	42.2000	292.0966	.8645	.9288
SEPA8	41.9000	289.9552	.8450	.9297
SEPA9	42.3667	287.6885	.8358	.9302

Reliability Coefficients

N of Cases = 30.0 N of Items = 9

Alpha = .9409

****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
TI_OCVIG	931.3333	700118.8506	.5296	.6631
TI_OCMOD	845.8333	534455.3161	.6078	.6453
TI_OCWAL	838.5000	656589.9138	.5049	.6649
TI_TRBIK	955.6667	832777.1264	.3590	.6997
TI_TRWAL	787.5000	685728.8793	.5054	.6656
TI_HOVIG	917.3333	808713.3333	.3351	.6972
TI_H_OUT	927.8333	862401.1782	.2045	.7113
TI_HO_IN	887.6667	841344.3678	.0640	.7366
TI_RECWA	868.5000	814486.4655	.1630	.7209
TI_REVIG	961.0000	832216.2069	.4039	.6980
TI_REMOD	955.5000	791162.6724	.6364	.6785

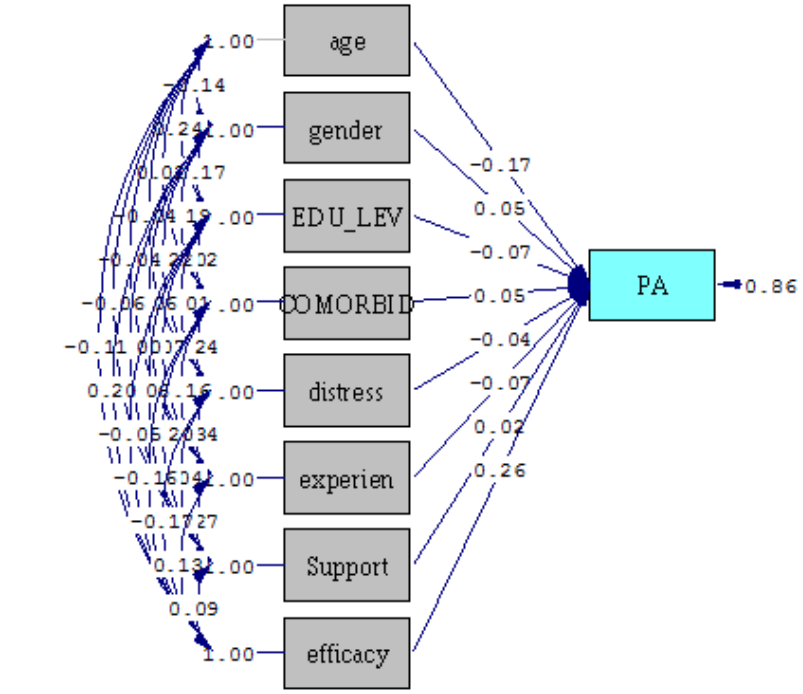
Reliability Coefficients

N of Cases = 30.0 N of Items = 11

Alpha = .7121

Table 26: Multicollinearity test among independent variables

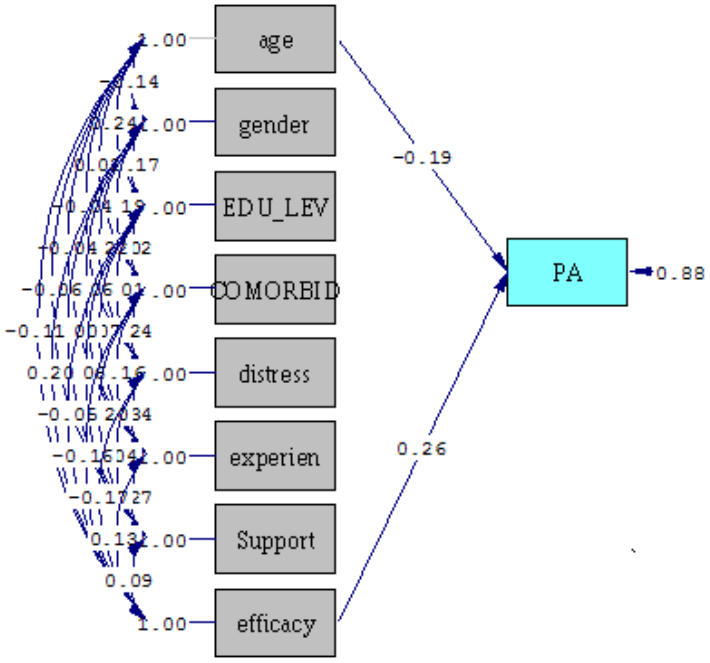
Independent variable	R^2	Tolerance ($1-R^2$)	VIF
Age	.083	.917	1.090
Gender	.123	.877	1.140
Education	.089	.911	1.097
Comorbidity	.169	.831	1.203
Symptom distress	.257	.743	1.345
Subjective experiences	.250	.750	1.333
Family and friend support	.102	.898	1.113
Self-efficacy	.107	.893	1.119



Physical Activity' = -.079age* + 0.556gender - 0.932education + 0.218comorbidity -0.008symptom distress -0.037subjective PA experiences + 0.006family and friend support + 0.055self-efficacy**

$Z'_{\text{physical activity}} = -0.173Z^{*}_{\text{age}} + 0.054_{\text{gender}} - 0.070Z_{\text{education}} + 0.048Z_{\text{comorbidity}} -0.042Z_{\text{symptom distress}} - 0.068_{\text{subjective PA experiences}} + 0.021Z_{\text{family and friend support}} + 0.256Z^{**}_{\text{self-efficacy}}$

Figure 5: Regression analysis of Physical Activity (1,000 Met) among new coronary artery disease (CAD) patients after hospitalization with Robust Maximum likelihood estimation (Table 24)



Physical Activity' = -.087age** + 0.056self-efficacy**

$Z'_{\text{physical activity}} = -0.056Z^{*}_{\text{age}} + 0.261Z^{**}_{\text{self-efficacy}}$

Figure 6 Parsimonious regression model of Physical Activity (1,000 Met) among new coronary artery disease (CAD) patients after hospitalization with Robust Maximum likelihood estimation (Table 25)

VITA

Mrs. Suchada Raungratanaamporn was born on October 6th, 1956 in Pathum Thani. She finished her Diploma in Nursing and Health, and in Midwifery Program, Faculty of Nursing, Mahidol University (1977) and Bachelor's degree of Education in Nursing Education, Faculty of Education, Chulalongkorn University (1983), and Bachelor's degree of Education in Early Childhood Education, Sukhothai Thammathirat Open University (1990). She got a Master degree of Nursing Science Programme in Adult Nursing, Faculty of Nursing, Mahidol University (1999).

She had 25 years clinical experiences as a professional nurse at Siriraj Hospital, Faculty of Medicine, Mahidol University as fellows, a registered nurse in medical ward (1977 – 1981), in Cardiac Care Unit (1981 - 1988), and a cardiac sonographer in Division of Cardiology, Department of Medicine, (1988 - 2000). In addition, she had got the Clinical Nurse Specialist (CNS) of cardiac nursing (1995), and was promoted to be a Head Nurse of Cardiac Catheterization Laboratory, Her Majestic Cardiac Center, Siriraj Hospital (2000 - 2002). Then, she spent 9 years of working as an instructor at Graduate School, Christian University of Thailand between 2002 and 2011, and changed to work as a freelance instructor till present. Suchada Raungratanaamporn attends study Philosophy Program in Nursing Science, Faculty of Nursing, Chulalongkorn University, since 2008 to 2013.