

**A Feasibility Study Using Motivational Interviewing
for Promoting Physical Activity among Middle-Aged Thai Working Women**

By

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ABSTRACT

Background: Cardiovascular disease (CVD) has become the leading cause of mortality and morbidity among middle-aged women in Thailand. A preponderance of evidence supports the conclusion that physical inactivity is a major risk factor for CVD. Despite increasing support for the benefits of physical activity (PA), some middle-aged women in urban areas still report a low frequency of participation in regular exercise or moderate PA. Pender's health promotion model (1996) offers a guide for exploring the complex bio-psycho-social processes that motivate an individual to engage in behaviors directed towards the enhancement of his or her health. Among Thai women, exercise participation was found to be significantly associated with the perception of benefits from PA, barriers to PA, self-efficacy, and social support for exercise. The principle of motivational interviewing (MI) as a proven method to increase positive health behaviors was used to understand and increase women's physical activity.

Purposes: The purpose of this study was to test whether a motivational interviewing-based health coaching program (MI-BHCP) would be feasible, practical, and effective in a program for promoting physical activity among Thai working women as opposed to an education-only approach using a health education program (HEP) in their workplace.

Methods: Fifty-one working women at a large workplace in Bangkok, Thailand were randomly assigned to either 10 weeks of MI-BHCP or HEP. A mixed-methods ANOVA was used to test if women in the MI-BHCP would have a greater change in their PA. The changes in their psycho-social factors including perceived benefits and barriers to be physically active, perceived social support, and perceived self-efficacy to overcome barriers over four time measures (baseline, week 8, week 13, and week

36) were also evaluated. Thematic analysis was used on the qualitative data collected at week 13, which related to their experience gained while participating in MI-BHCP.

Results: At baseline, 61% of the participants from both groups reported low PA.

Their total minutes for PA and their perceived benefits positively associated with their perceived social support ($r = .29, p < .05$; $r = .38, p < .01$). Their perceived self-

efficacy also positively associated with their perceived benefits ($r = .46, p < .01$) and

perceived social support from friends and family ($r = .37, p < .01$; $r = .35, p < .05$).

Their perceived barriers were negatively associated with their total minutes for PA ($r = -.31, p < .05$) and their perceived benefits ($r = -.32, p < .05$). Analysis of the primary

outcome revealed no statistical changes in the total minutes for PA across four time points related to the two different coaching styles. The interaction of coaching style

and the use of the pedometer had a small effect on the total minutes for PA across

three time points ($F(1, 24) = 1.64, p = .21, \omega^2 = .01$). Participants in MI-BHCP who

used the pedometer reported higher total minutes for PA at the endpoint than did the

participants who used the pedometer in the HCP. The coaching styles only moderately

affected the number of walking steps over time, $F(2, 26) = .76, p = .05, \omega^2 = .10$, with

the number of steps of participants in MI-BHCP being higher than the number of the

HEP participants at the endpoint. Only the increase of walking steps over times of

participants in both groups was statistically significant, $F(2, 26) = 4.85, p = .02,$

$\omega^2 = .07$. The findings also showed some small effect of MI-BHCP on the increase of

perceived benefit ($F(2, 80) = 1.44, p = .24, \omega^2 = .01$) and the decrease of perceived

barriers ($F(1.8, 71.85) = 1.90, p = .24, \omega^2 = .05$). The results of the participants in MI-

BHCP group were higher than those of the participants in HEP over time even though

these effects were not statistically significant. The perceived social support of

participants in both groups was statistically increased over time ($F(2, 80) = 3.40,$

$p = .04$, $\omega^2 = .05$) with their perception of social support at the endpoint being higher than at baseline. The qualitative data also showed that participants in MI-BHCP clearly perceived the benefits accrued from participating in MI, and as a result of these perceived benefits, their motivation to be physically active increased. The results affirmed that MI is an appropriate coaching style for use in promoting healthy behaviors at the workplace in Thailand.

Implication: The data clearly revealed the need to promote physical activity among middle-age Thai working women. The findings support the conclusion that MI can be appropriately used to increase self-efficacy, perceived benefits, and social support as well as to decrease perceived barriers to activity in working women.

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CHAPTER 1

Introduction

Worldwide, cardiovascular disease (CVD) is the major cause of death in women. The burden of CVD among women is increasing as life expectancy continues to increase and economies become more industrialized in both developed and developing countries. Cardiovascular disease is also the major cause of death in Thai women. Death certificate data from the Thailand Health Profile 2005-2007 (Wibulpolprasert, Sirilak, Ekachampaka, Wattanamano, & Taverat, 2007) revealed that chronic illnesses, including cardiovascular disease, have recently surpassed communicable diseases as the leading cause of mortality in Thailand. Specifically, in midlife Thai women, coronary heart disease is reported as the major cause of death. The transformation from an agriculture society to an industrial society is an important factor that has an effect on physical activity in Thai women. As reported by the Thailand National Survey of Health Status (Wibulpolprasert, Siasiriwattana, Ekachampaka, Wattanamano, & Taverat, 2005), 32% of the women living in the central part of the country reported physical inactivity and almost 20% of those women aged 45 to 59 years reported physical inactivity. Furthermore, women in urban settings reported physical inactivity more frequently than women in rural setting. Women tended to report higher physical inactivity as they become older.

Impact of Physical Activity on Cardiovascular Disease Prevention

In Western countries, where heart disease has been studied extensively, a preponderance of evidence supports the fact that physical inactivity is one of the risk factors for cardiovascular heart disease, specifically for coronary heart disease (Conroy, Cook, Manson, Buring, & Lee, 2005; Lee, Sesso, Oguma, & Paffenbarger, 2003; Li et al., 2006; Mosca et al., 2007) For example, in one population-based cohort

study of 88,393 women aged 34 to 59 years, 32% of CHD risk in women was explained by physical inactivity and obesity (Li et al., 2006). Study findings also strongly support that physical activity can reduce the risks of cardiovascular disease. Individuals who reported vigorous, heavy exercise had lower cardiovascular risks than individuals who reported moderate or insufficient activity (Lee et al., 2003; Sundquist, Qvist, Joansson, & Sundquist, 2005). Regular physical activity improves not only physical health but psychological health as well (Sullum, Clark, & King, 2000). Regular physical activity can enhance a sense of well-being, reduce the risk of depression and anxiety, and improve mood (US Department of Health and Human Services, 2008). Additionally, regular exercise can reduce work-related injury and enhance work performance in employees.

Physical activity has been included in the guideline for prevention of CVD, which recommends that women accumulate a minimum of 30 minutes of moderate-intensity physical activity on most days of the week (Conroy et al., 2005; Mosca et al., 2006). Even though support for the potential benefits of physical activity in prevention of CVD is increasingly clear, some midlife women still report low participation in regular exercise and moderate physical activity. The American Heart Association (AHA) has documented that unclear explanations about how to change their risk status for CVD is a major barrier to achieving heart health in women (Mosca, Carole, & Benjamin, 2007).

Physical Inactivity among Middle-Aged Thai Women in Urban Settings

During a woman's midlife years, many physiological changes occur, some of which are modifiable. In midlife women, the prevalence of CHD risks such as obesity, physical inactivity, and diabetes mellitus has been increasing over the last decade (Thailand Health Profile, 2008). Physical activity is an important health behavior that

may change across the life course. Working midlife women face the shifting roles of women as well as bio-psycho-socio-cultural changes, including menopause transition. Developing new health behaviors may not be their priority, thereby making it difficult for them to change their health behaviors. Although some women may know that cardiovascular disease can be both prevented and reduced by healthy diet and exercise, they do not change their behavior. And, although women have knowledge about health promotion, they may not be motivated to change their behavior at this time.

Thai women grow up with Buddhism as their central cultural belief. As a Buddhist, they believe that life is impermanent. This belief may lead women to accept the decline of bodily functions that come with age. Moreover, women in menopause perceive their menopause period as a sign of becoming old. A number of women consider themselves “old” and accept becoming unhealthy (Chirawatkul, Patanasri, & Koochaiyasit, 2002). They also believe that changes in their health status affect their economic capability because of difficulties in performing hard work. Consequently, some women do not value changing health behaviors to obtain a healthier life. These beliefs and perceptions likely affect their physical activity in daily life. In addition, in Thai society, seniority is valued as a social status and norm. It is believed that young people should take care of their parents or older persons. This belief may diminish the activity level of midlife Thai women as they allow others to perform the physical tasks of daily living for them. These conflicting perceptions between their beliefs and how they would want their health to be may add to the discrepancy between their present status and a desired goal. No discrepancy might lead to no motivation for change in their behavior because the discrepancy refers to how they perceive the

importance of change. Consequently, no motivation for change can inhibit them from doing what is necessary for their optimal health.

Gap in Knowledge

The traditional health education programs in Thailand, which emphasized the information model and was not client-centered, could not facilitate health behavior change effectively. Individuals get stuck on their change process and get off track because changing was from the extrinsic rather than their intrinsic factors. “Motivational Interviewing (MI) is a client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence (Miller & Rollnick, 2002, p. 25).” MI is used in health coaching to understand what triggers change in each individual. In addition, MI has been found to be a successful technique for promoting physical activity (Butterworth, Linden, McClary, & Leo, 2006; Perry, Rosenfeld, Bennett, & Potempa, 2007; Scales, Miller, Scales, & Miller, 2003). Thus, motivational interviewing-based health coaching developed for Thai women may serve as an effective intervention for midlife working women in Thailand to change their health behavior through enhancing the perceived benefits, self-efficacy, and interpersonal influences and decreasing their perceived barriers to change on physical activity. In Thailand, MI has been applied in preventive behavior and smoking cessation in unpublished studies ((Jaruchovarit, 1995; Narkarat, 1997). There is no evidence of process evaluation of MI in Thailand. Since MI originated in Western culture, the feasibility testing of MI and the pilot study in Thai culture will be useful for increasing the effectiveness of the health promotion program.

Significance for Health Promotion

Currently, Thai people are encouraged by the Ministry of Public Health to be physically active to prevent chronic diseases. The health promotion programs have

been developed to encourage people to exercise. However, most research studies have focused only on promoting formal exercise rather than physical activity in daily life. These health education programs may be effective for promote physical activity among people who are ready to increase their exercise, but they may be not effective to motivate working women whose exercise or being physically active is not their priority, especially among middle-aged women. In addition, the effectiveness of health promotion programs has rarely been studied using a parallel group randomized controlled clinical trial over time to study the long-term effect of the intervention.

This feasibility study serves as a concrete resource for improving health coaching programs to promote physical activity, especially with working women in the workplace. The findings from this study can also be used to apply motivational interviewing coaching style to the existing program for promoting health. In addition, working women who participated in this program improved their leisure exercise and daily physical activity. The company participating in this program will also benefit from healthy workers and can reduce the number of unhealthy workers in the workplace. In the future, healthcare providers, especially occupational nurses and nurse practitioners, can use motivational interviewing-based health coaching programs to enhance physical activity and other health promotion behaviors in women.

Purpose of the Study

This feasibility study applied a Westernized coaching style in the Thai culture, providing tailored health coaching in a Thai workplace to promote physical activity of employees. This may serve as an innovation in occupational health nursing in Thailand. Motivational interviewing has been used in two published studies to evaluate the effectiveness of adherence therapy in a brief intervention based on

compliance therapy and motivational interviewing techniques among people with schizophrenia in Thailand (Maneesakorn, Robson, Gournay, & Gray, 2007) and to determine the effectiveness of Motivational Enhancement Therapy (MET) on hazardous drinkers (Noknoy, Rangsin, Saengcharnchai, Tantibhaedhyangkul, & McChambridge, 2010), but there was no evidence of using motivational interviewing to promote physical activity in the workplace. This study also evaluated the effectiveness of motivational interviewing compared to traditional health education in persons over time to avoid errors from experimental effects. A parallel group design allowed us to see if the motivational interviewing had higher effectiveness in promoting physical activity among middle-aged working women than health education. An objective step-monitor, the pedometer, was also used to measure physical activity outcomes in both groups. Using the pedometer, a non-invasive measure, allowed the researcher to measure more accurate physical activity data in the intervention study.

Specific Aims

The specific aims of this study are to:

1. To describe the physical activity, perceived benefits and barriers, self-efficacy, and social support for exercise in middle-aged Thai working women
2. To test the efficacy of a motivational interviewing-based health coaching program compared to a standard education program among this group
3. To describe the feasibility of a motivational interviewing-base health coaching program in this group

CHAPTER 2

Review of the Literature

This section reviews studies most closely related to the aims regarding Thai culture, heart disease, physical activity, the determinants of physical activity, and motivational interviewing as well as the conceptual framework of using motivational interviewing for promoting physical activity:

Middle-Aged Women's Situations and Elderly Trends in Thailand

The Thai economy has, in general, shown positive growth over the last three decades. Even though this positive growth has decreased since the economic crisis in 1997, the Thai economy still shows positive growth (Wibulpolprasert et al., 2007). During these decades, the Thai economic structure has been transformed from an agricultural society to an industrial and service society. The majority of the gross domestic product (GDP) during the period 1982-2006 resulted from the service, industrial, and agriculture sectors. For instance, in 2006, 54.3% of the GDP was from the service sector, and 35.0% and 10.7% were from industrial and agriculture sectors, respectively. In 2006, 55.6% of the nation's population (36.2 million) were in the workforce: 37.8% of the population (13.7 million) were workers in business or industrial workplaces, whereas 61.2% (22.5 million) of the population were workers in the agriculture sector, self-employed, or home-based workers (Wibulpolprasert et al., 2007).

Since Thailand is considered a developing country, the change from an agriculture to an industrial society has been pronounced. Lifestyles have also changed dramatically. People are more likely to work outside the house. Especially in urban settings, people spend almost 80% of their time in their workplace and commuting. Automobiles have become the main mode of transportation. Most people cannot

afford to pay for lodging near their workplace, and due to the distances that must be traveled, it is no longer possible for them to walk or cycle to their workplace. In addition, walking or cycling is no longer safe in some areas of the urban setting. Telecommunications have also rapidly expanded. The home phone, cell phone, television, radio, and the Internet have become a necessary facility in every household and with every individual.

The Thai family social structure has also gradually changed. Even though the family structure of the Thai people has remained intact over centuries, the family roles have rapidly adapted to fit the transformed economic structure. Consequently, women's roles in both the family and the society at large are changing. It's noticeable that Thai women can now earn more money than at any time in the past, and some of them have taken the major responsibility for the family's finances. In many families, women are now considered as an agent of change because they are primarily responsible for the important role of taking care of their children, their husbands, and their older parents as well as providing the family's living expenses. These new women's roles outside the home are increasingly more acceptable in Thailand. However, the idea that taking care of husbands and housework as a major role of women is strongly embedded in the Thai culture. Hence, midlife Thai women are coping with both the shifting roles of women in general in Thai society and the changing of their bio-psycho-socio-cultural traditions. A number of midlife women have now reached a crisis stage—a time when old values and goals no longer make sense to them, which creates a more or less permanent state of frustration. Stressful and/or turbulent psychological transitions, often known as *midlife crisis*, usually occur in women in their late 40s. A qualitative study of 32 Thai women age 45 to 55 in Bangkok revealed that Thai women perceived their midlife years as transforming

periods (Arpanantikul, 2004). These women experienced a gradual decline in biological functioning such as decline in muscle strength, eyesight, lung capacities, and other physical capacity. Most of them perceived themselves as being vulnerable to poor health at this age. A number of Thai women considered themselves “old” and unhealthy at menopause (Arpanantikul, 2004; Chirawatkul, Patanasri, & Koochaiyasit, 2002). In addition, women experienced a change in their relationships, roles, and life patterns. Some women had a more comfortable relationship with their husband, whereas some women had to suffer with an unfaithful husband. Most women spent their time parenting young children and working outside. Some women took on the new roles of mother-in-law and grandmother. In addition, Thai women grow up with Buddhism as their central cultural belief. As Buddhists, they believe that life is impermanent. This belief may lead women to accept the decline of bodily functions that come with age. They also believe that changes in their health status negatively affect their economic capability because of the difficulties in performing hard work at their age (Arpanantikul, 2004). These perceptions of being old and vulnerable to poor health as a normal process of aging and social expectation are challenging to these women’s health practice.

Not only the economic structure, physical environment, and social structure have changed over the past three decades, but population proportions have also dramatically changed. In 2005, the majority of the Thai population was aged 15-59 years, whereas the elderly population 60 and older was the smallest portion (Wibulpolprasert et al., 2007). However, it appears that these proportional trends will have totally changed by 2025. The decrease in the population growth rate has also affected the number and age structure of the Thai population. In 2010, the largest population in Thailand will be adults aged 35-49 years. The proportion of children

aged 0-14 is dropping whereas the working-age and elderly proportions are likely to go up. Thus, Thailand will become an elderly society in the period 2010 to 2030 because of increasing life expectancy.

During the period 1964-2006, the life expectancy at birth of Thai people increased from 55.9 to 69.9 years for men and 62.0 year to 77.6 years for women. It is expected that the life expectancy of Thai citizens will reach 74.8 years for men and 80.3 years for women in 2025, (Ekachanpaka & Wattanamano, 2008). However, Thai elders still report chronic diseases that tend to decrease their quality of life. The World Health Report 2003 also revealed that, in 2002, Thailand's health life expectancy was only 60.1 years (57.7 for men and 62.4 for women). Moreover, in the last decade, cancer and heart disease have emerged as the first and second major causes of death among the elderly. The Bureau of Policy and Strategy of the Ministry of Public Health (Wibulpolprasert et al., 2007) also revealed that 175.3 of 100,000 older adults died from heart disease in 2006.

An anticipated rapid increase in the population of older adults in Thai society has led to increasing concern about the health and healthcare system in Thailand. Zimmer and Amornsirisomboon (2001) studied the socioeconomic status and health among 14,000 adults aged 50 and older during 1994 in Thailand. They found that 1) older individuals reported poorer health often than younger individuals; 2) women were more likely to report functional problems, poor self-assessed health, and chronic conditions than men in all age groups of 50 to 59, 60 to 69, and 70 and over. Thus, coping with chronic diseases and illnesses of the elderly will be a major problem for the future healthcare system in Thailand. Strategies for healthy aging and the prevention of chronic diseases are very important for solving these issues. We must prepare young people and adults to become active aging people.

Heart Disease in Middle-Aged Thai Women

Worldwide, cardiovascular disease is the major cause of death in women, accounting for one-third of all deaths (Mosca et al. 2007). The burden of CVD among women is increasing as life expectancy continues to increase and economies become more industrialized in both developed and developing countries. Thailand is no exception to this trend.

In Thailand, vascular disease has become the leading cause of mortality and morbidity among Thai people age 45 and older (Wibulpolprasert et al., 2007). A study on the causes of death among Thai people during a one-year period between 1997 and 1999 in 16 provinces using the verbal autopsy method, conducted by the Ministry of Public Health's Bureau of Policy and Strategy, revealed that the number-one cause of death was diseases of the circulatory system (18.6% of all causes) for all age groups. Even though, in 2006, the Ministry of Public Health reported that the major cause of mortality in Thailand was cancer, AIDS, and heart disease, respectively, the mortality rate of 28.4 per 100,000 populations from heart disease still indicated that this disease is one of the major health problems of Thailand.

Surveys on specific illnesses conducted by the National Statistical Office during 1991-2006 found that the most prevalent illnesses were diseases of the respiratory tract, followed by musculoskeletal diseases and gastrointestinal diseases. However, the percentage of people with cardiovascular disease in 2008 was three times greater than the percentage of people with this disease in 1999 (National Statistical Office of Thailand, 2009). The admission rate per 100,000 populations of cardiovascular diseases in Thailand has also risen from 56.5 in 1985, to 109.4 in 1994, to 397.0 in 2003, and to 618.5 in 2006 (Wibulpolprasert et al., 2007; Wibulpolprasert et al., 2005). Furthermore, the majority of disabled women (18.3%) reported the

diagnosis of cardiovascular disease (Wibulpolprasert et al., 2007). The 2003-2004 health examination survey on Thai people also revealed that the prevalence of hypertension, which is one of the cardiovascular diseases, increased from 5.4% in 1991 to 11.0% in 1996 and to 22% (10.1 million individuals) in 2004. The number of patients with coronary atherosclerosis has also trended upwards. The number of patients with this disease treated at the Cardiology Institute of Thailand, a central cardiology center in Thailand, rose from 616 in 1995 to 2064 in 2006. Specifically, the percent of women with coronary atherosclerosis has shown a rising trend since 1995.

Regarding gender, an analysis of the differences in the causes of death in males and females revealed that women had a higher proportion of diseases of the circulatory system when compared with males. In measuring the health status of Thai people using the disability-adjusted life year (DALY) as the indicator, it was found that the number-one cause of DALY for women is cerebrovascular disease. Cerebrovascular disease is also considered one of the major health problems for those aged 60 years and older (Ekachanpaka & Wattanamano, 2008).

The 2006 survey on the health risks of Thai elders, conducted by the Ministry of Social Development and Human Security, revealed that three-fourths of all elders had commonly found illnesses, i.e., hypertension, bone/joint diseases, diabetes, eye disease, and cardiovascular disease. Interestingly, elderly women tended to have a higher prevalence of hypertension than elderly men. In addition, elders in urban areas tended to have a higher prevalence of hypertension than those in rural areas.

The American Heart Association (AHA) has documented that there is little agreement about how to change the risk status for heart disease in women (Mosca et al., 2007). Thus, this non-clarity in explaining heart disease presents a major barrier in

finding solutions. Cardiovascular risks in the literature mostly involve diagnoses of CVD, CHD, IHD, AMI, or deaths from CVD. However, the AHA has established a list of guidelines for the primary prevention of CVD. This list includes eliminating smoking, blood lipid management, physical activity, weight management, diabetes management, and the treatment of chronic atrial fibrillation in adults without coronary or other atherosclerotic vascular diseases.

Physical Activity and Cardiovascular Disease

Cardiovascular diseases include coronary heart disease, stroke, hypertension, rheumatic fever, congestive heart defects, congestive heart failure, and peripheral vascular disease. Coronary heart disease, stroke, hypertension, and peripheral vascular disease are known to be increased by lack of physical activity or low cardiorespiratory fitness. Physical activity (both leisure-time and occupational) and cardiorespiratory fitness play an important role in reducing the risks of coronary heart disease.

Physically inactive persons have a 45% higher risk of developing coronary heart disease when compared to physically active persons (Kohl, 2001). The benefits of physical activity and cardiorespiratory fitness include reducing risk factors for mortality in individuals with cardiovascular disease. Moreover, the difference in population characteristics such as culture and gender might also affect the relationship between leisure-time physical activity and the development of cardiovascular disease (Pereira, Folsom, McGovern, Carpenter, Arnett, et al., 1999). For example, culture may affect how persons choose their leisure physical activity. Moreover, recreation in each culture results in different levels of physical activity.

Research supports the conclusion that physical inactivity is one of the risk factors for cardiovascular heart disease (Conroy et al., 2005; Knoop et al., 2004; Lee et al., 2003; Li et al., 2006; Sjol, Thomsen, Schroll, & Andersen, 2003;

Sundguist et al., 2005). The studies also strongly support the idea that physical activity can reduce the risks of cardiovascular disease. Individuals who reported vigorous or heavy exercise had lower cardiovascular risk than individuals who reported moderate or very little physical insufficient activity (Lee et al., 2003; Noda et al., 2005; Sundguist et al., 2005).

Physical activity is defined as any bodily movement produced by the contraction of skeletal muscles that substantially increases energy expenditures (US Department of Health & Human Services, 1996). Physical activity associated with health outcomes usually refers to the movements of large muscles, such as arms and legs (Sallis & Owen, 1999). Physical activity differs from exercise in that exercise is a subset of physical activity. Physical exercise is usually defined as “planned, structured, and repetitive bodily movement performed to improve or maintain one or more components of physical fitness” (Sallis & Owen, 1999, p. 10). Physical exercise is a specific form of physical activity dedicated to improving physical fitness. Physical fitness training is another term used as a synonym for exercise. Thus, exercise is leisure-time physical activity undertaken during discretionary time whose intent is to improve physical fitness, physical performance, or health (Corbin, Pangrazi, & Franks, 2004; Tipton & Franklin, 2006). In sum, physical activity is one of several important ingredients to healthy lifestyles in addition to nutrition and stress management.

Effects of Physical Activity on Preventing Cardiovascular Disease

When the effects of cardiorespiratory fitness were compared with physical activity Lakka et al. (1994) found that cardiorespiratory fitness as a risk factor for cardiovascular disease has a greater effect than physical activity. However, cardiovascular fitness and physical activity are so closely related that an individual's

fitness level is in large measure determined by his or her physical activity over the most recent weeks or months. Many studies have shown that aerobic-based physical activity clearly prevents cardiovascular disease. The study results show that individuals who participate in at least 30 minutes of resistance activity per week along with aerobic-based physical activity can reduce the risk of coronary heart disease by 23% (Lakka et al., 1994).

Even though the specific mechanism of cardiovascular prevention by exercise still needs additional support evidence, it is clear that regular exercise can reduce risk factors associated with cardiovascular disease. Hypertension, diabetes mellitus, obesity, blood lipids, risk of thrombosis, and endothelial dysfunction have been considered as cardiovascular risk factors. Regular exercise has been reported as an important factor for reducing those risk factors. Regular exercise can reduce the risk of developing high blood pressure by altering the central command of global blood flow. One study supported the hypothesis that baroreceptor sensitivity was reduced during acute exercise. According to the reduction in baroreceptor sensitivity, the blood pressure at rest is decreased. In addition, alterations in vascular endothelial tissue can reduce the risk of hypertension (Powers, Lennon, Quindry, & Mehta, 2002). After adopting a program of regular physical activity, the total peripheral resistance of blood vessels is reduced. The reduction results from the reduction of resting blood pressure. Changes in total peripheral resistance are also primarily mediated by changes in the blood vessel diameters. These changes include less sympathetic neural influence on the peripheral blood vessels and local vasodilator influences on the blood vessels from molecules such as nitric oxide. Nitric oxide is one of the paracrine substances. Nitric oxide helps maintain the health of the vascular wall and regulate vasomotor function (Green, Maiorana, O'Driscoll, & Taylor, 2004).

These neural and local changes lead to the reduction of the vasoconstrictive state of the peripheral vasculature and decrease total peripheral resistance and thus lower blood pressure. Nitric acid is also directly involved in inhibiting platelet adhesion to collagen fibers and an endothelial cell matrix. Thus, the risk of coronary thrombosis is also decreased by regular exercise, which further reduces the risk of an adverse cardiac and/or cerebrovascular event (Powers et al., 2002). The studies also found that glucose transportation across muscle cell membranes was improved by an upregulation of glucose transportations after obtaining regular exercise. In addition, the release of glucose from the liver during regular exercise was also decreased (Shephard & Balady, 1999). In addition to reducing blood pressure, regular physical activity also improves the blood lipid profile by decreasing triglyceride and increasing high-density lipoproteins. The meta-analysis of exercise effects on serum lipids and lipoprotein levels reveal that regular exercise contributed to a 6.3% decrease in total cholesterol, 10.1% reduction in low-density lipoprotein cholesterol, and 5% increase in high-density lipoprotein cholesterol in men and women (Tran & Weltman, 1985).

There are also benefits from decreased levels of C-reactive protein. This reduced C-reactive protein level decreases blood vessel damage as well as atherosclerosis of the cardiac, cerebral, and peripheral blood vessels. Recently, studies have shown that free-radical production, calcium overload, protease activation, altered membrane lipids, and leukocyte activation lead to myocardial ischemia-reperfusion injury (I-R injury) (Powers et al., 2002). There are two important factors that may contribute to I-R-induced myocardial injury: 1) radical-mediated processes and 2) oxidative injury. Superoxide is one of the best-known oxygen-derived radicals and it is produced from the univalent reduction of molecular oxygen. Superoxide production can lead to the formation of many other reactive oxygen species (ROS), which can

promote several types of cell damage. Two important types of oxidative injury are lipid peroxidation and protein oxidation. Lipid damage in cells can occur by radical species reacting with polyunsaturated fatty acids in membranes, while cellular protein can be damaged by radical-mediated protein oxidation of amino acids. On the other hand, a disturbance in cellular calcium homeostasis such as calcium overload in the heart can impair cardiac contractile function. Although the mechanisms of how exercise can guard against I-R injury to protect the myocardium is not clear, in addition to changes in the coronary arteries, the induction of myocardial heat shock proteins and the improving of myocardial antioxidant capacity can be used to explain the mechanisms of exercise on cardioprotection. Heat shock proteins are synthesized to combat the disturbance of cellular homeostasis from protein damage of impaired protein synthesis in cell. Prolonged exercise can produce heat shock proteins; those cells that include this protein are more resistant to protein-damaging stresses such as I-R injury. Thus, regular exercise can protect against cardiovascular disease by improving vascular endothelial function and protecting myocardial cells from ischemia-reperfusion injury as well as reducing risk factors associated with cardiovascular disease. Moreover, regular exercise can increase cardiorespiratory function. For example, endurance exercise can improve cardiac output by increasing left ventricular size (Powers & Howley, 2007).

The dose-response of physical activity. Fortunately, most CVD in women is preventable. Studies have reported the effects of physical activity on the risks of CHD in midlife women (Conroy et al., 2005; Li et al., 2006). These studies showed that increasing levels of physical activity were associated with a graded reduction in coronary heart disease risk. In addition, being overweight or obese were significantly associated with increased risk of coronary heart disease. Relative risks of coronary

heart disease in obese and sedentary women were 1.4 times greater than the risk for obese women who were active⁵. In women, physical activity in young adulthood did not predict lower risk of CVD at middle age and older (Conroy et al., 2005). In addition, the studies showed that women who were more active in their early lives tended to be more likely to meet physical activity recommendations during middle age.

There are many publications available that contain specific information informing the public and health professionals about cardiovascular prevention guidelines. These publications are made available by the American Heart Association, Office of the Surgeon General, U.S. Department of Health and Human Services, Center for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, and President's Council on Physical Fitness and Sports.

In the U.S., physical activity is recommended by many private groups and government agencies such as the Office of the Surgeon General (OSG), the Center for Disease Control and Prevention (CDC), and the President's Council on Physical Fitness and Sports (PCPFS), American College of Sports Medicine (ACSM), the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD), the National Association for Sport and Physical Education (NASPE), American Heart Association (AHA) and the Institute of Medicine (Juarbe et al., 2002) of the National Academy of Science. These organizations can be categorized into three types: governmental, professional, and private agencies. Each organization usually has a different mission. For instance, OSG and CDC are especially likely to focus on general health issues, whereas ACSM, AAHPERD, and NASPE tend to focus on physical activity with typical recommendations that relate specifically to

fitness and physical activity promotion (Corbin, Masurier, & Franks, 2004). However, the OGS focus is on the promotion of physical activity as a method of reducing disease risk and improving health, as well as achieving fitness (U.S. Department of Health & Human Services, 1996). The AHA is a private organization that focuses on behaviors that affect heart disease. For instance, in the case of heart disease, in 1992, the AHA, in association with other agencies, including ACSM, identified physical activity as a risk factor for coronary artery disease.

In Thailand, physical activity has been specifically recommended by the World Health Organization (2008). WHO mentioned that appropriate regular daily physical activity is a major component in preventing chronic disease, including CVD, along with a healthy diet and not smoking. At least 30 minutes of moderately intense physical activity per day is recommended by WHO. This type of physical activity does not mean running a strenuous marathon or playing competitive sports. Rather, physical activity for most people is about walking the children to school or taking a brisk stroll in the park. It also means taking the stairs instead of the elevator and getting off the bus two stops early and walking to the destination (WHO, 2008). Interestingly, Thai people are advised to participate in some sort of exercise at least 3 days per week for 30 minutes or longer (Wibulpolprasert et al., 2007; National Statistical Office of Thailand, 2004). Exercise refers to any activities that cause body movement and aims to promote health, recreation, or social needs but does not include activity for one's occupation or moving in daily life (Akajumpaga, Wattanamano, & Thaweerat, 2006; National Statistical Office of Thailand, 2004). This recommendation is based on studies in Thailand, which basically focused on exercise. Even though in Thailand there are no specific recommendations for a dose-response relationship for cardiorespiratory fitness, the Heart Association of Thailand

under Royal Patronage tends to encourage the levels of physical activity based on AHA and ACSM.

In the 2007 guidelines, for the prevention of CVD in women, women at all risk levels of cardiovascular disease are recommended to implement class 1 lifestyles. These recommendations include no smoking at all, the adoption of heart-healthy eating patterns, regular physical activity, and weight management. In relation to physical activity, the recommendation for women is to accumulate a minimum of 30 minutes of moderate-intensity physical activity (e.g., brisk walking) on most, and preferably all, days of the week. Women who need to lose weight or who need to sustain a past weight loss should accumulate a minimum of 60 to 90 minutes of moderate-intensity physical activity (e.g., brisk walking) on most, and preferably all, days of the week. It has become clear that women who reported vigorous or moderate physical activity were more likely to have a lower incidence of cardiovascular disease. Even in obese women, physical activity can lower their risk of cardiovascular disease. Physical activity in middle age and beyond can lower the risk of CVD regardless of the level of physical activity in young adulthood.

Many health professionals recommend a minimum level of energy expenditure (volume of physical activity) of about 1000 kcal per week, which is about equal to 1 hour of moderate walking 5 days a week (Warburton, Nicol, & Bredin, 2006). These health benefits can be achieved through structured and non-structured periods of physical activity (some as short as 10 minutes) accumulated throughout the day on most days of the week. The energy expenditure target recommendation can be another practical recommendation for lifestyle health promotion. The American College of Sports Medicine (2006) has also stated that health benefits occur with energy expenditures as low as 700 kcal per week, with additional benefits occurring at higher

levels. Currently, the recommended daily energy expenditure for health has been set at 150-400 kcal per day.

The approximate MET values for middle-aged adults (40-64 years) can be divided into three levels (Tipton & Franklin, 2006). Low-intensity (light effort) aerobic exercise requires 20-39% of heart rate reserve, or about 2-4 METs about 60 minutes per day for most (preferably all) days of the week. Moderate-intensity aerobic exercise requires 40-59% of heart rate reserve, or about 4-6 METs about 20-60 minutes per day for 3-5 day per week. Lastly, high-intensity aerobic exercise requires 60-84% of heart rate reserve, or about 6-8 METs about 20-60 minutes per day for 3-5 days per week. Resistance and flexibility exercise is also recommended for achieve the health benefits.

Presently, resistance exercise, as combined with aerobic-based physical activity, is recommended to increase protection against cardiovascular disease. Endurance training induces greater improvements in aerobic capacity and associated cardiopulmonary and metabolic variables and more effectively modifies CVD risk factors. Resistance exercise also enhances muscular strength, endurance, bone mineral density, lean body mass, insulin sensitivity, HDL cholesterol, basal metabolic rate, submaximal and maximal endurance time, and VO_2 max (Williams, Haskell, Ades, Amsterdam, Bittner, et al., 2007). In addition, reductions in percent body fat, basal insulin level, LDL cholesterol, triglycerides and submaximal exercise rate-pressure product are realized.

Participating in weight training for at least 30 minutes per week has resulted in a decreased coronary heart disease risk of 23% as compared with those who performed aerobic-based physical activity only (Tanasescu et al., 2002). For maximum health benefits, 3 sets (each set consisting of 8-12 repetitions) of 8-10

different resistance exercises of moderate intensity that engage the large muscle groups for 2-4 days per week are required. In the beginning, for the average person undertaking a strength training regimen, a single-set program performed a minimum of 2 days per week is recommended over multiple-set programs (Williams et al., 2007).

Additionally, gentle reaching, bending, and stretching of the major muscle groups will improve flexibility (if holding each stretch for 10-30 seconds). These low-intensity exercises should be performed a minimum of 2-3 days per week (preferable 4-7).

The components of exercise prescription. The characteristics of exercise prescription and its benefits vary depending on the individual's age, gender, health status, fitness level, and goals. The components of exercise prescription include mode of exercise, frequency, intensity, duration, and rest intervals (Tipton & Franklin, 2006).

Exercise prescriptions are designed to enhance physical fitness, promote health by reducing risk factors for chronic disease, and ensure safety during exercise participation. The essential components of a systematic, individualized exercise prescription include the appropriate mode, intensity, duration, frequency, and progression of physical activity (Whaley, Brubaker, & Otto, 2006).

Mode of Exercise. Sports also have aerobic conditioning potential if they are pursued for a sufficient duration and intensity. The greatest improvement in maximal oxygen consumption occurs when exercise involves the use of large muscle groups over prolonged periods in activities that are rhythmic and aerobic in nature such as walking, hiking, running, machine-based stair climbing, swimming, elliptical activity, cycling, rowing, combined upper and lower body ergometry, dancing, skating, cross-

country skiing, and endurance games. If possible, the trainer should design programs to eliminate or attenuate barriers that might decrease the likelihood of compliance with, or adherence to, the exercise program.

Duration of exercise. The duration of an exercise session interacts with the intensity to result in the expenditure of a sufficient number of calories to achieve health and fitness goals such as improved body composition. The cardiorespiratory phase usually includes 20 to 60 minutes of continuous or intermittent activity (10-minute bouts accumulated throughout the day). However, the recommended duration for improving cardiorespiratory fitness of 20-30 min/day exclude the time spending warming up and cooling down.

Frequency of exercise. Frequency of exercise refers to the appropriate frequency of endurance-related activities (dynamic exercise) (Tipton & Franklin, 2006). The ACSM recommended an exercise frequency of 3 to 5 days/week. An exercising frequency of 3 days/week is sufficient to improve or maintain maximal oxygen consumption for individuals who exercise at 60% to 80% heart rate reserve or 77% to 90% maximal heart rate, whereas an exercising frequency of 5 to 7 days/week is appropriate for individuals with 3-5 MET capacities.

Intensity of exercise. Intensity is an essential component of the prescription because of its importance in eliciting the acute effects while maintaining the chronic effects of exercise. Intensity of exercise refers to the magnitude of the physiological disruption or stress caused by the activity. For dynamic exercise, intensity is best characterized by a measure of energy expenditure, which may be expressed on an absolute or relative basis.

Intensity and duration of exercise determine the total caloric expenditure during a training session and are inversely related. Improvement in health-related

benefits may be achieved by a low-intensity, longer-duration (>20 minutes) regimen whereas improvements in cardiorespiratory fitness are associated with a higher-intensity, shorter-duration (<10 minutes) program. The intensity range to increase and maintain cardiorespiratory fitness is intentionally broad and reflects the fact that low-fit or unconditioned individuals may demonstrate increases in cardiorespiratory fitness with exercise intensities of only 40% to 49% heart rate reserve (HRR) or 64% to 70% HR_{max}. Thus, one of the factors to consider before determining the level of exercise intensity is that low-fit, sedentary, and clinical populations can improve fitness with lower-intensity, longer-duration exercise sessions. Higher-fit individuals need to work at the higher end of the intensity continuum to improve and maintain their fitness.

Intensity of exercise can be described either by oxygen consumption (VO₂) or heart rate (HR). Traditionally, the range of exercise training intensities (ml/kg/min or in MET) has been based on a straight percentage of maximal oxygen consumption. Recently, the most common methods of setting the intensity of exercise to improve or maintain cardiorespiratory fitness use HR and rate of perceived exertion (RPE). The actual maximal HR is specific to the mode of exercise and may differ within populations of the same age and sex. Obtaining the actual maximal HR through a maximal exercise test is preferred. However, based on the absence of a true determination of maximal HR, the traditional, empirically based, easy-to-use base (220 - age) is still acceptable. There are several approaches to determining a target heart rate range for prescriptive purposes including the direct method, the percent of maximal heart rate (zero to peak method), and the heart rate reserve method (Karvonen & Vuorimaa, 1988). RPE is considered an adjunct to monitoring heart rate because RPE determined during a graded exercise test may not consistently translate

to the same intensity during an exercise session of different modes of exercise.

However, RPE has proved to be a valuable aid in prescribing exercise for individuals who have difficulty with HR palpation, and in cases where the HR responses to exercise may have been altered because of changes in medication.

Metabolic equivalent. MET is defined as the ratio of the associated metabolic rate for a specific activity divided by the resting metabolic rate (Ainsworth, 2004). MET is used in the *Compendium of Physical Activities* to reflect the intensity of the specific activities. The *Compendium of Physical Activities* was developed to facilitate the coding of physical activities obtained from physical activity records, logs, and surveys and to promote comparison of coded physical activity levels across observational studies. MET intensities listed in the *Compendium of Physical Activities* can be used to estimate the energy expended during physical activities (Ainsworth, 2004). In addition, MET is used to calculate the energy expenditure from physical activity in kilocalories per week (Ainsworth, 2004, p. 49).

$$\text{Kcal per week} = \text{METs} \times \text{sessions per week} \times \text{hours per session} \times \text{body weight in kg}$$

The US Surgeon General (1996) released a report to the nation about physical activity and health recommending that expenditure of at least 150 kilocalories per day or 1000 kilocalories per week in moderate- and vigorous-intensity physical activities is recommended for all adults. This amount of energy expenditure is sufficient to reduce the risks for some type of chronic disease including coronary heart disease.

The intensity range for the Absolute Intensity of Dynamic Exercise (MET) for healthy middle age (40-64 years) by ACSM and the Surgeon General for dynamic exercise lasting 60 minutes is <2.0 for very light, 2.0-3.9 for light, 4.0-5.9 for moderate, 6.0-8.4 for heavy, ≥ 8.5 for very heavy, and 10 for maximal (Tipton & Franklin, 2006).

Measurement of Physical Activity

Physical activity is a complex behavior, so it's hard to measure. Physical activity can be measured in all exercise dimensions including mode, duration, frequency, and intensity. However, the assessment of least frequency, intensity, and duration is also acceptable for evaluating if an individual meets the physical activity recommendation by healthcare professionals. In addition, overall amount or volume of physical activity is sufficient in evaluating an intervention program or determining the prevalence of physical activity. In sum, physical activity measurements can be categorized into two main methods: direct and indirect method (Guthrie, 2002). The direct method refers to the measurement of real activity such as a self- or interviewer-administered questionnaire, diary annotation, mechanical or electronic motion sensors, self-contained body-action recorders, or remote-reading telemetric devices. Indirect methods refer to the measures of energy intake, energy expenditure, body composition, and fitness parameters such as pulse rate or muscular strength. Another way to categorize measurement of physical activity is based on the resulting data as subjective or objective data (Sallis & Owen, 1999).

Self-report physical activity measure. Self-report measures are frequently used to assess the effect of an intervention program, or to identify the relationships between activities and various health outcomes or measures of human performance (Sallis & Owen, 1999). Mainly, self-report questionnaires focus on assessing energy expenditure and time spent in physical activity (Booth & Booth, 2000; Kaewthummanukul, Brown, Weaver, & Thomas, 2006; Paffenbarger, Hyde, Wing, Lee, Jung, et al., 1993; Pols, Peeters, Kemper, & Collette, 1996; Sallis, Haskell, Wood, Fortmann, Rogers, et al., 1985; Taylor, Jacobs, Schucker, Knudsen, Leon, et al., 1978; Wanikun, 2003; Youngpradith, 2004). The self-report physical activity can

be either self- or interviewer-administered. In addition, it may ask participants to recall or prospectively record their physical activity in a diary. Recall periods in the questionnaire vary from 7 days, 14 days, 1 month, to 1 year. The recall method runs a low risk of affecting the patterns being measured, but it is time- and cost-consuming to educate the interviewers and code the data (Lagerros & Lagiou, 2007). On the other hand, physical activity records (diary) and physical activity logs are instruments that require participants to record their current activity. The checklist form of physical activity log is more convenient for participants than recording their physical activity in the diary. However, both of them may influence the participant's physical activity pattern.

The International Physical Activity Questionnaire. Compared to the other questionnaires, the International Physical Activity Questionnaire (IPAQ) is more likely to measure the physical activity based on lifestyle physical activity rather than leisure-time physical activity only. The IPAQ was initially developed by Booth (2000) in 1996 and then continuously developed by the International Consensus Group in Geneva during 1998 (Craig, Marshall, Sjostrom, Bauman, Booth, et al., 2003). This questionnaire was developed in four formats: 1) the long-term 7-day self-administered, 2) the short-term 7-day self-administered, 3) the long-term 7-day telephone-interview, and 4) the short-term 7-day telephone-interview. The long-term 7-day questionnaire contains five domains: 1) job-related physical activity; 2) transportation physical activity; 3) housework, house maintenance, and caring for family; 4) recreation, sport, and leisure-time physical activity; and 5) time spent sitting. This questionnaire has been used internationally among young, middle-aged, and senior adults in descriptive studies (Bassett, Schneider, & Huntington, 2004; Choi, Wilbur, Miller, Szalacha, & McAuley, 2008; Panagiotakos, Pitsavos, Lentzas,

Skoumas, Papadimitrou, et al., 2008; Santos, Silva, Santos, Ribeiro, & Mota, 2008) as well as in intervention studies (Cocker, Bourdeaudhuij, Brown, & Cardon, 2007; Jancey, Lee, Howat, Clarke, Wang, et al., 2008; Opendacker, Boen, Vanden Auweele, De Bourdeaudhuij., 2008; Spittaels, Bourdeaudhuij, & Vandelanotte, 2007).

The long-term 7-day recall IPAQ has been tested for validity and reliability. This version reported good test-retest repeatability for monitoring population levels of physical activity among 18- to 65-year-olds in diverse settings (Craig et al., 2003). In testing for reliability and validity across 12 countries, the study revealed a good repeatability coefficient of $\rho = 0.81$ (95% CI 0.79 – 0.82). In addition, the long version usual day recall IPAQ (N=904, $\rho = 0.83$) reported a higher level of repeatability than the long-term 7-day recall IPAQ (N= 294, $\rho = 0.77$) (Craig et al., 2003). Interestingly, the criterion validity of the long-term 7-day recall IPAQ self-administrated against accelerometers reported moderate agreement between two measures whereas the short-term 7-day recall IPAQ self-administrated reported fair agreement. Congruently, a study in healthy males and females revealed a strong positive relationship between the activity monitor (accelerometer) data and the IPAQ (long-term 7-day recall) data for total physical activity ($\rho = 0.55$, $p < 0.001$) and vigorous physical activity ($\rho = 0.71$, $p < 0.001$) (Hagstromer, Oja, & Sjostrom, 2006). However, this study reported a weak correlation between moderate physical activity data from IPAQ and those data from the activity monitor ($\rho = 0.21$, $p < 0.051$), as well as a weak correlation of total physical activity from IPAQ with aerobic fitness ($\rho = 0.21$, $p = 0.051$) and BMI ($\rho = 0.25$, $p = 0.009$). A study of the short-term 7-day recall IPAQ self-administered in middle-aged persons also reported low agreement with percent body fat and cardiorespiratory fitness ($r = -0.11$ and 0.24) and did not reach the level of statistic significance (Mader, Martin, & Schutz., 2006). Besides, this study also showed low

agreement ($r = -0.18$) with the activity monitor (accelerometer) and did not reach the level of statistical significance. Even though the short version IPAQ has been used in many international studies, the long version IPAQ seems to have become the standard for use as the outcome measure in research. The long version IPAQ has shown better reliability and validity than the short version IPAQ. In addition, the long version IPAQ allows analyzing of the physical activity in each domain.

Objective physical activity measure. Doubly-labeled water, pedometer, accelerometer, polar heart rate monitor, and combined activity and heart rate monitor have been used widely in intervention research as an objective measure (Bassett, Ainsworth, Swartz, Strath, O'Brien, et al., 2000; Leger & Thivierge, 1988; Melanson & Freedson, 1995; Montoye, Kemper, Saris, & Washburn, 1996; Regensteiner, Steiner, & Hiatt, 1996; St-Onge, Mignault, Allison, & Rabasa-Lhoret, 2007) Doubly-labeled water is considered the most accurate among objective measures. However, this device has been used rarely in intervention studies because it is expensive, uses complicated methods, and limits physical activity pattern data. The pedometer and accelerometer are more feasible to use because they are convenient and inexpensive. Compared with a pedometer, an accelerometer is considered more accurate because it can be used to assess vertical movement in addition to the pedometer. Nevertheless, an accelerometer such as the Caltrac accelerometer cannot report the pattern of activity because it reports the total energy expenditure. Additionally, the Caltrac accelerometer cannot differentiate whether the participant wore the device. Computer science and application (CSA), the triaxial accelerometer, and the actigraph (AG) were developed to address these limitations.

An Effective Intervention for Improving Physical Activity

Physical activity is an essential factor for improving quality of life. In women's health, studies have reported that physical activity and exercise improved functional and emotional states (Shin, 1999; Sunsern, 2002; Wadden, 1998). Moreover, studies also showed that physical activity and exercise decreased climacteric symptoms and elevated blood pressure in middle-aged women as well (Seal, 1997; Ueda, 2004). However, many people cannot perform exercise or physical activity regularly. Thus, interventions to establish and maintain physical activity behavior were studied in order to address these problems.

Epidemiologic evidence clearly indicates that 30 minutes of daily moderate physical activity provides many health benefits. The effect of lifestyle physical activity gives the same positive result as structured exercise in reducing cardiovascular risk factors (Anderson, Wadden, Barlett, Zemel, Verde, et al., 1999; Dunn, Marcus, Kampert, Garcia, Kohl, et al., 1999). A lifestyle program focused on encouraging accumulating moderate-intensity physical activity through increasing behavior skills associated with adopting and maintaining activity (Dunn et al., 1999). Both the lifestyle and structured activity groups had significant and comparable improvements in physical activity and cardiorespiratory fitness from baseline to 24 months for total energy expenditure, VO_{2peak} , systolic blood pressure, diastolic blood pressure, and percent of body fat.

Women in middle age are different from other groups because they perform many important responsibilities as wives, mothers, caretakers, and workers. These women tend to focus their attention on those around them rather than themselves. Furthermore, these women are eventually faced with menopausal symptoms, which threaten their quality of life. Thus, current interventions intend to enhance exercise in

these groups (Jakicic, 1995; Shin, 1999; Sunsern, 2002; Wilbur, et al., 2005; Young & Steward, 2006). The intervention generally is centered on a cognitive-behavioral approach to physical activity (Skimkin-Silverman, Wing, Boraz, & Kuller, 2003; Wadden, et al, 1998; Wilbur et al., 2005). These women are motivated to self-efficacy to exercise and exercise self-monitoring. The sources of self-efficacy belief and social support were used as strategies to enhance their exercise self-efficacy (Simkin-Silverman, et al., 2003; Sunsern, 2002; Wilbut, et al. 2005). Home-based exercise also gave good results in promoting physical activity in middle-aged women (Ueda, 2004; Wilbut, et.al. 2005). Additionally, the exercise programs participated in by women in the studies usually focused on the duration of exercise (i.e., walking duration) and the frequency of exercise. The results revealed that although the recommended exercise was a continuous 30 minutes of intensive exercise three time a week, women who completed the three 15-minute exercise sessions per day reported similar improvement in cardiorespirator fitness as those who completed the recommend exercise (Jackicic, et.al., 1995). Equally important, the study reported that women who continued to exercise reported better quality of life than at the end of the short-course exercise program (Asbury, Chandruangphen, & Collins, 2006).

In Thailand, exercise intervention studies for middle-aged women are rare. Moreover, exercise and physical interventions seem to be general programs or not for middle-aged women (Harnirattisai & Johnson, 2005; Mo-suwan, Pongprapai, Junjana, & Puetpaiboon, 1998; Sunsern & Sunsern, 2002). Tailored prescription exercises couldn't be found in the intervention program for this group either. Even though there were studies showing that self-efficacy for exercise had direct and indirect effects on exercise through outcome expectations for exercise, there was no evidence that motivation to self-efficacy were added to the intervention. Moreover, the

interventions normally were short-course exercise interventions and didn't focus on maintaining physical activity.

Motivational Interviewing

Motivational interviewing is considered a method of communication rather than a set of techniques. Thus, motivational interviewing is defined as a directive, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence (Miller, 1983; Miller & Rollnick, 1991, 2002). This method enhances intrinsic motivation to change by exploring and resolving ambivalence. Motivational interviewing is considered a directive method because a coach or counselor is consciously directing the session toward resolving the patient's ambivalence (Jones, Burckhardt, & Bennett, 2004). The coach or counselor emphasizes the particular intentional direction in pursuing the goal of change. Thus, MI is very useful for clients who are reluctant to change or who are ambivalent about changing their behavior because this method helps patients resolve their ambivalence about behavior change and builds their intrinsic motivation before providing education. Even though MI overlaps with patient-centered communication, focusing on goal-direction makes MI differ from patient-centered communication. In addition, MI includes some concrete motivational strategies that can be briefly and practically implemented.

MI involves two key aims: (1) building patients' intrinsic motivation to adopt health recommendations, and (2) resolving patients' ambivalence about behavior change (Miller & Rollnick, 2002). Motivation can be defined as state and trait constructs. In the trait definition, motivation refers to the degree of need or drive for competency and self-determinism in health behavior (Deci & Ryan, 1980). Those defining motivation as a state characteristic tend to focus on the readiness for a

behavior (Carter & Kulbok, 2002). Motivation has been used to explain health behavior in many frameworks and theories such as the health belief model, health promotion model, theory of reasoned action, interaction model of client health behavior, self-determination, goal setting theory, stage of change model and self-efficacy theory.

Motivation is the intrinsic determination to attain a goal. In self-determination theory, there are two types of motivated behaviors based on different reasons for behaving: autonomous and controlled. *Autonomous* refers to behaviors that occur from a full sense of volition and choice, because the activity is interesting or personally important whereas *controlled* refers to behaviors that occur with pressure because of a coercive demand or a seductive offer. In addition, people will tend to feel more autonomous, relative to controlled, when they experience greater fulfillment of three psychological needs including autonomy, competence, and relatedness to others (Tudor-Locke et al., 2002). In MI, intrinsic motivation is strengthened by discussing how change is consistent with the patient's own values and goals. In addition, intrinsic motivation can be increased by having the patient play an active role in the consultation. Increasing intrinsic motivation can enhance the probability of both initial change and sustained change.

On the other hand, motivational interviewing helps individuals pass through their ambivalence. Ambivalence can occur with anyone at any time when individuals perceive both the pros and cons of changing and not changing. They want to change, and they don't want to change at the same time. Ambivalent cognitions, emotions, and behaviors are a normal part of any approach-avoidance conflict situation. This kind of conflict seems to have special potential for keeping people stuck and creating considerable stress. In approach-avoidance, a person is both attracted to and repelled

by the same object. However, ambivalence is a common human experience and a stage in the normal process of change, and it is difficult to resolve by oneself. Thus, ambivalence is a normal part of the process of change. In the other words, ambivalence shows the intention to change of that person even though he or she might not perform the action to change yet. However, this conflict motivation can result in the individual stuck in a state in which he or she is unable to change despite there being incentives to do so, or to alternate between engaging in a new behavior pattern and relapsing to old behaviors (Markland, Ryan, Tobin, & Rollnick, 2005). Thus the recognition of client ambivalence plays a central role in motivational interviewing.

Principles of motivational interviewing. Motivational interviewing was originally described based on the principles of experimental social psychology and self-efficacy (Miller, 1983). The desire to change and how to change behavior of individuals is based on their responsibility to decide for themselves, which is considered the key assumption underlying motivational interviewing. The counselor's role in the process is to help the client locate and clarify his or her motivation for change, providing information and support, and offering alternative perspectives on the problem behavior and potential ways of changing.

Principles of motivational interviewing are (1) the expression of empathy, (2) the development of discrepancy, (3) rolling with resistance, (4) support for self-efficacy, and (5) evoking change talk (Miller & Rollnick, 2002; Rollnick, Miller, & Butler, 2008).

The first principle is the expression of empathy. In the healthcare setting, it is common for healthcare professional to set thing a right. The healthcare professional always develops an opinion as to what the right course of action would be for the client or patient to take. Using righting reflex, the healthcare professional tends to

proceed to advise, teach, persuade, counsel, or argue for a particular resolution to the client or patient's ambivalence. When the healthcare professional takes the righting reflex, the client or patient naturally responds by defending the other during his or her ambivalence. It can be said that righting reflex evokes the individual's resistance. Instead of arguing, clients or patients want the healthcare professional to understand their feelings and perspectives without judging, criticizing, or blaming (Miller & Rollnick, 2002). Thus, empathy from the healthcare professional is an important strategy to understanding the individual's feeling and perspective. Empathic communication should be shown from the very beginning and throughout the process of motivational interviewing.

The second principle of motivational interviewing is the development of discrepancy. This principle focuses on creating and amplifying a discrepancy between the client's present behavior and his or her broader goals and values. The assumption of this principle is that the healthcare professional creates and amplifies this discrepancy based on the individual's perspective. Developing discrepancy involves exploring the pros and cons of the individual's current behaviors compared to the prospective positive behavior in a supportive and accepting environment in order to generate or intensify an awareness of the discrepancy (Markland et al., 2005). The discrepancy-developing strategy was developed from the cognitive dissonance theory in Festinger's framework (1957). Since this method aims to help individuals become aware of the discrepancies inherent in their current behaviors and to lead them toward considering change, motivational interviewing is seen as a directive method. However, Rollnick et al. (2008) mentioned three communication styles for different situations: following, directing, and guiding communication styles. The following style, in which listening predominates, is appropriate for approaching an individual in

an extremely emotional state. A brief period of following helps the counselor understand the patients' symptoms and how these fit into the larger picture of their life and health. The directing style, in which the healthcare professional takes charge of knowledge, expertise, authority, or power is appropriate for individuals who depend on the healthcare professional for decisions, action, and advice such as patients. Lastly, the guiding style, in which individuals choose their direction, is appropriate to use in circumstances where both the healthcare professional and the client explore together the pros and cons of each option. In this style, the healthcare professional may offer a bit of what he or she knows about the client or about people and relationships more generally, recognizing and honoring the individual's autonomy (Rollnick et al., 2008).

Rolling with resistance is the third principle of motivational interviewing. Resistance is an interpersonal phenomenon. How the healthcare professional approaches or responds to the client or patient can influence whether the resistance increases or diminishes. In motivational interviewing, it is believed that the resistance that a person offers can be turned or reframed slightly to create a new momentum toward change. The healthcare professional can roll or flow with the resistance rather than directly oppose it. In motivational interviewing, the reluctance and ambivalence are not opposed but are acknowledged to be natural and understandable. Instead of being forced to assume new goals or perspectives, the individual is invited to consider new information and is offered new perspectives. Thus, in rolling with resistance the individual is actively involved in the process of problem-solving (Miller & Rollnick, 2002).

Supporting self-efficacy is a fourth important principle of motivational interviewing. Since changing behavior is the individual's responsibility, a goal of

motivational interviewing toward self-efficacy is to enhance the client's confidence in the capability to cope with the barrier and to succeed in change. Even if the individual is motivated to modify his or her behaviors, change will not occur unless the client believes that he or she has the resources and capabilities to overcome barriers and successfully implement new ways of behaving (Markland et al., 2005).

The last principle of motivational interviewing is evoking change talk.

Motivational interviewing differs from client-centered counseling in that motivational interviewing is always directive. In other words, the coach consciously directs the client toward the resolution of ambivalence in order to facilitate change. Change talk is the statement or speech that shows the desired kind of change (Miller & Rollnick, 2002). In turn, if clients find themselves arguing against changing a specific behavior, they may perceive that it's not possible to change that behavior. In a study of the relationship between change talk and outcome behavior, Moyers, Martin, Christopher, Houck, Tonigan, et al. (2007) found that change talk significantly described variability in alcohol drinking behavior. Interestingly, the study found that the counter change talk (resistance) had a greater ability to describe variability in outcome behavior than change talk. However, this study focused on both the frequency of change talk and counter change talk rather than their intensity. Amrhein, Miller, Yahne, Palmer, and Fulcher (2003) studied client language from a motivational interviewing and drug use perspective. This study focused on both frequency and strength of client commitment. The study revealed that the outcome behavior was predicted by the commitment strength of the client's evaluation of the change plan. Moreover, the commitment strength was predicted by strength of desire, ability, need, and reasons. The results also suggested that commitment strength is a pathway for their influence on behavior. Equally important, the studies also found that the

counseling, which was not inconsistent with motivational interviewing spirits and principles, could cause the resistance to change from the client (Francis, Rollnick, McCambridge, Butler, Lane, et al., 2005; Moyers et al., 2007). Thus, in motivational interviewing both eliciting and responding in particular ways to change talk is very important.

The spirit of motivational interviewing. Miller and Rollnick (2002) referred philosophy or fundamental of using motivational interviewing as Spirit. Thus, the underlying spirit of motivational interviewing occupies understanding and experiencing the human nature. Collaboration, evocation, and autonomy are three key components considered as the spirit of motivational interviewing.

Based on collaboration, a partner-like relationship is expected during the interviewing. The healthcare professional, as an interviewer, seeks to create a positive interpersonal atmosphere that is conducive to change. However another important role of the healthcare professional as a counselor is to elicit the individual's motivation and evoke it. This role is required in the evocative spirit. The third component of motivational interviewing spirit is autonomy. The healthcare professional is expected to respect the individual's autonomy and affirm the individual's right and capability for self-direction and then facilitate an informed choice (Miller & Rollnick, 2002).

Important tools in motivational interviewing. Four specific tools can be useful for healthcare professionals as they involve the spirit and principles of motivation in communicating with their clients or patients: (1) asking open questions, (2) using affirmations, (3) using reflections, and (4) using summaries.

Asking open questions will encourage the individual to do most of the talking. Open questions let individuals open the door for the healthcare professional to explore, which is providing opportunities for using other methods.

Affirmations can be defined as a form of compliments or statements of appreciation and understanding. Directly affirming and supporting individuals during the counseling process creates a rapport relationship as well as reinforcing open exploration from individuals because they can perceive the empathetic response from their healthcare professional.

Reflection, or reflective listening, is one of the most important and most challenging skills required for motivational interviewing. The essential of reflection is the response of the counselor to what the individual says. Thus, reflective listening involves taking a guess at what the individual means and reflecting it back, restating the client's thoughts or feelings in a slightly different way. This tool helps to ensure understanding of the individual's perspective, emphasizes individual positive statements about change, and diffuses resistance (Borrelli, Riekert, Weinstein, & Rathier, 2007).

Summarizing is the fourth tool. It can be used both to link and reinforce material that has been discussed. In addition, summarizing can be used as a transitional statement, which marks and announces a shift from one focus to another.

The main idea of motivation is to have the patient or client give voice to exactly the opposite kinds of statements, to present the arguments for change. Thus, it is the healthcare professional's responsibility to facilitate the individual's expression of such change talk. Methods for evoking change talk include asking evocative questions, using the ruler to weight the importance, exploring the decisional balance, elaborating, querying extremes, looking back, looking forward, and exploring goals and values. In other words, eliciting change talk is a primary method for developing discrepancy. The four tools can also be integrated with eliciting change talk by asking open questions that pull for change talk, affirming and reinforcing the individual for

change talk, reflecting back change talk that the client has said, and offering collecting, linking, and transitional summaries of change talk.

Effectiveness of Motivational Interviewing In Health Behavior Change

This concept of using motivational interviewing was initially used with problem drinkers Miller (1983). Currently, this concept is being used in various studies aimed to change patients' or clients' health-related behaviors such as substance abuse risk-reduction, HIV prevention, smoking reduction, medication adherence, diet control, weight control, and physical activity promotion.

From a systematic review and meta-analysis of MI, 72 randomized controlled studies assessing the effectiveness of motivational interviewing in client counseling during 1991-2004 showed that MI has a significant effect for combined effect estimates for body mass index, total blood cholesterol, systolic blood pressure, blood alcohol concentration and standard ethanol content (Rubak, Sandback, Lauritzen, & Christensen, 2005). A total of 94% (68/72) of the studies used individual interviews in person. The median duration in all studies was estimated to be 60 minutes (range = 10-120 minutes), whereas 81% showed an effect. On the other hand, 11 studies used less than 20 minutes per encounter and 64% of them showed an effect. In addition, 87% of studies with more than five encounters showed an effect, while only 40% of studies with one counseling session showed an effect. Of the studies, 72% (18/25) targeted physiological problems such as weight loss, lowering of lipid levels, increasing physical activity, diabetes, asthma, and smoking cessation, and they demonstrated success.

Using Motivational Interviewing to Promote Physical Activity

Self-motivation is the best determinant of exercise adherence among the psychological variables studied (Plonczynski, 2000). Having people be more

motivated to behave in ways that would improve physical activity and maintain those behaviors would be of great benefit to both people and the healthcare system. Studies of motivation to exercise have shown links between motivational orientation toward exercise and adherence-related variables (Conn, Burks, Minor, & Mehr, 2003; Nies, Chruscial, & Hepworth, 2003; Teixeira, Going, Houtkooper, Cussler, Metcalfe, et al., 2006). Interest/enjoyment and competence motives were also positively related to the number of hours per week one exercised (Frederick-Recascino, 2002).

Motivational interviewing has been used in various populations to improve their physical activity. It has been used in patients, survivors from cancer, persons at health risks, and healthy persons (Bennett, Lyons, Winters-Stone, Nail, & Scherer, 2007; Brodie & Inoue, 2005; Harland, White, Drinkwater, Chinn, Farr, et al., 1999; Perry, 2005). Most studies used a randomized controlled trial design to prove the effectiveness of using motivational interviewing. MI is considered a method of communication rather than a set of techniques. In other words, it is a facilitative approach to communication that evokes change from inside of the client. Motivational interviewing has shown effective in promoting physical activity in inactive healthy person (Bennett et al., 2008; Perry et al., 2007). In addition, it has been used to improve physical activity in the workplace (Butterworth et al., 2006); even though this study didn't show the statistically significant difference of physical activity between pre- and post-intervention, the intervention group showed significant improvement in physical activity compared to the control group. So far, MI has been used as either the intervention by itself or adding to a structured exercise class. The MI in the intervention was also conducted by various healthcare providers including health coaches, physicians, nurse practitioners, nursing graduate students, exercise experts, and dietitians. Mostly, in the successful interventions, healthcare

professionals who conducted MI were trained in MI and evaluated for proficiency by an independent coder with expertise. In general, the duration time of MI interventions varied from 12 weeks to 6 months. The MI was conducted both in person and on the telephone. Almost all of the studies conducted the first counseling in person. For the in-person MI, each session lasted 25-40 minutes. The meeting time on the phone was approximately 15 minutes. It has also been shown that MI can be effective even in brief encounters (Ang, Kesavalu, Lydon, Lane, & Bigatti, 2007; Bennett, Young, Nail, Winters-Stone, & Hanson, 2008; Perry, 2005). Thus, based on MI principles and tools, brief interventions can help people pass through their ambivalence and make a decision to move toward change (Miller & Rollnick, 2002).

Occupational Health Related to Health Promotion in Thailand

Thailand is one of the newly industrial countries in Asia. The rapid movement from an agricultural to industrial country resulted in changes in healthcare for the worker population. Women are now more likely to engage in the labor force. Beside chronic diseases, occupational disease tends to be causes of morbidity and mortality among Thai people (Wibulpolprasert et al., 2007). In Thailand, the Social Security Office takes the responsibility for providing protection and security for employees who are injured, sick, or disabled, and families of deceased employees, including maternity service (SocialSecurityOffice, 2006). In 1972, the Ministry of Interior established a law that requires a nurse be on duty during working hours at a large worksite. Worksites employing 200 to 999 workers are required to have at least one nurse during working hours, while those employing 1000 or more workers are required to have at least two nurses and one physician for at least 2 hours during office working hours (Kalampakorn, 2003). The occupational health issue has been included in the National Health Development Plan of Thailand to ensure the good

health of workers (2007). In terms of health promotion, the plan focused on quality development, 100% insurance coverage, management efficiency improvement, and health behavior changes for health promotion including disease prevention.

In Thailand, four main government agencies take responsibility for occupational health: 1) the Ministry of Public Health, 2) the Ministry of Industry, 3) the Ministry of Labor and Social Welfare, and 4) the Social Security Office. The Ministry of Labor and Social Welfare, the Ministry of Industry, and the Ministry of Public Health play important roles in occupational health. However, not all workplaces provide occupational health services, especially small industrial settings employing fewer than 50 (Kalampakorn, 2003).

Conceptual Framework

Health promotion model. The health promotion model (HPM) had a major influence on this study. The HPM proposed a framework for integrating nursing and behavioral science perspectives on factors influencing health behaviors. The framework offered a guide for exploration of the complex biopsychosocial process that motivates individuals to engage in behaviors directed toward the enhancement of health (Pender, Murdaugh, & Parsons, 2006, p. 47). This model is considered a competence- or approach-oriented model. It can be applicable to any health behavior in which treatment is not proposed as a major source of motivation for the behavior. Thus, this model is appropriate to promote physical activity in middle-aged women.

The HPM is an attempt to depict the multidimensional nature of persons interacting with their interpersonal and physical environments as they pursue health. The HPM's theoretical underpinnings are provided by social cognitive theory and expectancy-value theory (Bandura, 1986). This model comprises three major components: 1) individual characteristics and experiences, 2) behavior-specific

cognitions and affect, and 3) behavior outcome. The individual characteristics and experience component include the prior related behavior and the personal factors. The behavior-specific cognitions and affect component include perceived benefit of action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences. In Thai women, the studies also indicated that these behavior-specific cognitions related to their exercise (Kaewthummanukul et al., 2006; Vannarit, 1999; Youngpradith, 2004). One study found that there was a statistically significant relationship between exercise participation and the set of selected personal factors, perceived benefits of and barriers to exercise, perceived self-efficacy, and perceived social support (Kaewthummanukul et al., 2006). A study using a causal model to explain leisure-time physical activity among women aged 40-59 years residing in the Bangkok Metropolis also revealed that the model of perceived self-efficacy, interpersonal influences, perceived benefits, and perceived barriers together explained 55% of the variance of their leisure-time physical activity (Youngpradith, 2004). In sum, the results from these studies can be used to guide the effective intervention to increase physical activity in middle-aged women. Moreover, HPM also provides suggestions for the intervention, which is congruent with these research findings. The suggested interventions for health behavior change in HPM include (1) raising consciousness, (2) reevaluating the self, (3) promoting self-efficacy, (4) enhancing the benefits of change, controlling the environment, and managing barriers to change (Pender et al., 2006). See Figure 1.

Individual Characteristics and Experiences

Behavior-Specific Cognitions and Affect

Behavioral Outcome

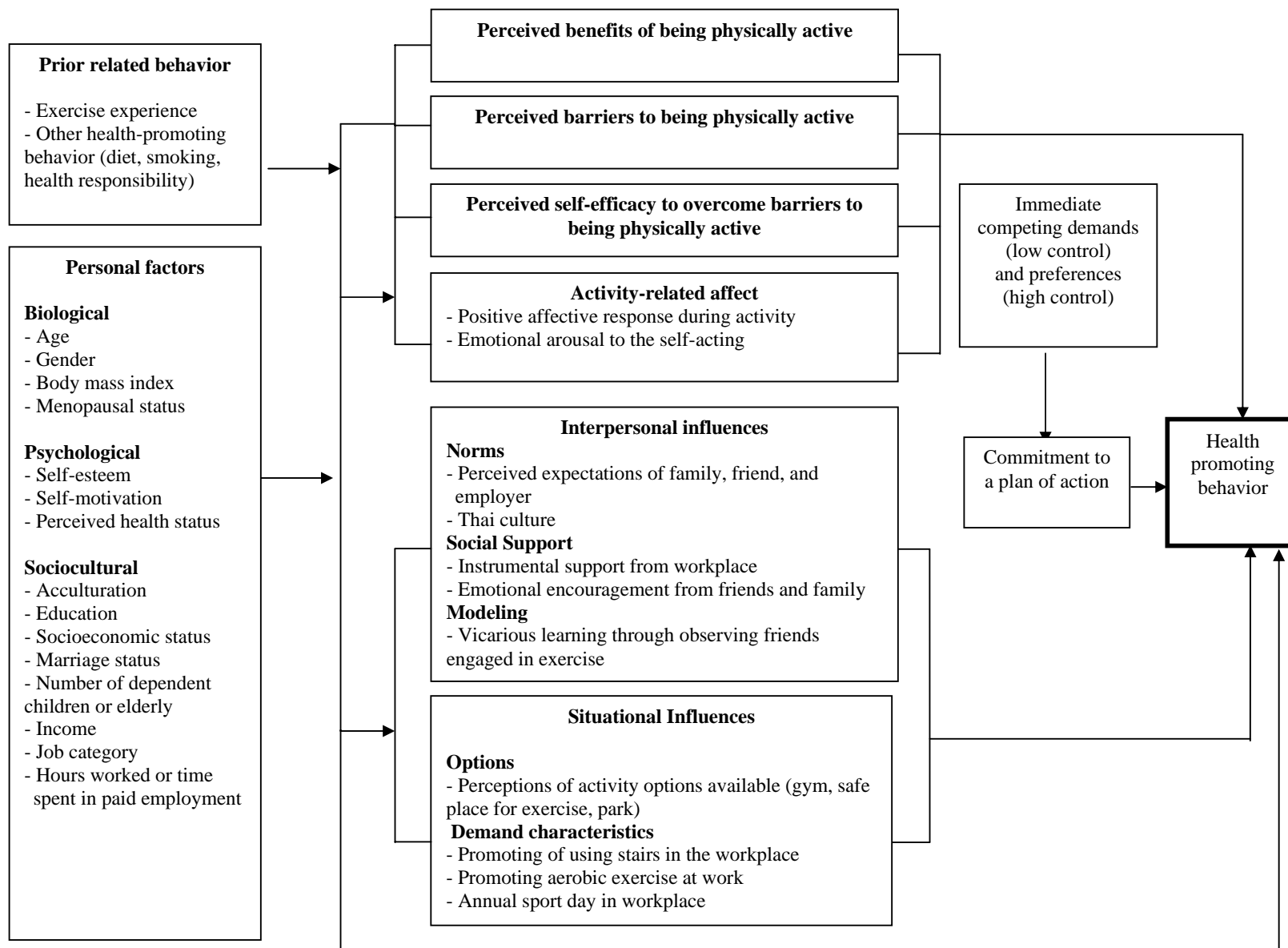


Figure 1 Theoretical framework for promoting health-related physical activity based on HPM (Pender et al., 2006)

Perceived self-efficacy for being physically active. Self-efficacy is a construct in the social cognitive theory. This construct is used to understand human behavior through the sources of self-efficacy. Self-efficacy can be defined as a person's belief in his or her ability or capacity to enact goal-directed behaviors within a domain of activity. An individual develops efficacy expectations via a number of sources including mastery experience, vicarious experience, verbal persuasion, and physiological states. The individual will use his or her efficacy expectations to initiate, engage, and persist in a given activity. Thus, self-efficacy has an important role in self-control in terms of selecting the extent of behavior for change and the practice for building confidence in self-regulation. Moreover, self-efficacy is worthwhile for predicting continued performance of a target health behavior even when confronted with failure, as well as for predicting long-term maintenance of complex health behaviors (lifestyle) even in the presence of stress (Harnirattisai & Johnson, 2005; Jones, Harris, Waller, & Coggins, 2005; Shin, Hur, Pender, Jang, Kim, et al., 2006).

Self-efficacy enhancement is defined as sources of self-efficacy beliefs (Bandura, 1997). Sources of self-efficacy beliefs to enhance confidence for exercise include mastery of exercise, vicarious experience, verbal persuasion, and physiological arousal. The most influential source of efficacy information is the mastery of exercise because it is based on authentic mastery experience. Successes raise efficacy appraisals; failures lower them. The second source is vicarious experience. This source is by observing the success of others. Thirdly, verbal persuasion contributes to successful performance by giving a heightened appraisal within realistic bounds. Lastly, physiological arousal refers to physiological and emotional states. The individual's physiological or emotional states influence self-

efficacy judgments with respect to specific tasks. Thus, emotional reactions to such tasks (e.g., anxiety) can lead to negative judgments of one's ability to complete the tasks.

Self-efficacy is essential in research on determinants of physical activity in previously inactive adults (Resnick & Resnick, 2004; Stutts, 2002). Specially, exercise self-efficacy was a significant predictor of adoption and overall exercise levels in previous sedentary adult women (Stutts & Stutts, 2002). Moreover, exercise self-efficacy was the important influential variable on commitment to a plan for exercise in persons with chronic disease and cancer survivors (Bennett et al., 2008; Nies et al., 2003; Shin et al., 2006). Self-efficacy is also an important predictor for physical activity behaviors in Thai women (Kaewthummanukul et al., 2006; Youngpradith, 2004). Women with high self-efficacy for physical activity reported higher physical activity than those with low self-efficacy for physical activity.

Perceived benefits of and barriers to being physically active. Perceived benefits of and perceived barriers to preventive action were initially proposed in the health belief model in the 1960 (Rosenstock, 1974). The health belief model was a useful model to predict whether persons want to perform preventive behaviors. In the health promotion model, perceived benefits of and barriers to the action are viewed as one of the behavior-specific cognitions and affect factors (Pender et al., 2006). Various studies supported the idea that the importance of perceived benefits of and barriers to action influence health behavior (Juarbe, Turok, & Perez-Stable, 2002; Nishida, Suzuki, Wang, & Kira, 2003; Wilcox, Der Ananian, Abbott, Vrazel, Ramsey, et al., 2006). Perceived benefit of exercise refers to perceptions of the anticipated benefit of exercise, which were mental representations of the reinforcing consequences of an exercise behavior (Pender, Murdaugh, & Parsons, 2006).

Perceived benefits were also shown in many studies as an influencing factor for exercise adherence (Melillo et al., 1996); Robertson & Kelly, 1992). Benefits of exercise can be classified into five dimensions: life enhancement, physical performance, psychological outlook, social interaction, and preventive health (Nygaard et al., 2005; Sechrist, Walker, & Pender, 1987). Among these, the most cited benefit was life enhancement (Jones & Nies, 1996). Jones and Nies (1996) found a significant relationship between perceived benefit and barriers to exercise.

On the other hand, perceived barriers to physical activity were defined as the individual's perception of factors that prevent women or individuals from being physically active (Pender et al., 1996). Lack of time was cited as the most frequent barrier in the studies (Heesch & Masse, 2004; Nygaard et al., 2005; Reichert et al., 2007). Feeling too tired and lack of money were also reported in the studies (Nygaard et al., 2005; Reichert et al., 2007), which might be associated with lack of time. Interestingly, muscle pain or limited mobility was also considered as a barrier to physical activity in midlife women (Nygaard et al., 2005; Plotnikoff, 2004; Reichert et al., 2007). Women who perceived "lack of time" to be a consideration might just have felt overwhelmed and tired, so they didn't want to participate in physical exercise or be physically active. However, some studies reported the gap between perceived and real barriers (Heesch & Masse, 2004; Jilcott, Evenson, Laraia, & Ammerman, 2007). Moreover, the studies showed those barriers to exercise varied depending on age, gender, and setting (Jilcott et al., 2007; Plotnikoff, 2004; Reichert et al., 2007). It can be implied that women will participate in physical activity based on their perceptions of barriers to be physically active, which relate to their age and setting. Equally important, these perceptions may or may not relate to their real barriers. Thus, to increase physical activity in these women, healthcare providers

should understand what the perceived barriers are and help them minimize those barriers.

Perceived social support for being physically active. Social support is defined as information that allows one to believe that he or she is cared for and loved, esteemed and valued, and a member of a network of mutual obligation (Cobb, 1976). Social support is a middle range theory that is important for healthcare providers to consider as they support a person's health status, health behaviors, and use of health services (Schaffer, 2009; Cohen & Syme, 1985) viewed social support as the resources, which are useful information or things, provided by other persons. Therefore, social support initially referred to the supportive behaviors consisting of either verbal or nonverbal information or both, including advice, psychosocial assistance, and tangible aid provided by a social network (Gottlieb, 1983; Tilden & Weinert, 1987). Recently, the abstract meaning of social support has been described as perceptions, quality and quantity of support, behaviors, and social system. For instance, House (1981) described social support based on its possible attributes including 1) emotional, 2) informational, 3) instrumental, and 4) appraisal support. For the health-promoting behavior context, it is believed that perception of ability to cope with the stressful situation can be strengthened by supportive resources. In this case, the social support acts as stress buffer (Cohen, Gottlieb, & Underwood, 2001). Being a part of a social network also controls and pressures a person to engage in health-promoting behaviors. The person has a more positive psychological state such as a sense of predictability, stability, purpose, belonging, and security. The person can also use the resources from his or her social network to promote his or her behaviors and to prevent illness (Schaffer, 2009). Thus, the support resources and

emotional encouragement from the supporters strengthen an individual's perceived ability to cope with a stress situation (Cohen et al., 2001).

According to the health promotion model, social support is one of the interpersonal influence processes (Pender et al., 2006). The interpersonal influence processes include norms, modeling, and social support. Norms refers to expectations of significant others, whereas social support refers to instrumental and emotional encouragement from family, peer, and healthcare providers. However, these cognitions may or may not correspond with reality. The perceived support is the generalized appraisal of persons, which is related to the perceptions of being cared for and valued as well as having others available to them (Schaffer, 2009). Thus, social support is connected to the appraisal of persons to the instrumental and emotional encouragement from their family, peer, and healthcare providers. However, social support is a dyad relationship between the provider's and the recipient's perceptions. The provider has to recognize the other's need for social support before determining the response to the need. On the other hand, the recipients might consider the support unhelpful. A matched perception of social support will enhance the benefits of social support. In the health promotion model, it is believed that given sufficient motivation to behave in a way consistent with interpersonal influences, individuals are likely to undertake behaviors for which they will be admired and socially reinforced.

Social support has been found to be a significant predictor of physical activity in western countries (DuncanEyler, Bronson, Donatelle, King, Brown, et al., 1999; Resnick, Orwig, Magaziner, & Wynne, 2002; Wilcox, Bopp, Oberrecht, Kammermann, & McElmurray, 2003). Persons with high levels of social support were significantly less likely to be sedentary than those with low support. For the lifestyle activity, the study found that women with high social support were twice as likely to

reach the recommended physical activity level compared to those with low or no social support (Eyler et al., 1999). Social support for physical activity involves instrumental, informational, emotional, or appraisal supports from family, relatives, and friends. The support from family members and friends plays a significant role in physical activity. However, social support was described as an indirect influence on physical activity rather than a direct influence (Resnick et al., 2002; Wilcox et al., 2003) In addition, healthcare providers can strengthen the social support interaction between providers and recipients. In Thai working women, social support is also the significant determinant for physical activity (Kaewthummanukul et al., 2006; Youngpradith, 2004) However, when social support was applied in the intervention to promote exercise among Thai elderly, the study reported a non-significant relationship between social support and exercise behavior (Sommang, 1999). This result can imply that the group discussion followed by suggestions from the group instructor and exercise modeling were not enough to strengthen social support interactions between providers and recipients.

Conceptual framework of using MI for promoting PA. The conceptual framework for this study is based on the HPM and MI. Based on the HPM, the behavior outcome will result from the individual's commitment to a plan of action. In turn, the individual's commitment to a plan of action is influenced by the behavior-specific cognitions and affect as well as the immediate competing demands and preferences (Pender et al., 2006). To promote physical activities, the behavior-specific cognitions and affect including perceived self-efficacy to overcome barriers to being physically active, perceived benefits of and barriers to being physically active, and perceived social support for being physically active have been proved as predictors of commitment to a plan of action resulting in physical activity outcomes (Bennett et al.,

2008; Kaewthummanukul et al., 2006; Perry et al., 2007; Youngpradith, 2004). In addition, the study found that the commitment strength positively predicted the behavior outcome (Amrhein et al., 2003). MI basically aims to build up the patient's intrinsic motivation to adopt health recommendations and to resolve the patient's ambivalence about behavior change (Miller & Rollnick, 2002). Consistent with the principles of MI, which include the expression of empathy, the development of discrepancy, rolling with resistance, support for self-efficacy, and evoking change talk, the health coach or counselor can help women address their ambivalence and increase their intrinsic motivation to increase and maintain their physical activity. Working with women in ambivalence, a health coach can help them walk through their ambivalence as well as create and amplify the discrepancy between their present behavior and desired behavior. Then, evoking change talk should be elicited and responded to support their commitment to change. Thus, MI can be used as an intervention to promote physical activity in middle-aged Thai working women based on their readiness to change. Related to the HPM, addressing women's ambivalence and evoking change talk will increase women's perception of self-efficacy, benefits of and barriers to, and social support for being physically active. The negative perceptions of these psychosocial factors, in turn, may cause the ambivalence and inhibit change talk. Thus, using MI as a tailored intervention depending on their psychosocial factors may be an effective intervention for promoting physical activity in Thai working women. See Figure 2.

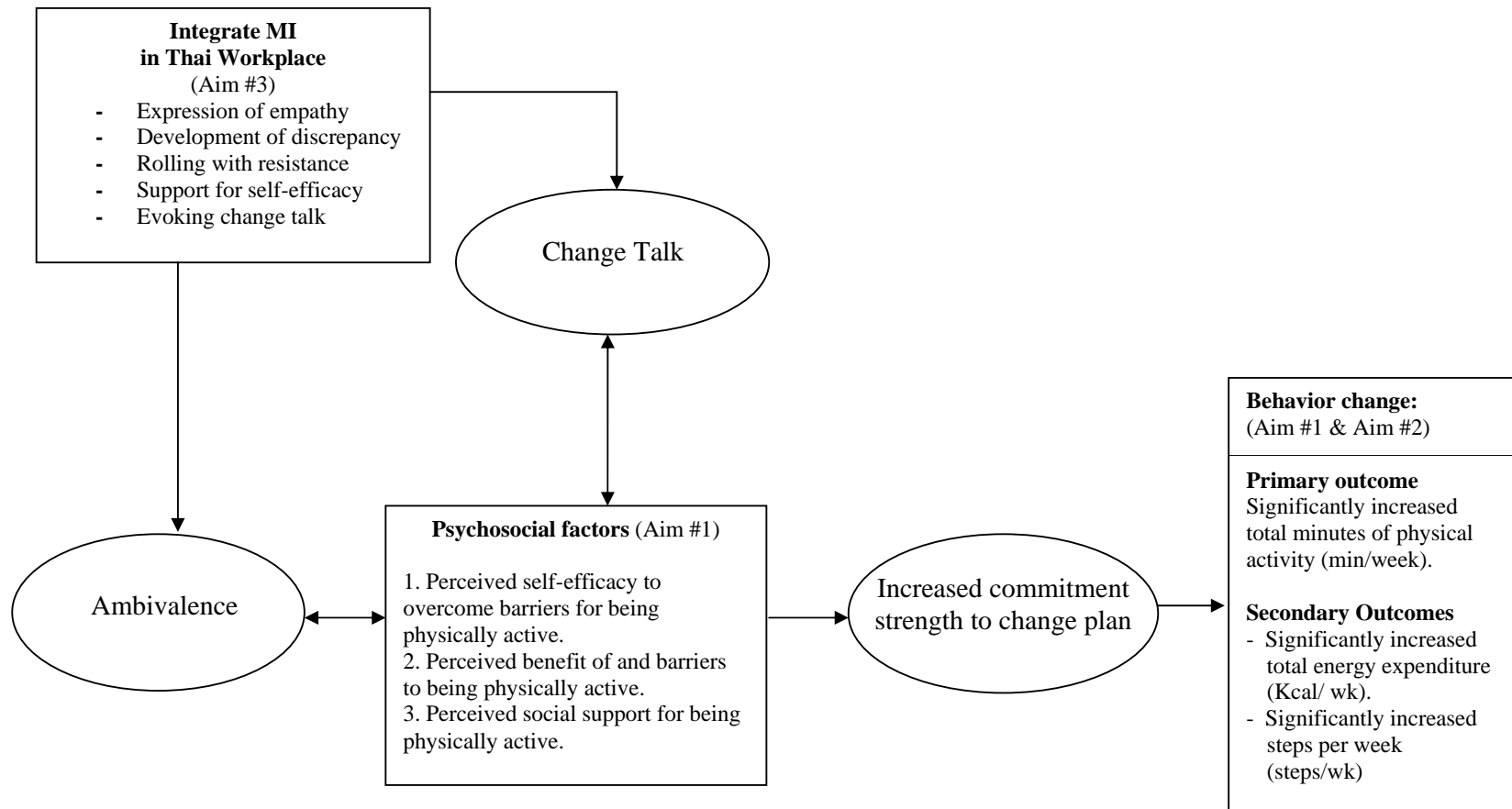


Figure 2 Conceptual framework of using MI for promoting PA

CHAPTER 3

Research Design and Methods

This chapter discusses the study's research design and methods. The design, population and setting, sample, power analysis, subject recruitment, intervention, selection of measures for study variables, procedures, data collection, protection of human subjects and data analysis plan are the focus of this chapter. Since Motivational Interviewing was rarely used in Thailand, the researcher applied this technique to promote physical activity among middle age Thai working women in Oregon prior to use with Thai women in Thailand.

Pilot Study in Oregon

The purpose of the pilot study was to explore the experience of motivational interviewing among Thai working women to increase their physical activity in preparation for a study in Thailand.

Methods and sample. This pilot study used an exploratory, pre-post design to assess the effects of a motivational interviewing intervention and to explore the experience of motivational interviewing among Thai working women in the Thai community in Oregon in the Pacific Northwest of the United States. A total of 13 women who met the following inclusion criteria participated in the study:

1. Age 40-65 years
2. Physically inactive, defined by exercising less than 3 days a week at moderate intensity in the last three months
3. Interested in increasing their physical activity
4. No history of cardiovascular disease, uncontrolled diabetes, uncontrolled high blood pressure, any physical condition that precluded exercise (e.g., musculoskeletal or neurological disorder), pregnancy, taking medications

that adversely affect exercise (e.g., insulin, anti-depressants, bronchodilators/antihistamines, thyroid medication)

5. Literate and fluent in Thai

Recruitment and procedure. Participants were recruited in Portland and Salem, Oregon, from community sites where Thai people come together. The advertisements about the study were posted at Thai restaurants, grocery stores, and the Thai temple in Salem. Participants who were interested in participating contacted the investigator. The investigator provided them more information about the study and asked a series of questions to determine if the applicant met the inclusion criteria. For those who did not meet the inclusion criteria, the investigator explained why they were not eligible to participate and thanked them for their interest. In addition, the current participants were asked to refer their friends. The referred persons were also contacted and provided the necessary information to determine if they were willing and qualified to participate in this study.

Women who met the inclusion criteria were asked to meet with the investigator four times, twice in person and twice on the telephone. At the first meeting, the participants had their blood pressure measured by the investigator. If their blood pressure was normal, the women were asked to sign the informed consent to participate in the study and the agreement to allow the investigator to use a digital recording device during the interview. After that, the women filled out the written questionnaires giving their opinions related to the benefits of physical activity, barriers to their physical activity, and their social support for being physically active. Additionally, the participants were asked about their confidence in the benefits of being physically active. Answering the questionnaires took about 30 minutes. After completing the questionnaires, the subjects made appointments with the investigator for their first

motivational interview. The interview was conducted at their workplace or an agreed-upon confidential location. This in-person interview took about 45 minutes. The second and third motivational interviews were conducted on the telephone and took approximately 20 minutes. The subjects chose a convenient time for the telephone interviews. The second and third interviews were scheduled at 2- and 4-week intervals after the first interview. During motivational interviewing, the subjects created a plan related to their personal physical activity goals. The subjects and the investigator then discussed how to overcome any perceived barriers. Five weeks after the first session, the questionnaires relating to the benefits of physical activity, barriers to physical activity, social support for physical activity and confidence in being physically active were mailed to the participants. These questionnaires were returned to the investigator via pre-paid envelope within one week. The open-ended questions related to their experience of participating in the program were also sent to them in a separate envelope with no name on it. All the questionnaires were sent to the research team who was not their interviewer to avoid answer bias.

Measures. The Self-Efficacy for Overcoming Barriers to Exercise (SEOBE) questionnaire is an 18-item questionnaire. This questionnaire was designed to measure self-efficacy expectations related to the ability to continue to exercise in the face of challenges. The six scales used are negative effect, excuse making, exercising alone, access to equipment, resistance from others, and bad weather. A 5-point Likert scale (0=not at all confident and 4=completely confident) was administered to assess how confident the participants were in their ability to exercise when they were faced with these barriers.

The Perceived Benefits of and Barriers to Exercise (PBBE) questionnaire was a 43-item questionnaire. This questionnaire includes 29 items on the perceived benefit of

exercise and 14 items on the perceived barriers to exercise. A 4-point Likert scale ranging 1 to 4 (1= strongly disagree and 4= strongly agree) is used to indicate agreement with the item statements.

The Perceived Social Support for Exercise (PSSE) questionnaire consisted of the family and friend scales. Each scale contains 12 identical items where the scale range is from 1 to 5 (1=none and 5=very often). The higher scores indicate higher perceived social support from family or friends.

The Experience of Motivational Interviewing (EMI) is an open-end questionnaire. It consists of a short series of questions that assess user satisfaction with PA-MIHCP and questions to evaluate the appropriateness of using PA-MIHCP to promote physical activity in Thai working women.

Findings and application. The finding revealed that only self-efficacy showed a statistically significant difference between pre- and post-intervention. In addition, women reported higher scores of perceived benefits and barriers, perceived social support, and perceived self-efficacy after the MI intervention. The findings from the pilot study suggested the implication for the proposed study in Thailand including (1) altering the current MI process by adding one more in-person session to allow participants to adjust their goals, (2) increasing the time spent for the first follow-up, and (3) anticipating client resistance in the silent format based on Thai culture. In summary, the findings from the pilot study confirmed that motivational interviewing can be used with Thai working women to promote the psycho-social factors that influence them to increase their physical activity.

The study in Thailand

The pilot study in Oregon informed the appropriate design and intervention to use with the study in Thailand. In addition, the subjective and objective measurement

was included to measure the physical activity outcome. Different from the pilot study, the study in Thailand used a parallel group controlled clinical trial with subjects randomized to 10 weeks of motivational interviewing-based health coaching program (MI-BHCP) or health education program (HEP) to test three study aims: 1) to describe the physical activity and selected psycho-social factors including perceived benefits of and barriers to be physically active, self-efficacy to overcome barriers for being physically active, and social support for being physically active; 2) to test the efficacy of a motivational interviewing-based health coaching program compared to a health education program on physical activity; and 3) to describe the feasibility of using a motivational interviewing-based health coaching program for promoting physical activity among Thai working women. Randomization was conducted using a computer to generate a random number table 1:1. The measurements included four questionnaires to measure physical activity and psycho-social factors at baseline, week 8, week 13, and week 36 (6-month follow-up). The step-monitor was also used to measure at baseline, week 8, and week 13. All questionnaires were sent back to the researcher in closed envelopes, except for week 36 where the participants completed the questionnaires online. The research assistant, who was blinded to the group assignments, checked to see if there were any missing data in the questionnaires.

Population and Setting. This study took place in a Thai workplace. In the year 2000, Bangkok had a total population of 6,355,144 with 52.61% being female (National Statistical Office, 2000). Most of the population (99%) held Thai nationality and 94.5% of the population considered themselves Buddhists. In 2007, there were 295,282 workplaces that had at least one employee. The majority of these workplaces (33.7 %) were retail sales businesses, 14.4% were manufacturers, 12.1% were hotel and restaurant businesses, and 10.8% were recreation and other service-oriented

businesses. The rest of the workplaces were engaged in the wholesale, maintenance, or computer business. The majority of the workplaces in Bangkok had 1-15 employees (93.1%, 274,884 workplaces). There were only 0.4% workplaces that had more than 200 employees. Total employment in Bangkok was 2.5 million. One-third of the workforce (34.4%) was employed in workplaces with >200 employees and 33.2% of the workforce was employed in workplaces with 1-15 employees according to the National Statistical Office of Thailand. Merchandizing and service-oriented businesses were the most numerous (55.2%).

The target population for this study was middle-aged Thai women aged 40-65 years who had been working in a Thai workplace in an urban area. Only women who were working in urban area workplaces were included in this study for three reasons: 1) Thai women in urban areas are at reported higher risk of cardiovascular disease than women in rural areas; 2) Thai women in urban areas have different lifestyles from women in rural areas, which is likely to increase their risk for cardiovascular disease; and 3) Thai women in urban areas have reported less physical activity than women in rural areas. The recruitment of participants for this study was at a communications company in Bangkok. This company is one of the largest workplaces in Bangkok. It operates five core businesses, which include mobile phone service, online business information services, pay-TV services, digital commerce business, and digital content business. Women from this workplace were recruited because this workplace is in an urban area. In addition, women represent 52% of all employees in this workplace, and 20% of these women were aged between 40 and 65. Even though this study was conducted in only one workplace in an urban area, the results of this study have the potential to be generalized to the large majority of office-based workplaces in Thailand. The investigator offered the proposal to the workplace and

asked if the workplace wanted to participate in the study. Then, the investigator asked for permission to access the study site and collect the data.

Sample.

Inclusion criteria and exclusion criteria. Only women who meet the study criteria were included in this study. Inclusion criteria were as follows: 1) women aged 40-65 years, 2) physically inactive (defined by exercising less than 3 days a week at moderate intensity in the last three months), 3) having an interest in increasing their physical activity by contacting the investigator to participate in the study, 4) able to ambulate independently, 5) literate and fluent in Thai. Exclusion criteria included current or past history of cardiovascular disease, uncontrolled diabetes, uncontrolled high blood pressure (BP > 140/90 mmHg), and uncontrolled pulmonary disease.

Power analysis. The sample size was determined with a power analysis using exercise behavior data (minutes of exercise per week) from the International Physical Activity Questionnaire (IPAQ). The effect size was calculated from both pre- and post-intervention data derived from the website-delivered computer-tailored intervention for increasing physical activity study (Spittaels et al., 2007). This study was used for the effect-size calculation because the intervention and primary outcome in selected study are similar to the proposed study. The intervention in this study included the tailored physical activity advice on the interactive website and seven non-tailored e-mails to invite participants to visit a specific website section by follow a hyper link (goal setting, weekly plan, strength and flexibility exercises, start-to-run program, forum, links, and contact information). The advice was tailored on stages of change both by content and the way in which the participants were approached. In addition, the advice was given based on the theory of planned behavior, self-efficacy, social support, knowledge, benefits and barriers of physical activity, which is

congruent with the intervention used in the proposed study. Based on the means and standard deviations reported in the study by Spittaels et al., (2007), the effect size d was computed ($d = 0.74$). Power Analysis Sample Size (PASS) software was used to calculate the sample size based on this effect size and an alpha level of .05 as well as a 2X3 mixed-methods ANOVA, with a two level between-subjects factor (group) and a three level within-subjects factor (time). The autocorrelation was assumed to be .70. The results indicated that with a sample size of 15 per group, the study would have 92% power to detect an effect. Because this effect size is only based on one study and may be subject to sampling variation, a power analysis with a more conservative value of .54 will be considered to use as an effect size, which represents a medium effect size. With a sample size of 20 women per group, the study will achieve 81% power to detect an effect size of .54 with an alpha level of .05. Attrition rates of Thai women in exercise intervention studies range from 17% to 26% (Pongchaiyakul, Nguyen, Kosulwat, Rojroongwasinkul, Charoenkiatkul, et al., 2004; Sukjam, 2000; Sunsern, 2002). Thus, this study enrolled 48 women to allow for a 30% attrition rate.

Procedures.

Recruitment. Women were recruited at the communication service company in Bangkok, Thailand. Advertisements were disseminated and fliers were posted at various human resource offices and the study sites describing the relevant details of the study. The advertisements were sent to women who could be prospective study subjects aged 40- 65 via the blind copy compose (bcc) e-mail. If a woman was interested in participating in this study, she contacted the investigator by telephone, email, or in person at the study site. The investigator provided more information about the study and asked a series of questions to determine if the applicant met the inclusion criteria. Women who met the inclusion criteria were asked to sign the

informed consent form and the agreement form to allow the investigator to use a digital recording device during the interview. These women were given an information sheet and notice of privacy practices to obtain their consent to participate in the study. For those who did not meet the inclusion criteria, the investigator explained why they were not eligible to participate and thanked them for their interest. There were 144 women in this company who met the eligibility requirements and who were possible participants in the study; 57 women contacted the researcher to get more information about the study. Seven of these women could not participate in the study because of time limitations. Seventeen others were excluded because they did not conform to other inclusion criteria. Ten of them were younger than 40 years old. Three more were male and four others were not employees in this company. These ineligible employees initially became aware of the study either from the advertising posters at the building or from their friends who had received the e-mails. In summary, 51 women participated in this study. All the women were randomized to either MI-BHCP or HEP.

The recruitment was done within 4 weeks, but the women asked to start their programs at different times based on their schedule. The rationale for the limited recruitment time was to decrease the major threat to internal validity as natural history. For example, weather conditions might affect women's motivation to be physically active. In the rainy season, women might use vehicles instead of walking, while women might be more active during the summer season. In addition, a long weekend could influence physical activities of women during an intervention. The workplace and national health promotion policy during the intervention might also influence their activities. The recruited participants were called or emailed every two

weeks to update their recruitment status. The pre-test measures were conducted in private at the participants' workplace offices.

Intervention group. Women in the intervention group were asked to meet with the investigator five times, three times in person and twice on the telephone. At the first meeting, the women had their blood pressure measured by the researcher. After that, the women filled out four written questionnaires giving their opinions relative to the health benefits of physical activity, the barriers to their participating in physical activity and the social support they had for being physically active (as measured by the Perceived Benefits of and Barriers to Exercise questionnaire and the Perceived Social Support for Exercise questionnaire). Additionally, the participants were asked about their confidence in the benefits of being physically active (as measured by the Perceived Self-Efficacy to Overcome Exercise barriers questionnaire). Answering the questionnaires took about 30 minutes.

After completing the questionnaires, the women made appointments with the researcher for their initial motivational interview. The interview was conducted at their workplace in a confidential location. During this initial meeting, participants received individually tailored counseling using motivational interviewing techniques to enhance their physical activity. The women and the investigator then discussed how to overcome any perceived barriers to physical activity as well as the possible resources to increase their being active. The principles of motivational interviewing, which include (1) the expression of empathy, (2) the development of discrepancy, (3) rolling with resistance, (4) support for self-efficacy, and (5) evoking change talk (Miller & Rollnick, 2002; Rollnick et al., 2008), were used to evaluate the participants' motivation to increase their physical activity.

In order to decrease the probability of cardiovascular disease, the women were encouraged to reach the currently accepted optimal level of 30 minutes of moderate-intensity physical activity (e.g., brisk walking) 5 days a week or walking 10,000 steps per day at a slower pace. Thus, the women's goals varied with each person based on her readiness for change. Even though a standard goal of a minimum of 30 minutes of moderate-intensity physical activity on most, and preferably all, days of the week was given to these women, women created their own plan based upon their personal physical activity goals.

The second personal interview (the first MI follow-up at week 4) was conducted two weeks after the initial MI interview also at their workplace. In the second interview, the conversation related to adjusting their goals and overcoming any existing barriers to their being physically active. Each of these in-person interviews took approximately 30 minutes. The third and fourth Interviews (the second and third MI follow-ups) were conducted over the telephone and took approximately 15 minutes each. The subjects chose a convenient time for the telephone interviews during their work time. The third and fourth interviews were scheduled at 2 and 4 week intervals after the second interview (week 6 and week 10). The total dose of the intervention expected to reach 90 minutes.

Motivational interviewing fidelity. The MI counseling was conducted by the investigator, who was trained in MI techniques. In order to conduct MI, the investigator attended a 16-hour motivational interviewing workshop level I and an 8-hour of motivational interviewing workshop level II conducted by members of the Motivational Interviewing Network of Trainers (MINT) supported by the Oregon Health and Science University. After the workshop, the investigator practiced using motivational interviewing with two Thai working women. The language spoken at

these practice interviews was Thai. The translated transcripts were coded and discussed concerning the relevance of using MI in the Thai culture. The Motivational Interviewing Treatment Integrity (MITI) was used to code the transcripts. The global rating score was shown to be proficient for using MI (global rating score > 3.5). Motivational interviewing had previously been used with 14 Thai working women in a pilot study designed to promote physical activity in Thai working women living in Oregon.

In this study, all the interviews were audio-taped and 5% of the meetings from both groups were randomly selected to be transcribed into Thai by two bilingual translators for coding. As a result, 12 interviews were randomly selected including (1) three initial interviews from MI-BHCP, (2) three initial interviews from HEP, (3) three follow-up interviews from MI-BHCP, and (4) three follow-up interviews from HEP. The translated transcripts were coded using the Motivational Interviewing Treatment Integrity (MITI) coding system by a trained coder. In this study, there was a difference between the global rating scores from the interviews from the MI-BHCH and those from the HEP. The global rating scores from the interviews of the MI-BHCP group were higher than the scores of the HEP group. The scores showed that the interviewer demonstrated a satisfactory beginning proficiency and competency in using reflection with a high percent of using complex reflection. Even though the global scores of MITI were acceptable for use in another culture by a novice interviewer, the global rating scores in MI-BHCP did not meet the proficiency level of MITI.

Table 1
The average and percent of motivational interviewing treatment integrity scores based on group

Behavior Count or Summary Score Thresholds	Beginning Proficiency	Competency	HEP	MI-BHCP
Global Clinician Ratings	Average of 3.5	Average of 4	1.3	3.17
Reflection to Question Ratio (R:Q)	1	2	0.18	1.33
Percent Open Questions (% OC)	50%	70%	8%	53%
Percent Complex Reflections (% CR)	40%	50%	53%	70%
Percent MI-Adherent (% MIA)	90%	100%	14%	84%

Comparison group. Women who were randomized to a comparison group met individually with the investigator for 30 minutes in person at the beginning. The first interaction was based on the teaching in the general health education and free from any teaching using motivational interviewing. At this session, they also got written standard education material, exercise logs, and a pedometer. The interviewer also contacted the participants by telephone each month for a 5-minute interview to provide positive reinforcement that did not endorse principles of MI. The total interaction dose for the control group was expected to reach 40 minutes.

Data Collection. The questionnaires relating to the previous 7 days' physical activity, the benefits of physical activity, the barriers to being physically active, the social support for physical activity, and the confidence in being physically active were collected three times: (1) before the initial motivational interview at week 1, (2) 5 weeks after the initial motivational interview at week 8, and (3) 12 weeks after the initial motivational interview at week 13. In addition, at week 36 (6 months after finishing the program), the participants were asked to answer the physical activity questionnaire and also answer five questions relative to weighting their overall

perceived benefits, perceived barriers, perceived social support from friends, perceived social support from family, and perceived self-efficacy.

A physical activity log related to step count and exercise frequency was given to each woman so she could record her daily physical activity and progress. Thirty percent of the women in both groups were randomly selected to wear pedometers to count their walking steps during the 12-week program. All 16 women (8 women from each group) received the pedometer after completing the baseline questionnaire. The steps walked at baseline were their number of steps in the last 7 days before receiving either MI or HE. Participants who used a pedometer were asked to record their number of steps and calories expended in the physical activity log every day and to hand it in to the researcher along with the questionnaire at weeks 8 and 13. The researcher collected the data via the organization's internal mail. The data were anonymous as the names of the participants were not on the questionnaires nor on the log book. In addition, the research team and the mail delivery service was not able to connect the questionnaires with any one participant. The data were not shared and were maintained in a locked location available only to the research team. Figure 3 shows the data collection framework.

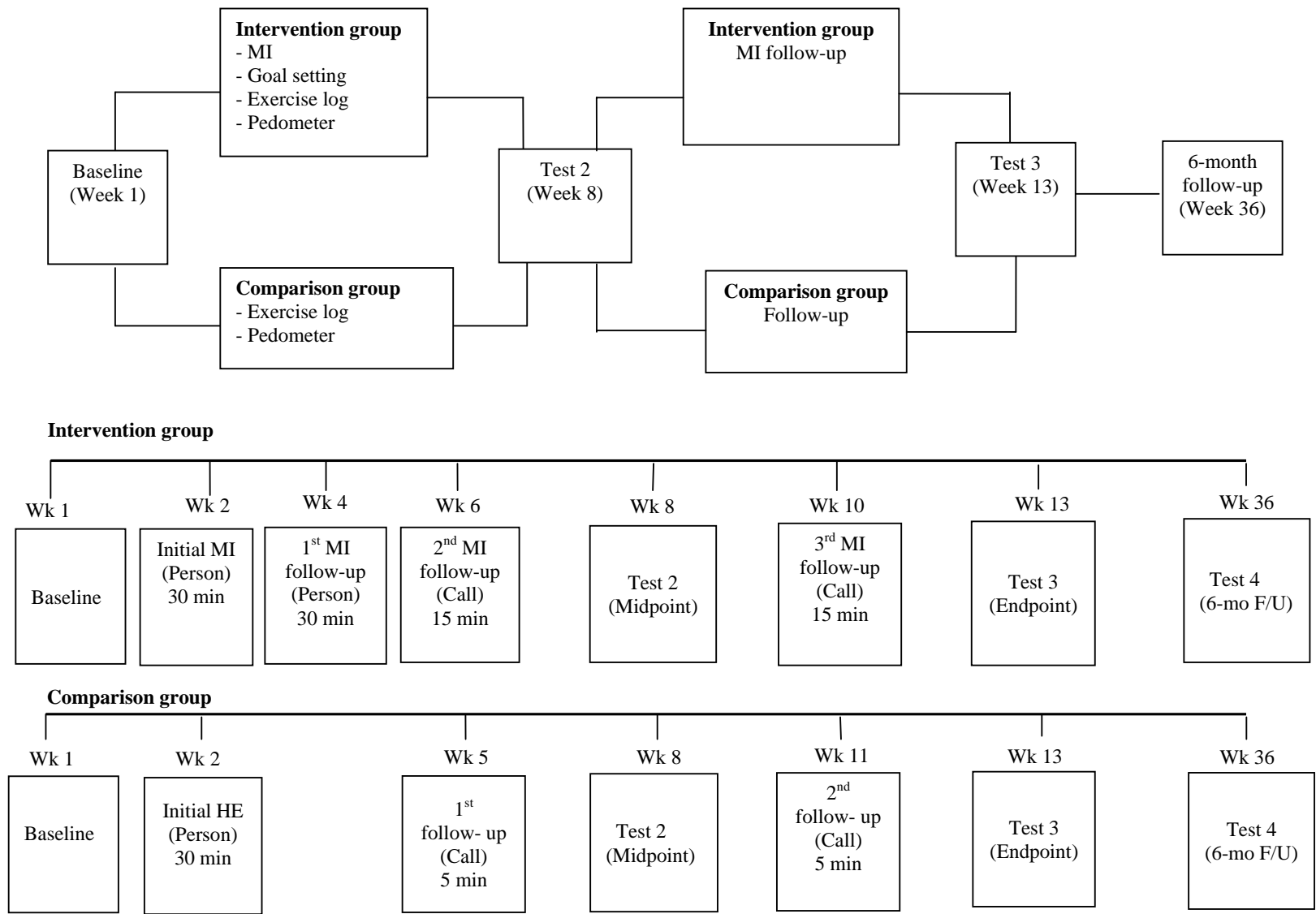


Figure 3 Collecting data framework

Measurements. Demographic data and clinical data included age, marital status, education, job characteristics, body mass index, and number of dependent family members.

Primary outcome measures.

Physical activity. The International Physical Activity Questionnaire (IPAQ) was used to measure the physical activity data. The IPAQ is a 4-part questionnaire that includes 1) the long-term 7-day self-administered, 2) the short-term 7-day self-administered, 3) the long-term 7-day telephone-interview, and 4) the short-term 7-day telephone-interview. In this study, the long self-administered section was used to collect the previous 7 days of physical activity data. The IPAQ includes five activity domains, which are questioned separately: 1) job-related physical activity; 2) transportation physical activity; 3) housework, house maintenance, and caring for family physical activity; 4) recreation, sport, and leisure-time physical activity; and 5) time spent sitting. The IPAQ was translated into Thai using the back translation method, which is based on the guidelines for cultural adaptation and translation for IPAQ (Barbara E. Ainsworth, 2008) and the Translation Instruments into Other Languages Guideline (Hilton & Skrutkowski, 2002). Based on these guidelines, the IPAQ English version was translated independently into Thai by two bilingual translators including the researcher and a bilingual PhD student who had experience in exercise measurement. Then the two Thai version questionnaires were compared and discussed among the translators to get the final translated version of the Thai IPAQ. The final translation was modified in the activity samples area to more closely conform to the Thai culture. All the example activities were checked for the MRT intensities from the *Compendium of Physical Activities* to make sure that the activities were categorized as either vigorous or moderate intensity. The modified Thai IPAQ

was sent to five experts: two Thai experts in promoting physical activity, one Thai expert in occupational health nursing, one Thai expert in public health, and one Thai expert in questionnaire development. The Thai IPAQ was validated for the concept, understandable language, and cultural appropriateness. The face validity by experts revealed that the Construct Validity Index met the 80% criterion of validation agreement for conceptual and cultural appropriation for use with Thai working women. Then, the Thai IPAQ was translated back into English by a certificated translator. The focus of the translation was to maintain the conceptual rather than the literal meaning. The back-translated version was compared with the original version by the research team.

The validated Thai version was used with two Thai working women to verify that the words used in the questionnaire were clear and the activities made sense to them. The women were asked to recall their physical activity in each domain during the last seven days. The IPAQ has acceptable measurement properties and has reasonable measurement properties for monitoring population levels of physical activity among 18- to 65-year-olds in diverse settings (Craig, Marshall, Sjostrom, Bauman, Booth, et al., 2003). The recall method also runs a low risk of affecting the patterns being measured. The long 7-day recall IPAQ reported good test-retest repeatability for monitoring population levels of physical activity among 18- to 65-year-olds in diverse settings (Craig et al., 2003). In testing for the reliability and validity across 12 countries, the study revealed a good repeatability coefficient of $\rho = 0.81$ (95% CI 0.79 – 0.82).

The data from the IPAQ were summed up within each physical activity domain to estimate the total time spent in occupational, transport, household, and leisure-related physical activities in moderate and vigorous activity based on IPAQ

guideline as well as total time reported sitting per week. However, the sitting questions were not part of the summed physical activity score. Total physical activity in minutes per week was categorized to determine the proportion of each sample that met the physical activity guideline of a minimum of 30 minutes of moderate-intensity physical activity on most, and preferably all, days of the week. Based on the IPAQ guideline, the physical activity category was divided into 3 categories: high physical activity, moderate physical activity, and low physical activity. Participants who reported their physical activity in the high category were recorded as a participant who performed vigorous-intensity activity on at least 3 days per week or who achieved a minimum total physical activity of at least 1500 MET-minutes/week. Participants who reported their physical activity in the moderate category were recorded as a participant who performed moderate-intensity activity on 5 or more days per week or who achieved a minimum total physical activity of at least 600 MET-minutes per week from moderate or vigorous-intensity activities. The participants who reported their physical activity in the low category were recorded as a participant whose physical activity did not meet the criteria for either the high or low category. The weighted MET-minutes per week was calculated as duration of activity per day x frequency per week x metabolic equivalent (MET) intensity. This number was summed across activity domains to produce a weighted estimate of total activity from all reported activities per week. The total MET-minutes per week was the summation of the MET-minutes per week from moderate and vigorous intensity activity in work, domestic, leisure-time, and transportation physical activity domains.

Table 2 Formula for calculating MET-min/wk for physical activity outcomes

MET-min/wk	Formula
MET-min/wk	MET X Frequency (day) X Duration (minute)
Total MET-min/wk at work	MET-min/wk of moderate PA + MET-min/wk of vigorous PA at work
Total MET-min/wk of transportation	MET-min/wk of moderate PA + MET-min/wk of vigorous PA if transportation
Total MET-min/wk of housework	MET-min/wk of moderate PA + MET-min/wk of vigorous PA of housework
Total MET-min/wk of leisure PA	MET-min/wk of moderate PA + MET-min/wk of vigorous PA of leisure PA
Total MET-minute/week	Summation of total MET-minute/wk from work, transportation, housework, and leisure-time physical activity domains.

Secondary outcome measures.

Energy expenditure. The total energy expenditure for physical activity was derived from weighting the reported minutes per week within each activity category by an MET energy expenditure estimate assigned to each category of activity. The MET levels of moderate, vigorous, and walking activity were derived from the MET intensity mentioned in the IPAQ guideline, which was obtained from the 2000 *Compendium of Physical Activities* (Ainsworth et al., 2000). Thus, the energy expenditure during physical activities per week in this study was calculated from the MET intensities, sessions of physical activity per week (frequency), hours per session (duration), and body weight in kilograms to compare the energy expenditure at baseline, midpoint, endpoint, and 6-month follow-up in both groups.

MET values of all walking during work, transportation, housework, and leisure time are listed as 3.3. According to the work domain, MET values for moderate and vigorous physical activity are listed as 4 and 8, respectively. For the

active transportation domain, the MET value per cycle is listed as 6. Related to housework, moderate MET value for yard and inside-house work are equal to 4 and 3, respectively. Originally, the IPAQ did not include questions related to vigorous physical activity inside the home.

In order to make it fit within the context of Thailand, the Thai IPAQ included questions about vigorous physical activity for housework inside the house. Then the researcher assigned the MET value for this activity to equal the MET values for yard chores activity, which are listed as 5.5. The MET values for moderate and vigorous leisure-time physical activity are equal to 4 and 8, respectively. The total energy expenditure was reported in kilocalorie (Kcal) per week:

$$\text{Kcal per week} = \text{METs} \times \text{sessions} \times \text{hours} \times \text{BW (kg.)}$$

Steps walked. Electronic pedometers were used as the objective data measurement for physical activity. In this study, the New Lifestyles NL 2000 pedometer was used to measure steps, walking distance, and energy expenditure. The New Lifestyles NL 2000 has an accelerometer consisting of a horizontal beam and a piezoelectric crystal. Steps are determined from the number of zero-crossings of the instantaneous acceleration versus time curve (Crouter et al, 2003). The study revealed that the NL 2000 had correlation coefficients of 0.99 and provided mean values within +/- 1% of actual steps. The NL 2000 also estimates gross kilocalories by taking into account the subject's RMR (based on input of age, gender, weight, and height). For net kilocalories, the NL 2000 was significantly different ($p < .05$) for at least four speeds of fastest walking. The women who were randomly assigned to use the pedometer were asked to wear the New Lifestyles pedometer starting on day 1 of the 12-week program and to record daily their steps and energy expenditure on the

exercise log. The steps counted from the pedometer in the past 7 days were compared with the intervention and control groups as well as the baseline, midpoint, endpoint.

Perceived self-efficacy for being physically active. The self-efficacy for being physically active in this study was measured using the Thai version of the Self-Efficacy for Overcoming Barriers to Exercise (SEOBE) questionnaire (Wanikun, 2003). This questionnaire was developed from a multidimensional scale of self-efficacy for overcoming barriers to exercise (Benisovich, Rossi, Norman, & Nigg, 1998). The questionnaire was originally designed to measure self-efficacy expectations related to the ability to continue exercise in challenging situations. The questionnaire was divided into six dimensions: 1) negative affect, 2) excuse making, 3) must exercise alone, 4) inconvenient to exercise, 5) resistance from others, and 6) bad weather. Wanikun (2003) developed this questionnaire to be appropriate for middle-aged Thai women.

The SEOBE questionnaire is a 23-item questionnaire. This questionnaire was designed to measure self-efficacy expectations related to the ability to continue the exercise in the face of challenges. The six scales used are the same as the original version. A 5-point Likert scale (0=not at all confident and 4=completely confident) is administered to assess how confident the participants are in their ability to exercise when they are faced with these barriers. A higher total score on the SEOBE means the woman has more confidence in her ability to exercise when these barriers are in the way of exercising. This questionnaire demonstrated good internal consistency reliability when tested on women aged 45-81 who had coronary artery disease. Internal-consistency reliability estimates (α) of each sub-scale were in the range of .83 to .92. Negative affect ($\alpha=.92$) had the highest reliability, followed by resistance from others ($\alpha=.90$), excuse making ($\alpha=.89$), bad weather ($\alpha=.89$), must

exercise alone ($\alpha=.87$), inconvenient to exercise ($\alpha=.83$). From the current study, the questionnaire also reported high internal-consistency reliability estimates (alpha) at baseline, midpoint, and endpoint measures ($\alpha=.93$, .93, and .94, respectively).

In this study, the questionnaire was used at pre- and post-intervention for women in both the intervention and control groups. The total score of the SEOBE questionnaire was used to compare between the intervention and control groups at three different times. At the 6-month follow-up, women were asked about their overall confidence to overcome the barriers to being active by using one question on the online survey. The total average of perceived self-efficacy was also divided into 3 levels: perceived high self-efficacy (mean = 2.67 – 4.00); perceived moderate self-efficacy (mean = 1.34 – 2.66); and perceived low self-efficacy (mean= 1.00- 1.33).

Perceived benefits of and barriers to being physically active. The perceived benefits of and perceived barriers to be physically active was measured using the Perceived Benefits of and Barriers to Exercise (PBBE) questionnaire modified by Vannarit (1999). The original English version was developed by Sechrist et al. (1987). The instrument consists of 43 items, including 29 items on perceived benefit of exercise and 14 items on perceived barriers to exercise. A 4-point Likert scale ranging from 4 (strongly agree) to 1 (strongly disagree) was used to indicate agreement with the item statements. Based on the pilot study with Thai working women in Oregon, items 21 and 22 were deleted from the questionnaire because the content in these items were too closely related to other items and caused confusion in the participants. Thus, for this study, the questionnaire contained 41 items, including 28 items on perceived benefit of exercise and 13 items on perceived barriers to exercise. The possible range of scores on the perceived benefits of exercise and perceived barriers to exercise are 28 to 112 and 13 to 52, respectively, with the higher scores indicating

higher levels of perceived benefit of or barriers to exercise. In order to calculate the total scores for the PBBE, the barriers scale was reversely scored, and then added to the benefits scored. The total average of perceived benefits and barriers were also divided into 3 levels: perceived high benefits or barriers (mean = 2.67 – 4.00); perceived moderate benefits or barriers (mean = 1.34 – 2.66); and perceived low benefits or barriers (mean= 1.00- 1.33).

The factor analysis of the total items for this instrument yielded a nine-factor solution (life enhancement, physical performance, psychological outlook, exercise milieu, social interaction, time expenditure, preventive health, physical exertion, and family encouragement) and accounted for 94.4% of variance. Second-order factor analysis found that when two factors were extracted, one a benefits factor and the barriers factor, an explained variance of 47.7% was found. Internal-consistency reliability (coefficient alpha) for the total instrument was .95. The 29-item benefits scale had a coefficient alpha of .95, and the 14-item barriers scale had a coefficient alpha of .87.

Test-retest reliability of the Thai version of the PBBS was done using a 2-week interval. The reliability of the perceived benefits scale and the perceived barriers scale in rural Thai older adults was .99 and .97, respectively (Vannarit, 1999). (Kaewthummanukul, 2003) also reported internal-consistency reliability of the Thai version in 970 female registered hospital nurses who worked full-time. Cronbach's alphas for total perceived benefits of and barriers to exercise, perceived benefits of exercise, and perceived barriers to exercise were .97, .97, and .89, respectively. From the current study, the internal-consistency reliability estimates (alpha) at baseline, midpoint, and endpoint measures of total scale had good reliability (α =.84, .80, and .83, respectively). The questionnaire also reported good internal-consistency

reliability estimate (alpha) at baseline, midpoint, and endpoint measures for both perceived benefits sub-scale ($\alpha=.94$, .89, and .95, respectively) and perceived barriers sub-scale ($\alpha=.82$, .75, and .86, respectively). In this study, the total score of the PBBE questionnaire was separately used to compare intervention and control groups over three different times. In addition, at the 6-month follow-up, women were asked about their overall perception related to the benefits using one question and another one question to ask about their overall perceived barriers to being active by on the online survey.

Perceived social support for physical activity. The women's perceived social support for physical activity was measured using the Perceived Social Support for Exercise (PSSE) questionnaire translated by Vannarit (1999). The original English version of the PSSE was developed by Sallis et al (1987). The social support for exercise behaviors scale is a self-administered tool consisting of two sub-scales: the family and friend sub-scales. Each sub-scale contains 12 identical items that assess the frequency of support of exercise during the previous 3 months using a 5-point scale ranging from 1 (none) to 5 (very often). If women are not trying to exercise, they could rate some of the questions as "does not apply"; these are scored as 1 (none). The possible range of scores on each scale is 12 to 60, with higher scores indicating higher perceived social support from family (or members of the household) or from friends (or acquaintances or coworkers). The total average of perceived social support was also divided into 3 levels: perceived high social support (mean = 3.33 – 5.00); perceived moderate benefits or barriers (mean = 1.67 – 3.32); and perceived low benefits or barriers (mean= 1.00- 1.66).

Factor analysis (varimax rotation) of the family scale yielded a two-factor solution: (a) participation and involvement and (b) rewards and punishments factors,

which accounted for 46.2% of variance. The friend scale yielded only a one-factor solution (exercising together), which accounted for 35% of the variance. Test-retest reliability measured over a 1- to 2-week interval for the family and friend scales was .77 and .79, respectively. Internal consistency as measured by Cronbach's alphas for the family and friend scales were .91 and .84, respectively. Kaewthummanukul (2003) also reported good internal-consistency reliability of the Thai version in 970 female registered nurses who worked full-time. Internal consistency of the perceived social support from family members and perceived social support from friends, acquaintances, or co-workers were .96 and .95, respectively. At the 6-month follow-up, women were asked about their overall perception about social support from family and friends separately by using one question on the online survey.

Experience of motivational interviewing. The experience of participating in the program was measured using the Experience of Motivational Interviewing (EMI) questionnaire. The EMI is an open-end questionnaire. It consists of a short series of questions that assess user satisfaction with the MI-based health coaching program and questions to evaluate the appropriateness of using the program to promote physical activity in Thai working women. The experience of participating in the program was also completed by the participants in the health education group to describe their experience. Participants in both groups were asked to complete the EMI at week 13.

Data analysis plan. The data were entered into the Statistical Package for the Social Sciences (SPSS), version 17. Data entry was verified via double entry with 100% agreement. The data were screened using frequency distribution and descriptive statistics for all items. The distribution for all variables was examined for equal variance. In order to deal with the extreme outliers, the winsorizing method was used (Cohen, 2008). If the data distribution is not normal, both the top and bottom 10% of

the data points are winsorized. These 10% extreme values are placed by the less extreme values in the distribution of scores. The winsorization is performed for every level of the two factors: coaching style and time (Keselman, Algina, Wilcox, & Kowalchuk, 2000).

The demographic data, which included age, marital status, education, job characteristics, body mass index, and number of dependent family members, were described if the intervention and comparison groups were comparable as well as if the intervention effect holds over such variability. If statistically significant differences in demographic data are found between groups, the Analysis of Covariance (ANCOVA) is used to control these differences.

The first study aim was to describe the physical activity (as measured by the IPAQ), perceived benefits of and barriers to be physically active (as measured by the PBBE questionnaire), self-efficacy to overcome barriers for being physically active (as measured by the SEOB questionnaire), and social support for being physically active (as measured by the SSE questionnaire) of middle-aged Thai working women. The hypothesis for this aim was that women with more minutes of physical activity on their IPAQ, higher energy expenditure on the IPAQ, and greater number of steps on the pedometer would have higher self-efficacy scores, higher exercise benefit scores, lower barrier to exercise scores, and higher social support scores compared to women with fewer minutes of physical activity, lower energy expenditure, and a smaller number of steps.

Descriptive statistics including mean and standard deviation were conducted to describe the physical activity, energy expenditure, steps walked, perceived benefits and barriers, self-efficacy, and social support to exercise of midlife Thai working women. The Pearson Correlation was used to analyze the relationships between the

psycho-social factors and physical activity outcomes in each group at baseline, week 8, week 13, and week 36.

The second study aim was to test the efficacy of a motivational interviewing-based health coaching program compared to a standard education program among middle-aged Thai working women. The hypothesis for this aim was that women in the motivational interviewing-based health coaching program would have a greater change in their physical activity data as well as selected psycho-social outcomes over four different times than the changes seen in the health education group.

A mixed-methods ANOVA was used to analyze the primary and secondary outcomes. The assumptions underlying the mixed-methods ANOVA were tested prior to the analyses. The assumption of multi-sample sphericity was tested to see whether group variability was the same for each of the groups and that the scores were normally distributed and independent among groups. For the primary outcome analysis, the 2x3 and 2x4 mixed-methods ANOVA was conducted with group and time as the independent variables and minutes of physical activity as the dependent variable. In addition, the 2x2x3 mixed-methods ANOVA was also conducted to see if use of the pedometer added any effect to the coaching style on minutes of physical activity. Coaching style, use of pedometer, and time were used as the independent variables; the minutes of physical activity were used as the dependent variable.

For the secondary outcome analysis, the five 2x3 mixed-methods ANOVA was conducted with group and times as the independent variables and the secondary outcomes including steps walked, perceived benefits and barriers, perceived self-efficacy, and perceived social support as the dependent variables.

The third study aim was to describe the feasibility of the motivational interviewing health coaching program among Thai working women. The qualitative

data were translated into English and then they were coded and analyzed using thematic analysis.

CHAPTER 4

Results

Fifty-one office-based working women participated in this study. One woman refused to participate in the study before completing the baseline questionnaire while another woman from the motivational interviewing group withdrew from the study before the initial interview. The data were entered into the Statistical Package for the Social Sciences (SPSS), version 17. Data entry was verified via double entry with 100% agreement. The data were screened using frequency distribution and descriptive statistics for all items. The demographic data including age, family status, education, job characteristics, body mass index, and number of dependent family members were described based on the intervention and control groups. Figure 4 shows the consort flowchart for the study period.

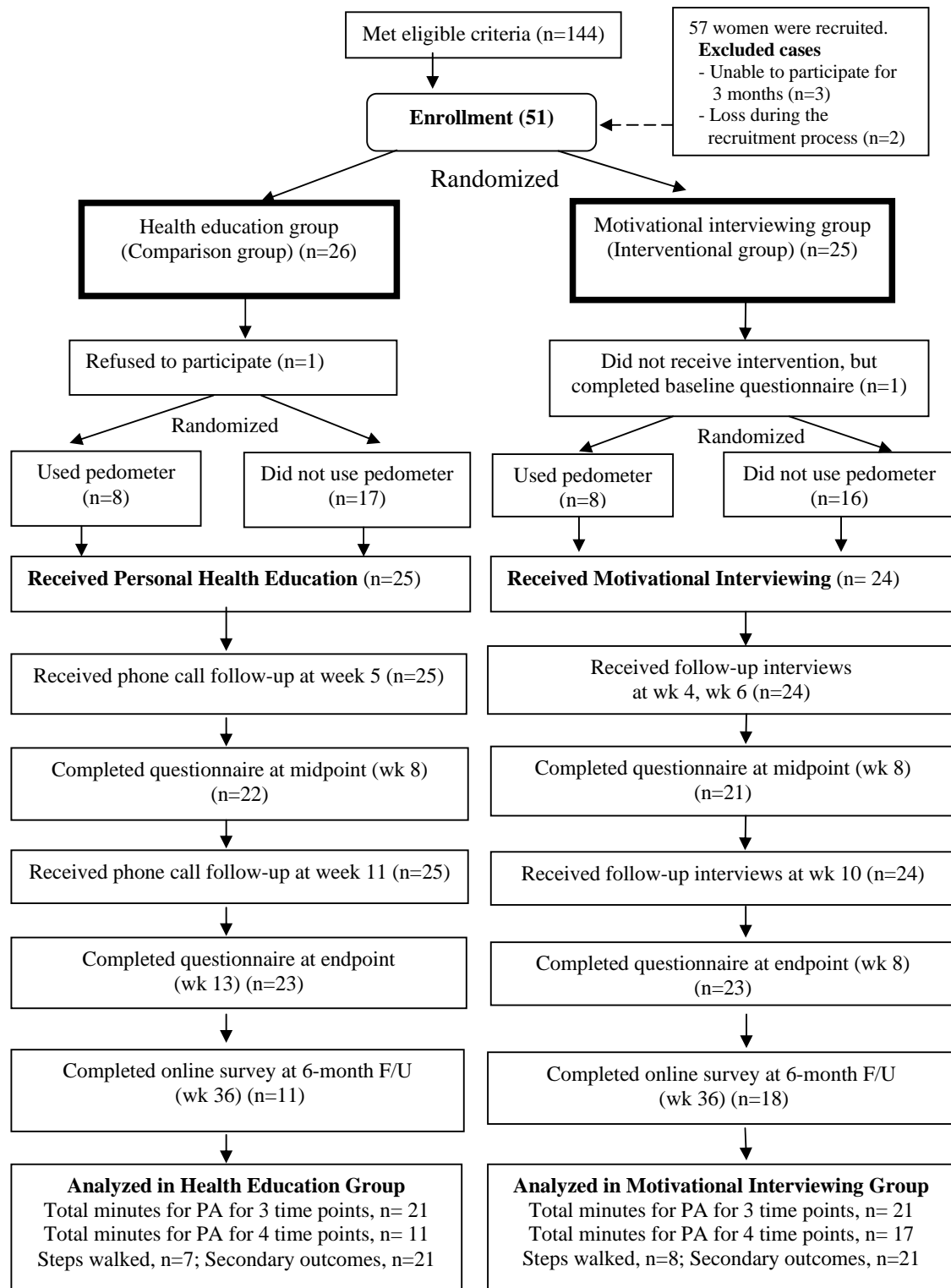


Figure 4 The consort flowchart February 2009 – January 2010

Demographics

The majority of participants' ranged between 40-49 years old in both groups. Almost 95% of both groups reported higher education. About 70% of both groups had their Bachelor's degree, while another 25% had a graduate degree. The majority of participants worked in customer service, programming, sales and channel management, production, and account and procurement departments in that order. Sixty percent of participants in both groups reported good financial status. All participants reported low physical activity at work including mainly sitting with slight arm movement (56% of the motivational interviewing group and 38.5% of the health education group) and sitting or standing with some walking (44% of the motivational interviewing group and 61.5% of the health education group). About 36% of participants in the motivational interviewing group and 19% of participants in the health education group were overweight and obese. The number of dependent family members in both groups ranged between 1 and 10. See Table 3.

Table 3
Frequency and percent of baseline characteristics by group

Demographic Data	Motivation Interviewing n=25		Health Education n=26	
	n	%	n	%
Age				
• 40-49	23	92.0	24	92.3
• 50-60	2	8.0	2	7.7
Education				
• Primary	0	0	1	3.8
• Secondary	0	0	0	0
• Associate	2	8.0	0	0
• Bachelor's	17	68.8	18	69.2
• Graduate	7	26.9	7	26.9
Family Status				
• Never married	8	32.0	6	23.1
• Currently married/partnered	14	56.0	18	69.2
• Widowed/divorced/separated	3	12.0	2	7.7
Department				
• Programming	4	16.0	6	23.1
• Sale& Channel Management	3	12.0	6	23.1
• Broadcast & Engineering	0	0	1	3.8
• Production	4	16	1	3.8
• Human Resource & Administration	2	8	0	0
• Marketing	0	0	2	7.7
• Customer Service	6	24.0	6	23.1
• Information Systems	1	4	1	3.8
• Account & Procurement	5	20.0	2	7.7
• Security Guard	0	0	1	3.8

Table 3 (Continued)
Frequency and percent of baseline characteristics by group

Demographic Data	Motivational Interviewing n= 25		Health Education n =26	
	n	%	n	%
Financial Status				
• Not enough	1	3.8	1	4.0
• Enough but no saving	8	32.0	12	46.2
• Having some extra money to save	15	60.0	9	34.6
• Having more than need	1	4.0	4.0	15.4
General Activity Type				
• Mainly sitting with slight arm movement	14	56.0	10	38.5
• Sitting or standing with some walking	11	44.0	16	61.5
BMI				
• Less than 18.5 (Underweight)	2	8.0	2	7.7
• 18.51-24.99 (Normal)	14	56.0	19	73.1
• 25.00-29.99 (Overweight)	6	24.0	4	15.4
• 30 and greater (Obesity)	3	12.0	1	3.8
Number of dependent family members				
• 1	6	24.0	2	7.7
• 2	5	20.0	7	26.9
• 3	10	40.0	7	26.9
• 4	3	12.0	6	23.1
• 5	1	4.0	3	11.5
• 10	0	0	1	3.8

In the motivational interviewing group, the average age of participants was 44. The average age of participants in the health education group was 46. Participants in the motivational interviewing group had an average body mass index higher than the average of participants in the health education group. See Table 4.

Table 4
Mean and standard deviation of baseline characteristics by group

Demographic Data	Motivational Interviewing n= 25		Health Education n =26	
	M	SD	M	SD
Age	43.96	3.26	45.58	3.68
BMI	24.35	5.29	22.76	4.10

To determine if there were statistically significant differences in demographic data between groups, baseline data were compared using *t*-tests for parametric data and a chi-square for non-parametric data. From parametric data, there was no statistically significant difference in family status ($\chi^2(2) = .96, p = .62$), education ($\chi^2(3) = 3.09, p = .38$), working department ($\chi^2(9) = 10.49, p = .31$), general physical activity type at work ($\chi^2(1) = 1.57, p = .21$), or financial status ($\chi^2(3) = 4.08, p = .25$) at baseline between groups. See Table 5.

Table 5
Chi-square tests for subject characteristics

Characteristic	Chi-Square	df	p-value
Family status	.96	2	.62
Level of highest education	3.09	3	.38
Department	10.47	9	.31
General activity Type	1.57	1	.21
Financial status	4.08	3	.25

Similarly, the parametric data indicated no statistically significant difference in the number of education years ($t(49) = -.98, p = .33$), the number of working hours at work ($t(49) = .68, p = .50$), body mass index ($t(49) = -1.20, p = .24$), age ($t(49) = 1.66,$

$p = .10$), and total minutes for overall physical activity ($t(49) = -1.68, p = .10$) at baseline between groups. Only the mean of dependent family members of the health education group ($M = 3.31, sd = 1.78$) was significantly higher than the mean of the motivational interviewing group ($M = 2.52, SD = 1.12$) at baseline measure ($t(49) = 1.88, p = .07$). The 95% confidence interval for the dependent family member mean ranged from $-.06$ to 1.63 . See Table 6.

Table 6
Independent t-test for subject characteristics

Characteristic	M (Bradvik et al.)	t	df	p-value	95% CI
Number of education years					
- Health Education	17.19(3.10)	-.98	49	.33	[-2.10 - .73]
- Motivational Interviewing	17.82(1.69)				
Job hours per week					
- Health Education	46.65(11.16)	.68	49	.50	[-3.42 – 6.97]
- Motivational Interviewing	43.88(6.65)				
Number of dependent family members					
- Health Education	3.31(1.78)	1.88	49	.07	[-.06 – 1.63]
- Motivational Interviewing	2.52(1.12)				
BMI					
- Health Education	22.76(4.10)	-1.20	49	.24	[-4.24 – 1.07]
- Motivational Interviewing	24.35(5.29)				
Age					
- Health Education	45.58(3.68)	1.66	49	.10	[-.34 – 3.58]
- Motivational Interviewing	43.96(3.26)				
Total minutes for overall physical activity					
- Health Education	448.50 (379.65)	-1.68	49	.10	[-903.05, 87.66]
- Motivational Interviewing	856.20 (1150.28)				

Physical Activity Status

At baseline measures, the physical activity intensity of participants was classified in the low and moderate categories. At midpoint measures, participants in the health education group seemed to have increased their physical activity into the moderate category compared with the baseline measure. At endpoint measures, participants in both group reported their physical activity intensity in the low intensity category rather than the moderate intensity and no participants reported any high activity at baseline, midpoint, and endpoint. Sixty percent of participants completed the follow-up online survey at 6 months after the 3 month-study. At the 6-month follow up, 83% of participants in the motivational interviewing group and 90% of participants in the health education group reported moderate physical activity while

3% of participants in the motivational interviewing group and 9% of participants in the health education group reported high activity. See Table 7.

Table 7
Frequency and percent of PA category described by group and time

Category	Motivational Interviewing		Health Education	
	n	%	n	%
Baseline (week 1) overall	25	100	25	100
- Category 1 (low activity)	13	52	18	72
- Category 2 (moderate activity)	12	48	7	28
- Category 3 (high activity)	0	0	0	0
Midpoint (week 8) overall	21	100	22	100
- Category 1 (low activity)	9	42.9	10	45.5
- Category 2 (moderate activity)	12	57.1	12	54.5
- Category 3 (high activity)	0	0	0	0
Endpoint (week 13) overall	23	100	23	100
- Category 1 (low activity)	14	60.9	12	52.2
- Category 2 (moderate activity)	9	39.1	11	47.8
- Category 3 (high activity)	0	0	0	0
Follow-up (week 36) overall	18	100	11	100
- Category 1 (low activity)	0	0	0	0
- Category 2 (moderate activity)	15	83.3	10	90.9
- Category 3 (high activity)	3	16.7	1	9.1

Participants using the pedometer reported more physical activity in the moderate category at midpoint (71.4%) compared to baseline measures (19%). At midpoint measures, 36.7% of the no-pedometer group and 56.3% of the pedometer group reported moderate physical activity. At the 6-month follow-up, the percent of moderate physical activity of the motivational interviewing and the health education groups was 85 and 88.9 respectively. See Table 8.

Table 8
Frequency and percent of PA category described by pedometer use and time

Category	Non-Pedometer n=30		Pedometer n=16	
	n	%	n	%
Baseline (Week 1) Total	34	100.0	16	100.0
- Category 1 (low activity)	21	61.8	10	62.5
- Category 2 (moderate activity)	13	38.2	6	19.0
- Category 3 (high activity)	0	0	0	0
Midpoint (Week 8) Total	29	100	14	100.0
- Category 1 (low activity)	15	51.7	4	28.6
- Category 2 (moderate activity)	14	48.5	10	71.4
- Category 3 (high activity)	0	0	0	0
***one participant with pedometer didn't turn in the IPAQ at midpoint				
Endpoint (Week 13) Total	30	100.0	16	100.0
- Category 1 (low activity)	19	63.3	7	43.8
- Category 2 (moderate activity)	11	36.7	9	56.3
- Category 3 (high activity)	0	0	0	0
Follow-up (Week 36) Total	20	100.0	9	100.0
- Category 1 (low activity)	0	0	0	0
- Category 2 (moderate activity)	17	85.0	8	88.9
- Category 3 (high activity)	3	15.0	1	11.1

Results for Specific Aim #1

The first study aim was to describe the physical activity (as measured by the IPAQ), perceived benefits of and barriers to be physically active (as measured by the PBBE), self-efficacy to overcome barriers for being physically active (as measured by the SEOBE), and social support for being physically active (as measured by the SSE) of middle-aged Thai working women.

Descriptive statistics studies, including mean and standard deviation, were conducted to describe the minutes of physical activity, energy expenditure for exercise, number of steps walked, perceived benefits and barriers, self-efficacy, and social support to exercise of midlife Thai working women. The data are described by group in Table 9 including means and standard deviations.

At baseline measures, participants in the motivational interviewing group reported higher mean total minutes for physical activity, total energy expenditure, number of steps walked, and perceived benefits and barriers than participants in the health education group. In addition, across 4 time points, participants in the motivational interviewing group reported the highest mean of total minutes for physical activity, total energy expenditure, and number of steps walked at midpoint measures. The results also showed that the mean score of perceived social support and perceived self-efficacy in the motivational interviewing group gradually increased across times.

Table 9
Mean and standard deviation for outcome variables described by group

Outcome Variables	Motivational Interviewing				Health Education			
	M	SD	M	SD	M	SD	M	SD
Total minutes for physical activity per week								
• Baseline (week 1)	667.65	667.32	551.76 ^a	394.53 ^a	447.27	331.30	447.27 ^a	331.30 ^a
• Midpoint (week 8)	873.53	963.73	622.64 ^a	370.21 ^a	611.77	645.33	567.48 ^a	343.49 ^a
• Endpoint (week 13)	609.26	604.63	548.35 ^a	459.87 ^a	781.03	945.84	579.90 ^a	146.55 ^a
• Follow-up (week 36)	684.71	698.58	568.76 ^a	400.37 ^a	783.64	676.59	656.18 ^a	327.92 ^a
Total energy expenditure for physical activity per week								
• Baseline (week 1)	2730.24	2929.72			1728.05	1327.36		
• Midpoint (week 8)	3198.10	3817.05			2798.37	2309.59		
• Endpoint (week 13)	2533.30	2932.93			3142.70	4053.79		
• Follow-up (week 36)	2948.27	3137.46			771.88	2560.04		
Steps of walking								
• Baseline (week 1)	49434.63	11647.63			45698.57	8497.432		
• Midpoint (week 8)	56215.00	17058.54			59210.29	19770.30		
• Endpoint (week 13)	51907.13	16668.49			47010.14	10004.77		
Perceived benefit and barrier								
• Baseline (week 1)	3.25	.32			3.09	.39		
• Midpoint (week 8)	3.04	.19			3.13	.28		
• Endpoint (week 13)	3.10	.27			3.00	.46		
Perceived Benefits								
• Baseline (week 1)	3.24	.40			3.13	.39		
• Midpoint (week 8)	3.02	.32			3.11	.32		
• Endpoint (week 13)	3.08	.32			2.98	.45		

a. As data had outliers in both directions. The data was winsorized to meet the assumption of normal distribution.

Table 9 (Continued)
Mean and standard deviation for outcome variables described by group

Outcome Variables	Motivational Interviewing				Health Education			
	M	SD	M	SD	M	SD	M	SD
Perceived barriers								
• Baseline (week 1)	1.83	.39			2.07	.49		
• Midpoint (week 8)	1.99	.32			1.92	.36		
• Endpoint (week 13)	1.94	.40			2.03	.51		
Perceived social support from friend and family								
• Baseline (week 1)	2.11	.67			2.17	.71		
• Midpoint (week 8)	2.28	.59			2.22	.60		
• Endpoint (week 13)	2.31	.72			2.38	.53		
Perceived self-efficacy								
• Baseline (week 1)	2.17	.46			2.48	.57		
• Midpoint (week 8)	2.27	.60			2.39	.48		
• Endpoint (week 13)	2.33	.58			2.37	.52		

At baseline in both groups, participants spent their time in moderate physical activity the most, then time for walking and vigorous physical, activity. Participants in the motivational interviewing group reported the majority of minutes for moderate physical activity at baseline ($M= 546.67$, $SD= 633.40$), midpoint ($M= 497.50$, $SD= 646.74$), endpoint ($M= 367.38$, $SD= 365.92$), and 6-month follow-up ($M= 309.72$, $SD= 452.01$). The participants in the health education group also reported the majority of minutes for moderate physical activity at baseline ($M= 322.26$, $SD= 246.10$), midpoint ($M=417.65$, $SD=392.07$), endpoint ($M= 424.52$, $SD= 423.62$), and 6-month follow-up ($M=321.82$, $SD= 250.07$). See Table 10.

Table 10
Mean and standard deviation for total minutes of PA described by group and activity intensity

Outcome Variables	Motivational Interviewing		Health Education	
	M	SD	M	SD
Total minutes/wk for vigorous PA				
- Baseline	10.00	23.87	14.52	38.08
- Midpoint	42.38	76.89	62.14	96.08
- Endpoint	33.57	147.12	69.52	192.46
- Follow-up	65.00	102.51	96.36	106.05
Total minutes/wk for moderate PA				
- Baseline	546.67	633.40	322.26	246.10
- Midpoint	497.50	646.74	417.65	392.07
- Endpoint	367.38	365.92	424.52	423.62
- Follow-up	309.72	452.01	321.82	250.07
Total minutes/wk for walking PA				
- Baseline	175.48	251.10	92.38	180.83
- Midpoint	324.64	371.80	282.96	471.79
- Endpoint	178.10	185.25	218.40	327.01
- Follow-up	308.61	275.08	365.45	419.29

In both groups, participants reported a higher mean of total minutes for physical activity from household and gardening activity than other activities. Participants in the motivational interviewing group reported the highest mean for the household and gardening activity at midpoint measures ($M= 35789.52$, $SD=$

153668.34). Participants in the health education group reported the highest mean for the household and gardening activity at endpoint measures ($M= 35789.52$, $SD= 153668.34$). See Table 11.

Table 11
Mean and standard deviation for total minutes of PA described by group and activity domain

Outcome Variables	Motivational Interviewing		Health Education	
	M	SD	M	SD
Total minutes per week of activity at work				
- Baseline	107.62	319.15	22.02	100.93
- Midpoint	49.29	80.53	137.86	247.99
- Endpoint	50.95	120.79	112.38	208.52
- Follow-up	187.50	296.13	250.00	319.45
Total minutes per week of walking for transportation				
- Baseline	66.191	85.75	35.24	70.90
- Midpoint	173.57	219.43	131.99	212.27
- Endpoint	98.69	129.57	120.66	226.07
- Follow-up	163.61	147.19	170.00	156.49
Total minutes per week of Household and gardening				
- Baseline	18601.43	45655.50	14096.79	32153.14
- Midpoint	35789.52	153668.34	10141.19	18183.06
- Endpoint	8614.76	20774.24	32677.62	95872.44
- Follow-up	801.94	404.16	820.00	802.28
Total minutes per week of leisure time				
- Baseline	105.95	162.63	61.67	109.83
- Midpoint	189.52	214.51	156.73	210.93
- Endpoint	145.12	184.17	132.50	189.14
- Follow-up	118.61	125.20	179.50	228.38

The Pearson Correlation was used to analyze the relationships between the psycho-social factors and physical activity outcomes at baseline, midpoint, endpoint, and 6 months follow-up. The correlations for both groups of participants are displayed in Tables 10, 12, 14, and 16 for the data at baseline, midpoint, and endpoint, respectively. In Tables 11, 13, 15, and 17, the correlation data of both groups are

presented separately in the same table. Intercorrelations for participants in the motivational interviewing group are presented above the diagonal, and intercorrelations for participants in the health education group are presented below the diagonal. Means and standard deviations for the motivational interviewing group are presented in the vertical columns, and means and standard deviations for participants in the health education group are presented in the horizontal rows.

The total minutes for physical activity highly positive correlated with total energy expenditure at baseline, $r = .98, p < .01$, and positively correlated with perceived social support from friend at low level of activity, $r = .29, p < .05$. In addition, the total minutes for physical activity negatively correlated with perceived barriers to physical activity at low level, $r = .31, p < .05$. It can be concluded that total minutes for physical activity will increase when participants have low perceived barriers and high perceived social support from friends. See Table 10.

Perceived benefits for physical activity positively correlated with perceived social support from family, $r = .38, p < .01$, and perceived self-efficacy, $r = .46, p < .01$. Perceived benefits also negatively correlated with perceived barriers to physical activity, $r = -.32, p < .05$. Perceived social support from family also positively correlated with perceived social support from friends, $r = .34, p < .05$, and perceived self-efficacy, $r = .37, p < .01$. Perceived social support from friends also positively correlated with perceived self-efficacy. It can be concluded that participants who had high perceptions of social support from family and friends reported more perception of self-efficacy for physical activity and less perception of barriers. See Table 12.

Table 12
Bivariate correlations of study variables at baseline

Outcome Variables	1	2	3	4	5	6	7	8
1. Total minutes for physical activity	-							
2. Total energy expenditure	.98**	-						
3. Total steps walked	.35	.39	-					
4. Perceived benefits	.09	.08	-.10	-				
5. Perceived barriers	-.31*	-.31*	-.18	-.32*	-			
6. Perceived social support from family	.11	.08	-.37	.38**	-.001	-		
7. Perceived social support from friends	.29*	.26	.00	.13	.02	.34*	-	
8. Perceived self-efficacy	.16	.16	.25	.46**	-.18	.37**	.35*	-
M	652.35	2479.69	47691.13	3.18	1.94	2.36	1.99	2.34
SD	872.39	3449.30	10124.29	.37	.45	.84	.86	.57

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 13
Bivariate correlations of study variables at baseline described by group

Outcome Variables	1	2	3	4	5	6	7	8	M	SD
1. Total minutes for physical activity	-	.99**	.28	.09	-.26	.04	.38	.33	856.20	1150.28
2. Total energy expenditure	.95**	-	.36	.08	-.29	.05	.35	.33	3308.49	4604.88
3. Total steps walked	.59	.48	-	.05	-.41	-.45	-.09	.14	49434.62	11647.63
4. Perceived benefits	.40	.01	-.29	-	-.20	.45*	.18	.49*	3.22	.42
5. Perceived barriers	-.45*	-.42*	.14	-.39	-	.05	-.09	-.50*	1.84	.42
6. Perceived social support from family	.41*	.32	-.08	.32	-.07	-	.37	.48*	2.33	.87
7. Perceived social support from friends	.41*	.37	.18	.11	.07	.32	-	.20	1.90	.78
8. Perceived self-efficacy	.01	.01	.62	.50*	-.03	.26	.44*	-	2.22	.54
M	448.50	1650.88	45698.57	3.14	2.05	2.38	2.08	2.45		
SD	379.65	1286.53	8497.43	.38	.46	.82	.94	.60		

* $p < .05$, ** $p < .01$, *** $p < .001$

At the midpoint, the total minutes for physical activity highly positively correlated with total energy expenditure, $r = .95$, $p < .01$, and perceived social support from friends at a low level, $r = .39$, $p < .01$. Total energy expenditure also positively correlated with perceived social support from friends at a low level, $r = .33$, $p < .05$. It

can be concluded that total minutes for physical activity and energy expenditure are increased when participants have high perceived social support from friends. See Table 14.

Perceived self-efficacy for physical activity also positively correlated with total steps walked, $r = .56$, $p < .05$, and negatively correlated with perceived barriers to physical activity, $r = -.43$, $p < .01$. It can be concluded that participants who had high perception self-efficacy and low perception of barriers will report a higher number of walked steps. See Table 14.

Table 14
Bivariate correlations of study variables at midpoint

Outcome Variables	1	2	3	4	5	6	7	8
1. Total minutes for physical activity	-							
2. Total energy expenditure	.95**	-						
3. Total steps walked	.27	.34	-					
4. Perceived benefits	.07	.17	.32	-				
5. Perceived barriers	-.18	-.16	-.47	-.11	-			
6. Perceived social support from family	.09	.05	-.12	.23	.15	-		
7. Perceived social support from friends	.39**	.33*	.19	.21	-.21	-.04	-	
8. Perceived self-efficacy	.21	.24	.56*	.30	-.43**	.16	.25	-
M	807.28	2874.82	57612.80	3.06	1.96	2.53	2.0	2.33
SD	847.79	2957.27	17759.58	.27	.34	.84	.85	.53

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 15
Bivariate correlations of study variables at midpoint described by group

Outcome Variables	1	2	3	4	5	6	7	8	M	SD
1. Total minutes for physical activity	-	.97**	.36	.05	-.13	-.01	.39	.03	864.52	916.86
2. Total energy expenditure	.94**	-	.34	.16	-.15	-.01	.34	.15	3065.03	3551.87
3. Total steps walked	.12	.35	-	.07	-.73*	-.24	.07	.67	56215	17058.54
4. Perceived benefits	.12	.25	.44	-	.01	.24	.15	.17	3.02	.21
5. Perceived barriers	-.25	-.22	-.22	-.16	-	.31	-.23	.40	2.0	.32
6. Perceived social support from family	.20	.12	.12	.27	-.002	-	.06	-.09	2.60	.87
7. Perceived social support from friends	.42	.38	.26	.23	-.19	-.12	-	.12	1.96	.74
8. Perceived self- efficacy	.49*	.44*	.40	.40	-.45*	-.52*	.38	-	2.27	.60
M	752.64	2693.25	5921.29	3.10	1.92	2.46	2.03	2.39		
SD	797.04	2324.93	19770.30	.31	.36	.83	.97	.47		

* $p < .05$, ** $p < .01$, *** $p < .001$

At the endpoint, the total minutes for physical activity highly positively correlated with total energy expenditure, $r = .94$, $p < .01$, and perceived social support from friends at a moderate level, $r = .47$, $p < .01$. Total energy expenditure also moderately positively correlated with perceived social support from friends, $r = .49$, $p < .01$. It can be concluded that the total minutes for physical activity and energy expenditure are more likely to increase when participants have high perceived social support from friends. See Table 16. Perceived benefits negatively correlated with perceived barriers to physical activity at a low level, $r = -.38$, $p < .01$, and positively correlated with perceived self-efficacy at a low level, $r = .38$, $p < .01$.

Table 16
Bivariate correlations of study variables at endpoint

Outcome Variables	1	2	3	4	5	6	7	8
1. Total minutes for physical activity	-							
2. Total energy expenditure	.94**	-						
3. Total steps walked	.32	.34	-					
4. Perceived benefits	.19	.20	.10	-				
5. Perceived barriers	-.17	-.21	-.24	-.49**	-			
6. Perceived social support from family	.17	.15	.13	-.01	.17	-		
7. Perceived social support from friends	.47**	.49**	.29	.35*	-.21	.05	-	
8. Perceived self-efficacy	.18	.19	.48	.38**	-.37*	.13	.27	-
M	630.52	2452.41	49621.87	3.04	1.99	2.54	2.07	2.36
SD	636.24	2793.32	13719.04	.38	.45	.98	.84	.54

* $p < .05$, ** $p < .01$

Table 17
Bivariate correlations of study variables at endpoint described by group

Outcome Variables	1	2	3	4	5	6	7	8	M	SD
1. Total minutes for physical activity	-	.94**	.71*	.38	.17	.51*	.38	.07	563.91	530.22
2. Total energy expenditure	.94**	-	.70	.36	.10	.51*	.41	.06	2264.09	2570.76
3. Total steps walked	.54	.47	-	.18	-.35	.10	.34	.64	51907.12	16668.49
4. Perceived benefits	.12	.12	.03	-	-.05	.36	.34	.66**	3.09	.32
5. Perceived barriers	-.39	-.44	-.11	-.73	-	-.03	.05	-.45	1.93	.40
6. Perceived social support from family	-.08	-.20	.31	-.34	.40	-	.22	.12	2.60	.95
7. Perceived social support from friends	.52**	.55	.44	.38	-.43	-.10	-	.21	1.99	.79
8. Perceived self-efficacy	.28	.31	.08	.18	-.31	.13	.35	-	2.37	.58
M	697.12	2640.72	47010.14	2.99	2.05	2.47	2.15	2.36		
SD	732.99	3045.81	10004.77	.44	.49	.81	.90	.51		

* $p < .05$, ** $p < .01$

At the 6-month follow-up, the total minutes for physical activity highly positively correlated with total energy expenditure, $r = .97$, $p < .01$. Perceived barriers to physical activity negatively correlated with perceived social support from family, $r = -.42$, $p < .05$, and perceived self-efficacy, $r = -.45$, $p < .05$, at a moderate level. Perceived social support from friends also moderately positively correlated with

perceived self-efficacy, $r = .58, p < .01$. It can be concluded that participants who perceive low self-efficacy will be more likely to report low social support from family and perceive higher barriers to being physically active. See Table 18.

Table 18
Bivariate correlations of study variables at 6-month follow-up

Outcome Variables	1	2	3	4	5	6	7
1. Total minutes for physical activity	-						
2. Total energy expenditure	.97**	-					
3. Perceived benefits	-.002	.02	-				
4. Perceived barriers	.07	.04	-.19	-			
5. Perceived social support from family	.06	.04	.04	-.42*	-		
6. Perceived social support from friends	.23	.25	.12	.04	.31	-	
7. Perceived self-efficacy	.26	.30	.24	-.45*	.58**	.30	-
M	721.38	3024.56	3.69	1.93	3.28	2.83	2.48
SD	666.96	2862.04	.47	.65	.84	.89	.74

* $p < .05$, ** $p < .01$

Table 19
Bivariate correlations of study variables at 6-month follow-up described by group

Outcome Variables	1	2	3	4	5	6	7	M	SD
1. Total minutes for physical activity	-	.97**	-.08	.18	.11	.10	.18	683.33	677.75
2. Total energy expenditure	.98**	-	-.04	.16	.08	.16	.24	3041.67	3104.10
3. Perceived benefits	.14	.14	-	-.03	.05	.17	.32	3.72	.46
4. Perceived barriers	-.05	-.06	-.29	-	-.53*	-.27	-.61**	1.78	.43
5. Perceived social support from family	-.10	-.17	.04	-.62*	-	.46	.63**	3.28	1.02
6. Perceived social support from friends	.44	.42	.06	.276	-.10	-	.46	2.83	.86
7. Perceived self-efficacy	.41	.46	.16	-.56	.35	.04	-	2.39	.78
M	783.64	2996.56	3.64	2.18	3.27	2.82	2.64		
SD	676.59	2560.04	.51	.87	.47	.98	.67		

* $p < .05$, ** $p < .01$, *** $p < .001$

Results for Specific Aim #2

The second study aim was to test the efficacy of a motivational interviewing-based health coaching program compared to a standard education program among middle aged Thai working women. The hypothesis for this aim was that women in the motivational interviewing-based health coaching program would have a greater change in their physical activity data as well as selected psycho-social outcomes over three different times than changes seen in the standard education group.

Primary outcomes.

Total minutes for physical activity at baseline, midpoint, and endpoint.

A mixed- design repeated measure ANOVA was conducted to evaluate the effect of coaching style and time on total minutes of physical activity. The dependent variable was total minutes of physical activity in last 7 days from the IPAQ. The between-subjects factor was coaching style with two levels (motivational interviewing-base health coaching and health education), and the within-subject factor was measurement times with 3 levels (baseline, midpoint, and endpoint). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of total minutes of physical activity. The Box's test and the Levene's test were conducted to test homogeneity of variance and homogeneity of covariance. They were significant and the skewness values for the baseline, midpoint, and endpoint data of total minutes of physical activity were larger than ± 1.0 . The assumption of multi-sample sphericity was tested to see whether within-group variability of total minutes of physical activity was the same for each of the groups and that scores were normally distributed and independent among groups. The Mauchly's test statistic was met ($\chi^2(2) = 4.87$, $P = .09$), so it can be concluded that there are no significant differences between the variances of differences.

The test of between-subjects effects revealed no significance for main effect due to between-subject factor (coaching style), $F(1, 40) = .25, p = .61$, indicating that total minutes of physical activity using different coaching styles were in general the same. There was also a non-significant interaction effect of coaching style by time on total minutes of physical activity, $F(2, 80) = 1.99, p = .14$, indicating that total minutes of physical activity at different coaching styles and time points were in general the same. Only the main effect due to within-subject factor (time) was significant at $p < .10$, $F(2, 80) = 2.41$. Due to the small sample size, the omega square was used to report the effect size instead of the partial eta square in order to prevent a positive bias. There was no effect size of the main effect of coaching style. The effect size of the main effect of time and the effect size of the interaction between coaching style and time were small: $\omega^2 = .03$ and $.02$, indicating that the times of measure had a small effect on the number of total minutes for physical activity across times. See Table 20.

Table 20

Test of between-subjects (coaching style) and within-subjects effects of total minutes of PA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effect							
Group	257694.31	1	257694.31	.25	.62	.00	.00
Error (Group)	41482805.19	40	1037070.13				
Within-Subjects Effect							
Time	1213937.66	2	606968.83	2.41	.09	.06	.03
Time * Group	1001721.33	2	500860.67	1.99	.14	.05	.02
Error (Time)	20156143.05	80	251951.79				

The test of within-subjects contrasts revealed that total minutes of physical activity at time 2 was significantly higher than the total minutes at baseline: $F(1, 40) = 6.19, p = .01$. The test of coaching style by time interaction was also significant at the difference between baseline and endpoint measures, $F(1, 40) = 4.17, p = .04$.

This result indicated that the total minutes of physical activity between coaching styles differed only when the baseline and endpoint measures were compared. See Table 21.

Table 21
Test of within-subjects contrasts

	Source	Type III Sum of Squares	df	Mean Square	F	Sig
Time	Midpoint vs. baseline	2279905.00	1	2279905.00	6.19	.01
	Endpoint vs. baseline	177944.34	1	177944.34	.37	.54
Time * Group	Midpoint vs. baseline	425115.48	1	425115.48	1.15	.28
	Endpoint vs. baseline	1999410	1	1999410.25	4.17	.04
Error (Time)	Midpoint vs. baseline	1.47E7	40	368399.09		
	Endpoint vs. baseline	1.91E7	40	479126.80		

Winsorized total minutes of physical activity at baseline, midpoint, and endpoint. The results showed that the primary outcome data, total minutes of physical activity, violated the assumption of the mixed-design ANOVA. Although the assumption of random assignment was met, the normal distribution and homogeneity of covariance across groups was not met (*Box's M* = 28.98, $F(6, 11592.45) = 4.44, p = .00$). The skewness value tests for the baseline, midpoint, and endpoint data were larger than ± 1.0 . In addition, there were extreme outlier data of the total minutes of physical activity. Thus, the winsorized means were used to deal with the extreme outlier cases. The assumption of multisample sphericity was also tested to see whether within-group variability was the same for each of the groups and that scores were normally distributed and independent among groups. The Mauchly's test statistic violated the assumption ($\chi^2(2) = 7.26, P < .05$), so it can be concluded that there were significant differences between the variances of differences. Thus, the assumption of sphericity was not met. The Epsilon adjustment is used to adjust the degrees of

freedom for the averaged test. As a result, the degrees of freedom were corrected using Huynh-Feldt because the estimates of sphericity were greater than .75.

The test of between-subjects effects revealed there was no significance for the main effect due to the between-subject factor (coaching style), $F(1, 40) = .22, p = .64$, indicating that total minutes of physical activity at different coaching styles were in general the same. The test of main effect due to within-subject factor (time), $F(1.82, 72.93) = 1.80$, and the test of interaction effect of coaching style by time on total minutes of physical activity were not significant: $F(1.82, 72.93) = 1.40, p = .25$. The results indicated that total minutes of physical activity at different time points were in general the same. There was also a non-significant interaction effect between time and coaching style. The main effect of time and the interaction effect between coaching style and time were small, $\omega^2 = .02$ and $.01$, indicating that the times of measure had a small effect on the number of total minutes of physical activity (see Table 22). However, the estimated marginal means of the interaction effect between time and coaching style revealed that participants in both groups reported increased minutes of physical activity at midpoint and endpoint measures compared to the baseline measure.

Table 22
Test of between-subjects (coaching style) and within-subjects effects of winsorized total minutes of PA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	70443.89	1	70443.89	.22	.64	.01	.00
Error (Group)	12875740.71	40	321893.52				
Within-Subjects Effect							
Time	219454.13	1.82	120367.73	1.80	.18	.04	.02
Time * Group	170730.70	1.82	93643.57	1.40	.25	.03	.01
Error (Time)	4868744.38	72.93	66761.07				

Winsorized total minutes of physical activity based on coaching style and pedometer-wearing at baseline, midpoint, and endpoint. Thirty percent of participants in both groups were randomly assigned to wear a pedometer for measuring the number of steps while walking. Thus, the option of wearing a pedometer was added into the between-subjects factor. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and using a pedometer by time on total minutes of physical activity. The dependent variable was total minutes of physical activity in the last 7 days from the IPAQ. The between-subjects factors were coaching style with two levels (motivational interviewing-based health coaching and health education), and using the pedometer with two levels (none and used). The within-subject factor was measurement times with three levels (baseline, midpoint, and endpoint). The Mauchly's test statistic was violated ($\chi^2(2)=6.77, P<.05$), so it can be concluded that there are significant differences between the variances of differences. Thus, the assumption of sphericity was not met. The degrees of freedom were corrected using Huynh-Feldt because the estimate of sphericity was greater than .75.

There was no significant main effect of time indicating that total minutes of physical activity at different time points were in general the same, $F(1.93, 73.27)=2.03$. There was also a non-significant interaction effect between the time and coaching style, $F(1.93, 73.27)=2.30$. There was also no significant difference found for the interaction effect between using the pedometer by time, $F(1.93, 73.27)=.15$. Additionally, there was also a non-significant interaction effect between the time, coaching style, and using the pedometer, $F(1.93, 73.27)=1.44, r=.14$. There was no effect size for time * using-pedometer interaction effect. The effect size of the coaching style by time interaction effect was small, $\omega^2=.03$. The effect sizes of time

and time by coaching style by using pedometer effect were also small, $\omega^2 = .02$ and $.01$, indicating that the coaching style and using pedometer had a small effect on the number of total minutes of physical activity across three time points. The effect size of the between-subjects factors (coaching style) was zero. The effect sizes of the between-subject factors (using pedometer) and the interaction between coaching style and using pedometer were small, $\omega^2 = .01$ and $.01$. The results indicate that without considering the time points of measurement. The difference in coaching style and using-pedometer option has a small effect on the number of minutes of physical activity. See Table 23.

Table 23
Test of between-subjects (coaching style x pedometer) and within-subjects effects of winsorized total minutes of PA

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	5491.52	1	5491.52	.05	.82	.00	.00
Pedometer	222682.20	1	222682.20	2.21	.15	.06	.01
Group * Pedometer	267872.30	1	267872.30	2.66	.11	.07	.01
Error (Group)	3834225.84	38	100900.68				
Within-Subjects Effect							
Time	249826.15	1.93	129560.51	2.03	.14	.05	.02
Time * Group	282287.66	1.93	146395.14	2.29	.11	.06	.03
Time * Pedometer	18156.55	1.93	9416.04	.15	.86	.00	.00
Time * Group * Pedometer	177599.74	1.93	92103.69	1.44	.24	.03	.01
Error (Time)	4674545.58	73.27	63795.57				

Total minutes for physical activity at baseline, midpoint, endpoint, and 6-month follow-up.

Total minutes for physical activity (winsorized data) at baseline, midpoint, endpoint, and 6-month follow-up. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and time on total minutes of physical activity. The dependent variable was total minutes of physical activity in the last 7 days from the IPAQ. The between-subjects factor was coaching style with two levels (motivational interviewing-based health coaching and health education), and

the within-subjects factor was measurement times with four levels (baseline, midpoint, endpoint, and 6-month follow-up). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of total minutes of physical activity. The Box's test and the Levene's test were conducted to test homogeneity of variance and homogeneity of covariance. They were significant and the skewness values for the baseline, midpoint, and endpoint data of total minutes of physical activity were larger than ± 1.0 . Since the total minutes of physical activity did not meet the assumption of the mixed-design, the winsorized data were used as a dependent variable for this analysis. The assumption of multisample sphericity was tested to see whether within-group variability of self-efficacy was the same for each of the groups and that scores were normally distributed and independent among groups. The Mauchly's test statistic was met ($\chi^2(2) = 8.60, P = .13$), so it can be concluded that there are no significant differences between the variances of differences.

The test revealed there was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 26) = .01, p = .94$, and due to the within-subject factors (time), $F(3, 78) = .88, p = .46$, indicating that total minutes of physical activity at different coaching styles and time points were in general the same. There was also a non-significant interaction effect of coaching style by time on total minutes of physical activity, $F(3, 78) = .66, p = .58$. There was no effect size of the main effect of coaching style and time, no effect size of the coaching style * time interaction, indicating that the coaching style across the four time points had no effect on the number of total minutes of physical activity. See Table 24.

Table 24
Test of within-subjects effects of winsorized total minutes of physical activity

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	2764.18	1	2764.18	.01	.94	.00	.00
Error (Group)	1.047E7	26	402740.73				
Within-Subjects Effect							
Time	198078.98	3	66026.33	.87	.45	.03	.00
Time * Group	148170.33	3	49390.11	.66	.58	.03	.00
Error (Time)	5875753.66	78	75330.18				

Total minutes for physical activity (winsorized data) at baseline, midpoint, endpoint, and 6-month follow-up based on coaching style and using pedometer. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and using the pedometer by time on total minutes of physical activity. The dependent variable was total minutes of physical activity in the last 7 days from the IPAQ. The between-subjects factors were coaching style with two levels (motivational interviewing-based health coaching and health education), and using the pedometer with two levels (none and used). The within-subjects factor was measurement times with four levels (baseline, midpoint, endpoint, and 6-month follow-up). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of total minutes of physical activity. The Box's test and the Levene's test were conducted to test homogeneity of variance and homogeneity of covariance. They were significant, and the skewness values for the baseline, midpoint, and endpoint data of total minutes of physical activity were larger than ± 1.0 . Since the total minutes of physical activity did not meet the assumption of the mixed-design, the winsorized data were used as a dependent variable for this analysis. The assumption of multi-sample sphericity was tested to see whether within-group variability of self-efficacy was the same for each of the groups and that scores were normally distributed and independent among groups. The Mauchly's test statistic was met ($\chi^2(5) = 7.87$,

$P=.16$), so it can be concluded that there are no significant differences between the variances of differences.

The test of between-subjects effects revealed that there was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 24) = .16, p = .69$, due to using pedometer, $F(1, 24) = 1.64, p = .21$, and due to the within-subjects factor (time), $F(3, 72) = .99, p = .40$, indicating that total minutes of physical activity by different coaching styles, using pedometer, and time points were in general the same. There were also a non-significant interaction effect of coaching style by time, $F(3, 78) = .68, p = .57$, and using the pedometer by time on total minutes of physical activity, $F(3, 78) = .32, p = .81$. The effect size of the main effect of coaching style, using the pedometer, and time were small, $\eta_p^2 = .01$, $\eta_p^2 = .06$, and $\eta_p^2 = .04$, respectively. The effect size of the coaching style by time interaction effect, time by using pedometer interaction effect, and time by coaching style by using pedometer interaction effect were zero, indicating that the coaching style and using pedometer had no effect on the number of total minutes of physical activity across four time points. The effect size of using the pedometer and the effect size of the interaction between between-subjects factors (coaching style and using pedometer) were small, $\omega^2 = .02$. The results indicate that without considering the time points of measurement, the difference in coaching style and using-pedometer option had a large effect on the number of minutes of physical activity. See Table 25.

Table 25
Test of between-subjects (coaching style X pedometer) and within-subjects effects of winsorized total minutes of PA

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	60266.26	1	60266.26	.16	.69	.01	.00
Pedometer	618083.03	1	618083.03	1.64	.21	.06	.01
Group * Pedometer	1043598.70	1	1043598.70	2.77	.11	.10	.02
Error (Group)	9031989.70	24	376332.90				
Within-Subjects Effect							
Time	234074.58	3	78024.86	.99	.40	.04	.00
Time * Group	161712.84	3	53904.28	.68	.57	.03	.00
Time * Pedometer	76631.46	3	25543.82	.32	.81	.01	.00
Time * Group * Pedometer	102645.22	3	34215.07	.43	.73	.02	.00
Error (Time)	5688969.33	72	79013.46				

Secondary outcomes. For the secondary outcome analysis, five separate 2x3 mixed-methods ANOVA were conducted with group and time as the independent variables and the secondary outcomes including energy expenditure, perceived benefits and barriers, self-efficacy, and 4) social support as the dependent variables.

Energy expenditure. The results showed that the total energy expenditure violated the assumption of the mixed-design ANOVAs. The normal distribution and homogeneity of covariance across groups were not met (*Box's M* = 23.20, $p = .02$). The skewness values, which were tested for the baseline, midpoint, and endpoint data, were larger than ± 1.0 . Thus, the mixed-design repeated-measure method was not justified for the total energy expenditure. In addition, the total energy expenditure and the total minutes of physical activity were highly correlated, $r = .98$, $p < .001$. Thus, the main and interaction effect of time and coaching style were not tested for the total energy expenditure.

Steps walked measured by pedometer. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and time on steps walked. The dependent variable was steps walked monitored by pedometer. The between-subjects factor was coaching style with two levels (motivational

interviewing-based health coaching and health education), and the within-subjects factor was measurement times with three levels (baseline, midpoint, and endpoint). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of steps walked. The Box's test and the Levene's test were conducted to test homogeneity of variance and homogeneity of covariance. They were not significant, and the skewness values for the baseline, midpoint, and endpoint data of steps walked were within ± 1.0 . Thus, the steps walked outcome met the assumption of the mixed-design. The test of sphericity was also non-significant. The Mauchly's test statistic was also not significant ($\chi^2(2) = 1.94, P = .38$), so it can be concluded that there are no differences between the variances of differences across all groups.

The test revealed there was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 13) = .09, p = .77$, and for the interaction effect of coaching style by time on steps walked by pedometer, $F(2, 26) = .76, p = .48$. The test for main effect due to the within-subjects factor (time) was significant, $F(2, 26) = 4.85, p = .02$, indicating that steps walked were different at different time points. The effect size of the time effect was moderate, $\omega^2 = .07$. There was no effect size of the coaching style effect, while the interaction effect of coaching style by time was medium size, $\omega^2 = .10$. The results indicated that time of measure had a greater effect on the number of walked steps than the coaching style. See Table 26.

Table 26
Test of between-subjects (coaching style) and within-subjects effects of steps walked per week

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	39553702.30	1	39553702.30	.09	.77	.01	.00
Error (Group)	5.981E9	13	4.601E8				
Within-Subjects Effect							
Time	8.69E8	2	4.34E8	4.85	.01	.27	.07
Time * Group	1.36E8	2	677788980.40	.76	.48	.05	.10
Error (Time)	2.33E8	26	8957841.37				

The test of within-subjects contrasts revealed that the steps walked at time 2 and time 3 were greater than the steps walked at baseline. However, only the steps walked at time2 were statistically different from the steps walked at baseline, $F(1, 13) = .70$. See table 27.

Table 27
Test of within-subjects contrasting effects of steps walked per week

	Source	Type III Sum of Squares	df	Mean Square	F	Sig
Time	Midpoint vs. baseline	1.54E9	1	1.54E9	6.32	.02
	Endpoint vs. baseline	5.35	1	5.35	.43	.52
Time * Group	Midpoint vs. baseline	1.69E7	1	1.69	.70	.41
	Endpoint vs. baseline	5031619.22	1	5031619.22	.04	.84
Error (Time)	Midpoint vs. baseline	3.16E9	13	2.43E8		
	Endpoint vs. baseline	1.62E9	13	1.24		

Perceived benefits for and barriers to physical activity. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and time on self-efficacy. The dependent variable was perceived benefits for and barriers to being physically active, scored from 1 to 164. The between-subjects factor was coaching style with two levels (motivational interviewing-based health coaching and health education), and the within-subjects factor was measurement times with three levels (baseline, midpoint, and endpoint). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of perceived benefits and barriers. The Box's test and the Levene's test were conducted to test for homogeneity of variance and homogeneity of covariance. They were significant, and the skewness values for the baseline, midpoint and endpoint data of perceived benefits and barriers were larger than ± 1.0 . The assumption of homogeneity of covariance across groups was not met. Thus, the variable of perceived benefits for and barriers to physical activity were entered into the mixed-design ANOVA analysis separately.

Perceived benefits for physical activity. The assumptions underlying the mixed-methods ANOVA were tested prior to the analyses. The assumptions of normal distribution and homogeneity of covariance across groups for perceived benefits for physical activity were met, and the skewness values for the baseline, midpoint and endpoint data were within ± 1.0 . The test of sphericity was also non-significant, $\chi^2(2) = 6.11, P = .05$.

The test revealed there was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 40) = .27, p = .60$, and for the interaction effect of coaching style by time on perceived benefits for physical activity, $F(2, 80) = 1.44, p = .24$. The test for main effect due to the within-subjects factor (time) was significant, $F(2, 80) = 2.67, p = .08$, indicating that perceived benefits for physical activity scores were different at different time points. The effect size of the time effect was small, $\omega^2 = .04$. The effect size of the interaction effect of coaching style by time was also small, $\omega^2 = .01$. The results indicated that time of measure had some effect on the number of perceived benefits for physical activity. See Table 28.

Table 28
Test of between-subjects and within-subjects effects of perceived benefits

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	.02	1	.02	.27	.61	.01	.00
Error (Group)	2.40	40	.06				
Within-Subjects Effect							
Time	.53	2	.27	2.67	.08	.06	.04
Time * Group	.29	2	.14	1.44	.24	.04	.01
Error (Time)	7.94	80	.10				

The test of within-subjects contrasts for the difference of perceived benefits for physical activity at midpoint versus baseline and at endpoint versus baseline were significant. The results revealed that perceived benefits for physical activity at

midpoint and endpoint measures differed from participants' perceptions at baseline.

See Table 29.

Table 29

Test of within- subjects contrasts of perceived benefit

	Source	Type III Sum of Squares	df	Mean Square	F	Sig
Time	Midpoint vs. baseline	.55	1	.55	2.99	.09
	Endpoint vs. baseline	.98	1	.98	3.63	.06
Time * Group	Midpoint vs. baseline	.46	1	.46	2.50	.12
	Endpoint vs. baseline	.00	1	.00	.01	.94
Error (Time)	Midpoint vs. baseline	7.31	40	.18		
	Endpoint vs. baseline	10.81	40	.27		

Perceived barriers to physical activity. The assumptions underlying the mixed-design ANOVA were tested prior to the analyses. The assumptions of normal distribution and homogeneity of covariance across groups for perceived barriers to physical activity were met. The skewness values at baseline, midpoint, and endpoint data were within ± 1.0 . The test of sphericity was also non-significant, $\chi^2(2) = 6.18$, $P = .05$.

There was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 40) = .88$, $p = .36$, and main effect due to the within-subjects factor (time), $F(2, 80) = .13$, $p = .88$, indicating that perceived barriers to physical activity from different coaching styles and time points were in general the same,. There was also a non-significant interaction effect of coaching style by time on perceived barriers, $F(2, 80) = 1.98$, $p = .15$. The effect size of the interaction effect of coaching style by time was small, $\omega^2 = .02$. The results indicated that the coaching style and time of measure had a small effect on perceived barriers for physical activity score over time. See Table 30.

Table 30
Ttest of between-subjects and within-subjects effects of perceived barriers

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	.07	1	.07	.88	.36	.02	.00
Error (Group)	3.31	40	.08				
Within-Subjects Effect							
Time	.04	2	.02	.13	.88	.003	.00
Time * Group	.55	2	.27	1.98	.15	.05	.02
Error (Time)	11.06	80	.14				

Perceived social support. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and time on perceived social support. The dependent variable was perceived social support from family and friends, scored from 1 to 120. The between-subjects factor was coaching style with two levels (motivational interviewing-based health coaching and health education), and the within-subjects factor was measurement time with three levels (baseline, midpoint, and endpoint). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses. The assumptions of normal distribution and homogeneity of covariance across groups for perceived social support were met, and the skewness values for the baseline, midpoint, and endpoint data were within ± 1.0 . The test of sphericity was also non-significant, $\chi^2(2) = 4.45, P = .11$.

The test revealed that there was no significant for the effect due to the between-subjects factor (coaching style), $F(1, 40) = .02, p = .89$, and for the interaction effect of coaching style by time on perceived social support, $F(2, 80) = .42, p = .66$. The test for main effect due to the within-subjects factor (time) was significant, $F(2, 80) = 3.40, p = .04$, indicating that perceived social support scores were different at different time points. The effect size of the time effect was small, $\omega^2 = .05$. The effect size of coaching style effect and the interaction effect of coaching style by time were zero. The results indicated that time of measure had an effect on the number of

perceived social support from family and friends for physical activity across times not related to coaching style. See Table 31.

Table 31

Test of between-subjects and within-subjects effects of perceived social support from family and friends

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	.02	1	.02	.02	.89	.00	.00
Error (Group)	38.45	40	.96				
Within-Subjects Effect							
Time	.90	2	.45	3.40	.04	.08	.05
Time * Group	.11	2	.06	.42	.66	.01	.00
Error (Time)	10.55	80	.13				

The test of within-subjects contrasts for the difference of perceived social support at endpoint versus baseline was significant. The results revealed that perceived social support from family and friends for physical activity at endpoint measure by participants differed from their perception at baseline. See Table 32.

Table 32

Test of within-subjects contrasts of perceived social support from family and friends

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Time	Midpoint vs. baseline	.52	1	.52	2.36	.13
	Endpoint vs. baseline	1.79	1	1.79	5.10	.03
Time * Group	Midpoint vs. baseline	.15	1	.15	.68	.42
	Endpoint vs. baseline	.00	1	.00	.00	.95
Error (Time)	Midpoint vs. baseline	8.80	40	.22		
	Endpoint vs. baseline					

Perceived self-efficacy. A mixed-design repeated-measure ANOVA was conducted to evaluate the effect of coaching style and time on self-efficacy. The dependent variable was self-efficacy, scored from 1 to 92. The between-subjects factor was coaching style with two levels (motivational interviewing-based health coaching and health education), and the within-subjects factor was measurement

times with three levels (baseline, midpoint, and endpoint). The assumptions underlying the mixed-design ANOVA were tested prior to the analyses of perceived self-efficacy. The Box's test and the Levene's test were conducted to test homogeneity of variance and homogeneity of covariance. They were not significant, and the skewness values for the baseline, midpoint and endpoint data of self-efficacy were within ± 1.0 . Thus, the self-efficacy outcome met the assumption of the mixed-design. The assumption of multisample sphericity was tested to see whether within-group variability of self-efficacy was the same for each of the groups and that scores were normally distributed and independent among groups. The Mauchly's test statistic was violated ($\chi^2(2) = 8.03, P = .02$), so it can be concluded that there were significant differences between the variances of differences. Thus, the assumption of sphericity was not met. The degrees of freedom were corrected using Huynh-Feldt because the estimates of sphericity were greater than .75.

There was no significant for the effect due to the between-subject factors (coaching style), $F(1, 40) = 1.18, p = .28$, and main effect due to the within-subjects factor (time), $F(1.93, 73.27) = 2.03$, indicating that perceived self-efficacy at different coaching styles and time points were in general the same. There was also a non-significant interaction effect of coaching style by time on perceived self-efficacy, $F(1.93, 73.27) = 2.30$. There was no effect of the main effect of coaching style and time. The effect size of the coaching style by time interaction effect was small, $\omega^2 = .05$, indicating that the coaching style across time had a moderate effect on the self-efficacy score. See Table 33.

Table 33
Test of between-subjects and within-subjects effects of perceived self-efficacy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Omega Squared
Between-Subjects Effects							
Group	.75	1	.75	1.18	.28	.03	.00
Error (Group)	25.55	40	.64				
Within-Subjects Effect							
Time	.02	1.80	.01	.07	.91	.00	.00
Time * Group	.42	1.80	.24	1.90	.16	.05	.05
Error (Time)	8.94	71.85	.12				

Results for Specific Aim #3

Two different coaching styles were used in this study: (1) motivational interviewing health coaching program and (2) health education. The scope of both coaching styles is explained below. The motivational interviewing health coaching program focused on using the motivational interviewing technique to promote physical activity among middle-aged Thai working women in their workplace. Participants in this coaching style received individually tailored counseling in person and on the phone. The coaching focused on how to overcome any perceived barriers to physical activity as well as possible resources to increase being active including a change plan.

The health education program focused on educating participants about the benefit of physical activity to decrease the risk of cardiovascular disease. Participants in this program were also informed about exercise recommendations to promote heart health. Each participant in this group was provided the health education individually in person.

The environment of the study site. This study was conducted at True Visions Public Company Ltd., a communication services company. This company is a part of the TrueVision group. The True Visions company is comprised of four campuses, located in Bangkok, Khon-Kaen, Chiangmai, and Song-khla. The study site was at the

campus in Bangkok. This campus is located in the central part of Bangkok. This site is located in two buildings, of which one is a high-rise office building that includes many companies in the building. True Visions is located on six of the upper floors of this building. The second building is located in the same area and has three stories. All departments of True Visions Company are located in the high-rise building, except the customer service department, which is located in the three-story building. There are two zones in the high-rise building. Zone A is comprised of the first six stories of the building and is open to all residents. This zone contains the restaurant, canteen, cafeteria, fitness center, and parking lots. Building occupants can reach each place in this zone using either stairs or elevators. Zone B of this building contains all the offices. For security purposes, all employees carry employee badges and use only elevators to get to their offices. The stairs are only for fire escape purposes. There are two main transportation options to commute to this company: (1) driving one's personal car or (2) using public transportation including bus and taxi. There are two parking lots located in this area: (1) in the high-rise, and (2) in the parking building, which is located about 500 meters from the office buildings.

To support their healthcare, employees may use the services of the shared healthcare clinic provided for all residents in the building. A nurse provides first-aid and basic nursing care for employees. The company also organizes annual check-ups for all employees every year. If their check-up report shows any abnormal results, an appointment with a physician is arranged. The company also encourages employees to participate in active group activities together in order to encourage them to work as a team. Their personal health is also promoted through the activities such as an annual sport competition and exercise classes after work. The exercise classes vary, based on the interest of the employees.

Recruitment and procedure. This company was chosen to be the study site because it is one of the largest workplaces in the Bangkok urban area. In addition, 52 % of the employees are women and 20% of these women are age 40-65. The researcher contacted the human resource manager to ask for permission to run the health promotion program and collect data in the work place. The researcher submitted a research proposal, “Using Motivational Interviewing for Promoting Physical Activity among Middle-Aged Thai Working Women,” to the Human Resource Department. When the proposal was approved, a collaborative agreement letter from the company was sent to the OHSU Research Integrity Review Board to obtain their permission for the researcher to access the study site and collect data.

After obtaining approval from the OHSU Research Integrity Review Board, the researcher contacted the senior manager of the Human Resource Department to ask for permission to advertise the study project to the target population. The advertisement posters and fliers were posted in the Human Resource Department and at the research site located on the first floor of the three-story building.

Female employees (n=144) aged 40-65 years were contacted by the Human Resource Department to let them know that they were eligible for the study. The researcher then sent a blind copy email about the purpose and timeline of the study to these women. The electronic flier was attached to the email. The poster and flier contained the details about (1) the importance of the study, (2) the purpose of the study, (3) the inclusion and exclusion criteria for participating in the study, (4) the timeline for participating in the study, and (5) how to contact the researcher to get more information. Many women contacted the researcher via email and telephone. Some of them could not participate in the study because they did not meet the inclusion criteria including (1) being younger than 40 years old, (2) being male, (3)

working for another company, (4) planning to resign from their job before the study ended, (5) and having time limitations to complete the whole study.

After women signed informed consents to participate in the study, they were randomly assigned to either the motivational interviewing health coaching program or the health education program. Participants in both groups were asked to complete the questionnaires related to (1) demographic data, (2) physical activity in the past 7 days, (3) perceived benefits for and barriers to physical activity, (4) perceived social support from family and friends, and (5) perceived self-efficacy. To complete the questionnaires took approximately 30 minutes. Because of time limitations during working hours, all participants made another appointment to get their initial interview. The initial interview using motivational interviewing and personal health education was conducted individually in the coaching room.

The coaching room was provided by the company. It was located on the first floor of the three-story building. In the coaching room, posters related to exercise from the Thai Ministry of Public Health were posted on the walls. During the interviewing or giving of health education, the door was closed to keep the conversation private and to decrease sound from outside. All the interviews were recorded using a digital recorder for qualitative analysis and fidelity testing.

MI-BHCP implementation. Based on the pilot study, the implementation of the interventions (motivational interviewing health coaching program and the health education program) was revised over time. The motivational interviewing health coaching program was comprised of four interviews. Two interviews included the initial interview and the first follow-up interviews. These interviews were conducted in person. The average amount of time for the interviews was 27.71 minutes ($SD=7.51$) and 24.33 minutes ($SD=8.05$). The range of the initial interview was between

17 and 41 minutes; the range of the follow-up interview was between 11 and 45 minutes. The second and the final follow-up interviews were conducted on the phone at week 6 and week 10. The average time for the follow-up interviews was 12.25 minutes (SD= 3.12) and 11.00 minutes (SD= 2.51). The range of the second follow-up interview was between 4 and 20 minutes; the range of the final follow-up interview was between 3 and 20 minutes. The length of interview varied based on participants' convenience and their readiness to change. See in Table 34.

Table 34
Mean and standard deviation of the interviewing length described by group

Interview	Motivational Interviewing			Health Education		
	Mean minutes	SD	Min - Max	Mean minutes	SD	Min- Max
Initial at week 2 (person)	27.71	7.51	17 – 41	23.64	6.71	15 - 36
1 st follow-up at week 4 (person)	24.33	8.05	11 – 45	4.77	1.56	2 - 8
2 nd follow-up at week 6 (phone)	12.25	3.12	4 – 20	-	-	-
Final follow-up at week 10 (MI) or week 11 (HE) (phone)	11.00	2.51	3 - 20	4.88	0.53	3 - 6
Total interviewing minutes	75.29	15.65	55 – 109	33.28	7.16	22 - 48

All the interviews were conducted by the researcher who was trained in using the motivational interviewing techniques. During the initial meeting, participants received individually tailored counseling using motivational interviewing techniques to enhance their physical activity. The women and the researcher discussed how to overcome any perceived barriers to physical activity, as well as possible resources to increase their activity level. The principles of motivational interviewing, which include (1) the expression of empathy, (2) the development of discrepancy, (3) rolling

with resistance, (4) support for self-efficacy, and (5) evoking change talk were used to evaluate the participant's motivation to increase her physical activity.

In order to decrease the risk of cardiovascular disease, the women were encouraged to reach the currently accepted optimal level of 30 minutes of moderate-intensity physical activity (e.g., brisk walking) 5 days a week or walking 10,000 steps per day at a slower pace. Thus, the women's goals varied based on their readiness for change. Even though a standard goal of a minimum of 30 minutes of moderate-intensity physical activity on most, and preferably all, days of the week was given to these women, women created a plan based upon their personal physical activity goals.

The change plan worksheet was used to record their intention to change and their plan to increase their physical activity. The topics in worksheet included (1) "the changes I want to make (or continue making)," (2) "the reasons why I want to make these changes," (3) "the steps I plan to take in changing," (4) "the ways other people can help me," (5) "how I will know that my plan is working," (6) "things that could interfere with my plan," and (7) "what I will do if the plan is not working." The coach also recorded the follow-up plan on the worksheet.

The second personal interview (the first MI follow-up) was conducted two weeks after the initial MI interview (at week 4) in the coaching room. In the second interview, the conversation related to adjusting the participant's goals and overcoming the existing barriers to her being physically active. Participants also adjusted their change plan with the coach at this point. Participants who used a pedometer were more likely to use the number of steps as their target. There were some participants who felt uncomfortable talking when they could not reach their goals. For example, one participant said, "I am sorry that I could not do what I said. I really wanted to do, but something unexpected interrupted me to exercise as my plan." On the other hand,

some participants met their goals and realized that they could do it. Thus, they wanted to increase their targets.

The third and fourth interviews (the second and third MI follow-up) were conducted over the telephone and took approximately 12.25 and 11 minutes each, respectively. The participants made the appointment with the coach for the telephone interviews at a convenient time. The most convenient time for them was during 1 to 4 pm (37%) and during 4 to 6 pm (30.1%), respectively for the telephone call. The time of 1 to 4 pm was also the most convenient for participants (44.9%) to meet in person. The interviews on the phone focused on following up on their physical activity and support for their self-efficacy to overcome their barriers to being active. The total time of the intervention for participants in the motivational interviewing-based health coaching program was approximately 75 minutes (SD= 15.65). The total minute range for all interviews was between 55 and 109 minutes. See Table 35.

Table 35

Frequency and percent of the convenient time for interviews in person and on telephone call

	Time	Frequency	Percent
In person			
	08:00 – 09:59	7	7.1
	10:00 – 11:59	24	24.5
	12:00 – 12:59	2	2.0
	01:00 – 03:59	44	44.9
	04:00 - 06:00	21	21.4
Phone call			
	08:00 – 9:59	1	1.4
	10:00 – 11:59	17	23.3
	12:00 – 12:59	3	4.1
	01:00 – 03:59	27	37
	04:00 - 05:59	22	30.1
	06:00 – 08:00	3	4.1

Constraints of the MI-BHCP. There were some limitations for conducting this program. First of all, many participants had time challenges. Their available time varied for participating in the study. Their plan for increasing their physical activity was also adjusted based on their time limitations.

The second limitation was the changeable weather. Between February and May, there are tropical storms in Bangkok, which affected the participants' appointments and exercise plans. For example, participants in the high-rise could not travel to the coaching room in the three-story building during storms. Some participants also could not do their outdoor activities as they had planned.

The holidays that occurred during the study were also an issue. This study was conducted from February to July 2009. There were six holidays in this time period, including Buddhist days (Magha puja and Wisakha bucha), water festival days (Songkarn), and Coronation Day (Chat-tra-mong-khon). In addition, there was a political crisis and violence in the streets in Bangkok during April, so the company asked all employees to leave their offices early and stay home during the crisis situation for their safety. It was very difficult to keep appointments according to the study timeline, because some participants travelled during their long holidays. Some appointments also had to be rescheduled because of the unexpected political situation. Some participants said that they had to change their exercise plan because of the holidays and crisis situation. Their children could not go to school, so they had to stay at home with them, which took them away from their original exercise plan. In addition, during the crisis, political issues were more likely to be discussed among friends and family rather than health concerns.

Qualitative data related to the experience of motivational interviewing.

After completing the program, participants were asked to answer some open-ended

questions to describe their experience while participating in the motivational interviewing health coaching program. The questions related to (1) their feelings during the interviews, (2) their favorite parts of their interviews, (3) parts of the interview that may have made them uncomfortable, (4) how the interviews affected their physical activity, (5) how the program could be more helpful, (6) their opinions on how this program would fit into the lifestyles of Thai working women, (7) opinions about the questionnaire in general, and (8) any additional comments related to the program. All participants turned in the questionnaires, but one of the participants did not answer any of the questions. Thus, to get a better understanding of the working women's experience on motivational interviewing, the data from 23 participants were coded and analyzed using thematic analysis.

Feelings during the interviews. Participants were asked "How did you feel during the interview?" Based on the answers to this question, four themes were derived from the qualitative data: (1) getting benefits from participating in the program, (2) supportive relationships, (3) ability to create a plan, and (4) becoming motivated.

Getting benefits from participating in the program. Participants felt good to be a part of the program and felt comfortable with the interview. In their opinion, this program was interesting and very useful in improving their health. This program helped them gain general knowledge about physical activity and the prevention of cardiovascular disease in particular as well as improving their general physical activity.

Exemplar: "I felt comfortable to be a part of this program. I'm glad that I joined this program. This is a good program. I got good advice about exercise. This program made me more aware of my health. I felt very good with the program."

Supportive relationship. Participants mentioned they felt good with the interview atmosphere. They felt like they were talking with a friend during the interview. They didn't have the feeling of attending a lecture or receiving generalized health education information. In contrast, they felt like they were exchanging knowledge with a friend and getting support from a friend.

Exemplar: "I felt like I was talking with a friend. During the interview, we were more likely to exchange knowledge rather than be interviewed. It was good. The atmosphere of the interview was good. The interviewer was very friendly."

Able to create a plan. The interview helped participants create their plan for exercise. The program encouraged participants to be concerned about their need to exercise and arrange their time for exercise. Their progress was also monitored through the interviews.

Exemplar: "This is a good program. If I hadn't joined this program, I would still be doing the same bad habits every day. I would not put in any effort to be healthy."

Becoming motivated. The interviews encouraged participants to take care of themselves by increasing their physical activity. Every participant felt some pressure to increase her exercise as a result of the follow-up interviews. All participants said they felt energized and motivated as a result of the interviews.

Exemplar: "I felt encouraged and energized to exercise and take better care of my health."

Favorite part of the interview.

Feelings of support and caring from the interviewer. Participants perceived support and caring from the interviewer. During the interview, they mentioned that the interviewer always asked about their feelings and gave good advice to help their

progress. In addition, they also noticed a willingness to help from the interviewer. The interviewer also affirmed their plan and decisions, which raised their confidence to continue with their plan for exercise.

Exemplar: “The interviewer supported me and gave me good advice. She also affirmed that what I did or decided was a good reason.”

Appreciated the material used in this study. Participants found that the manual and guidelines for exercise that they got from the program were useful. Some of them also appreciated the advice to record their physical activity in the diary. Recording physical activity in the diary seemed to motivate participants to continue exercise and to make progress.

Exemplar: “I like to record my activity in the diary. It made me eager to do more activity in order to write it down in the diary.”

Feelings of equal status between coach and participant. Another reason that participants felt comfortable with the interviews using the motivational interviewing technique was the equal status relationship with their coach during the interviews. They were comfortable in talking about their own ideas and attitudes because they felt the interviewer listened to them and respected their opinions.

Exemplars: “I like the part where I can talk about my ideas and attitudes with the interviewer.” “The interviewer was friendly and polite. The interviewer respected me. The questions and conversation did not make me feel pressured.”

Good feelings about exercise. After participating in this program, participants found they got benefit from the interviews. Their knowledge and motivation regarding exercise was increased. The more they talked about their success in following their exercise plan, the more they felt good about themselves as well as feeling good about the program.

Exemplars: “I like this program because I got benefit from exercise.” “I like the interview because it increased my motivation and encouraged me to exercise.”

What made participants feel uncomfortable. Mostly participants felt comfortable with the interviews. Only a few of them felt uncomfortable with some parts of the interview. In addition, one of them felt uncertainty about her privacy because the conversation was recorded. The themes related to their feeling uncomfortable during the interview were (1) feeling disappointed that they could not meet their goals, (2) inability to do what was expected. and (3) uncomfortable with some questions.

Feeling disappointed that they could not meet goals. Some participants felt uncomfortable with their ability to follow their plan. They felt guilty because they could not do what they told the interviewer they would do and that they could not reach their goals. In addition, some participants also felt uncomfortable when they compared their actual physical activity with the standard recommendation. Even though some of the participants improved their physical activity, it still seemed to them that their actual activity was still too far from the recommendation.

Exemplar: “I felt uncomfortable when I compared my actual exercise with the standard recommendation for exercise. My exercise did not reach the goals for standard exercise.”

Unable to do what was expected. When women gave consent to participate in this study, they felt they were expected to complete all activities mentioned in the study. Thus, when they could not do what they committed to do, it seemed a lack of responsibility on their part. In addition, they felt they were a part of the study and they did not want to make the study fail because they could not do what they said they could do.

Exemplar: “Sometimes I got the phone call from interviewer when I was busy; it made me uncomfortable that I could not pick up her call. I felt very sorry about that.”

Uncomfortable with some questions. While some participants felt motivated from the questions during interviews, other participants felt uncomfortable with the process. Sometimes they did not know how to answer the question because they felt their situation was out of their control.

Exemplar: “I felt uncomfortable when the interviewer asked me ‘what you can do to reach your goal?’ I felt a little bit guilty that I could not do it. Sometimes I thought that I would have done it if I knew how to.”

How the interview affected physical activity. All the participants perceived that the motivational interviewing health coaching program affected their physical activity. They perceived that the interview increased their knowledge and raised their concern about increasing their physical activity. In addition, they received motivation to get back on track and continue their exercise. Themes for this question are outlined below.

Raised my concern about increasing my activity. During interviews, the perception of the importance of exercise in these participants was increased. They realized the necessity of exercise to improve their health during middle age. Furthermore, the interviewer challenged participants to find good reasons to increase their physical activity and find time to exercise.

Exemplar: “The interviewer made me realize that I am getting older and need to exercise to be healthy.”

Helped me get back on track. Some participants had been exercising successfully on their own but got off-track when other events in their life became a

higher priority. However, when they participated in this study, the interview helped them get back on-track again. They felt the interview awakened them to the importance of getting back to their exercise programs.

Exemplar: “These interviews dramatically affected my physical activity.

Finally,

I went back to a regularly scheduled exercise program again.” “I like to exercise, but I haven’t done it for a while. Thus, when I had someone wake me up, it made me eager to exercise.”

Motivated me to continue exercise. The interviews not only helped participants to re-start their physical activity programs, but they also helped them become more regular in their exercising. Half of the participants felt their motivation and intention to exercise was increased as a result of the interviews. They wanted to exercise regularly and kept recording their activity in their diaries.

Exemplars: “Participating in the interviews reminded me to exercise.” “I planned to continuously exercise regularly.”

Gave me options for exercise. Besides creating motivation, participants perceived options for exercise and the autonomy to select the options that fit well for them from the interviews. The various options encouraged them to continue exercise even when they perceived barriers to exercise. The opportunity to reach their goals was increased because they were able to discuss all possible options relating to their individual lifestyles.

Exemplars: “The interviews made me aware that my exercise can be done at home and not be limited to only the gym or sports field.” “My motivation to exercise was increased. Even when I didn’t have time or a chance to exercise, at least I could increase my physical activity by walking.”

Increased my physical activity. Half the participants mentioned their physical activity was increased because of the interviews. The interviews helped them move forward from concerns about their health and be motivated to actually increase their physical activity. As a result, they were able to improve their physical activity by increasing their exercise or number of steps.

Exemplars: “The interview encouraged me to try to increase my physical activity.” “The interview made me increase my activity. I walked more often; I didn’t just sit at my desk.”

How to make the program more helpful. To respond to this question, participants provided suggestions for improving the program. The suggestions covered both how to work on themselves and changes to the program. Themes for improving the program are outlined below.

Continuing my commitment to exercise. A majority of the participants believed that having been a part of this program will be of more future value if they continue their personal commitment to exercise. Some of the participants committed to continuing their current exercise plan, while others were desirous of looking for other options to include in their exercise plan.

Exemplar: “This program made me concerned about exercise. I realized that I had to do many things; I should not ignore exercise. Even if I only exercise for 10 minutes, I can say I’m improving my health.”

Not limiting the result to only the prevention of cardiovascular disease. Not only were all of the participants concerned that they were at risk for cardiovascular disease, they were also interested in how to prevent other diseases. Thus, some of them would have liked the program to not only focus on the prevention of cardiovascular disease but also to provide information and techniques on how to

prevent a variety of other diseases. In addition, they wanted to include other healthy behaviors in the program such as how to create and eat a healthy diet.

Exemplar: “The program would be more helpful if we included the other benefits of exercise rather than only the prevention of cardiovascular disease.”

Seeing specific positive changes. Some participants felt their motivation would be increased if they could see any positive change in some specific outcomes. In their opinion, the specific outcomes were more likely to refer to the clinical outcomes. Thus, changing these outcomes might make better sense for their progress as well as better sense for the effectiveness of the program in general.

Exemplar: “The program should be able to demonstrate the benefits of exercise by showing actual physical changes in the body such as weight, appearance, and strength.”

Providing group activity. Some participants found that the interviews alone were not enough to provoke behavioral changes. Working as a group, such as in an exercise class or in a group discussion, might support them to increase and maintain their physical activity.

Exemplar: “This program is very useful. The problem is that participants could not consistently exercise because of negative periodic environment factors. Thus, I would like to suggest adding group exercises or group discussions.”

Providing exercise machines and pedometers. Most participants who used the pedometer in the study mentioned that seeing the step numbers on the pedometer increased their motivation. Actually seeing the numbers let them know exactly where they were relative to their goals. Some of them who realized that increasing walking and other activities could not be their choice due to time, location, and weather

constraints would have liked the program to provide them with a non-complicated exercise machine to use for workouts.

Exemplars: “I may need to keep using the pedometer continuously, so I will try to exercise.” “I checked my step number every evening. If it was not enough, I tried to move my body to increase my activity.”

Follow-up after the end of the program. Some participants found the interviews very useful. The interviews assisted them in more efficiently using the study material such as the exercise manuals, physical activity diary, and pedometer. Thus, they would have liked to continue receiving health information or advice from the program. In addition, they were willing to participate in additional interviews and continued monitoring in their exercise and stay motivated to exercise. They would also have liked to receive a report related to their physical activity after participating in this program.

Exemplar: “I received useful information for my health. This program can be another option to get knowledge about health information. The program should follow up with participants.”

How this program fit for Thai working women. All participants agreed that this program was appropriate for Thai working women. They were satisfied with the program. They confirmed that this program was very useful for working women at present and would be useful in the future. They wished many employees could join this program. In addition, they wanted to share the information from this program with other people. The reasons why they were satisfied with the program can be categorized into seven themes: (1) it was tailored to working women’s lifestyles, (2) it was an appropriate program for all people, (3) it was doable, (4) it raised self-awareness regarding health in working women, (5) it made them feel motivated and

supported, (6) it gave them personal autonomy, and (7) they received benefits from this program.

Tailored to working women's lifestyles. Most of the participants realized that as working women in offices they are required to sit almost all the time. They don't have any free time to even think about exercise. Some of them mentioned that even taking a break to walk during office hours was very difficult for them. They felt that their energy and time was totally used up with their work and family duties. Exercise and being physically active was not a priority in their daily life. Thus, this program seemed to fit with their lifestyle. They could keep working and increase their activity without interference with their work or family.

Exemplar: "The program is very appropriate. If I didn't participate in this program, a working woman like me might think that exercise is not necessary, that doing housework is enough."

Appropriate program for all people. Although this program was proposed to focus only on working Thai women of middle age, participants perceived that this program would be suitable for other people. They offered to share this program with other workers across gender and life-span lines. In addition, they mentioned that this program was useful for both people who were novices to exercise and people who had experience with exercise.

Exemplars: "This program is very appropriate. Working women don't have the time to think about exercise. For some of us who have never exercised, we felt good when we had someone tell us about exercise or talk with us about our exercise. We felt that we had someone following us and monitoring our exercise, so we were motivated to exercise. For those who had exercised, we felt good that we could talk about our exercise and the barriers." "This program is appropriate for all genders and

all ages. It is also appropriate with people who work at home as well as on the outside.”

Program was doable. Participants mentioned that the activities and goals in this program were doable for them. In addition, they didn't have to totally change their lifestyle. If they were asked to do many things that were mostly impossible for them, they did not think they could continue participating in this program.

Exemplar: “This program is appropriate because it didn't change my working and family life. In contrast, this program encouraged me to better manage my daily routine in order to reach the targets set in the program.”

Raising self-awareness regarding health in working women. The majority of working women participating in this program remarked that this program was appropriate for them because of its ability to raise their self-awareness. Lack of time is the main concern and the main limitation among working women. They did not have time to be concerned about their exercise and their health and pay attention to their work at the same time. Thus, this program raised their self-awareness regarding their health and also resulted in raising their awareness of time management.

Exemplar: “This program is very appropriate. It made me think critically about my daily activity and I learned how to better manage my daily activity in order to be healthier.”

Feeling motivated and supported. Another reason that participants preferred this program to others they had experienced was the feeling of motivation and support. Having someone to talk to about their health at the workplace was new for them. They perceived the support from the coach when they were interviewed and given tailored information about their health and exercise. They felt that the interviews made them increase their confidence and intention to exercise.

Exemplar: “I have never exercised. After participating in this program, I felt that this program had a very high value for me. I got a lot of benefit from this program. My muscles are getting firmer. I am now more aware of my eating in order to prevent vascular disease, high blood cholesterol, and other diseases. Thank you very much for providing this very good program. With it, everyone will know that having a healthy life is not too difficult. It depends on your intention and desire to do better.”

Personal autonomy. The women perceived they had the autonomy to participate and comply with the program. They independently created their own goals and activity to increase their physical activity. They were able to choose the options that fit them during the interviews. They also perceived a sense of self-control from being able to monitor their own exercise or walking steps.

Exemplar: “This program is appropriate because I can exercise even when I stay at home. It depends on my intention to exercise.”

Receiving benefits from this program. Some women who got benefits from this program also confirmed that this program is appropriate for working women. There were benefits in their perceptions related to their progression of exercise and to their feeling healthier. Some of them can now picture that they will be able to decrease their risks of cardiovascular disease.

Exemplars: “I’m glad to have joined this program. This program forced me to taking care of myself because I knew that I would get benefits from it. In my opinion, you can’t buy health; you have to do it yourself.” “This is a good program to help working women raise their concern about exercise and their intent to exercise. This program made me pay more attention to my health and my intention to prevent the risk of possible disease in the future.”

All participants confirmed that this program was useful and appropriate for working women, especially at the workplace. Time limitation was still their major concern in order to comply with the activity in this program. For example, one of them mentioned that exercise by walking seems to be simple and the easiest way for a lot of women. For some working women who have limited time to walk because of job requirements, even walking sometimes seemed to be impossible.

Feelings about the questionnaires. A questionnaire was used to measure baseline, midpoint, endpoint, and follow-up data in this study. The questionnaire was composed of questions about demographic and clinical data, physical activity data, and psycho-social factors related to the participant's physical activities. Themes relating to these questions from the participants perception were (1) "exhausted with the questions," (2) "increased my motivation," (3) "having problems recording my activity," (4) "value of the questions."

Exhausted by the questions. Participants took 20-30 minutes to complete the questionnaire. Participants complained about the number of questions. To them, the questionnaire contained too many questions and seemed to ask similar questions. They felt confused and did not quite understand the purpose of some questions. The questions related to physical activity seemed to be a problem for many of them. One of them suggested that the researcher use open-ended questions to highlight only the changed behavior at midpoint and endpoint. Another limitation of the physical activity questionnaire, in their opinion, was problems with recording the activity data. The activity example given in each question did not necessarily cover their activity. Some of them worried that their answers might be in error as a result of their confusion with some of the questions.

Exemplar: “I was confused by the questions sometimes. The questions seemed too similar to me. I had to take time to understand the purpose of each question.”
“Some questions asked about daily activity, which did not seem practical to me. I wasn’t doing the activity mentioned in the questions.”

Increased my motivation. Although participants felt exhausted with the questions, the questions were still of value to them. Some of them mentioned that they were confused with the questions only at the beginning. On the other hand, the questions were useful for improving their physical activity. For instance, they were able to evaluate their own improvement through answering the follow-up questionnaires. They also learned about the intensity of the activity from the questions. The questions showed them how much their activity needed to be increased. Then, they adjusted their exercise plan based on the data from their answers.

Exemplar: “I felt good about the questionnaire. The questions were used as my monitor tool, which encouraged me to exercise.”

The qualitative data from questions relating to their experience in participating in the motivational interviewing health coaching program revealed three patterns of themes included (1) talking about the benefit of participating in this program, (2) talking about uncomfortable feelings that occurred during participation in this program, and (3) suggestions for increasing the benefits from participating in this program. In summary, participants perceived benefits from participating in this program because they felt comfortable with the interviews. They perceived support and caring from the interviewer. During the interviews, they felt positive about having equal status between coach and participant. Further, they perceived a personal autonomy to participate in this study and to increase their physical activity. For

instance, the interviews provided them options for increasing their physical activity, so they were able to choose goals and an activity plan that fit with their lifestyles. As a result of being part of this study, the participants' awareness about their health and increasing activity was raised such that they became motivated through the interviews. Many participants were able to create their own plan for increasing their physical activity. Most of them started exercising in line with their physical activity plan and tried to maintain continuity with their exercise. Some of those who were exercising prior to participation in this study were also able to get back on track. They mentioned the usefulness of the materials used in this study, including the pedometer, diary, exercise guide book, and questionnaire. These materials increased participants' motivation to exercise. In addition, the feeling of being able to complete their exercise plan also motivated them to continue their activity. Thus, all participants confirmed that this program is appropriate for working women. It is tailored to working women's lifestyles and is doable for them. They also suggested providing this useful program to other people in different age and gender groups.

However, some women still felt uncomfortable while participating in this study. They felt disappointment for two main reasons: 1) they could not meet their exercise goals and 2) they were unable to do what was expected of them as a participant in other areas. Some of them felt uncomfortable with questions from the coach during interviews even though they felt motivated by the challenging questions. One participant also felt uncomfortable with being recorded during the interview because she felt she had lost her privacy. Many participants also felt exhausted by the number of questions on the questionnaire. There were too many questions for them, and some questions seemed similar to others. In order to improve this program, participants suggested the research team include more varied activity in the program,

especially group activity. They also would like this study to cover the benefits associated with other diseases and not to limit the result to only the prevention of cardiovascular disease. They want to get an exercise machine and pedometers to use during the program. They also expected to get advice and follow-up after the end of the program and expected to see their specific positive changes on clinical data reports. Equally important, participants mentioned that this program would be more useful if they could keep continuing their commitment to exercise.

CHAPTER 5

Discussion

Major Findings

This chapter addresses the major findings from the study and their implications for health promotion. These findings include the major strong points of the study as well as the limitations of the study and suggestions for future research related to using motivational interviewing in the workplace. The discussion is organized based on the study's aims.

The purpose of this study was to test whether a motivational interviewing-based health coaching program would be feasible, practical, and effective to use for improving physical activity among Thai working women in the workplace compared to a health education program (Aim #2 and Aim #3). The study also described the physical activity and psycho-social factors relating to physical activity, including perceived benefits of physical activity and barriers to being physically active, perceived social support from family and friends, and perceived self-efficacy to overcome the barriers to being physically active among Thai working women (Aim #1).

The findings of this study are divided into two parts: quantitative data and qualitative data. The quantitative data describe the characteristics of the subjects, physical activity data, and psychosocial-factors related to their physical activity. In addition, the quantitative data provided the results for the effectiveness of the motivational interviewing-based health coaching program compared to the health education program over time. On the other hand, the findings from the qualitative data reflected the feasibility of using the motivational interview to promote the health of working women in the workplace. Because this was a feasibility study with a small

sample size, some differences are discussed even though they were not statistically significant. They are included because they may be clinically important. In the other words, the interactions of the coaching style and time will be discussed if they demonstrated any effect on the physical activity or psycho-social outcomes.

The major finding of the descriptive data at baseline indicated that 1) all participants reported low to moderate physical activity and in the workplace they mainly sat with slight arm movement or stood with some walking; 2) about 36% of participants in both groups were overweight and obese; 3) participants in both groups spent the major portion of their time involved in moderate physical activity and the minority of their time for walking and vigorous physical activity, respectively; 4) participants in both groups used 98% of their time for physical activity in household and gardening activities; 5) participants in both groups perceived high benefits of physical activity and moderate barriers for being physically active; 6) they perceived moderate self-efficacy for overcoming the barriers and perceived moderate support from family and friends for physical activity; 7) the total minutes per week of physical activity were more likely to be increased when participants had low perceived barriers and high perceived social support from friends; and 8) participants who had a high perception of social support from family and friends were more likely to report higher perceptions of self-efficacy and less perception of barriers for physical activity.

Furthermore, the major findings of the mixed-design repeat-measure ANOVAs indicated that 1) the steps walked per week measured by pedometer were changed at three different time points, which were not related to the coaching style; 2) both time and its interaction effect with coaching style had a medium effect on steps walked per week; 3) the number of walked steps at midpoint were significantly higher than steps at baseline but there was no statistical difference between steps at endpoint

and baseline measure; 4) the total minutes per week of physical activity at baseline, midpoint, and endpoint were, in general, the same; 5) the coaching style and pedometer use had a small effect on the total minutes per week of physical activity across the three time points; 6) when the total minutes per week of physical activity were compared at baseline, midpoint, endpoint, and at the 6-month follow-up, it also indicated that the minutes were in general the same and were not affected by the coaching style and use of the pedometer.

For the psycho-social factors related to physical activity, the major findings of the mixed-design repeat-measure ANOVAs indicated that 1) the different time points of measure had some small effect on changing the perceived benefit for physical activity scores, which did not relate to the coaching style; 2) the interaction between time of measure and coaching style did have a small effect on the perceived benefits; 3) the perceived benefits for physical activity in both groups tended to decrease across time, 4) the perceived barriers to being physically active did not change significantly during the study, but the coaching style had a small effect on the barriers over time; 5) the time of measure had a small effect on perceived social support from family and friends, with the perception at the endpoint being significantly higher than at baseline; 6) the coaching style had a small effect on perceived self-efficacy across time, but it was not big enough to make a significant change; 7) results from the descriptive data showed that the mean score of perceived social support and perceived self-efficacy in the MI program gradually increased across time.

Besides the findings from the quantitative data, the major findings related to the feasibility of using motivational interviewing to promote physical activity among Thai working women indicated that 1) the motivational interviewing-based health coaching program could be conducted at the workplace because all participants in this

program were able to participate in all activities' 2) the motivational interview in person took 24-29 minutes and the interview in person took 11-12 minutes' 3) the most convenient time to interview was from 1 to 4 pm and the total time of the intervention for participants in the motivational interviewing-based health coaching program was approximately 75 minutes; 4) the constraints of the motivational interviewing-based health coaching program during this study were the time challenges of participants, the changeable weather, the long holidays, and the Thai political crisis.

The qualitative data from the participants' experience revealed three patterns of themes: 1) the benefits of participation in this program, 2) the uncomfortable feelings that occurred during participation in this program, and 3) suggestions for improving the benefits of participating in this program. The experience of participants relating to the benefits indicated that 1) participants perceived benefits because they felt comfortable with the interviews, 2) they perceived support and caring from the interviewer, 3) they felt there was equal status between coach and participant, 3) they perceived personal autonomy from participating and increasing their physical activity, 4) participants' awareness about their health and increasing activity was raised and they became motivated to improve their physical activity through the interviews, 5) they were able to create a plan for increasing their physical activity, 6) the program helped them get back on track, 7) the materials used in this study were useful, and 8) their motivation was increased when they were able to complete their plan for exercise. In conclusion, the program is appropriate for working women because it is tailored to working women's lifestyles and is doable for them.

Some participants felt uncomfortable while participating in this study. The qualitative data indicated that 1) they felt disappointment that they could not meet

their goals as well as anticipated and that they were unable to do what was expected of them as a participant, 2) some questions during the interviews made them uncomfortable even though they felt motivated to improve from those challenging questions, 3) many of them felt exhausted by the number of questions on the questionnaire. In order to improve this program, participants suggested that, 1) group activity should be included in the program and they would like this study to cover the benefits that apply to other diseases and not limit the focus to the prevention of cardiovascular disease, 2) an exercise machine and pedometers should be provided for use during the program, 3) they expected to receive advice and follow-up after the end of program as well as to see their specific positive changes on the clinical data report, and 4) this program would be more useful to them if they could keep their motivation and commitment to exercise.

Implications for Specific Aim #1

Describe the physical activity, perceived benefits and barriers, self-efficacy, and social support for exercise in middle-aged Thai working women

As expected, participants, as office-based working women, reported their physical activity to be at low to moderate levels. The results of reported physical activity intensity of women who participated in this study were congruent with the survey study conducted with Thai women (Wibulpolprasert et al, 2007). The participants' general activity at work was mainly to sit with slight arm movement or stand with some walking. One-third of the participants were overweight and/or obese. These results confirmed that women who work mainly in offices are at risk for cardiovascular disease due to lack of physical activity. Physical activity and cardiorespiratory fitness play an important role in reducing the risks of coronary heart disease. Physically inactive persons have a 45% higher risk of developing heart

disease than those who are physically active (Kohl, 2001). The physical activity reported by working women in this study confirmed the need for promoting their increased physical activity. Working women spend most of their time on moderate physical activity; most of this activity involves household chores and gardening. These findings are congruent with family roles of working women in the Thai culture. Even those women who have working roles still have the responsibility for taking care of their children, their husbands, and their older parents. It can be implied from the big difference between the total minutes for household and gardening physical activity among these women that they possibly feel too tired from this household activity to increase their physical activity by walking or by involving themselves in a leisure-time physical activity.

Although the participating women had very little time for leisure-time exercise and walking, they reported a high perception of the benefits of physical activity. Possibly, the women participating in this study have considerable education so they have access to various educational sources related to physical activity and exercise. Although the participants reported a moderate perception of the barriers to being physically active, the findings still revealed that their perception of the benefits of physical activity were negatively associated with their perception about barriers to exercise. This finding is congruent with the finding of the relationship between perceived benefits of and barriers to exercise among African American women in an urban area of the mid-South of the United States (Jones & Nies, 1996). Differences from the studies of Thai female nurses (Kaewthummanukul et al., 2006) and middle-aged Thai women (Youngpradith, 2004) were such that the perceived benefit of physical activity did not associate with adherence to physical activity. In the health promotion model, the perceived benefit of physical activity referred to an individual's

perceptions of the anticipated benefits of physical activity, which were mental representations of the reinforcing consequences of his or her physical activity behavior (Pender, 1996). Bandura (1977) proposed that perceived benefit or positive outcome expectations influence health behavior through perceived self-efficacy. The study among middle-aged Thai women also supports the conclusion that the perceived benefits of exercise influence exercise behavior through women's perception of self-efficacy (Youngpradith, 2004).

It is interesting to note that perceived barriers are negatively associated with physical activity and perceived benefits of physical activity even there was no direct association between perceived barriers and perceived self-efficacy. There is no association between perceived barriers and perceived self-efficacy as well as no association between perceived self-efficacy and their physical activity by these participants. However, perceived barriers and self-efficacy might relate to each other through their perceived benefits of physical activity because the perceived benefits showed a positive association with self-efficacy. Related to these findings, it can be implied that in these women, the perceived barriers to being physically active affected their ability to increase physical activity rather than their confidence to exercise. Furthermore, women were asked about their confidence to overcome their barriers after they had made the decision to participate in the program. At that moment their perceived self-efficacy might have increased more than usual, but the physical activity that was asked about in the questionnaire was their physical activity in the previous 7 days, not at the same moment.

The findings showed that high perceptions of social support, especially from friends, were positively associated with perceived self-efficacy. They were also negatively associated with perceived barriers. It can be implied that working women

spend a lot of their time in social interactions both at work and at home. Thus, social support influenced their activity in daily life. Working women spend more than half their time at the workplace. Thus, their friends are more likely to have more influence on their exercise and physical activity during leisure time than does their family. See Figure 5.

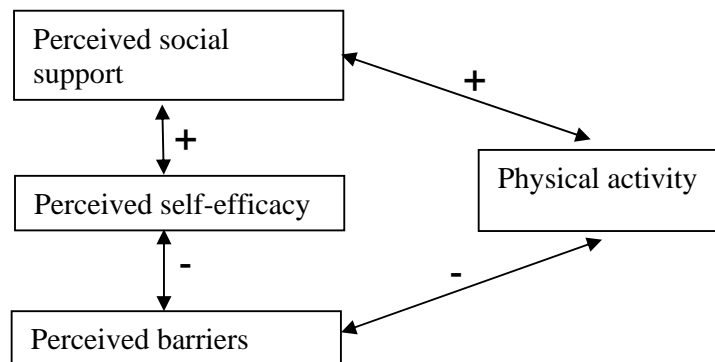


Figure 5 The relationship among psycho-social factors of participants

Implications for Specific Aim # 2

Test the efficacy of a motivational interviewing-based health coaching program compared to a standard education program among middle-aged Thai working women

Physical activity outcomes. The analysis of the primary outcome revealed that no changes in the total minutes of physical activity across four time points were related to the coaching styles. However, the analysis of the secondary outcome showed that the number of walked steps per week measured by pedometer was changed over time even though it was not related to the coaching styles. Besides the significant changing of steps over time, the coaching style slightly affected the number of steps walked across time. The results showed that at endpoint the participants in MI-BHCP reported a higher number of walked steps than those

participants in HEP at the same time point as well as a higher number of steps at baseline. Even though both total minutes of physical activity and steps walked measured by pedometer aimed to measure physical activity outcomes, the pedometers were more likely to be a more sensitive tool for measuring physical activity. Because of the self-reported measures, the physical activity data might have been over- or under-estimated in the reporting by the participants. Although the pedometer seems to be a more sensitive technique for measuring physical activity, using the pedometer across a three-month time span was very difficult for the participants; some of them could not use the pedometer all the time.

The positive changes in the number of walked steps over time implied that participants from both groups received benefits from participating in the study. Even though the Thai Ministry of Public Health has publicly promoted the benefits of physical activity, many workplaces did not provide physical activity or health promotion programs for their employees. In addition, there was no health counseling or health educator service provided to employees in the companies even though all employees had to participate in yearly health check-ups provided by companies. Thus, having a health educator at the workplace would seem to provide motivation and raise people's concern about their health. However, the analysis still revealed the small effect of coaching style on the steps walked. From the greater improvement of participants in MI-BHCP, it can be implied that motivational interviewing may be an effective technique to use for encouraging women to engage in more physical activity, especially at the beginning of the program. From the study, women in the MI group increased their physical activity and their energy expenditure dramatically at the midpoint compared to the baseline measure, which differed from the women in health education group. Women in the health education group gradually increased their

minutes of physical activity across time, but their energy expenditure was dramatically decreased at the 6-month follow-up. In contrast with the participants in HEP, energy expenditure of participants in MI-BHCP at follow-up was higher than their energy expenditure at baseline. If we integrate the data from the reported total minutes of physical activity with the steps walked from the pedometers, it can be implied that motivational interviewing is a useful technique to encourage women to start acting on a program to start behavior change. In addition the improvement of participants in MI-BHCP at 6-month follow-up also implied that the effect of the motivational interviewing technique may last longer than the effect of the standard health education used in this study. Based on the 6-month follow-up, 75% of participants in MI-BHCP group completed the survey, while only 44% of those in the health education group completed the survey. In addition, participants in the motivational interviewing group (17%) reported on-going vigorous physical activity twice the duration as the participants in the health education group (9%) and also reported no low physical activity. These results can be used to confirm that the long-lasting effects of motivational interviewing are greater on health behaviors, especially on the behavior of physical activity.

The findings indicated that the coaching styles and the use of the pedometer had a small effect on the total minutes per week for physical activity across the three time points. From these findings it can be implied that using the pedometer along with motivational interviewing will increase motivation for physical activity among working women. The study showed that the pedometer can be used for both the measure and the motivator for the participants (Craig, tudor-Locke, & Bauman, 2007). Many participants said that the pedometer very effectively allowed them to monitor their improvement. When they saw the number of steps increase on their

pedometer, it motivated them to increase their walking time. However, when the physical activity outcomes were analyzed based on the pedometer only, there was no significant difference between participants who used and who did not use the pedometer. In a study examining the population-wide effects of Canada on the Move, findings indicated that owning a pedometer increased by 14% participants' walking time; what's more, participants who had had their awareness raised about walking and owned a pedometer reported that they increased their number of walking hours by 2 times longer than those who did not meet the conditions (Craig et al., 2007). These results confirmed the prediction that using the pedometer alone does not motivate participants to increase their physical activity; therefore, a pedometer will be more useful among Thai working women when it is used with the motivational interviewing technique. In addition, when the 6-month follow-up data were added to the analysis, it revealed no effects due to the pedometer and the interaction effect between pedometer and coaching style on physical activity data. Thus, it may be concluded that use of the pedometer by itself is more useful for studies and/or exercise programs that last only a short period of time.

Psycho-social factor outcomes. The findings revealed that the different time points of measure had some small effect on the change in perceived benefits for physical activity. This small effect was not related to the coaching style. The perceived benefits for physical activity in both groups tended to decrease across time. This finding is not congruent with the hypothesis of this study aim. However, the trends of the perceived benefits of physical activity in both groups are in the same direction. As mentioned in the descriptive data related to perceived benefits and barriers to being physically active, the perceived benefits were negatively associated with perceived barriers in these participants. From the results, even the perceived

barriers to being physically active did not change significantly during the study, but the coaching style did have a small effect on the perceived barriers over time in both groups. Participants in both groups trended to increase their perception about their barriers to being physically active, although participants in HEP had a higher perception of barriers than participants in MI-BHCP at endpoint. This increasing trend may be the result of the participants trying to increase their physical activity and meeting increased resistance over time. For instance, prior to participating in this study, participants might not have recognized their barriers to exercise. When they actually took action on their exercise plan, they might have realized that some barriers they did not at first expect prevented them from exercise.

The time of measure had a small effect on perceived social support from family and friends for participants in both groups. In general, the perception of support at the endpoint was significantly higher than at the baseline. This finding implied that participants felt that the MI-BHCP and HEP supported them in their efforts to increase their physical activity compared with their ordinary life. Social support is defined as information that allows the participant to believe he or she is cared for and loved, esteemed and valued and that he or she is a member of a network of mutual obligation (Cobb, 1976). The questionnaire did not specifically ask about the social support from the coach. But just by being in the study, participants also got support from their friends and/or co-workers who participated in the study with them. Some participants also mentioned that family and friends provided support to them in order to help them increase their exercise when they knew that the participants were a part of the study.

The coaching style that participants engaged in had a small effect on perceived self-efficacy across times, but this small effect was not big enough to make any

significant change to the perceived self-efficacy. However, this finding demonstrated that the participants' confidence in overcoming their barriers improved differently between the two groups. The findings of the descriptive data also revealed that the mean score of perceived social support and perceived self-efficacy in MI-BHCP gradually increased across time. Findings from this study are also congruent with the findings from the Heart-to-Heart Promoting Walking in Rural Women through Motivational Interviewing and Group Support study (Perry et al., 2007). From this study, the self-efficacy scores of participants also increased across time, but there was no significant change in the scores among participants in the Heart-to-Heart and the comparison group. Based upon the principles of the motivational interviewing technique, change will not occur even if the participants are motivated to modify their behavior unless the participants believe they have the resources and the capability to overcome barriers and successfully implement new ways of behaving (Markland et al., 2005). The results of this study did not show a significant difference in the perceived self-efficacy of the participants in MI-BHCP, and the perceived self-efficacy of these participants did not significantly associate with their physical activity. It may be implied that the perceived self-efficacy of the participants in this study needs to be increased by using more intense MI. On the other hand, motivational interviewing may not directly increase a participant's physical activity through the improvement of his or her perceived self-efficacy. In contrast, self-efficacy may catalyze the changing of physical activity among participants who engaged in MI-BHCP. In a study of motivational interviewing to Increase physical activity in long-term cancer survivors, the findings also revealed that survivors with high self-efficacy for exercise increased their regular physical activities more than did those with low self-efficacy, whereas the changes of participants in the comparison

group did not relate to their self-efficacy (Anderson, Perry, Blue, Browne, Henderson, et al., 2003). Thus, a program that contains the intense motivational interviewing technique with a larger sample size may allow us to see an increase in physical activity of participants.

Implications for Specific Aim #3

Describe the feasibility of a motivational interviewing-base health coaching program in middle-aged Thai working women

Collaboration with the workplace. Prior to conducting a health promotion program, collaboration and assistance from the involved company is of great importance. The human resource department is considered to be a gatekeeper for accessing participants. In order to conduct the study in this company, the researcher proposed a study project that contained 1) the information related to the MI-BHCP and HEP, 2) the recruitment and the data collection processes, and 3) the benefits for the employees. When the proposal was approved, a collaborative agreement letter from the company was sent to the OHSU Research Integrity Review Board. This collaboration was very important for accessing eligible subjects, providing time for participating in the program, and preparing a coaching room.

Accessibility to the study. In order to convey information related to the study to all eligible subjects, the researcher discussed and consulted with the Human Resource Department the details regarding the recruitment plan. The staff of this department provided very useful and updated information on how to contact eligible subjects. The department's suggestion of sending an e-mail to all eligible subjects proved to be very effective. Even though the advertising posters were posted at Human Resources and on the information boards in this company, they were unable to attract all the eligible subjects because of the nature of the physical environment of

this company. In contrast, email proved to be the most effective communication and provided the most important technique for the recruitment process because it accessed the subjects directly and personally. Most of the employees in this company were able to use email for communication. News and other information are also delivered to their employees via email. The electronic flyers were also effective. Many women referred to the flyer when they registered for the study. Snowballing proved to be another useful communication for accessing subjects in this study. Some of the women came to the study site to ask for more information after they learned about this study from their colleagues. Some women came with their friends and asked permission to listen to the study details. Some of them decided to join the study, while others found the study purposes and timeline did not meet with their needs and available time. At the least, snowballing allowed the researcher to meet with these women who were basically too shy to come on their own.

Eligibility for the study. Some employees could not participate in the study because they did not meet the inclusion criteria. For instance, some male employees or women aged younger than 40 years wanted to participate in this study because they wanted to increase their exercise for the purposed of being healthy and better-looking. Some of them were disappointed that the study did not cover them. However, they were all invited to drop by the study site, even though they could not receive the interview or materials used in the study. Nevertheless, these employees might still receive some benefit from this study. Some studies have shown that even posters or flyers publicly posted have motivated people to be concerned about their health. In addition, these employees might be friends of the participants and they might share information from this study in their conversations.

Other subjects who were unqualified to participate in this study were working in another company, planning to resign from their job before the study ended, or had time limitations and could not complete the whole study. Employees in other companies also contacted the researcher because they saw the posters and flyers about this study. Additionally, participants who received benefits from the study also shared the information about the study with their friends and family who worked at different places. Although this study may have been of benefit to working women in other companies, in order to control the study environment, the study needed to be conducted with participants in this one company only as a plan. Equally important, this was a feasibility study. We wanted to see the effectiveness of the activities of MI-BHCP in complete activities mentioned in the protocol. Thus, it is difficult to summarize the consequence of the study if participants were unable to complete the study. However, these findings do imply that many working women are interested to participating in some sort of health promotion program.

Practical time for participating in the study. Participants joined in the study for a period of approximately nine months. During the first three months, the participants in both groups were contacted continuously during recruitment, baseline measurement, measurement during the program, and one week after finishing the MI-BHCP and HEP. After that, they were asked to answer an online survey at six months after finishing the programs. The total time of the interviews in MI-BHCP was approximately 75 minutes, while the total time of the health education in HEP was approximately 33 minutes. The actual time for intervention in both groups was shorter than anticipated. The average amount of time for the initial interviews in person of MI-BHCP was approximately 28 minutes, which was compliant with the proposed plan. The average time of the HEP was approximately 24 minutes, which was 5

minutes shorter than expected. The length of interviews and personal education varied based on the participant's schedule. In addition, the "readiness to change" of the participants in MI-BHCP seemed to affect their interviewing time. These findings also implied that the duration of 24-27 minutes is possible for meeting with working women in person and possible for conducting motivational interviewing. The time used for motivational interviewing in this study was similar to the amount of time used in other effective studies (Ang et al., 2007; Bennett et al., 2008; Perry, 2005). For the first follow-up interviews of the MI-BHCP conducted in person, the average amount of time was approximately 24 minutes, which was shorter than the expected 30 minutes. The motivational interviewing of the studies in the United States, usually conducted on the telephone, took about 15 minutes. The telephone follow-up in this study for motivational interview took around 11-12 minutes. Due to considerations based on the Thai culture, the first follow-up interview using motivational interviewing was revised to be conducted in person rather than on the telephone. From observations by the interviewer during the study, participants seemed to pay more attention to the in-person interviews rather than to interviews conducted on the telephone. Participants revealed more details about their experience of exercise and the barriers that might be preventing them from a commitment to exercise in the interviews conducted in person. Some women asked if they could talk with the interviewer in person rather than talking on the telephone. Obviously some participants did not feel comfortable speaking about their story on the telephone. Lack of privacy in the workplace might be one of their concerns. Most participants worked in shared offices and had their own telephones. Some of them said it was easier for them to ask questions about recording data in the diary and on how to use the pedometer in person. Although many participants preferred meeting in person, their

time limitations were another problem that kept them from doing so. Half of the appointments were eventually rescheduled because participants had unexpected events or were unable to finish their work at the appointment time. The reschedule form included either changing the time or changing the date. One of the participants mentioned she felt disappointed because she was unable to answer the telephone in order to conduct her interview. However, the majority of participants were eventually able to meet at a scheduled time. It implies that participants in different departments with different job characteristics may need different choices of communication. Thus, it may be more practical to let participants choose the communication method that is best suited for them for the follow-up interviews.

The target for physical activity used in the study was appropriate. The 30 minutes of moderate-intensity physical activity, such as brisk walking for 5 days a week or walking 10,000 steps per day at a slower pace, were motivating as an appropriate goal to decrease the risk of cardiovascular disease. During data collection, the Thai Ministry of Public Health encouraged people to increase their physical activity but not all Thais know what constitutes an appropriate amount of physical activity or exercise for them. Most participants created their own plan for increasing their physical activity related to exercise or walking. Some participants increased their exercise by walking or jogging at a public park. Others exercised on exercise equipment or joined exercise classes at fitness centers. Additionally, some participants extended their walking distance to their transportation in order to increase their steps walked. Some women increased their physical activity or walked steps by spending more time playing with their children. Some women exercised on equipment at home and some increased their walking in front of the television or in the bedroom. Being able to set their own plan and choose their own strategy to increase their physical

activity, participants were affirmed in their rights and their capability of self-direction. Supporting a participant's autonomy is one component of the spirit of motivational interviewing. Through this spirit, participants are able to continue their commitment to increase their physical activity. As a result, at the 6-month follow-up, the response rate of participants in this group was higher than participants in the HEP group, and they also reported more minutes of physical activity than the other group. It is interesting to note that participants who had gotten off-track before participating in this program usually set their goal on vigorous exercise at the gym. They were more likely to initially choose to work on exercise equipment or join an exercise class rather than walking or exercising at home. Based on self-efficacy theory, they may have set their activity plan based on their previous experience. However, this goal might have been not practical for them at this later time. Thus, the in-person follow-up interview allowed them to revise their plan for exercise. However, for some participants, even 30 minutes of walking at least 5 days a week was impossible for them. They had to put a lot of effort into it. Motivational interviewing helped them to gradually move forward towards their optimal goal. Their activities were affirmed by the interview, and it motivated them to keep working on their goal.

Applicability of motivational interviewing in the Thai culture. In Western countries, motivational interviewing has been used successfully in many studies. It has been used in many populations to promote their positive behaviors. In Thailand, it has been used in a study of adherence therapy for people with schizophrenia in Chiang Mai (Maneesakorn et al., 2007). In this adherence study, motivational interviewing was used with cognitive behavioral therapy in a brief cognitive therapy for Thai people with schizophrenia. The main contents of motivational interviewing used in this study included (1) exchanging information, (2) developing discrepancy,

and (3) effectively dealing with resistance. The findings from this study indicated that patients in the adherence therapy group improved in overall psychotic symptoms, attitude towards and satisfaction with medication. Although motivational interviewing was not the main method used in this study, the findings supported the fact that motivational interviewing could be successfully used in the Thai culture. Thus, the findings from this study are congruent with the data from this current study.

From the qualitative data related to their experience, participants in MI-BHCP indicated that they got benefit from the interview using motivational interviewing techniques. Participants perceived support and caring from the interviewer. These experiences may be the result of interviews focused on the collaborative relationship between participant and interviewer. Building a collaborative relationship is one of the fundamentals of motivational interviewing. Participants and the interviewer should maintain a partner-like relationship during the interview. Noticeably from qualitative data, participants mentioned that they felt comfortable with the interviews and felt they had equal status with the interviewer. They also perceived personal autonomy in participating in this study and in increasing their physical activity. These experiences differed from being in the formal health education program, which contained an expert-non expert, teacher-student, or healthcare provider-patient relationship. Some participants who were at risk of hypertension and cardiovascular disease mentioned that they were told by doctors many times about exercise, but they felt it impossible for them. One of them said that the doctor did not understand her situation. Thus, besides building rapport, the expression of empathy by the interviewer also supported and prevented resistance from the participants. Experiencing these relationships, participants' awareness about their health and being active was raised. They became motivated through the interviews. Therefore, it can be

implied that the interviews were able to develop the discrepancy between their actual physical activity and the optimal goal for preventing cardiovascular disease and being healthy among Thai working women.

In the Thai culture, women aged 40-65 maintain many important roles in the family such as taking care of their elderly parents, taking care of their children, taking care of their husband, or taking care of the household expenses. Some of women who participated in this study also take responsibility as a leader in their job. Thus, they want to have autonomy to take care of their own selves. As mentioned in their experience of participating in MI-BHCP, they felt comfortable talking about their own ideas and attitudes because they felt that the interviewer listened to them and respected their opinions. Many of them started exercising as their physical activity plan and tried to continue their exercise.

However, some questions aimed at evoking the participant's change talk made some of the participants uncomfortable. While they said that those questions made them feel pressured, they also mentioned that they were motivated to be physically active by those same questions. Thus, it seems to be reinforcing and motivating rather than stimulating resistance to use evoking questions in Thai culture. In contrast to the health education group, participants themselves asked the interviewer about how much exercise was good for them. Then, they tried to increase their activity in their plan. The pressure to exercise came from their trying to continue to meet the commitment on their plan, not from the righting reflex(Kohl, 2001) of the healthcare provider. Thus, the evoking change talk technique seems to be practical for use with Thai working women. However, the interviewer or healthcare provider should be concerned about providing advice, teaching, persuading, counseling, or arguing that may counter the participant's ambivalence to being active.

Using a pedometer with Thai working women. The pedometer seems to be used widely in Western countries such as the United States and Canada. It has been used for both measurement and self-monitoring. Studies also found that the pedometer motivates people to increase their walking. Thai working women in this study also appreciated using the pedometer. It allowed them to set up their walking-step target and monitor their progress each day. However, some women felt uncomfortable wearing the pedometer at first. They were shy about showing that they were participating in the program. When they felt familiar with it, they enjoyed checking their steps each day and sometimes comparing with other participants. However, one participant in HEP felt uncomfortable using the pedometer and gave up using it continuously. She also did not want to write down her steps in the diary. Almost 94% of participants who used the pedometer were able to report their steps until the end of the study. However, some of them complained about wearing it on a dress. One of them lost it in the laundry machine, while another accidentally dropped it in the meeting room.

Limitations of the Study

Small sample size. This feasibility study was conducted in a short period of time and used only one study site for environment control purposes. Thus, only a small number of working women participated in this study. In addition, this study was a single experiment at one specific place, and used only one experimenter. Thus, the findings from this study may not be generalizable across settings.

Limitations for generalization of the findings across participants. The generalizability of the findings in this study may be limited because only one interviewer was used to conduct the motivational interviewing. In addition, this study excluded male employees; employees younger than 40; those participating in some

kind of exercise; those unable to ambulate independently; those with a current or past history of cardiovascular disease, uncontrolled diabetes, uncontrolled high blood pressure, and uncontrolled pulmonary disease. These exclusion criteria helped minimize variability within the conditions of the experiment and provided more powerful tests of the research hypotheses. However, these exclusion criteria reduced the generalizability of the findings across other participants.

Experimenter knew research hypothesis and group assignment. In this study, the researcher conducted both motivational interviewing for participants in motivational interviewing-based health coaching program and providing health education for participants in the health education program. Concerning the experimental bias, researcher carefully conducted the study plan according to the study protocol. The motivational interviewing and health education scripts were also used as a guideline during the interviews or giving health education. However, that researcher might have held an unconscious bias while delivering the interviews and health education because the study hypotheses and group assignment of participants were known to her.

Participants might have recognized that they were in the intervention group. Because participants in the intervention and comparison groups worked at the same campus, participants in MI-BHCP might have recognized that they were expected to report better outcomes than participants in the other group. The comparison group might be useful to decrease some placebo effect in this study because participants in both groups got different interventions. It was not explicitly different like the difference between the intervention and control group. However, this placebo effect might have occurred in this study even though the researcher did not tell participants about their group assignment. In addition, at the beginning, during informed consent,

the researcher explained to all participants that they would be randomly assigned to either MI-BHCP or HEP. Participants who were contacted by the researcher more often might have recognized that they were in the intervention group.

Interaction between participants in intervention and comparison groups.

Because of a pilot study using motivational interviewing among Thai working women in Thailand, the study site was limited to only one study site. Therefore, some participants in this study knew each other, and some participants came from the same departments. The advantage of having participants in both groups from the same department was to control the study condition of job characteristics. However, participants in both groups might have shared information from the interviews and health education. This contamination of participants in two groups may have reduced the effectiveness of the intervention.

Unequal of number of sessions between groups. Participants in MI-BHCP met with the interviewer twice in person and twice on the telephone while participants in HEP met with the interviewer only once in person and twice on the telephone. In addition, the total minutes for interviews of the MI-BHCP were twice as long as the minutes used in HEP. This unequal number times for participation between participants and the interviewers might have encouraged participants in the MI group to increase their physical activity.

Limitation of 6-month follow-up on the psycho-social factor data. The 6-month follow-up was added to the study after the participants had completed the study at week 13. Participants were only asked to answer the questions in IPAQ online. For the psycho-social factors, they were asked to weigh their overall perception related to their perceived benefits, perceived barriers, perceived social support, and perceived self-efficacy. The overall perception questions were used instead of the full

questionnaire because participants complained about feeling overwhelmed by the number of questions at week 13. The limitation of these incomplete data inhibited the ability to compare the psycho-social factor data at four time points.

Suggestions for Future Research

The findings of this mixed-method study adds to our confirmation of using motivational interviewing for promoting health behavior in the Thai culture, specifically to promote physical activity among middle-aged Thai working women. This study may be among the first RCT studies of using Motivational Interviewing to promote healthy behavior of employees in Thailand. This study also combined motivational interviewing with a pedometer together to see the interaction effect of using both motivational interviewing and pedometer to promote physical activity in Thai culture. However, this study is considered a pilot study for feasibility testing of using motivational interviewing for promoting physical activity among Thai working women to prevent cardiovascular disease risk.

Findings from this study revealed multiple areas for improvement in the future study. These areas included 1) Increasing sample size; 2) increasing number of study sites such as in various campuses or companies; 3) increasing the number of experimenters and using blind and naïve experimenters; and 4) adding a group support activity to the protocol. In addition, motivational interviewing should be used to promote other healthy behaviors among employees at their workplace. Based on the response rate and findings from the follow-up at week 36, it was confirmed that the effect of motivational interviewing lasted longer than the effect of the traditional health education. Thus, in the future studies, the effect of motivational interviewing should be studied in other conditions, such as symptom management, treatment compliance, and disease control.

Summary

It is known that women should accumulate a minimum of 30 minutes of moderate-intensity physical activity on most days of the week to prevent the risks of cardiovascular disease (Mosca et al, 2006; Conroy et al., 2005). The challenge of increasing physical activity among middle-aged women in urban setting is a result of the high prevalence of physical inactivity in women aged 45-59 (Wibulpolprasert et al, 2007). In addition, we found that women in urban areas were more likely to report low physical activity than women in rural areas. These findings seem to be the result of the economy becoming more industrialized. Working middle-aged women face the shifting roles of women, as well as bio-psycho-social-cultural changes, including their menopause transition. Thus, in order to promote physical activity among these women, traditional health education itself could not motivate these women to increase or re-start their commitment to exercise. In addition, the physical environment in urban areas does not support them to include activity in their routine. Motivational interviewing was selected to promote physical activity among these women because this technique can address their ambivalence about increasing their physical activity, when being physically active is not their priority compared with other tasks. It is difficult for them to add any additional activity to their routine. In addition, motivational interviewing can help raise their sense of self-control. It helps them plan their activities and set up their goals, at their own pace and convenience. The interviewer may guide them in a goal-oriented direction; however these women fully take responsibility to create their plans and goals.

Among working women, time limitation was reported as the major barrier for being active. Some women spend half of their time at work. As a brief effective intervention, motivational interviewing provides an opportunity for health care

providers to promote employees' health in limited amounts of time. This study was the first to investigate the effectiveness of using a motivational based health coaching style to promote physical activity among, female employees. This study also provided several opportunities to learn about physical activity patterns among Thai women and the correlation of selected psycho-social factors with physical activity outcomes, as well as the opportunity to use motivational interviewing combined with providing pedometers to the employees.

The study highlighted that at baseline all participants reported low to moderate physical activity, and in their workplace mainly sat with slight arm movement or stood with some walking. In addition, the vast majority of their time for physical activity was spent for household and gardening activities, with very low physical activity at spent during transportation, work, and leisure time. Among middle-aged Thai working women, perceived barriers to being physically active was the most influential factor in promoting their physical activity, compared to their perceived benefits of physical activity, perceived social support for physical activity, and perceived self-efficacy.

The findings from this parallel group controlled clinical trial also highlighted that the perceived barriers of participants in MI-BHCP were decreased across time, while the perception of those in HEP was increased. The perceived self-efficacy in MI-BHCP also gradually increased across time which is opposite with the results from participants in the HEP. Even when there was no the interaction effect between coaching style and time on the primary outcome (the total minutes per week of physical activity); the coaching style and pedometer use had a small effect on the total minutes per week for physical activity over three time points. However, women in both groups reported improved physical activity at week 36, with no participant

reporting low physical activity. In addition, some of the women reported high physical activity with a higher number of participants in MI-BHCP than the number of those in HEP.

These finding suggested that both MI-BHCP and HEP can be used to promote physical activity among middle-aged Thai working women. MI-BHCP seemed to be more effective and its effect on physical activity lasted longer than HEP. However, HEP can still be used to increase physical activity during short time for some employees who have never participated in any health promotion program.

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Appendix A

Consent and Authorization Forms for Pilot Study in Oregon

OREGON HEALTH & SCIENCE UNIVERSITY

Research Integrity Office, L106-RI
 2525 SW First Avenue, Portland, OR 97201
 Phone: (503) 494-7887

MEMO

Date: July 29, 2008

To: Catherine Salvesson, MS ,PHD
 Susan B. Bankowski, M.S., J.D., Chair, Institutional Review Board, L106-RI
 Gary T. Chiodo, D.M.D., F.A.C.D., Director, OHSU Research Integrity Office, L106-RI

From: Charlotte Shupert, Ph.D., Associate Director, Research Integrity Office, L106-RI
 Kara Manning Drolct, Ph.D., IRB Co-Chair, Institutional Review Board, L106-RI
 Susan Hickman, Ph.D., IRB Co-Chair, Institutional Review Board, L106-RI
 Elizabeth Steiner, M.D., F.A.A.F.P., IRB Co-Chair, Institutional Review Board, L106-RI

Subject: IRB00004539, The experience of Motivational Interviewing for promoting physical activity among Thai working women aged 40-65

<p>Initial Study Review Protocol/Consent Form Approval</p>

This memo also serves as confirmation that the OHSU IRB (FWA00000161) is in compliance with ICH-GCP codes 3.1-3.4 which outline: Responsibilities, Composition, Functions, and Operations, Procedures, and Records of the IRB.

This study is approved for 30 subjects.

Your Protocol is approved for one year effective 07/29/2008.

Other items reviewed and administratively approved by the IRB include:

- Lay Language Summary
- Advertisement
- Advertisement (Thai language)
- Data Collection Forms Instructions
- Data Collection Sheet
- Information Sheet - English
- Information Sheet - Thai
- Study Measurement - Exercise Benefits/Barriers Scale
- Study Measurement - Exercise Benefits/Barriers Scale (Thai language)
- Study Measurement - Experience of Motivational Interviewing/Final Interview Guidelines
- Study Measurement - Self Efficacy for Overcoming Barriers to Exercise
- Study Measurement - Self Efficacy for Overcoming Barriers to Exercise (Thai language)
- Study Measurement - Social Support for Exercise Behaviors

- Study Measurement - Social Support for Exercise Behaviors (Thai language)
- Waiver of Authorization Form

This study met the criteria for EXPEDITED IRB review based on Category #4, 6 & 7, whereas (4) research involves collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves (Blood Pressure measurement), (6) research involves collection of data from voice, video, digital, or image recordings made for research purposes, and (7) research employs survey methodologies.

This memo confirms approval of an alteration to the consent/authorization process for the above referenced protocol. The requirement to obtain consent and authorization from research subjects has not been waived. The requirement to obtain a signed consent form has been waived in accordance with 45CFR46.109(c), 45CFR46.117(c)(1-2) and 45CFR164.512(i)(1)(i)as:

- The research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

In addition the IRB finds:

- That the alteration will not adversely affect the rights and welfare of the subjects;
- That the research could not practicably be conducted without the alteration;
- That the research could not practicably be conducted without access to and use of the PHI;
- That the use or disclosure of the PIII involves no more than minimal risk to the privacy of the subjects as a result of:
 - An adequate plan to protect the PHI from improper use and disclosure;
 - An adequate plan to destroy any identifiers contained in the PHI at the earliest opportunity consistent with the research;
 - Adequate written assurances that the PHI will not be reused or re-disclosed to any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of PHI would be permitted; and;
- Whenever appropriate, the subjects will be provided with additional pertinent information after participation.

This waiver of documentation of consent and waiver of authorization applies only to the PHI for which use or access has been requested and described in the attached request for waiver.

Subjects must receive a copy of OHSU's Notice of Privacy Practices.

Accounting for disclosures is:

Not needed because the information will not be disclosed outside of OHSU.

This approval may be revoked if the investigators fail to conduct the research in accordance with the guidelines found in the Roles and Responsibilities document (<http://www.ohsu.edu/research/rda/rgc/randr.pdf>). Please note that any proposed changes in key personnel must be submitted to the IRB via a Modification Request and approved prior to initiating the change. If you plan to discontinue your role as PI on this study or leave OHSU, you must arrange either (a) to terminate the study by so notifying the IRB and your department head, or (b) propose to transfer the responsibility of the PI to a new faculty member using a Modification Request.

eIRB#: e4539

OREGON HEALTH & SCIENCE UNIVERSITY (OHSU)
Information Sheet

TITLE: THE EXPERIENCE OF MOTIVATIONAL INTERVIEWING FOR PROMOTING PHYSICAL ACTIVITY AMONG THAI WORKING WOMEN AGED 40-65

PRINCIPAL INVESTIGATOR: Catherine Salvesson, Ph.D., RN; (503) 494-3558

CO-INVESTIGATORS: Yupawan Thongtanuam MSN., RN

SPONSOR: N/A

PURPOSE OF STUDY: You have been invited to be in this research study because you are a Thai working woman between the ages of 40 and 65. The purpose of this study is to learn about what Thai women think about the benefits of physical activity and if there are any barriers to adding physical activity to your daily lives. We also want to know more about how confident you are in being physically active and how your family and friends may affect your physical activity after participating in this study. Additionally, we would like to hear your feedback on the activities you participate in for this study. This study will include a total of about 10 women. Your participation in this study will consist of two interviews in person and three telephone interviews. Interviews in person will last for approximately 45 minutes and telephone interviews will last for approximately 20 minutes.

PROCEDURES: If you choose to be in this study, you will first be asked a series of questions from a survey. This survey has questions about: 1) you (such as your age and education) 2) your health (such as history of heart disease or pulmonary disease and taking medication) 3) your work (such as job characteristics and work hours) 4) your physical activity (such as exercise experience within the past 3 months). This interview will take about 15 minutes to complete.

If you meet the requirements for this study and wish to continue your participation, the researcher will ask to make an appointment to fill out additional questionnaires about your opinions related to the benefits of physical activity, barriers to physical activity, how your family and friends affect your physical activity, and how confident you are to be physically active. The questionnaires will take about 30 minutes. After completing the questionnaires, we will make another appointment for an interview at a place and time convenient to you.

The interview will be in person and will be a conversation about your physical activity. We will ask you to select a conversation topic and to create a plan related to your physical activity. The interview will take about 45 minutes. The appointments for the telephone interviews will be made at the end of this in-person interview.

eIRB#: e4539

The telephone interviews will be conducted over 3 phone calls. The first and second telephone call will ask about your physical activity since the in-person interview. The third telephone call will be conducted by a research assistant to ask about your opinion of this study.

RISK AND DISCOMFORTS: Some of the questions you may be asked may reveal some personal information. It may seem very personal or embarrassing to you. You might feel uncomfortable talking about it. You can refuse to talk about any of the questions that you do not wish to answer.

ALTERNATIVES: Being in this study is voluntary. You can choose not to take part in this study. You can change your mind at any time about being in the study.

BENEFITS: You may or may not personally benefit from being in this study. However, by being in a study, you may help us learn new information that may benefit other women in the future.

CONFIDENTIALITY: Neither your name nor your identity will be used for publication or publicity about the study. The questionnaires and records will not contain your name. We will use a number code instead. In addition, questionnaires and records will be kept in locked files in the researcher's office at OHSU indefinitely. Your contact information will be kept in a separate locked file and will be destroyed when the study is over.

COSTS: There will be no cost to you for being in this study. There is a \$10 compensation for your time, which will be given to you at the end of the study by mail.

CONTACT: If you have questions about the study, please contact **Catherine Salveson, Phone number (503) 494-3558**. If you have questions regarding your rights as a research participant, please contact the **OHSU Research Integrity Office at (503) 494-7887**.

มหาวิทยาลัยโอเรกอนเฮลส์แอนด์ไซน์
(Oregon Health & Science University)

หนังสือแจ้งเกี่ยวกับการวิจัย

ชื่อโครงการวิจัย

ประสบการณ์การเข้าร่วมในการศึกษาการสนับสนุนแรงจูงใจเพื่อการส่งเสริมการมีกิจกรรมการเคลื่อนไหวของผู้หญิงไทยทำงานอายุ 40 – 65 ปี โดยใช้เทคนิคการสัมภาษณ์ (Motivational Interviewing)

ชื่อหัวหน้าโครงการวิจัย ดร.แคทเธอริน ชาวเวอร์ซัน โทรศัพท (503) 494 3558

ชื่อผู้ร่วมรับผิดชอบโครงการวิจัย นางสาวยุพาวรรณ ทองตะนูนาม โทรศัพท (503) 382 – 9511

วัตถุประสงค์ของการศึกษา คุณเป็นผู้หนึ่งที่ได้รับเชิญเข้าร่วมในการศึกษาค้นคว้าครั้งนี้เนื่องจาก

คุณเป็นผู้หญิงไทยทำงานอายุระหว่าง 40 ถึง 65 ปี

ปัจจุบันโรคทางระบบหัวใจและหลอดเลือดถือเป็นปัจจัยหลักของการตายในผู้หญิงอายุ 40 – 65 ปีในประเทศไทย

วัตถุประสงค์ของการศึกษาค้นคว้านี้เพื่อลดความเสี่ยงต่อการเกิดโรคหัวใจและหลอดเลือดในผู้หญิงทำงานโดยการส่งเสริมการมีกิจกรรมการเคลื่อนไหวร่างกาย ในการที่จะส่งเสริมการมีกิจกรรมการเคลื่อนไหวทางกายนี้

ผู้วิจัยต้องการที่จะเรียนรู้เกี่ยวกับการรับรู้ประโยชน์และอุปสรรคต่อการมีกิจกรรมการเคลื่อนไหวทางกายของผู้หญิงทำงาน

รวมถึงต้องการเรียนรู้เกี่ยวกับความมั่นใจในการมีกิจกรรมการเคลื่อนไหวร่างกายในผู้หญิงทำงาน

ตลอดจนถึงอิทธิพลของครอบครัวและเพื่อนต่อการมีกิจกรรมการเคลื่อนไหวทางกาย

นอกจากนี้เรายังต้องการฟังความคิดเห็นของคุณต่อการศึกษาค้นคว้านี้ด้วย โดยจะมีผู้หญิงเข้าร่วมการศึกษานี้ประมาณ 10 คน

หากคุณเข้าร่วมในการศึกษานี้ คุณจะได้รับการสัมภาษณ์แบบพบตัวจำนวน 2 ครั้งและทางโทรศัพท์จำนวน 3 ครั้ง

การสัมภาษณ์แบบพบตัวใช้เวลาประมาณ 45 นาที ส่วนการสัมภาษณ์ทางโทรศัพท์ใช้เวลาประมาณ 20 นาที

การดำเนินการวิจัย หากคุณเลือกที่จะเข้าร่วมในการศึกษานี้ ผู้วิจัยจะถามคำถามเกี่ยวกับข้อมูลส่วนตัวของคุณ

เพื่อตรวจสอบว่าคุณมีคุณสมบัติที่จะเข้าร่วมในการศึกษาค้นคว้านี้หรือไม่ คำถามต่างๆประกอบไปด้วย 1) คำถามเกี่ยวกับตัวคุณ

เช่น อายุและการศึกษา 2) สุขภาพของคุณ เช่น ประวัติการเจ็บป่วยด้วยโรคหัวใจและระบบทางเดินหายใจ

และประวัติการใช้ยาและการรักษา 3) การทำงานของคุณ เช่น ลักษณะงานที่ทำ และตารางการทำงาน 4)

การมีกิจกรรมทางกายของคุณ เช่น การออกกำลังกาย ภายใน 3 เดือนก่อนหน้านี้อ การสัมภาษณ์ครั้งนี้จะใช้เวลาประมาณ 15 นาที

ถ้าหากคุณมีคุณสมบัติตรงกับการศึกษาค้นคว้านี้เราจะนัดหมายคุณเพื่อตอบแบบสอบถามความคิดเห็นเกี่ยวกับประโยชน์และอุปสรรค

ต่อการมีกิจกรรมการเคลื่อนไหวทางกาย อิทธิพลของครอบครัวและเพื่อนต่อการมีกิจกรรมการเคลื่อนไหวทางกาย

และความมั่นใจในการมีกิจกรรมการเคลื่อนไหวร่างกายเพิ่มขึ้น การควบคุมแบบสอบถามใช้เวลาประมาณ 30 นาที
หลังจากกรีนแอส จะนัดหมายเพื่อจะพบคุณในสถานที่ที่คุณสะดวกในกรณีให้สัมภาษณ์

การสัมภาษณ์ครั้งที่หนึ่งเป็นการสัมภาษณ์แบบพบตัวเกี่ยวกับพฤติกรรมการมีกิจกรรมการเคลื่อนไหวของคุณ
นอกจากนั้นเราจะให้คุณวางแผนและเป้าหมายเกี่ยวกับการมีกิจกรรมการเคลื่อนไหวหรือการออกกำลังกายของคุณ
การสัมภาษณ์นี้ใช้เวลาประมาณ 45 นาที ในการสัมภาษณ์ทุกครั้งบทสนทนาจะถูกทำการบินที่เสียงโดยผู้วิจัย
หลังจากสิ้นสุดการสัมภาษณ์ครั้งที่หนึ่งเราจะนัดหมายการสัมภาษณ์ทางโทรศัพท์อีกสามครั้ง
การสัมภาษณ์ทางโทรศัพท์ครั้งที่หนึ่งและสองจะเป็นการสนทนาเกี่ยวกับการมีกิจกรรมทางกายของคุณ
ส่วนการสัมภาษณ์ทางโทรศัพท์ครั้งที่สามจะเป็นการสัมภาษณ์เกี่ยวกับความคิดเห็นของคุณต่อเข้าร่วมในการศึกษานี้
การสัมภาษณ์สุดท้ายนี้จะดำเนินการโดยผู้วิจัยซึ่งไม่มีส่วนเกี่ยวข้องกับสัมภาษณ์ก่อนหน้า

ความเสียและความไม่สบายใจที่อาจเกิดขึ้นจากการเข้าร่วมในการศึกษานี้

บางข้อคำถามและบทสนทนาในการศึกษานี้จะรวมคำถามที่เกี่ยวข้องกับข้อมูลส่วนตัวของคุณ
ซึ่งอาจทำให้คุณไม่รู้สึกสะดวกใจที่จะพูดถึง
อย่างไรก็ตามคุณสามารถปฏิเสธที่จะพูดถึงเรื่องดังกล่าวที่อาจจะทำให้คุณไม่สบายใจได้ในคำถามนั้นๆ

ทางเลือก การเข้าร่วมในการศึกษานี้ถือเป็นความสมัครใจ ดังนั้นคุณสามารถเลือกที่จะไม่เข้าร่วมในการศึกษานี้
นอกจากนั้นคุณยังสามารถเปลี่ยนใจไม่เข้าร่วมในการศึกษาได้ตลอดเวลาที่อยู่ในการศึกษา

ประโยชน์ที่จะได้รับจากการเข้าร่วมในการศึกษา

การรับรู้เกี่ยวกับพฤติกรรมการเคลื่อนไหวทางกายนี้จะมีประโยชน์โดยตรงต่อทั้งตัวคุณเอง และผู้หญิงทำงานคนอื่น ๆ
ในอนาคตต่อไป

นอกจากนี้คุณจะได้รับเหรียญกำไลข้อมือเพื่อช่วยในการส่งเสริมการออกกำลังกายระหว่างการเข้าร่วมในการศึกษานี้ด้วย
ซึ่งคุณสามารถเก็บเหรียญไว้ใช้ต่อไปได้หลังจากคุณเข้าร่วมกิจกรรมจนกระทั่งสิ้นสุดการศึกษา

ความเชื่อถือได้ในการเก็บรักษาข้อมูลของคุณเป็นความลับ ชื่อและข้อมูลต่างๆ ที่จะสามารถระบุตัวคุณได้

จะถูกเก็บรักษาไว้อย่างดีในที่ที่สามารถไว้วางใจได้ว่าจะไม่เผยแพร่สู่บุคคลภายนอก

นอกจากนี้ข้อมูลต่างๆที่เราเก็บจากคุณจะไม่ปรากฏชื่อของคุณ เราจะใช้รหัสแทนชื่อของคุณ

และเราจะเก็บข้อมูลต่างๆจากแบบสอบถามและเทปบันทึกเสียงไว้ในลิ้นชักที่สามารถล็อกกุญแจได้ซึ่งจะเก็บรักษาไว้ในห้อง
ของหัวหน้าโครงการวิจัยที่มหาวิทยาลัยโอเรกอนสเตตส์แอนดีไซน์ ส่วนข้อมูลสำหรับการติดต่อของคุณเราจะเก็บแยกต่างหาก
และจะทำลายข้อมูลเหล่านี้เมื่อการศึกษานี้สิ้นสุดลง

ถ้าขัดแย้งในการเข้าร่วมในการศึกษา ไม่มีค่าใช้จ่ายใดๆในการเข้าร่วมการศึกษานี้

ติดต่อสอบถาม ถ้าคุณมีข้อคำถามเกี่ยวกับการศึกษานี้ โปรดติดต่อหัวหน้าโครงการดร.แคทเธอริน ชาวเวอร์ชัน โทรศัพท์
(503) 494 – 3558 หรือถ้าคุณมีข้อคำถามเกี่ยวกับสิทธิของการเป็นผู้เข้าร่วมในการศึกษา โปรดติดต่อ OHSU Research
Integrity Office โทรศัพท์ (503) 494 – 7887

Notice of Privacy Practices

THIS NOTICE DESCRIBES HOW MEDICAL INFORMATION ABOUT YOU MAY BE USED AND DISCLOSED AND HOW YOU CAN GET ACCESS TO THIS INFORMATION. PLEASE REVIEW IT CAREFULLY.

Oregon Health & Science University and OHSU Medical Group are committed to preserving the privacy of your health information. In fact, we are required by law to do so for any information created or kept by us. We are also required to provide you with this Notice describing our legal duties and our practices concerning your health information.

Oregon Health & Science University includes the schools of Dentistry, Medicine, Nursing, and Science & Engineering; OHSU Hospital, and Doernbecher Children's Hospital; numerous primary care and specialty clinics; multiple research institutes and centers; and several community service and outreach programs. For the rest of this Notice, "OHSU" will refer to all services, service areas, and workers of Oregon Health & Science University and OHSU Medical Group.

A. PURPOSE OF THIS NOTICE.

This Notice tells you how OHSU uses and discloses the health information that you have given us or that we have learned from you when you were a patient in our system. It also tells you about our responsibility to you and how we can and cannot use your health information.

Note: When we use the words "your health information," we mean any information that you have given us about you and your health, as well as information that we have gathered while we have taken care of you (including health information provided to OHSU by those outside OHSU). OHSU will follow this Notice of Privacy Practices and any future changes to the Notice that we are required or authorized by law to make. We have the right to change this Notice and to make the revised or changed Notice effective for health information we already have about you, as well as any information we receive in the future. We will have a copy of the

current Notice with an effective date in clinical locations and on our website at www.ohsu.edu/cc/hipaa.

The health information practices listed in this Notice will be followed at all OHSU hospitals, OHSU clinics and other OHSU locations. This includes the practices of:

- All OHSU employees, volunteers, students, residents and service providers, including clinicians, who have access to health information.
- Any health care professional authorized to enter information into your OHSU health record.
- Any non-OHSU clinicians who might otherwise have access to your health information created or kept by OHSU, as a result of, for example, their call coverage for OHSU clinicians.

The people listed above will share your health information with each other for purposes of treatment, payment, and healthcare operations, as further described in this Notice.



B. USES AND DISCLOSURES OF HEALTH INFORMATION FOR TREATMENT, PAYMENT AND HEALTH CARE OPERATIONS AT OHSU.

1. Treatment, Payment and Health Care Operations.

The following section describes different ways that we use and disclose health information for treatment, payment and health care operations. For each of those categories, we explain what we mean and give one or more examples. Not every use or disclosure will be noted and there may be incidental disclosures that are a byproduct of the listed uses and disclosures. The ways we use and disclose health information will fall within one of the categories.

- a. For Treatment.** We may use your health information to provide you with medical or dental treatment or services. We may disclose your health information to staff physicians, staff dentists, post-graduate fellows, midwives or nurse practitioners, and other personnel involved in your health care. We may also disclose your health information to students and resident physicians who, as a part of their OHSU educational programs (and while supervised by physicians or dentists), are involved in your care. Treatment includes (a) activities performed by nurses, office staff, hospital staff, technicians and other types of health care professionals providing care to you or coordinating or managing your care with third parties, (b) consultations with and between OHSU providers and other health care providers, and (c) activities of non-OHSU providers or other providers covering an OHSU practice by telephone or serving as the on-call provider.

For example, a physician or dentist treating you for an infection may need to know if you have other health problems that could complicate your treatment. That provider may use your medical history to decide what treatment is best for you. They may also tell another provider about your condition so that he or she can decide the best treatment for you.

- b. For Payment.** We may use and disclose your health information so that we may bill and collect payment from you, an insurance company, or someone else for health care services you receive from OHSU. We may also tell your health plan about a treatment you are going to receive to obtain prior approval, or to determine whether your plan will pay for the treatment.

For example, we may need to give your health plan information about surgery you received at OHSU so your health plan will pay us or reimburse you for the surgery.

- c. For Health Care Operations.** We may use and disclose your health information in order to run the necessary administrative, educational, quality assurance and business functions at OHSU. For example, we may use your health information to evaluate the performance of our staff in caring for you. We may also use health information about patients to help us decide what additional services we should offer, how we can improve efficiency, or whether certain treatments are effective. Or we may give health information to doctors, nurses, technicians, or health profession students for review, analysis and other teaching and learning purposes.

- 2. Special Circumstances.** Treatment, payment and health care operations at OHSU include uses and disclosures in the circumstances listed below.

- a. Appointment Reminders.** We may use and disclose your health information to contact you as a reminder that you have an appointment for treatment or services.

- b. Treatment Alternatives and Health Related Products and Services.** We may use and disclose your health information in order to allow someone to contact you about possible treatment options or alternatives, or health related products or services that may be of interest to you. For example, an OHSU provider may contact you with information about a health service that may benefit you after your discharge from the hospital.

- c. Fundraising Activities.** We may use and disclose a limited amount of your health information internally, or to the OHSU Foundation and Doernbecher Children's Hospital Foundation to allow them to contact you to raise money for OHSU. The health information released for these fundraising purposes will include your name, address, phone number and dates on which you received service at OHSU.

3. Uses and Disclosures You Can Limit

- a. Hospital Directory.** Unless you notify us that you object, we may include certain information about you in the hospital directory in order to respond to inquiries from friends, family, clergy and others who inquire about you when you are a patient in the hospital. Specifically, your name, location in the hospital and your general condition (e.g., good, fair, serious, critical) may be released to people who ask for you by name. In addition, your religious affiliation may be given to a member of the clergy, such as a priest or rabbi, even if they don't ask for you by name.

b. Family and Friends. Unless you notify us that you object, we may provide your health information to individuals, such as family and friends, who are involved in your care or who help pay for your care. We may do this if you tell us we can do so, or if you know we are sharing your health information with these people and you don't stop us from doing so. There may also be circumstances when we can assume, based on our professional judgment, that you would not object. For example, we may assume you agree to our disclosure of your information to your spouse if your spouse comes with you into the exam room during treatment.

Also, if you are not able to approve or object to disclosures, we may make disclosures to a particular individual (such as a family member or friend), that we feel are in your best interest and that relate to that person's involvement in your care. For example, we may tell someone who comes with you to the emergency room that you suffered a heart attack and provide updates on your condition. We may also make similar professional judgments about your best interests that allow another person to pick up such things as filled prescriptions, medical supplies and X-rays.

OTHER PERMITTED USES AND DISCLOSURES OF HEALTH CARE INFORMATION.

We may use or disclose your health information without your permission in the following circumstances, subject to all applicable legal requirements and limitations:

1. **Required By Law:** As required by federal, state, or local law.
2. **Public Health Risks:** For public health reasons in order to prevent or control disease, injury or disability; or to report births, deaths, suspected abuse or neglect, non-accidental physical injuries, reactions to medications or problems with products.
3. **Health Oversight Activities:** To a health oversight agency for audits, investigations, inspections, licensing purposes, or as necessary for certain government agencies to monitor the health care system, government programs, and compliance with civil rights laws.
4. **Lawsuits and Disputes; Law Enforcement:** In response to a subpoena or a court or administrative order, if you are involved in a lawsuit or a dispute, or in response to a court order, subpoena, warrant, summons or similar process, if asked to do so by law enforcement.

5. Coroners, Medical Examiners and Funeral

Directors: To a coroner or medical examiner, (as necessary, for example, to identify a deceased person or determine the cause of death) or to a funeral director, as necessary to allow him/her to carry out his/her activities.

6. Organ and Tissue Donation: To organizations that handle organ procurement or organ, eye or tissue transplantation, or to an organ donation bank, as necessary to facilitate a donation and transplantation.

7. Research: For research purposes under certain limited circumstances. Research projects are subject to a special approval process. Therefore, we will not use or disclose your health information for research purposes until the particular research project, for which your health information may be used or disclosed, has been approved through this special approval process.

8. Serious Threat to Health or Safety; Disaster

Relief: To appropriate individual(s)/organization(s) when necessary (i) to prevent a serious threat to your health and safety or that of the public or another person, or (ii) to notify your family members or persons responsible for you in a disaster relief effort.

9. Military and Veterans: As required by military command or other government authority for information about a member of the domestic or foreign armed forces.

10. National Security; Intelligence Activities;

Protective Service: To federal officials for intelligence, counterintelligence, and other national security activities authorized by law, including activities related to the protection of the President, other authorized persons or foreign heads of state, or related to the conduct of special investigations.

11. Workers' Compensation: To your employer via a workers' compensation or similar work-related injury program.

12. Inmates: To a correctional institution (if you are an inmate) or a law enforcement official (if you are in that person's custody) as necessary (a) for the institution to provide you with health care; (b) to protect your or others' health and safety; or (c) for the safety and security of the correctional institution.

D. WHEN WRITTEN AUTHORIZATION IS REQUIRED.

Other than for those purposes identified above in Sections B and C, we will not use or disclose your health information for any purpose unless you give us

your specific written authorization to do so. If you give us authorization, you can withdraw this written Authorization at any time. To remove your authorization, deliver or fax a written revocation to OHSU Health Information Services, Mail Code OP17A, 3181 S.W. Sam Jackson Park Road, Portland, OR 97201; fax: (503) 494-6970. If you revoke your Authorization, we will no longer use or disclose your health information as allowed by your written Authorization, except to the extent that we have already relied on your Authorization.

E. YOUR RIGHTS REGARDING YOUR HEALTH INFORMATION.

You have certain rights regarding your health information which we list below. In each of these cases, if you want to exercise your rights, you must do so in writing by completing a form that you can obtain from the OHSU Integrity Office, at 2525 S.W. First Ave., Suite 140, Portland, OR 97201, or on the Web at www.ohsu.edu/cc/hipaa. In some cases, we may charge you for the costs of providing materials to you. You can get information about how to exercise your rights and about any costs that we may charge for materials by contacting the OHSU Integrity Office at (503) 494-0219.

1. **Right to Inspect and Copy.** With some exceptions, you have the right to inspect and get a copy of your health information that may be used to make decisions about your care. We may deny your request to inspect and/or copy in certain limited circumstances, and if we do this, you may ask that the denial be reviewed.
2. **Right to Amend.** You have the right to amend your health information maintained by or for OHSU, or used by OHSU to make decisions about you. We will require that you provide a reason for the request, and we may deny your request for an amendment if the request is not properly submitted, or if it asks us to amend information that (a) we did not create, (unless the source of the information is no longer available to make the amendment); (b) is not part of the health information that we keep; (c) is of a type that you would not be permitted to inspect and copy; or (d) is already accurate and complete.

3. **Right to an Accounting of Disclosures.** You have the right to request an accounting of disclosures. This is a list of certain disclosures we made of your health information. The list does not include all disclosures. For example it does not include disclosures to you, disclosures for treatment, payment, and health care operations purposes described above, or disclosures made with your Authorization as described above.

4. **Right to Request Restrictions.** You have the right to request a restriction or limitation on the health information we use or disclose about you (a) for treatment, payment, or health care operations, or (b) to someone who is involved in your care or the payment for it, such as a family member or friend. For example, you could ask that we not use or disclose information about a surgery you had. We are not required to agree to your request, and any time OHSU agrees to a restriction, it must be in writing and signed by the OHSU Privacy Officer or his or her designee.

5. **Right to Request Confidential Communications.** You have the right to request that we communicate with you about health matters in a certain way or at a certain place. For example, you can ask that we only contact you at work or by mail.

6. **Right to a Paper Copy of This Notice.** You have the right to a paper copy of this notice, whether or not you may have previously agreed to receive the Notice electronically.

F. QUESTIONS OR COMPLAINTS

If you have any questions about this Notice, please contact OHSU (503) 494-8311. If you believe your privacy rights have been violated, you may file a complaint with OHSU or with the Secretary of the Department of Health and Human Services. To file a complaint with OHSU, contact OHSU at (503) 494-8311. You will not be penalized for filing a complaint.

**This notice tells you how we may use and share health information about you.
If you would like a copy of the OHSU notice, please ask your health care provider.**



Oregon Health & Science University includes four schools; OHSU Hospital and Doernbecher Children's Hospital; numerous primary care and specialty clinics; multiple research institutes and centers; and several community service and outreach units.

OHSU is an equal opportunity, affirmative action institution. OHSU-NPI-0403. Reorder from Keltron, Order Number 133201.

Appendix B

Consent and Authorization Forms for Study in Thailand

OREGON HEALTH & SCIENCE UNIVERSITY
 Research Integrity Office, L106-RI (503) 494-7887

MEMO

Date: January 28, 2009
To: Catherine Salveson PHD, MS
From: Susan B. Bankowski, M.S., J.D., Chair, Institutional Review Board
 Gary T. Chiodo, D.M.D., F.A.C.D., Director, OHSU Research Integrity Office
 Kara Manning Drolet, Ph.D., IRB Co-Chair, Institutional Review Board
 Susan Hickman, Ph.D., IRB Co-Chair, Institutional Review Board
 Elizabeth Steiner, M.D., F.A.A.F.P., IRB Co-Chair, Institutional Review Board
CC: Charlotte Shupert, Ph.D., Associate Director, Research Integrity Office
IRB #: IRB00004539
Study Title: The experience of Motivational Interviewing for promoting physical activity among Thai working women aged 40-65
Modification ID: MR00014666
Modification Name: Modification for study in Thailand

Modification Approval

Continuing review materials must be submitted 6 – 10 weeks prior to the study's expiration date.

This study's current IRB approval expires on 7/28/2009.

Your modification request was reviewed and approved by the IRB on 1/28/2009.

Item(s) reviewed and approved include:

- Protocol (revised)
- Lay Language Protocol Summary (revised)
- Information Sheet: English, Thai (revised)
- Demographic and Clinical Data Sheet: English, Thai
- International Physical Activity Questionnaire: English, Thai
- Perceived Benefits and Barriers Questionnaire: English, Thai
- Perceived Self Efficacy Questionnaire: English, Thai
- Perceived Social Support Questionnaire
- Letter of Acceptance - True Visions Public Company, Ltd.

Item(s) reviewed and noted include:

- Translator Resume

November 4, 2008

To: Dr. Catherine Salvesson
OHSU School of Nursing
Portland, Oregon

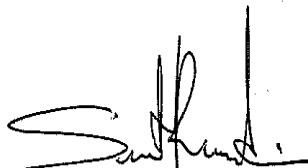
From: Mr. Suwat Buaurai
Human Resources Senior Manager
True Visions Public Company, Ltd.
Samsen Nai, Phayathai,
Bangkok, Thailand 10400

RE: Yupawan Thongtanunam's Thai Working Women's Study

I accept the opportunity to participate in Yupawan Thongtanunam's study, Using Motivational Interviewing for Promoting Physical Activity in Middle-Aged Thai Working Women. I understand she is a PhD student at the Oregon Health and Science University in the School of Nursing and this study is part of her graduate requirements.

I understand that there is no cost to me or True visions Public Company, Ltd. And that we will provide Yupawan with a place to speak privately, according to the plan in the protocol, with the 50 women participating in her study.

I have been provided with a copy of her research proposal and Dr. Catherine Salvesson is available to answer any questions or concerns I, or anyone at my company, may have.



Accept offer to participate: _____ Date: _____

eIRB#: e4539

**OREGON HEALTH & SCIENCE UNIVERSITY (OHSU)
Information Sheet**

TITLE: USING MOTIVATIONAL INTERVIEWING FOR PROMOTING PHYSICAL ACTIVITY AMON THAI MIDDLE AGED WORKING WOMEN

PRINCIPAL INVESTIGATOR: Catherine Salvesson, Ph.D., RN; (503) 494-3558

CO-INVESTIGATORS: Yupawan Thongtanuanm MSN., RN

SPONSOR: N/A

PURPOSE OF STUDY: You have been invited to be in this research study because you are a Thai working woman between the ages of 40 and 65. The purpose of this study is to learn about what Thai women think about the benefits of physical activity and if there are any barriers to adding physical activity to your daily lives as well as to learn about what your daily physical activities look like. We also want to know more about how confident you are in being physically active and how your family and friends may affect your physical activity after participating in this study. Additionally, we would like to hear your feedback on the activities you participate in for this study. This study will include a total of about 52 women. You may randomly selected in the Motivational Interviewing Group or the Health Education Group. If you are selected into the Motivational Interviewing Group, your participation will consist of three interviews in person and two telephone interviews. Interviews in person will last for approximately 30 minutes and telephone interviews will last for approximately 15 minutes. If you are selected into the Health Education Group, your participation will consist of one in person and two telephone interviews. Interviews in person will last for approximately 30 minutes and telephone interviews will last for approximately 5 minutes.

PROCEDURES: If you choose to be in this study, you will first be asked a series of questions from a survey. This survey has questions about: 1) you (such as your age and education) 2) your health (such as history of heart disease or pulmonary disease and taking medication) 3) your work (such as job characteristics and work hours) 4) your physical activity (such as exercise experience within the past 3 months). This interview will take about 15 minutes to complete.

If you meet the requirements for this study and wish to continue your participation, the researcher will ask to make an appointment to fill out additional questionnaires about your physical activity and your opinions related to the benefits of physical activity, barriers to physical activity, how your family and friends affect your physical activity, and how confident you are to be physically active. The questionnaires will take about 30 minutes. After completing the questionnaires, we will make another appointment for a private interview at a time convenient to you.

eIRB#: e4539

For the Motivational Interviewing Group, the interview will be in person and will be a conversation about your physical activity. We will ask you to select a conversation topic and to create a plan related to your physical activity. The interview will take about 30 minutes. The appointments for the telephone interviews will be made at the end of this in-person interview. The telephone interviews will be conducted over two phone calls. The telephone calls will ask about your physical activity since the in-person interview.

For the Health Education Group, you will receive health education about the benefit of physical activity and get a written standard education material at the first meeting. The appointments for the telephone calls will be made at the end of this in-person interview. The telephone interviews will be conducted over two phone calls. The telephone calls will be conducted to help you about filling the data in the questionnaire.

RISK AND DISCOMFORTS: Some of the questions you may be asked may reveal some personal information. It may seem very personal or embarrassing to you. You might feel uncomfortable talking about it. You can refuse to talk about any of the questions that you do not wish to answer.

ALTERNATIVES: Being in this study is voluntary. You can choose not to take part in this study. You can change your mind at any time about being in the study.

BENEFITS: You may or may not personally benefit from being in this study. However, by being in a study, you may help us learn new information that may benefit other women in the future.

CONFIDENTIALITY: Neither your name nor your identity will be used for publication or publicity about the study. The questionnaires and records will not contain your name. We will use a number code instead. In addition, questionnaires and records will be kept in locked files in the researcher's office at OHSU indefinitely. Your contact information will be kept in a separate locked file and will be destroyed when the study is over.

COSTS: There will be no cost to you for being in this study. There is a \$10 compensation for your time, which will be given to you at the end of the study by mail.

CONTACT: If you have questions about the study, please contact **Catherine Salveson, Phone number (503) 494-3558**. If you have questions regarding your rights as a research participant, please contact the **OHSU Research Integrity Office at (503) 494-7887**.

มหาวิทยาลัยโอเรกอนเฮลส์แอนด์ไซน์
(Oregon Health & Science University)

หนังสือชี้แจงเกี่ยวกับการวิจัย

ชื่อโครงการวิจัย การส่งเสริมการมีกิจกรรมการเคลื่อนไหวของหญิงไทยทำงานอายุ 40 – 65 ปี
โดยใช้เทคนิคการสัมภาษณ์เพื่อสร้างแรงจูงใจ

ชื่อหัวหน้าโครงการวิจัย ดร. แคทเธอรีน ชาวเวอร์สัน โทรศัพท์ (503) 494 - 3558

ชื่อผู้ร่วมรับผิดชอบโครงการวิจัย นางสาวยุพาวรรณ ทองตะนูนาม โทรศัพท์ 089 169 2852

วัตถุประสงค์ของการศึกษา คุณเป็นผู้หนึ่งที่ได้รับเชิญเข้าร่วมในการศึกษาค้นคว้าครั้งนี้เนื่องจาก

คุณเป็นผู้หญิงไทยทำงานอายุระหว่าง 40 ถึง 65 ปี

ปัจจุบันโรคทางระบบหัวใจและหลอดเลือดถือเป็นปัจจัยหลักของการตายในผู้หญิงอายุ 40 – 65 ปีในประเทศไทย

วัตถุประสงค์ของการศึกษาค้นคว้าครั้งนี้เพื่อลดความเสี่ยงต่อการเกิดโรคหัวใจและหลอดเลือดในผู้หญิงทำงาน โดยการส่งเสริมการมีกิจกรรมการเคลื่อนไหวร่างกาย ในการที่จะส่งเสริมการมีกิจกรรมการเคลื่อนไหวทางกายนี้

ผู้วิจัยต้องการที่จะเรียนรู้เกี่ยวกับการรับรู้ประโยชน์และอุปสรรคต่อการมีกิจกรรมการเคลื่อนไหวทางกายของผู้หญิงทำงานและลักษณะและจำนวนของการมีกิจกรรมการเคลื่อนไหวของผู้หญิงทำงานในแต่ละวัน

รวมถึงต้องการเรียนรู้เกี่ยวกับความมั่นใจในการมีกิจกรรมการเคลื่อนไหวทางกายในผู้หญิงทำงาน

ตลอดจนถึงอิทธิพลของครอบครัวและเพื่อนต่อการมีกิจกรรมการเคลื่อนไหวทางกาย

นอกจากนี้เรายังต้องการฟังความคิดเห็นของคุณต่อการศึกษาค้นคว้าครั้งนี้ด้วย โดยจะมีผู้หญิงเข้าร่วมการศึกษานี้ประมาณ 52 คน

หากคุณเข้าร่วมในการศึกษานี้คุณอาจได้รับการสุ่มเข้าอยู่ในกลุ่มการส่งเสริมการมีกิจกรรมทางกายโดยการใช้เทคนิคการสัมภาษณ์เพื่อสร้างแรงจูงใจหรือกลุ่มการส่งเสริมการมีกิจกรรมทางกายโดยการใช้เทคนิคการให้สุขศึกษา

ถ้าหากคุณได้รับการสุ่มเข้าอยู่ในกลุ่มการใช้เทคนิคการสัมภาษณ์เพื่อสร้างแรงจูงใจ

คุณจะได้รับการสัมภาษณ์แบบพบตัวจำนวน 3 ครั้งและทางโทรศัพท์จำนวน 2 ครั้ง การสัมภาษณ์แบบพบตัวใช้เวลาประมาณ 30 นาที ส่วนการสัมภาษณ์ทางโทรศัพท์ใช้เวลาประมาณ 15 นาที แต่ถ้าหากคุณได้รับการสุ่มเข้าอยู่ในกลุ่มการให้สุขศึกษา

คุณจะได้รับการให้สุขศึกษาแบบพบตัวจำนวน 1 ครั้งและทางโทรศัพท์ 2 ครั้ง การสัมภาษณ์แบบพบตัวใช้เวลาประมาณ 30 นาที ส่วนการสัมภาษณ์ทางโทรศัพท์ใช้เวลาประมาณ 5 นาที

การดำเนินการวิจัย หากคุณเลือกที่จะเข้าร่วมในการศึกษานี้ ผู้วิจัยจะถามคำถามเกี่ยวกับข้อมูลส่วนตัวของคุณ

เพื่อตรวจสอบว่าคุณมีคุณสมบัติที่จะเข้าร่วมในการศึกษาค้นคว้าครั้งนี้หรือไม่ คำถามต่างๆประกอบไปด้วย 1) คำถามเกี่ยวกับตัวคุณ เช่น อายุและการศึกษา 2) สุขภาพของคุณ เช่น ประวัติการเจ็บป่วยด้วยโรคหัวใจและระบบทางเดินหายใจ

และประวัติการใช้ยาและการรักษา 3) การทำงานของคุณ เช่น ลักษณะงานที่ทำ และตารางทำงาน 4) การมีกิจกรรมทางกายของคุณ เช่น การออกกำลังกาย ภายใน 3 เดือนก่อนหน้า^{นี้} การสัมภาษณ์ครั้งนี้จะใช้เวลาประมาณ 15 นาที ถ้าหากคุณมีคุณสมบัติตรงกับการศึกษาครั้งนี้เราจะนัดหมายคุณเพื่อออกแบบสอบถามเกี่ยวกับการมีกิจกรรมทางกายของคุณและความคิดเห็นของคุณเกี่ยวกับประโยชน์และอุปสรรคต่อการมีกิจกรรมการเคลื่อนไหวทางกาย อธิธิพลของครอบครัวและเพื่อนต่อการมีกิจกรรมการเคลื่อนไหวทางกาย และความมั่นใจในการมีกิจกรรมการเคลื่อนไหวร่างกายเพิ่มขึ้น การออกแบบสอบถามใช้เวลาประมาณ 30 นาที หลังจากนั้นเราจะนัดหมายเพื่อจะพบคุณ ในเวลาที่คู่คุณสะดวกในการให้สัมภาษณ์

สำหรับกลุ่มที่ได้รับเทคนิคการสัมภาษณ์

การสัมภาษณ์ครั้งที่หนึ่งและครั้งที่สองจะเป็นการสัมภาษณ์แบบพบตัวเกี่ยวกับพฤติกรรมการมีกิจกรรมการเคลื่อนไหวของคุณ นอกจากนั้นเราจะให้คุณวางแผนและเป้าหมายเกี่ยวกับการมีกิจกรรมการเคลื่อนไหวหรือการออกกำลังกายของคุณ การสัมภาษณ์นี้ใช้เวลาประมาณ 30 นาที ในการสัมภาษณ์ทุกครั้งบทสนทนาจะถูกทำบันทึกเสียงโดยผู้วิจัย หลังจากสิ้นสุดการสัมภาษณ์ครั้งที่สองเราจะนัดหมายการสัมภาษณ์ทางโทรศัพท์อีกสองครั้ง การสัมภาษณ์ทางโทรศัพท์ครั้งที่หนึ่งและสองจะเป็นการสนทนาเกี่ยวกับการมีกิจกรรมทางกายของคุณเนื่องจากการสัมภาษณ์แบบพบตัว

สำหรับกลุ่มที่ได้รับการให้สุศึกษา

คุณจะได้รับสุศึกษาเกี่ยวกับประโยชน์ของการมีกิจกรรมทางกายและได้รับหนังสือคู่มือในการดูแลสุขภาพตนเองในการพบครั้งแรก หลังจากนั้นผู้วิจัยจะนัดหมายกับคุณในการสนทนาทางโทรศัพท์ครั้งต่อไปอีกสองครั้ง การสนทนาทางโทรศัพท์จะเกี่ยวข้องกับการช่วยเหลือในการออกแบบสอบถาม

ความเสี่ยงและความไม่สบายใจที่อาจเกิดขึ้นจากการเข้าร่วมในการศึกษานี้

บางข้อคำถามและบทสนทนาในการศึกษานี้อาจรวมคำถามที่เกี่ยวข้องกับข้อมูลส่วนตัวของคุณ ซึ่งอาจทำให้คุณ ไม่รู้สึกสะดวกใจที่จะพูดถึง

อย่างไรก็ตามคุณสามารถปฏิเสธที่จะพูดถึงเรื่องดังกล่าวที่อาจจะทำให้คุณ ไม่สบายใจได้ในคำถามนั้นๆ

ทางเลือก การเข้าร่วมในการศึกษานี้ถือเป็นความสมัครใจ ดังนั้นคุณสามารถเลือกที่จะไม่เข้าร่วมในการศึกษานี้ นอกจากนั้นคุณยังสามารถเปลี่ยนใจไม่เข้าร่วมในการศึกษาได้ตลอดเวลาที่อยู่ในการศึกษา

ประโยชน์ที่จะได้รับจากการเข้าร่วมในการศึกษา

การเขียนรู้เกี่ยวกับพฤติกรรมการเคลื่อนไหวทางกายนี้อาจมีประโยชน์โดยตรงต่อทั้งตัวคุณเอง และผู้หญิงทำงานคนอื่น ๆ ในอนาคตต่อไป

นอกจากนี้คุณจะได้รับเครื่องนับก้าวเดินเพื่อช่วยในการส่งเสริมการออกกำลังกายระหว่างการเข้าร่วมในการศึกษารั้งนี้ด้วย ซึ่งคุณสามารถเก็บเครื่องนี้ไว้ใช้ต่อได้หลังจากคุณเข้าร่วมกิจกรรมจนกระทั่งสิ้นสุดการศึกษา

ความเชื่อถือได้ในการเก็บรักษาข้อมูลของคุณเป็นความลับ ชื่อและข้อมูลต่างๆ ที่จะสามารถระบุตัวคุณได้

จะถูกเก็บรักษาไว้อย่างดีในที่ที่สามารถไว้วางใจได้ว่าจะไม่เผยแพร่สู่บุคคลภายนอก

นอกจากนี้ข้อมูลต่างๆที่เราเก็บจากคุณจะไม่ปรากฏชื่อของคุณ เราจะใช้รหัสแทนชื่อของคุณ

และเราจะเก็บข้อมูลต่างๆทั้งจากแบบสอบถามและเทปบันทึกเสียงไว้ในล็อกที่สามารถล็อกกุญแจได้ซึ่งจะเก็บรักษาไว้ในห้อง

ของหัวหน้าโครงการวิจัยที่มหาวิทยาลัยโอเรกอนเฮลส์แอนด์ไซน์ ส่วนข้อมูลสำหรับการติดต่อของคุณเราจะเก็บแยกต่างหาก

และจะทำลายข้อมูลเหล่านั้นเมื่อการศึกษาสิ้นสุดลง

ค่าใช้จ่ายในการเข้าร่วมในการศึกษา ไม่มีค่าใช้จ่ายใดๆในการเข้าร่วมการศึกษารั้งนี้

ติดต่อสอบถาม ถ้าคุณมีข้อคำถามเกี่ยวกับการศึกษารั้งนี้ โปรดติดต่อหัวหน้าโครงการดร.แคเธอรีน ซาวเวอร์ชัน โทรศัพท์

(503) 494 – 3558 หรือถ้าคุณมีข้อคำถามเกี่ยวกับสิทธิของการเป็นผู้เข้าร่วมในการศึกษา โปรดติดต่อ OHSU Research

Integrity Office โทรศัพท์ (503) 494 – 7887

Appendix C

Consent and authorization forms for 6-month follow-up



Research Integrity Office, L106-RI
 3181 SW Sam Jackson Park Road
 Portland, OR 97239-3098
 (503) 494-7887

Memo

Date: November 17, 2009
To: Catherine Salveson, PhD, MS
From: Susan B. Bankowski, M.S., J.D., Chair, Institutional Review Board
 Elizabeth Steiner, M.D., F.A.A.F.P., Co-Chair, Institutional Review Board
 Gary T. Chiodo, D.M.D., F.A.C.D., Director, OHSU Research Integrity Office
 Kara Manning Drolet, Ph.D., Associate Director, OHSU Research Integrity Office
 Mindy Roberts, M.A., C.I.P., IRB Manager, OHSU Research Integrity Office
IRB #: IRB00004539
Study Title: The experience of Motivational Interviewing for promoting physical activity among Thai working women aged 40-65
Modification ID: MR00018223
Modification Name: Adding a 6-month follow up

Modification Approval

Continuing review materials must be submitted 6 – 10 weeks prior to the study's expiration date.

This study's current IRB approval expires on 07/21/2010.

Your modification request was reviewed and approved by the IRB on 11/17/2009.

Item(s) reviewed and approved include:

- Protocol Revised 10/16/09
- Memo to IRB regarding Modification
- Lay Summary
- Follow-up Thank You e-mail (Thai and English)
- Follow-up Questionnaire (Thai and English)
- Follow-up Information e-mail 1 (Thai and English)
- Follow-up e-mail 2 (Thai and English)

The requirement to obtain informed consent and HIPAA authorization has been waived or **its elements have been altered** in accordance with 45CFR46.116(d)(1-4) and

45CFR164.512(i)(1)(i). This memo confirms:

- That the research involves no more than minimal risk to the subjects;
- That the waiver will not adversely affect the rights and welfare of the subjects;
- That the research could not practicably be conducted without the waiver;
- That the research could not practicably be conducted without access to and use of the PHI;
- That the use or disclosure of the PHI involves no more than minimal risk to the privacy of the subjects as a result of:
 - An adequate plan to protect the PHI from improper use and disclosure;
 - An adequate plan to destroy any identifiers contained in the PHI at the earliest opportunity consistent with the research;
 - Adequate written assurances that the PHI will not be reused or re-disclosed to any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of PHI would be permitted; and
 - Whenever appropriate, the subjects will be provided with additional pertinent information after participation.

This waiver of consent and authorization applies only to the PHI for which use or access has been requested and described in the approved request for waiver.

Appendix D
Resumes and validate form
for International Physical Activity Questionnaire (IPAQ)

Translators

1. Asst. Prof. Suwanna Tantayanusorn

Position : Assistant Professor

Level : 8

Degree :

B.Ed (English)

Ed.s (English)

M.Ed (English)

M.A (English)

Institute :

Chiang Mai University, Thailand

University of South Alabama, U.S.A.

University of South Alabama, U.S.A.

University of South Alabama, U.S.A.

Speciality : English

2. Ms Sirikul KARUNCHARERNPANIT

Degree:

PhD candidate (Nursing)

MNS

Institute:

School of Nursing, Midwifery and

Postgraduate Medicine, WA, Australia.

Mahidol University

Validators

1. Sukjai Charoensuk, PhD., RN Boromarajonani College of Nursing Chon Buri,
Chonburi, Thailand
2. Nantawon Suwonnaroop Assistant Professor
Department of Public Health Nursing,
Faculty of Nursing, Mahidol University,
Bangkok, THAILAND
3. Napaporn Wanitkun, Ph.D., RN Assistant Professor
Surgical Nursing Department,
Faculty of Nursing Mahidol University,
Bangkok, THAILAND
4. Piyatida Junlapeeya, PhD., R.N. Borommarajonani College if Nursing,
Suratthani, Thailand
5. Surawuth Pengkred, MNS, R.N. Somdejprapiyamaharach Hospital,
Kanchanaburi, Thailand

Response Sheet: Content Validity
 Date:..... Validator name:.....

แบบสอบถามเกี่ยวกับกิจกรรมทางกาย

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ)

Definition

1) Vigorous Physical Activities refer to activities that take hard physical effort and make you breathe much harder than normal

กิจกรรมที่ต้องใช้กำลังอย่างมาก
 หมายถึงกิจกรรมที่คุณต้องออกแรงอย่างมากในการทำกิจกรรมนั้นจนทำให้คุณรู้สึกหายใจแรงกว่าปกติมาก และเหนื่อยมากจนไม่สามารถพูดคุยกับคนอื่น
 ได้สบายๆ ใดๆ

2) Moderate activities refer to activities that take moderate physical effort and makes you breathe somewhat harder than normal

กิจกรรมที่ต้องใช้กำลังปานกลาง
 หมายถึงกิจกรรมที่คุณต้องออกแรงในระดับปานกลางในการทำกิจกรรมนั้นจนทำให้คุณรู้สึกหายใจแรงกว่าปกติบ้างแต่รู้สึกไม่เหนื่อยมาก โดยคุณยังสามารถ
 คุยพูดคุยได้ในขณะทำกิจกรรมนั้นๆ

Questions	Does this item fit the concept of physical activity? <input type="checkbox"/> Yes <input type="checkbox"/> No ข้อเสนอนี้ สอดคล้องและ	Is this item easy to understand? <input type="checkbox"/> Yes <input type="checkbox"/> No	Is this item appropriate in Thai culture? <input type="checkbox"/> Yes <input type="checkbox"/> No
1. Do you currently have a job or do any unpaid work outside your home? 1. ในขณะนี้คุณมีงานทำนอกบ้าน ซึ่งอาจจะได้รับค่าตอบแทนหรือไม่ก็ตามหรือไม่	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. During the last 7 days, on how many day did you do vigorous physical activity 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. 2. ภายใน 7 วันที่ผ่านมา คุณเคยต้องทำกิจกรรมที่ต้องใช้กำลังอย่างมากในขณะทำงาน เช่น การยกของหนักเกินกว่า	<input type="checkbox"/> Yes <input type="checkbox"/> No ข้อเสนอนี้ สอดคล้องและ	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix E

Demographic and clinical data measure

**A Study of Promoting Physical Activity among Thai Working Women
To Prevent Cardiovascular Disease**

Physical Activity and Selected Psycho-social Factor Questionnaires

Instruction

We are interested in studying physical activity of middle age Thai working women. This package of questionnaires contains questions related to your daily physical activity and your opinions about physical activity. We would like you to answer every question, which is no right or wrong answer. It should take approximately 30 minutes. This package will be used three times: at baseline, seven and twelve weeks after participating in the health program. You can provide either the same or different answers to each question based on your opinion or feeling.

If you have any questions while completing the questionnaire, We invite you to speak to the researcher team. You can reach researchers by calling at 089 169 2852 from 8am – 8pm on Monday through Saturday or e-mail to thongtan@ohsu.edu at anytime.

After completing the questionnaires, please return them to the researcher in the provided sealed envelope.

โครงการวิจัยเพื่อส่งเสริมการเคลื่อนไหวในผู้หญิงทำงานเพื่อลดการเกิดโรคหัวใจและหลอดเลือด

แบบสอบถามเกี่ยวกับความคิดเห็นต่อการมีกิจกรรมทางกาย

คำชี้แจง

ผู้วิจัยกำลังสนใจศึกษาการมีกิจกรรมทางกายของผู้หญิงทำงาน

ชุดคำถามนี้ประกอบไปด้วยคำถามเกี่ยวกับความคิดเห็นของคุณต่อการมีกิจกรรมทางกาย

โปรดตอบคำถามทุกคำถาม ทุกคำถามไม่มีคำตอบที่ผิดหรือถูก โดยการตอบคำถามเหล่านี้จะใช้เวลาประมาณ 30 นาที ชุดคำถามนี้จะถูกใช้สามครั้งคือ ก่อนเริ่มโปรแกรม

ระหว่างและหลังการเข้าร่วมใน โปรแกรมการให้คำปรึกษาเรื่องการมีกิจกรรมการเคลื่อนไหว

คุณอาจตอบคำถามแต่ละครั้งเหมือนหรือแตกต่างกันก็ได้

ขึ้นอยู่กับความคิดเห็นหรือความรู้ของคุณในขณะนั้น

ถ้าหากคุณมีข้อสงสัยขณะตอบแบบสอบถามเหล่านี้ กรุณาสอบถามจากคณะผู้วิจัย

หรือหากคุณกำลังตอบแบบสอบถามเหล่านี้เป็นผู้ที่บ่น กรุณาสอบถามข้อสงสัยต่างๆทาง โทรศัพท์หมายเลข 085 118 6423

หลังจากคุณตอบแบบสอบถามครบทุกข้อแล้ว

กรุณาใส่แบบสอบถามและสมุดบันทึกการมีกิจกรรมการเคลื่อนไหว (เล่มชมพู) ลงในซองที่จัดให้

และส่งคืนให้แก่ผู้วิจัยที่ห้องโครงการวิจัยเพื่อสุขภาพ (ห้อง **Coaching 1**) ตึก **Low-rise** ชั้น **1**

ขอขอบคุณอย่างยิ่งที่กรุณาให้ความร่วมมือตอบแบบสอบถามนี้

คณะผู้วิจัย

For researcher only: Running number of research participant.....

Date and time of data collection.....

Demographic Data and Clinical Data

1. Current Marital Status:
 - Never Married
 - Currently Married/ Partnered
 - Widowed/ Divorced/ Separated

2. Years of Education..... years

3. Highest level of Education
 - Primary school
 - High school
 - Associate/ technical
 - Bachelor
 - Graduate
 - Other.....

4. Employment Type
 - Full time hours/ week
 - Part time hours/ week

5. Department

<ul style="list-style-type: none"> <input type="checkbox"/> Programming <input type="checkbox"/> Sales & Channel Management <input type="checkbox"/> Broadcast & Engineering <input type="checkbox"/> Warehouse & Installation <input type="checkbox"/> Production <input type="checkbox"/> Finance & Legal <input type="checkbox"/> Human Resource & Administration <input type="checkbox"/> News <input type="checkbox"/> Other..... 	<ul style="list-style-type: none"> <input type="checkbox"/> Marketing <input type="checkbox"/> Advertising & Sponsorships Sales <input type="checkbox"/> Customer Service <input type="checkbox"/> Public Relations <input type="checkbox"/> Information Systems <input type="checkbox"/> Accounting & Procurement <input type="checkbox"/> Group Reporting & Risk management <input type="checkbox"/> Internal Audit
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

6. Which of the following categories best describes characteristics of your job?
 - Mainly sitting with slight arm movement
 - Sitting or standing with some walking
 - Walking with some handling of materials generally weighting less than 5 Kg.
 - Walking and heavy manual work
 - Other.....

7. Which of the following categories best describes your income?
 - Not enough
 - Enough but no saving
 - Having some extra money to save
 - I have more than I need.

8. Number of dependent family members in your household (Please check all that apply.)

- Elderly parent
- Spouse
- Child
- Other.....

9. Weight..... Kg

For researcher only: Body mass index =kg/m ²

10. Height.....cm.

11. Contact Phone Number

- Office phone number
- Home phone number
- Cell phone number

12. Convenient day to contact weekday Mon – Fri weekend Sat – Sun others.....

13. Convenient time to contact

- Morning from..... to
- Afternoon from to
- Evening from to

**Your kind cooperation in completing this questionnaire is greatly appreciated.
Research Team**

สำเนาสำหรับผู้วิจัยเท่านั้น: เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

ข้อมูลส่วนตัว

1. สถานภาพสมรส
 - โสด
 - สมรส/ อยู่ด้วยกัน
 - หม้าย/ หย่าร้าง/ แยกกันอยู่
2. จำนวนปีทั้งหมดที่ศึกษา..... ปี
3. วุฒิการศึกษาสูงสุด
 - มัธยมศึกษาตอนต้น
 - มัธยมศึกษาตอนปลาย
 - อาชีวศึกษา
 - ปริญญาตรี
 - สูงกว่าปริญญาตรี
 - อื่นๆ
4. ประเภทการจ้างงาน
 - เต็มเวลา ชม/ สัปดาห์
 - นอกเวลา ชม/ สัปดาห์
5. หน่วยงาน

<input type="checkbox"/> Programming	<input type="checkbox"/> Marketing
<input type="checkbox"/> Sales & Channel Management	<input type="checkbox"/> Advertising & Sponsorships Sales
<input type="checkbox"/> Broadcast & Engineering	<input type="checkbox"/> Customer Service
<input type="checkbox"/> Warehouse & Installation	<input type="checkbox"/> Public Relations
<input type="checkbox"/> Production	<input type="checkbox"/> Information Systems
<input type="checkbox"/> Finance & Legal	<input type="checkbox"/> Accounting & Procurement
<input type="checkbox"/> Human Resource & Administration	<input type="checkbox"/> Group Reporting & Risk management
<input type="checkbox"/> News	<input type="checkbox"/> Internal Audit
<input type="checkbox"/> อื่นๆ	
6. ข้อมูลใดต่อไปนี้แสดงลักษณะงานของท่านได้ดีที่สุด
 - ส่วนใหญ่นั่งทำงาน โดยที่มีการเคลื่อนไหวของแขนเล็กน้อย
 - นั่งหรือยืนและเดินบ้างขณะทำงาน
 - เดินร่วมกับทำงานที่ยกของหนักน้อยกว่า 5 กิโลกรัม
 - เดินร่วมกับทำงานที่ยกของหนักมากกว่า 5 กิโลกรัม
 - อื่น ๆ

7. ข้อมูลใดอธิบายถึงรายได้ของท่านได้ดีที่สุด
- ไม่เพียงพอ
 - เพียงพอแต่ไม่มีเก็บสะสม
 - เหลือเงินเก็บสะสมบ้าง
 - มีเงินเหลือเก็บ
8. จำนวนบุคคลที่อยู่ในความดูแลของท่าน (โปรดเลือกทุกข้อที่ตรงกับข้อมูลของท่าน)
- พ่อ/ แม่ ผู้สูงอายุ
 - คู่สมรส
 - ลูก
 - อื่น
9. น้ำหนัก..... กิโลกรัม
- สำหรับผู้วิจัย: Body mass index =kg/m²
10. ส่วนสูง.....เซนติเมตร
11. หมายเลขโทรศัพท์สำหรับการติดต่อขณะเข้าร่วมในงานวิจัย
- โทรศัพท์ที่สำนักงาน
 - โทรศัพท์บ้าน
 - โทรศัพท์มือถือ
12. วันที่สะดวกในการติดต่อ วันทำงาน จันทร์ – ศุกร์ วันหยุด เสาร์ – อาทิตย์ อื่นๆ.....
13. ช่วงเวลาที่สะดวกสำหรับการติดต่อ
- เข้า เวลา..... ถึง
 - บ่าย เวลา ถึง
 - เย็น เวลาถึง

ขอบคุณอย่างยิ่งที่กรุณาให้ความร่วมมือตอบแบบสอบถามนี้
คณะผู้วิจัย

Appendix F
Physical activity measurement

[1]

For researcher only: Running number of research participant.....
Date and time of data collection.....

Section 1**Questionnaire for Movement Activities (Back Translation Version)**

The researcher is interested in studying the daily activities of working women. The questionnaire is comprised of questions about time spent doing various activities in the past seven days. When answering this questionnaire, please think of the various activities you do while you are at work, at home, in the garden, around the house, in the yard and while you are traveling to places, as well as the activities you do in your leisure time like exercising or playing sports.

Suggestions for Completing the Questionnaire

This questionnaire is comprised of questions about your various daily activities. The questions are divided into five parts according to the type of activity as follows: 1) activities related to work 2) activities related to traveling 3) activities related to housework, home maintenance and caring for family members 4) activities related to entertainment, sports and other leisure activities and 5) time spent sitting.

When completing this questionnaire, please think of the activities you did in the past seven days which required a moderate to high level of energy. Please record only activities you did continuously for at least 10 minutes. The definitions of strenuous and moderate activities cited in this questionnaire are as follows:

"Strenuous activities" refers to activities that involve body movement and require a lot of energy. These activities will result in breathing faster than usual, sweating a lot, and feeling very tired to the point that you cannot finish what you're saying.

"Moderate activities" refers to activities that involve body movement and require a moderate amount of energy. These activities will result in breathing a bit heavier than normal or breathing faster with some sweating, but you don't feel very tired and you still can talk while doing these activities.

While completing this questionnaire, please think carefully of the activities you did. If they are **close to** any activities given in the examples, please check yes, even though they may not be exactly the same activities. However, if you did not do any activities similar to the activities in such questions, **please check in the square** in front of the activities that you did not do.

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[2]

For researcher only: Running number of research participant.....
Date and time of data collection.....

Part 1 Activities related to work

The first part of the questionnaire is related to outside work. Please do not record the home activities you do without compensation such as housework, gardening, maintenance work and family care in this part as such activities will be recorded in the third part. Questions in the second part do not include trips made to and from work.

1. In the past seven days, did you do any strenuous activities while working, such as walking up and down the stairs? If yes, count the number of times you did this per week. Please consider only the activities that you did continuously for at least 10 minutes each time.
- There was no work which included strenuous activities** Skip to item 3 if your answer is no

Yes, specify the numberday(s)/week **Specify the activities**

2. From item 2, what was the total amount of time spent on strenuous activities while working each day?

Specify the amount of timehour(s)/day

.....minute(s)/day

3. In the past seven days, did you do any moderate activities while working, such as moving desks or other equipment, or continuously cleaning the office for 10 minutes? If yes, count the number of time you did per week. Please do not include the time you spent walking places while working.

There was no work that included moderate activities Skip to item 5 if your answer is no

Yes, specify the numberday(s)/week **Specify the activities**

4. From item 3, what was the total amount of time spent on moderate activities while working each day?

Specify the amount of time hour(s)/day

..... minute(s)/day

5. In the past seven days, did you walk continuously for at least 10 minutes while working

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[3]

For researcher only: Running number of research participant.....
Date and time of data collection.....

(do not count time spent walking to and from work)? If yes, how many days in a week?

There was no walking related to work. If no, please skip to part 2 travelling

Yes, specify the amount of time.....day(s)/week

6. From the answer in number 5, how long did it normally take you to walk while working each day?

Specify the amount of time.....hour(s)/day

.....minute(s)/day

Part 2 Traveling Activities

Questions in this part are about traveling from one place to another such as from home to the office, to shops, the movie theatre, the shopping mall or other places.

7. In the past seven days, did you travel by vehicle such as private car, bus, train, taxi, electric train or motorcycle? If yes, how many days per week?

There was no traveling by any motor vehicles. If no, please skip to item 9

Yes, specify the amount of timeday(s)/week

8. From the answer in item 7, how long did it normally take you to travel by motor vehicle each day?

Specify the amount.....hour(s)/day

.....minute(s)/day

For the following questions, think only of the activities during which you traveled to different places (such as to work and back, out to run an errand or outside the office) by bicycling or walking.

9. In the past seven days, did you continuously ride your bike to different places for at least 10 minutes? If yes, how many days?

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[4]

For researcher only: Running number of research participant.....

Date and time of data collection.....

Did not ride the bike for traveling If you did not ride the bike, please skip to item 11.

Yes, specify the amount.....day(s)/week

10. From the answer in item 9, how much time did you spend riding your bike to different places each day?

Specify the amounthour(s)/day

.....minute(s)day

11. In the past seven days, did you continuously walk to different places for at least 10 minutes? If yes, how many days in a week?

Did not walk to different places If yes, please skip to part 3 for housework, maintenance and caring for family members.

Yes, specify the amount.....hour(s)/day

..... minute(s)/day

12. From the answer in item 11, how long did it take you to walk places each day?

Specify the amount of time.....hour(s)/day

.....minute(s)/day

Part 3 Activities related to housework, home maintenance and caring for family members

This part of the questionnaire is related to activities you did in your home and around it such as housework, gardening, yard maintenance, general home maintenance and caring for family members in the past seven days.

13. In the past seven days, did you do any strenuous activities to maintain the surrounding area of your home and yard such as digging soil, house painting, or roof fixing? If yes, how many days? Please count only the activities that you did continuously for at least 10 minutes each time.

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[5]

For researcher only: Running number of research participant.....
Date and time of data collection.....

There was no activity which was strenuous If no, please skip to item 15.

Yes, please specify the amount.....day(s)/week **Specify the activities**.....

14. From the answer in item 13, please specify the amount of time you spent doing strenuous activities to oversee the surrounding area of your home or the yard each day.

Specify the amount of time.....hour(s)/day

.....minute(s)/day

15. In the past seven days, did you continuously do moderate activities in maintaining the surrounding area in the yard such as cleaning around the house, cleaning the window panes, plant watering, or car cleaning for at least 10 minutes each time? If yes, how many days?

There was no housework which included moderate activities If no, please skip to item 17.

Yes, specify the amount.....day(s)/week **Specify the activities**.....

16. From the answer in item 15, please specify the amount of time spent on moderate activities maintaining the surrounding area of your home or the yard each day.

Specify the amounthour(s)/day

.....minute(s)/day

17. In the past seven days, did you do strenuous activities within your home, such as floor cleaning, cloth washing by hand, mobilizing a sick house member, elderly member, or handicapped, or walking up and down the stairs to arrange household things continuously for at least 10 minutes each time? If yes, how many days?

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[6]

For researcher only: Running number of research participant.....
Date and time of data collection.....

There was no housework which required strenuous energy If no, please skip to item 19.

If yes, specify the amount of time.....day(s)/week **Specify the activities**.....

18. From the answer in item 17, please specify the amount of time spent doing strenuous activities overseeing the household work each day.

Specify the amount of time.....hour(s)/day

.....minute(s)/day

19. In the past seven days, did you do any moderate activities within your home, such as cleaning windows and doors, cleaning the house, running with children or pets, or cooking, which required you to walk back and forth? (Each activity should last at least 10 minutes continuously.) If yes, how many days?

There was no housework which included moderate activities If no, please skip to questions in part 4.

Yes, specify the amount of time.....day(s)/week **Specify the activities**.....

20. From the answer in item 19, specify the amount of time spent doing moderate activities in overseeing the household work each day.

Specify the amount of time.....hour(s)/day

.....minute(s)/day

Part 4 Entertaining activities, sports, and doing activities in leisure time

The questions in this part are related to activities for entertainment, playing sports or activities in leisure time in the last seven days. These activities are not related to activities in previous questions.

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[7]

For researcher only: Running number of research participant.....
Date and time of data collection.....

21. In the past seven days, did you walk continuously for at least 10 minutes in your free time? (Do not include walking to work or going places.) If yes, how many days a week?

There was no walking for exercising or relaxing in free time If no, please skip to item 23.

Yes, specify the amount of time.....day(s)/week

22. From the answer in item 21, please specify the amount of time spent walking in your free time each day.

Specify the amount of time.....hour(s)/day

.....minute(s)/day

23. In the past seven days, did you do strenuous activities in your free time, such as aerobic dancing, running, fast bicycling, or fast swimming for exercise, rope jumping, body fitness by doing weight-lifting, or playing sports which required constant movement like badminton or basketball? If yes, how many days? Please consider only the activities that you did for at least 10 minutes each time.

There was no exercise or relaxation which was strenuous If no, please skip to item 25.

Yes, specify the amount of time.....day(s)/week **Specify the activities**.....

24. From the answer item 23, please specify the amount of time spent on strenuous activities in your free time each day.

Specify the amount of time.....hour(s)/day

.....minute(s)/day

25. In the past seven days, did you do any moderate activities in your free time such as normal speed bicycling, normal speed swimming, playing tennis or badminton in doubles, yoga practice, doing Tai-kek, jogging, slower dancing steps or playing sports which did not require much energy? If yes, how many days? Please consider only the activities that you did for at least 10 minutes each time.

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[8]

For researcher only: Running number of research participant.....
 Date and time of data collection.....

There was no moderate activity in exercise or relaxation

If no, please skip to part 5 the amount of time spent on sitting

Yes, specify the amount of time.....day(s)/week Specify the activities.....

26. From the answer in number 25, please specify the amount of time spent on moderate activities in your free time each day.

Please specify the amount of time.....hour(s)/day

.....minute(s)/day

Part 5: The amount of time spent sitting

The last part of this questionnaire is about the amount of time you spend sitting while you are working at home, studying or relaxing in your free time. This sitting time includes the sitting you do at your office desk, talking with your work friends, reading, or watching television. **Please do not include the amount of time spent sitting or standing while traveling which you already included in the section about traveling activities.**

27. In the past seven days, how long did you normally sit each day while working?

Please specify the amount of time.....hour(s)/day

.....minute(s)/day

28. In the past seven days, how long did you normally sit on each holiday?

Please specify the amount of time.....hour(s)/day

.....minute(s)/day

**Your kind cooperation in completing this questionnaire is greatly appreciated.
 Research Team**

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

แบบสอบถามกิจกรรมการเคลื่อนไหว

ผู้วิจัยสนใจศึกษาเกี่ยวกับชนิดของกิจกรรมในแต่ละวันของผู้หญิงทำงาน แบบสอบถามจะประกอบไปด้วยคำถามเกี่ยวกับการใช้เวลาเพื่อทำกิจกรรมต่างๆใน 7 วันที่ผ่านมา ในการตอบแบบสอบถามนี้ โปรดนึกถึงกิจกรรมต่างๆที่คุณทำในขณะที่คุณอยู่ที่ทำงาน ที่บ้าน ในสวนรอบๆบริเวณบ้าน ในสนามหญ้า และขณะเดินทางไปยังที่ต่างๆ รวมถึงกิจกรรมที่คุณทำในยามว่าง เช่น การออกกำลังกาย หรือการเล่นกีฬา

คำแนะนำในการตอบแบบสอบถาม

แบบสอบถามนี้ประกอบไปด้วยคำถามเกี่ยวข้องกับกิจกรรมต่างๆในชีวิตประจำวันของคุณ ข้อคำถามแบ่งออกเป็น 5 ส่วนตามหมวดของกิจกรรม ได้แก่ 1) กิจกรรมเกี่ยวกับการทำงาน 2) กิจกรรมเกี่ยวกับการเดินทาง 3) กิจกรรมเกี่ยวข้องกับงานบ้าน งานซ่อมแซมบำรุงบ้าน และการดูแลสมาชิกในครอบครัว 4) กิจกรรมเพื่อความเพลิดเพลิน การเล่นกีฬา และกิจกรรมอื่นๆในยามว่าง 5) เวลาที่ใช้ในการนั่ง

ในการตอบแบบสอบถามนี้ โปรดนึกถึงกิจกรรมที่คุณทำภายในช่วง 7 วันที่ผ่านมา ไม่ว่าจะ เป็นกิจกรรมที่คุณต้องใช้กำลังอย่างมาก หรือกิจกรรมที่คุณต้องใช้กำลังปานกลางในการทำกิจกรรมนั้น โปรดบันทึกเฉพาะกิจกรรมที่คุณต้องทำ นานติดต่อกันอย่างน้อยประมาณ 10 นาที ในแต่ละครั้งของการทำกิจกรรมนั้นๆ โดยความหมายของ กิจกรรมที่ต้องใช้กำลังอย่างมาก และ กิจกรรมที่ต้องใช้กำลังปานกลาง ในแบบสอบถามนี้มีดังต่อไปนี้

- 1) **กิจกรรมที่ต้องใช้กำลังอย่างมาก** หมายถึงกิจกรรมที่คุณต้องออกแรงอย่างมากในการเคลื่อนไหวร่างกายเพื่อทำกิจกรรมนั้นๆจนทำให้คุณรู้สึกหายใจหอบหรือแรงและเร็วกว่าปกติมาก มีเหงื่อออกมาก และเหนื่อยมากจนไม่สามารถพูดคุยกับคนอื่นได้จับประโยค
- 2) **กิจกรรมที่ต้องใช้กำลังปานกลาง** หมายถึงกิจกรรมที่คุณต้องออกแรงระดับปานกลางในการเคลื่อนไหวร่างกายเพื่อทำกิจกรรมนั้นๆจนทำให้คุณหายใจแรงกว่าปกติบ้างหรือหายใจกระชั้นขึ้น มีเหงื่อซึม แต่ไม่รู้สึกเหนื่อยมาก โดยคุณยังสามารถพูดคุยได้ในขณะทำกิจกรรมนั้นๆ

ขณะตอบคำถาม โปรดพิจารณาว่ากิจกรรมที่คุณทำอยู่ว่าใกล้เคียงกับกิจกรรมใดในตัวอย่างที่จัดให้ ถึงแม้ว่าจะไม่ใช่กิจกรรมเดียวกันกับตัวอย่างก็ตาม แต่ถ้าหากคุณไม่ได้ทำกิจกรรมที่คล้ายคลึงกับกิจกรรมในข้อคำถามนั้น โปรดใส่เครื่องหมาย \surd ลงในช่องที่เหลี่ยมหน้าข้อความที่แสดงว่าคุณไม่ได้ทำกิจกรรมดังกล่าว

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนตัว..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

ส่วนที่ 1 กิจกรรมที่เกี่ยวข้องกับการทำงาน

แบบสอบถามส่วนแรกเกี่ยวข้องกับการทำงานของคุณนอกบ้าน โปรดอย่าบันทึกกิจกรรมที่คุณทำที่บ้านโดยไม่มีคำตอบแทน เช่น งานบ้าน งานสวน งานซ่อมบำรุง และการดูแลครอบครัว ลงในคำถามส่วนนี้เนื่องจากกิจกรรมดังกล่าวจะถูกบันทึกในส่วนที่ 3 คำถามในส่วนที่ 2 ไม่รวมการเดินทางไปและกลับที่ทำงาน

1. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังอย่างมากจะทำงาน เช่น การเดินขึ้นลงบันได การขนย้ายของหรือไม่ ถ้ามี นับเป็นจำนวนที่วันต่อสัปดาห์ โปรดนับเฉพาะกิจกรรมที่คุณทำนานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง

ไม่มีงานที่ต้องใช้กำลังอย่างมาก → ถ้าไม่มีโปรดข้ามไปตอบคำถามข้อที่ 3

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม

2. จากคำตอบข้อ 2 คุณใช้กำลังอย่างมากในขณะที่ทำงานรวมทั้งสิ้น ในแต่ละวัน เป็นระยะเวลาานเท่าไร

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

.....

3. ใน 7 วันที่ผ่านมาคุณทำกิจกรรมที่ใช้กำลังปานกลางจะทำงาน เช่น เคลื่อนย้ายโต๊ะหรืออุปกรณ์ต่างๆ ทำความสะอาดสถานที่ทำงาน นานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง หรือไม่ ถ้ามี นับเป็นจำนวนที่วันต่อสัปดาห์ โปรดอย่านับรวมระยะเวลาที่ใช้ในการเดินทางไปยังที่ต่างๆในขณะที่ทำงาน

ไม่มีงานที่ต้องใช้กำลังปานกลาง → ถ้าไม่มีโปรดข้ามไปตอบคำถามข้อที่ 5

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม

4. จากคำตอบข้อ 3 คุณใช้กำลังปานกลางจะทำงาน ในแต่ละวันเป็นระยะเวลาานเท่าไร

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

.....

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนตัว..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

5. ใน 7 วันที่ผ่านมา คุณเดินบนดาดฟ้าอย่างน้อย 10 นาทีขณะทำงานหรือไม่ (ไม่นับเวลาที่เดินไปกลับที่ทำงาน) ถ้ามี นับเป็นกี่วันต่อสัปดาห์

ไม่มีงานที่เกี่ยวข้องกับการเดิน → ถ้าไม่มี โปรดข้ามไปตอบ ส่วนที่ 2 การเดินทาง

มี ระบุจำนวน วัน/สัปดาห์

6. จากคำตอบในข้อ 5 ปกติคุณใช้เวลาเดินระหว่างทำงาน ในแต่ละวัน เป็นระยะเวลาานเท่าไร

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

ส่วนที่ 2 กิจกรรมการเดินทาง

ข้อคำถามส่วนนี้เกี่ยวข้องกับการเดินทางจากสถานที่หนึ่งไปยังอีกที่หนึ่ง เช่น การเดินทางจากที่พักไปยังที่ทำงาน หรือ ไปยังร้านค้า โรงพยาบาล ศูนย์การค้า หรือสถานที่อื่นๆ

7. ใน 7 วันที่ผ่านมาคุณเดินทางโดยพาหนะยานยนต์ เช่น รถยนต์ส่วนตัว รถประจำทาง รถไฟ รถแท็กซี่ รถไฟฟ้า หรือ รถมอเตอร์ไซด์ หรือไม่ ถ้ามี นับเป็นกี่วันต่อสัปดาห์

ไม่มีการเดินทางโดยพาหนะที่ใช้เครื่องยนต์ → ถ้าไม่มี โปรดข้ามไปตอบคำถามข้อที่ 9

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม

8. จากคำตอบในข้อ 7 ในแต่ละวันคุณใช้ระยะเวลาานเท่าไรในการเดินทางโดยพาหนะยานยนต์

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ ลงชื่อผู้วิจัยติดตามข้อมูลส่วนตัว..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

สำหรับคำถามต่อไปนี้ ให้คุณนึกถึงเฉพาะกิจกรรมการเดินทางไปในที่ต่างๆ เช่น เดินทางไปและกลับจากที่ทำงาน
เดินทางไปทำธุระนอกบ้านหรือนอกที่ทำงาน โดยการใช้จักรยานหรือเดิน

9. ใน 7 วันที่ผ่านมา คุณใช้จักรยานเพื่อเดินทางไปยังที่ต่างๆ นานติดต่อกันอย่างน้อย 10 นาทีหรือไม่ ถ้ามี นับเป็นกี่วัน
- ไม่ได้ใช้จักรยานในการเดินทาง → ถ้าไม่ได้ใช้จักรยานในการเดินทางโปรดข้ามไปตอบคำถามข้อที่ 11
- มี ระบุจำนวน วัน/สัปดาห์
10. จากคำตอบในข้อ 9 ในแต่ละวันคุณใช้เวลาในการใช้จักรยานเพื่อเดินทางไปยังที่ต่างๆ เป็นระยะเวลาานเท่าไร
- ระบุจำนวน ชั่วโมง/วัน
..... นาที/วัน
-

11. ใน 7 วันที่ผ่านมา คุณเดินเพื่อไปยังที่ต่างๆ นานติดต่อกันอย่างน้อย 10 นาทีหรือไม่ ถ้ามี นับเป็นกี่วันต่อสัปดาห์
- ไม่ได้เดินเพื่อเดินทางไปยังที่ต่างๆ → ถ้ามีโปรดข้ามไปตอบส่วนที่ 3 งานบ้าน งานซ่อมแซมบำรุง
และงานดูแลสมาชิกในครอบครัว
- มี ระบุจำนวน วัน/สัปดาห์
12. จากคำตอบในข้อ 11 ในแต่ละวัน คุณใช้เวลาเดินเพื่อไปยังที่ต่างๆ เป็นระยะเวลาานเท่าไร
- ระบุจำนวน ชั่วโมง/วัน
..... นาที/วัน
-

ส่วนที่ 3 กิจกรรมเกี่ยวข้องกับงานบ้าน งานซ่อมแซมบำรุงบ้าน และงานดูแลสมาชิกในครอบครัว

แบบสอบถามส่วนนี้เกี่ยวข้องกับกิจกรรมที่คุณทำภายในและรอบๆ บริเวณบ้าน เช่น งานบ้าน ทำสวน ดูแลสนามหญ้า
งานบำรุงรักษาบ้านทั่วไป และงานที่เกี่ยวข้องกับการดูแลบุคคลในครอบครัว ที่คุณทำใน 7 วันที่ผ่านมา

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

13. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังอย่างมาก เพื่อดูแลบริเวณรอบๆบ้านและสวน เช่น ขุดดินเพื่อการดูแลสวนและสนามหญ้า ทาสีบ้าน ซ่อมหลังคา หรือไม่ ถ้ามี นับเป็นจำนวนกี่วัน โปรดนับเฉพาะกิจกรรมที่คุณต้องทำ นานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง

ไม่มีกิจกรรมที่ต้องใช้กำลังอย่างมาก → ถ้าไม่มี โปรดข้ามไปตอบคำถามข้อที่ 15

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม.....

14. จากคำตอบในข้อ 13 โปรดระบุระยะเวลาที่คุณใช้กำลังอย่างมาก เพื่อดูแลรอบๆบริเวณบ้าน สวน หรือสนามหญ้า ใน แต่ละวัน

ระบุจำนวน ชั่วโมง/วัน

.....นาทิต่อวัน

15. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังปานกลาง ในการดูแลรอบๆบริเวณสวน หรือสนามหญ้า เช่น การเก็บกวาดบริเวณรอบๆบ้าน การทำความสะอาดหน้าต่างประตู การรดน้ำต้นไม้ และการล้างรถ นานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง หรือไม่ ถ้ามี นับเป็นจำนวนกี่วัน

ไม่มีงานบ้านที่ต้องใช้กำลังปานกลาง → ถ้าไม่มี โปรดข้ามไปตอบคำถามที่ 17

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม.....

16. จากคำตอบในข้อ 15 โปรดระบุระยะเวลาที่คุณใช้กำลังปานกลาง ในการดูแลรอบๆบริเวณสวน หรือสนามหญ้า ใน แต่ละวัน

ระบุจำนวน..... ชั่วโมง/วัน

.....นาทิต่อวัน

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

17. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังอย่างมาก ในการทำงานภายในบริเวณบ้าน เช่น ภูพื้นบ้าน ชักผ้าด้วยมือ เคลื่อนย้ายสมาชิกในบ้านที่ป่วย สูงอายุ หรือพิการ ขึ้นลงบันไดอย่างต่อเนื่องเพื่อจัดบ้านนานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง หรือไม่ ถ้ามี นับเป็นจำนวนกี่วัน

ไม่มีงานบ้านที่ต้องใช้กำลังอย่างมากภายในบ้าน → ถ้าไม่มี โปรดข้ามไปตอบคำถามข้อที่ 19

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม.....

18. จากคำตอบในข้อ 17 โปรดระบุระยะเวลาที่คุณใช้กำลังอย่างมากในการดูแลภายในบริเวณบ้านในแต่ละวัน

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

19. ใน 7 วันที่ผ่านมา คุณใช้กำลังปานกลาง ในการทำงานภายในบริเวณบ้าน เช่น ทำความสะอาดหน้าต่างประตู เก็บกวาดภายในบ้าน วิ่งเล่นกับเด็กหรือสัตว์เลี้ยง ประกอบอาหารที่ต้องเดินไปมา หรือไม่ (แต่ละกิจกรรมทำนานติดต่อกันอย่างน้อย 10 นาที) ถ้ามี คิดเป็นจำนวนกี่วัน

ไม่มีงานบ้านที่ต้องใช้กำลังปานกลางภายในบ้าน → ถ้าไม่มี โปรดข้ามไปตอบคำถามในส่วนที่ 4

มี ระบุจำนวน วัน/สัปดาห์

ระบุกิจกรรม.....

20. จากคำตอบในข้อ 19 โปรดระบุระยะเวลาที่คุณใช้กำลังปานกลางในการดูแลภายในบริเวณบ้านในแต่ละวัน

ระบุจำนวน ชั่วโมง/วัน

..... นาที/วัน

ส่วนที่ 4 กิจกรรมสันทนาการ กีฬา และการมีกิจกรรมในยามว่าง

ข้อคำถามในส่วนนี้เกี่ยวข้องกับกิจกรรมสันทนาการ การเล่นกีฬา หรือกิจกรรมที่ทำในยามว่าง ภายในช่วง 7 วันที่ผ่านมา โดยกิจกรรมที่ถามในส่วนนี้จะไม่รวมถึงกิจกรรมอื่นๆที่คุณได้ตอบมาแล้วในข้อคำถามก่อนหน้า

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนตัว..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

21. ใน 7 วันที่ผ่านมา คุณเดินติดต่อกันอย่างน้อย 10 นาทีในยามว่างหรือไม่ (ไม่นับการเดินทางในขณะทำงานและการเดินเพื่อเดินทางไปยังที่ต่างๆ) ถ้ามี นับเป็นจำนวนกี่วันต่อสัปดาห์

ไม่มี การเดินเพื่อการออกกำลังกายหรือผ่อนคลายในยามว่าง → ถ้าไม่มีโปรดข้ามไปตอบคำถามข้อที่ 23

มี ระบุจำนวนวัน /สัปดาห์

22. จากคำตอบข้อ 21 โปรดระบุระยะเวลาที่คุณใช้เดินในยามว่างในแต่ละวัน

ระบุจำนวนชั่วโมง/วัน

.....นาที/วัน

23. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังอย่างมากในยามว่าง เช่น การเดินแอโรบิก การวิ่ง การปั่นจักรยานเร็วๆ หรือ การว่ายน้ำเร็วๆ เพื่อออกกำลังกาย การกระโดดเชือก การบริหารร่างกายด้วยการยกน้ำหนัก การเล่นกีฬาที่เคลื่อนไหวอยู่ตลอดเวลา เช่น แบดมินตัน บาสเกตบอล หรือไม่ ถ้ามี นับเป็นจำนวนกี่วัน โปรดนับเฉพาะกิจกรรมที่คุณต้องทำจนติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง

ไม่มี การออกกำลังกายหรือผ่อนคลายที่ต้องออกแรงอย่างมาก → ถ้าไม่มีโปรดข้ามไปตอบคำถามข้อที่ 25

มี ระบุจำนวนวัน /สัปดาห์

ระบุกิจกรรม.....

24. จากคำตอบข้อ 23 โปรดระบุระยะเวลาที่คุณใช้กำลังอย่างมากในยามว่าง ในแต่ละวัน

ระบุจำนวนชั่วโมง/วัน

.....นาที/วัน

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนตัว..... วันที่.....

สำหรับผู้วิจัยเท่านั้น:

เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

25. ใน 7 วันที่ผ่านมา คุณทำกิจกรรมที่ใช้กำลังปานกลางในยามว่าง เช่น การปั่นจักรยานด้วยความเร็วปกติ การว่ายน้ำด้วยความเร็วปกติ การตีเทนนิสหรือแบดมินตันคู่ การฝึกโยคะ การรำไทเก๊ก การวิ่งเหยาะๆ การเดินรำในจังหวัดไม่เร็วมาก หรือการเล่นกีฬาที่ไม่ต้องออกกำลังมากหรือไม่ ถ้ามี นับเป็นจำนวนกี่วัน โปรดนับเฉพาะกิจกรรมที่คุณต้องทำนานติดต่อกันอย่างน้อย 10 นาทีในแต่ละครั้ง

ไม่มีกิจกรรมออกกำลังกายหรือผ่อนคลายที่ต้องออกแรงปานกลาง → ถ้าไม่มีโปรดข้ามไปตอบส่วนที่ 5
ระยะเวลาที่ใช้ในการนี้

มี ระบุจำนวนวัน /สัปดาห์

ระบุกิจกรรม.....

26. จากคำตอบข้อ 25 โปรดระบุเวลาที่คุณใช้กำลังปานกลางในยามว่าง ในแต่ละวัน

ระบุจำนวนชั่วโมง/วัน

.....นาที/วัน

.....
ส่วนที่ 5 ระยะเวลาที่ใช้ในการนี้

แบบสอบถามส่วนสุดท้ายนี้จะถามเกี่ยวกับระยะเวลาที่คุณใช้ในการนั่งขณะที่คุณทำงาน ที่บ้าน หรือเรียน หรือเพื่อผ่อนคลายในช่วงเวลาที่ว่าง ซึ่งระยะเวลาที่ใช้การนั่งนี้รวมไปถึงนั่งในขณะที่อยู่ที่โต๊ะทำงาน เขียนเขียนหรือพูดคุยกับเพื่อนฝูง อ่านหนังสือ หรือนั่งหรือคนดูโทรทัศน์ โปรดอย่านับรวมระยะเวลาในการนั่งหรือยืนในขณะที่เดินทางซึ่งคุณได้ตอบไปแล้วในส่วนของกิจกรรมการเดินทาง

27. ใน 7 วันที่ผ่านมา ปกติคุณใช้เวลานั่ง ในแต่ละวัน เป็นระยะเวลาานเท่าไร ในช่วงวันทำงาน

ระบุจำนวนชั่วโมง/วัน

.....นาที/วัน

28. ใน 7 วันที่ผ่านมา ปกติคุณใช้เวลานั่ง ในแต่ละวัน เป็นระยะเวลาานเท่าไร ในช่วงวันหยุด

ระบุจำนวนชั่วโมง/วัน

.....นาที/วัน

ขอบคุณอย่างยิ่งสำหรับความร่วมมือในการตอบแบบสอบถาม

คณะผู้วิจัย

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ตั้งชื่อผู้วิจัยติดตามข้อมูลส่งมาที่ขาด.....วันที่.....



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

– Short and Long Forms

November 2005

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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):1027-1031. 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 2000-2001³. 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 = $3.3 * \text{walking minutes} * \text{walking days at work}$

Moderate MET-minutes/week at work = $4.0 * \text{moderate-intensity activity minutes} * \text{moderate-intensity days at work}$

Vigorous MET-minutes/week at work = $8.0 * \text{vigorous-intensity activity minutes} * \text{vigorous-intensity days at work}$

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 = $3.3 * \text{walking minutes} * \text{walking days for transportation}$

Cycle MET-minutes/week for transport = $6.0 * \text{cycling minutes} * \text{cycle days for transportation}$

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 = $5.5 * \text{vigorous-intensity activity minutes} * \text{vigorous-intensity days doing yard work}$ (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 = $4.0 * \text{moderate-intensity activity minutes} * \text{moderate-intensity days doing yard work}$

Moderate MET-minutes/week inside chores = $3.0 * \text{moderate-intensity activity minutes} * \text{moderate-intensity days doing inside chores}$.

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 = $3.3 * \text{walking minutes} * \text{walking days in leisure}$

Moderate MET-minutes/week leisure = $4.0 * \text{moderate-intensity activity minutes} * \text{moderate-intensity days in leisure}$

Vigorous MET-minutes/week leisure = $8.0 * \text{vigorous-intensity activity minutes} * \text{vigorous-intensity days in leisure}$

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**

Instruction for using New Life-style NL 2000

โครงการวิจัยเพื่อส่งเสริมการเคลื่อนไหวในผู้หญิงทำงาน
เพื่อลดการเกิดโรคหัวใจและหลอดเลือด



วิธีการใช้เครื่องนับก้าวเดิน

1. ติดเครื่องนับก้าวเดินบริเวณขอบกางเกงหรือกระเป๋า โปร่งให้ตรงกับกึ่งกลางของหน้าขาด้านซ้ายหรือขวาตามที่ท่านสะดวก (กรุณาติดสายยึดเครื่องนับก้าวเดินกับขอบกระเป๋า โปร่ง/กางเกง หรือเข็มขัดทุกครั้ง เพื่อป้องกันเครื่องตกหล่น และการแปลผลผิดพลาด)

2. กรุณาใส่เครื่องนับก้าวเดินตลอดทั้งวันแม้ในเวลา นั่ง ยกเว้นเวลานอนหรืออาบน้ำ หรือกิจกรรมอื่นใดที่อาจทำให้เครื่องนับก้าวเดินเปียกน้ำได้

การเปิดเครื่องนับก้าวเดินเพื่อบันทึกข้อมูล ทำได้โดยใช้มือข้างหนึ่งจับบริเวณที่หนีบเข็มขัดของเครื่อง

และใช้อีกมือหนึ่งจับบริเวณตัวเครื่องด้านหน้าเพื่อปลดล๊อคพร้อมทั้งดึงฝาเครื่องด้านหน้าออกตามุมฉากกับฝาด้านหลังเครื่อง

3. การอ่านข้อมูล เมื่อท่านหันหน้าจอแสดงเข้าหาตัวของท่าน กรุณากดที่ปุ่มบนด้านขวาของจอที่ท่าน
ใช้นั้น โดยการกดปุ่มเดิมซ้ำกันแต่ละครั้ง เครื่องจะบอกตัวเลขของจำนวนก้าวเดิน (STEPS)
จำนวนแคลอรีที่ใช้ในการทำกิจกรรมในแต่ละวัน (CALS) และจำนวนแคลอรีทั้งหมดที่ใช้ไปในแต่ละวัน (TOTAL
CALS) ท่านจะสามารถดูได้จากรูปลูกศรกระพริบ ที่เปลี่ยนตำแหน่งไปยังเมนูต่างๆ (STEPS, CALS,
TOTALS)

4. โปรดบันทึกข้อมูลที่ได้ลงในสมุดบันทึกที่จัดให้ ในแต่ละวันเมื่อท่านสิ้นสุดการทำกิจกรรมต่างๆในวันนั้นๆ เช่น
ท่านสามารถเลือกบันทึกข้อมูลก่อนเข้านอน หรือเมื่อตอนเช้าก่อนเริ่มใช้เครื่องของวันใหม่

โปรดใช้การเรียกดูข้อมูลอื่นๆ ของเครื่องนับก้าวเดิน
ในขณะที่ท่านกำลังอยู่ในช่วงของการเข้าร่วมในโครงการวิจัยนี้
เนื่องจากอาจทำให้ท่านสูญเสียข้อมูลที่สำคัญและเป็นประโยชน์กับท่านได้
เรายินดีที่จะให้ข้อมูลเพิ่มเติมแก่ท่าน เมื่อสิ้นสุดโครงการแล้วค่ะ

ขอขอบคุณอย่างยิ่งในความร่วมมือ
และขอภัยในความไม่สะดวกของท่านมา ณ โอกาสนี้
หวังว่าท่านจะสนุกกับการใช้เครื่องนับก้าวเดินนี้ค่ะ

กชฉวีวิจัย

Appendix G
Psycho-social factor measures and
experience of motivational interviewing

[9]

For researcher only: Running number of research participant.....

Date and time of data collection.....

Section 2**Exercise Benefit/ Barriers Scale**

Direction: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements.

- 1 = Strongly disagree
 2 = Disagree
 3 = Agree
 4 = Strongly agree

Items	1	2	3	4	For researcher
1. I enjoy exercise.	1	2	3	4	PB1 []
2. Exercise decreases feelings of stress and tension for me.	1	2	3	4	PB2 []
3. Exercise improves my mental health.	1	2	3	4	PB3 []
4. Exercise takes too much of my times.	1	2	3	4	PB4 []R
5. I will prevent heart attacks by exercising.	1	2	3	4	PB5 []
6. Exercise tires me.	1	2	3	4	PB6 []R
7. Exercise increases my muscle strength.	1	2	3	4	PB7 []
8. Exercise gives me a sense of personal accomplishment.	1	2	3	4	PB8 []
9. Places for me to exercise are too far away.	1	2	3	4	PB9 []R
10. Exercise makes me feel relaxed.	1	2	3	4	PB10 []
11. Exercise lets me have contact with friends and persons I enjoy.	1	2	3	4	PB11 []
12. I am too embarrassed to exercise.	1	2	3	4	PB12 []R
13. Exercise will keep me form having high blood pressure.	1	2	3	4	PB13 []
14. It costs too much money to exercise.	1	2	3	4	PB14 []R
15. Exercising increase my level of physical fitness.	1	2	3	4	PB15 []
16. Exercise facilities do not have convenient schedules for me.	1	2	3	4	PB16 []R
17. My muscle tone is improved with exercise.	1	2	3	4	PB17 []
18. Exercising improves functioning of my cardiovascular system.	1	2	3	4	PB18 []

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[10]

For researcher only: Running number of research participant.....

Date and time of data collection.....

Items	1	2	3	4	For researcher
19. I am fatigued by exercise.	1	2	3	4	PB19 []R
20. I have improved feeling of well being from exercise.	1	2	3	4	PB20 []
21. Exercise improves my flexibility.	1	2	3	4	PB23 []
22. Exercise takes too much time from family relationships.	1	2	3	4	PB24 []R
23. My disposition is improved by exercise.	1	2	3	4	PB25 []
24. Exercise helps me sleep better at night.	1	2	3	4	PB26 []
25. I will live longer if I exercise.	1	2	3	4	PB27 []
26. I think people in exercise clothes look funny.	1	2	3	4	PB28 []R
27. Exercise helps me decrease fatigue.	1	2	3	4	PB29 []
28. Exercising is a good way for me to meet new people.	1	2	3	4	PB30 []
29. My physical endurance is improved by exercising.	1	2	3	4	PB31 []
30. Exercising improves my self-concept.	1	2	3	4	PB32 []
31. My family members do not encourage me to exercise.	1	2	3	4	PB33 []R
32. Exercising increases my mental alertness.	1	2	3	4	PB34 []
33. Exercise allows me to carry out normal activities without becoming tired.	1	2	3	4	PB35 []
34. Exercise improves the quality of my work.	1	2	3	4	PB36 []
35. Exercise takes too much time from my family responsibilities.	1	2	3	4	PB37 []R
36. Exercise is good entertainment for me.	1	2	3	4	PB38 []
37. Exercise increases my acceptance by others.	1	2	3	4	PB39 []
38. Exercise is hard work for me.	1	2	3	4	PB40 []R
39. Exercise improves overall body functioning for me.	1	2	3	4	PB41 []
40. There are too few places for me to exercise.	1	2	3	4	PB42 []R
41. Exercise improves the way my body looks.	1	2	3	4	PB43 []

For researcher data recording complete incomplete

Signature of research assistant who recorded the missing data.....date.....

[๑]

สำหรับผู้วิจัยท่านนั้น: เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

ตอนที่ 2**แบบประเมินการรับรู้ประโยชน์ และคุณสรรคของการลอกกำลังกาย**

กรุณาบอกถึงระดับความเห็นด้วยและไม่เห็นด้วยต่อข้อความต่อไปนี้ โดยทำเครื่องหมาย (X)

ในช่องที่ตรงกับความเห็นของคุณ

ระดับความเห็นด้วย ได้แก่: 4 = เห็นด้วยอย่างยิ่ง
 3 = เห็นด้วย
 2 = ไม่เห็นด้วย
 1 = ไม่เห็นด้วยอย่างยิ่ง

ข้อความ	1	2	3	4	สำหรับ ผู้วิจัย
1. ฉันรู้สึกสนุกในการออกกำลังกาย	1	2	3	4	PB1 []
2. การออกกำลังกายช่วยลดความเครียดและความกดดันของฉัน	1	2	3	4	PB2 []
3. การออกกำลังกายทำให้สุขภาพจิตดีขึ้น	1	2	3	4	PB3 []
4. การออกกำลังกายทำให้ฉันเสียเวลามาก	1	2	3	4	PB4 []
5. ฉันจะป้องกันโรคหัวใจได้โดยการออกกำลังกาย	1	2	3	4	PB5 []
6. การออกกำลังกายทำให้ฉันเหนื่อยหรือเบื่อ	1	2	3	4	PB6 []
7. การออกกำลังกายเพิ่มความแข็งแรงของกล้ามเนื้อของฉัน	1	2	3	4	PB7 []
8. การออกกำลังกายทำให้ฉันรู้สึกถึงความสำเร็จส่วนตัวของฉัน	1	2	3	4	PB8 []
9. สถานที่ในการออกกำลังกายอยู่ไกลเกินไปสำหรับฉัน	1	2	3	4	PB9 []
10. การออกกำลังกายทำให้ฉันได้ผ่อนคลาย	1	2	3	4	PB10 []
11. การลอกกำลังกายทำให้ฉันได้ติดต่อกับเพื่อนและคนที่ฉันชอบพลด้วย	1	2	3	4	PB11 []
12. ฉันรู้สึกเหนื่อยมาก ที่จะต้องลอกกำลังกาย	1	2	3	4	PB12 []
13. การออกกำลังกายจะช่วยให้ฉันเกิดความตื่นโหดสูง	1	2	3	4	PB13 []
14. ต้องเสียเงินมากในการออกกำลังกาย	1	2	3	4	PB14 []
15. การออกกำลังกายช่วยเพิ่มความแข็งแกร่งของฉัน	1	2	3	4	PB15 []
16. สถานที่ที่ฉันจะไปออกกำลังกายได้ มีเวลาเปิด-ปิดที่ไม่สะดวกสำหรับฉัน	1	2	3	4	PB16 []
17. ความตึงตัวของกล้ามเนื้อของฉันเพิ่มขึ้น เนื่องจากการลอกกำลังกาย	1	2	3	4	PB17 []
18. การลอกกำลังกายช่วยให้ระกมลลดเล็ดและหัวใจของฉันทำงานได้ดีขึ้น	1	2	3	4	PB18 []
19. การออกกำลังกายทำให้ฉันเมื่อยล้า	1	2	3	4	PB19 []

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

[๑]

สำหรับผู้วิจัยเท่านั้น: เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

ระดับความเห็นด้วย ได้แก่: 4 = เห็นด้วยอย่างยิ่ง
 3 = เห็นด้วย
 2 = ไม่เห็นด้วย
 1 = ไม่เห็นด้วยอย่างยิ่ง

ข้อความ	1	2	3	4	สำหรับ ผู้วิจัย
20. ฉันมีความรู้สึกว่าคุณภาพดีขึ้น เนื่องจากการออกกำลังกาย	1	2	3	4	PB20 []
21. การออกกำลังกายช่วยเพิ่มความยืดหยุ่นของกล้ามเนื้อของฉัน	1	2	3	4	PB23 []
22. การออกกำลังกายทำให้ฉันเสียเวลาในการอยู่กับครอบครัว	1	2	3	4	PB24 []
23. รูปร่างของฉันดีขึ้นจากการออกกำลังกาย	1	2	3	4	PB25 []
24. การออกกำลังกายช่วยให้ฉันหลับสบายในเวลากลางคืน	1	2	3	4	PB26 []
25. ฉันจะมีอายุยืน ถ้าฉันออกกำลังกาย	1	2	3	4	PB27 []
26. ฉันคิดว่าคนที่ใส่ชุดออกกำลังกายดูน่าตลก	1	2	3	4	PB28 []
27. การออกกำลังกายช่วยลดความเหนื่อยล้าจากการทำงานของฉัน	1	2	3	4	PB29 []
28. การออกกำลังกายเป็นวิธีการที่ดีที่สุดสำหรับฉันในการที่จะได้พบเพื่อนใหม่	1	2	3	4	PB30 []
29. ร่างกายของฉันมีความอดทนมากขึ้น เนื่องจากการออกกำลังกาย	1	2	3	4	PB31 []
30. การออกกำลังกายทำให้ฉันมีภาพพจน์ต่อตัวเองดีขึ้น	1	2	3	4	PB32 []
31. คนในครอบครัวของฉันไม่สนับสนุนให้ฉันออกกำลังกาย	1	2	3	4	PB33 []
32. การออกกำลังกายทำให้ฉันมีความคิดฉับไวขึ้น	1	2	3	4	PB34 []
33. การออกกำลังกายช่วยให้ฉันทำกิจวัตรประจำวันตามปกติได้ โดยไม่รู้สึกเหนื่อย	1	2	3	4	PB35 []
34. การออกกำลังกายทำให้ฉันทำงานอย่างมีประสิทธิภาพมากขึ้น	1	2	3	4	PB36 []
35. การออกกำลังกายทำให้เสียเวลาในการทำหน้าที่ต่อครอบครัว	1	2	3	4	PB37 []
36. การออกกำลังกายเป็นวิธีการพักผ่อนหย่อนใจที่ดีที่สุดของฉัน	1	2	3	4	PB38 []
37. การออกกำลังกายทำให้ผู้อื่นยอมรับฉันมากขึ้น	1	2	3	4	PB39 []
38. การออกกำลังกายเป็นงานที่หนักสำหรับฉัน	1	2	3	4	PB40 []
39. การออกกำลังกายทำให้อวัยวะทุกส่วนในร่างกายของฉันทำหน้าที่ได้ดีขึ้น	1	2	3	4	PB41 []
40. สถานที่ในการออกกำลังกายมีน้อย	1	2	3	4	PB42 []
41. การออกกำลังกายช่วยให้รูปร่างของฉันดีขึ้น	1	2	3	4	PB43 []

สำหรับผู้วิจัย: การทรงกข้อมูล ครบ ไม่ครบ

ส่งชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

[11]

For researcher only: Running number of research participant.....
Date and time of data collection.....

Section 3

Perceive Social Support for Exercise Behaviors

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

Please rate each question twice. Under *family*, rate how often anyone living in your household has said or done what is described during the last 3 months. Under *friends*, rate how often your friends, acquaintances, or co-workers have said or done what is described during the last 3 months.

Please write one number from the following rating scale in each space.

None= (1) Rarely= (2) A few times= (3) Often= (4) Very often= (5) Does not apply= (8)

During the past 3 months, may family (or members of my household) or friends:

	<u>Family</u>	<u>Friends</u>
1. Exercised with me.	1a_____	1b_____
2. Gave me encouragement to stick with my exercise program.	2a_____	2b_____
3. Changed their schedule so we could exercise together.	3a_____	3b_____
4. Offered to exercise with me.	4a_____	4b_____
5. Gave me helpful reminders to exercise. ("Are you going to exercise to night?")	5a_____	5b_____
6. Planned for exercise on recreational outings.	6a_____	6b_____
7. Discussed exercise with me.	7a_____	7b_____
8. Talked about how much they like to exercise.	8a_____	8b_____
9. Helped plan activities around my exercise.	9a_____	9b_____
10. Asked me for ideas on how they can get more exercise.	10a_____	10b_____
11. Took over chores so I had more time to exercise.	11a_____	11b_____
12. Made positive comments about my physical appearance.	12a_____	12b_____

For researcher data recording complete incomplete
Signature of research assistant who recorded the missing data
data.....date.....

[11]

สำหรับผู้วิจัยเท่านั้น: เลขที่ผู้เข้าร่วมวิจัย.....

วันและเวลาที่เก็บข้อมูล.....

ตอนที่ 3**แบบสอบถามเกี่ยวกับการสนับสนุนทางสังคมสำหรับพฤติกรรมออกกำลังกาย**

โปรดระบุระดับอัตราความถี่ที่คนในครอบครัวหรือเพื่อนของคุณ กระทำในแต่ละข้อความ โดยภายใต้คำว่า ครอบครัว โปรดระบุระดับอัตราว่าบ่อยครั้งแค่ไหนที่ทุกคนในครอบครัว ของคุณ ได้พูด หรือทำในสิ่งที่กล่าวถึงตามข้อความข้างล่าง และภายใต้คำว่า เพื่อน โปรดระบุระดับอัตราว่าบ่อยครั้งแค่ไหนที่เพื่อนของคุณ คนที่รู้จัก หรือเพื่อนร่วมงาน ได้พูดหรือทำในสิ่งที่กล่าวถึงตามข้อความข้างล่างในช่วงที่ผ่านมา

โปรดระบุตัวเลขลงในแต่ละช่องว่าง โดยเลือกจ กระดับมาตรฐานดังต่อไปนี้

1	2	3	4	5	6
ไม่ทำเลย	แทบจะไม่ทำ	ทำเป็นบางครั้ง	ทำบ่อยครั้ง	ทำบ่อยครั้งมาก	คำถามนี้ไม่สามารถใช้กับท่านได้

ครอบครัวของคุณ (หรือสมาชิกในครัวเรือนของคุณ) หรือเพื่อน.....

	ครอบครัว	เพื่อน
1. ออกกำลังกายกับฉัน	1a _____	1b _____
2. ให้กำลังใจ เพื่อฉันจะได้จดจ่อกับ โปรแกรมการออกกำลังกายของฉัน	2a _____	2b _____
3. เปลี่ยนแปลงตารางเวลาของพวกเขา เพื่อที่จะสามารถออกกำลังกายด้วยกันได้	3a _____	3b _____
4. อาสาที่จะออกกำลังกายกับฉัน	4a _____	4b _____
5. ให้คำเตือนที่มีประโยชน์แก่ฉันเพื่อการออกกำลังกาย (เช่น “ท่านจะไปออกกำลังกายคืนนี้หรือไม่”)	5a _____	5b _____
6. วางแผนการออกกำลังกายสำหรับฉันนอกบ้าน/กลางแจ้งด้วยฉัน	6a _____	6b _____
7. สนทนาได้ตอบในเรื่องการออกกำลังกายกับฉัน	7a _____	7b _____
8. พูดคุยเกี่ยวกับความชอบของพวกเขาในการออกกำลังกายว่ามีมากแค่ไหน	8a _____	8b _____
9. ช่วยวางแผนกิจกรรมต่าง ๆ เพื่อพวกเขาจะได้ไม่ไปรบกวนการออกกำลังกายของฉัน	9a _____	9b _____
10. ขอความคิดเห็นจากฉันในเรื่องทำอะไรพวกเขาจะสามารถออกกำลังกายได้มากขึ้น	10a _____	10b _____
11. รับทำงานบ้านรวมทั้งงานอื่นๆภายในบ้านหรือที่ทำงานแทนฉัน เพื่อที่ฉันจะได้มีเวลา ในการออกกำลังกายมากขึ้น	11a _____	11b _____
12. แสดงความคิดเห็นในเชิงบวกเกี่ยวกับรูปร่าง ทรวดทรง ท่าทางและบุคลิกภาพของฉัน	12a _____	12b _____

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ

ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

[13]

For researcher only: Running number of research participant.....

Date and time of data collection.....

Items	1	2	3	4	For researcher SE []
13. I am confident I can participate in regular exercise when I do not have access to exercise equipment.	1	2	3	4	SE 13 []
14. I am confident I can participate in regular exercise when I am away from home often.	1	2	3	4	SE 14 []
15. I am confident I can participate in regular exercise when transportation is not convenient.	1	2	3	4	SE 15 []
16. I am confident I can participate in regular exercise when the environment is not safe for walking.	1	2	3	4	SE 16 []
17. I am confident I can participate in regular exercise when my friends do not want me to exercise.	1	2	3	4	SE 17 []
18. I am confident I can participate in regular exercise when my family does not want me to exercise.	1	2	3	4	SE 18 []
19. I am confident I can participate in regular exercise when I am spending time with friends or family who do not exercise.	1	2	3	4	SE 19 []
20. I am confident I can participate in regular exercise when it is raining.	1	2	3	4	SE 20 []
21. I am confident I can participate in regular exercise when it is too hot.	1	2	3	4	SE 21 []
22. I am confident I can participate in regular exercise when there is air pollution.	1	2	3	4	SE 22 []
23. I am confident I can participate in regular exercise when the roads or sidewalks are slippery.	1	2	3	4	SE 23 []

[12]

สำหรับผู้วิจัยเท่านั้น: เลขที่ผู้เข้าร่วมวิจัย.....
วันและเวลาที่เก็บข้อมูล.....

ตอนที่ 4**ความเชื่อมั่นในสมรรถนะของตนเองเพื่อเอาชนะอุปสรรคในการออกกำลังกาย**

โปรดพิจารณาถึงความเชื่อมั่นของคุณ ในการที่จะออกกำลังกายเมื่อคุณเผชิญกับอุปสรรคต่างๆ

โดยอ่านข้อความต่อไปนี้แล้ว **ทำเครื่องหมาย (X)** ลงในช่องว่างตรงกับตัวเลขที่ตรงกับความคิดเห็นของคุณที่สุด หากข้อความใดไม่ได้เกิดขึ้นจริงในชีวิตประจำวันของคุณ

ขอให้คุณตอบ โดยคิดว่าหากเหตุการณ์นั้นเกิดขึ้นกับคุณ คุณจะมีความมั่นใจในการออกกำลังกายอยู่ในระดับใด กรุณาตอบคำถามโดยใช้ระดับคะแนนทั้ง 4 ดังต่อไปนี้

	1	2	3	4	
	ไม่มีความมั่นใจเลย	มีความมั่นใจบ้าง	มีความมั่นใจปานกลาง	มั่นใจมาก	
ข้อความ	1	2	3	4	สำหรับ ผู้วิจัย
1 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกเครียดมาก	1	2	3	4	SE 1 []
2 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกหุดหุดหิมเศร้า	1	2	3	4	SE 2 []
3 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกวิตกกังวล	1	2	3	4	SE 3 []
4 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกว่าตนเองแก่เกินไปที่จะออกกำลังกาย	1	2	3	4	SE 4 []
5 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถึงแม้ว่าคุณรู้สึกว่าไม่มีเวลา	1	2	3	4	SE 5 []
6 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกว่าไม่อยากออกกำลังกายในขณะนี้	1	2	3	4	SE 6 []
7 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณยุ่งกับงานประจำ	1	2	3	4	SE 7 []
8 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกไม่สบายตัวเมื่อออกกำลังกาย	1	2	3	4	SE 8 []
9 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณกำลังประสบกับปัญหาส่วนตัวหรือครอบครัว	1	2	3	4	SE 9 []
10 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณอยู่ลำพังคนเดียว	1	2	3	4	SE 10 []

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

[13]

สำหรับผู้วิจัยเท่านั้น: เลขที่ผู้เข้าร่วมวิจัย.....
วันและเวลาที่เก็บข้อมูล.....

	1	2	3	4	
	ไม่มีความมั่นใจเลย	มีความมั่นใจบ้าง	มีความมั่นใจปานกลาง	มั่นใจมาก	
ข้อความ	1	2	3	4	สำหรับ ผู้วิจัย
11 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณต้องออกกำลังกายตามลำพัง	1	2	3	4	SE 11 []
12 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าเพื่อนที่ออกกำลังกายด้วยกันตัดสินใจไม่ออกกำลังกายในวันนั้น	1	2	3	4	SE 12 []
13 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณไม่มีอุปกรณ์ในการออกกำลังกาย	1	2	3	4	SE 13 []
14 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณต้องเดินทางไปไกลบ้านบ่อย ๆ	1	2	3	4	SE 14 []
15 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าการเดินทางไปสถานที่ออกกำลังกายไม่สะดวก	1	2	3	4	SE 15 []
16 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกว่าคุณสภาพแวดล้อมไม่ปลอดภัย	1	2	3	4	SE 16 []
17 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าเพื่อน ๆ ไม่ต้องการให้คุณออกกำลังกาย	1	2	3	4	SE 17 []
18 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าครอบครัวของคุณไม่ต้องการให้คุณออกกำลังกาย	1	2	3	4	SE 18 []
19 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณใช้เวลาอยู่กับเพื่อนหรือครอบครัวที่ไม่ออกกำลังกาย	1	2	3	4	SE 19 []
20 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าฝนกำลังตก	1	2	3	4	SE 20 []
21 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าคุณรู้สึกว่าอากาศร้อนเกินไป ๆ	1	2	3	4	SE 21 []
22 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าอากาศมีมลพิษ	1	2	3	4	SE 22 []
23 คุณมีความมั่นใจในระดับใด ที่จะออกกำลังกายได้อย่างสม่ำเสมอ ถ้าถนนหรือทางเดินเท้าลื่น	1	2	3	4	SE 23 []

สำหรับผู้วิจัย: การกรอกข้อมูล ครบ ไม่ครบ ลงชื่อผู้ช่วยวิจัยติดตามข้อมูลส่วนที่ขาด..... วันที่.....

Experience of Motivational Interviewing

Direction: The following will be used by the research assistant for the final telephone session. Participants will be asked about their satisfaction with the physical activity program (PA-MHCP) you have been part of and whether the program is appropriate to use for promoting physical activity in Thai working women.

Interview Questions

1. How do you feel during the interview?
2. Which part of interview did you like?
3. Did any part of interview does make you feel uncomfortable? Please explain
4. How did the interview affect your physical activity?
5. How could the program be more helpful?
6. Do you think this program is a good fit for Thai women? Why or Why not?
7. How did you like using the questionnaires?
8. Is there anything else you would like to tell us about the program?

**แบบสอบถามประสาการณ์การเข้าร่วมโปรแกรมเพื่อส่งเสริมการเคลื่อนไหวในผู้หญิงทำงาน
เพื่อป้องกันโรคหัวใจและหลอดเลือด**

คำชี้แจง

แบบสอบถามนี้ประกอบไปด้วยข้อคำถามเกี่ยวกับความพึงพอใจในการเข้าร่วมโปรแกรมการให้คำปรึกษาเกี่ยวกับการมีกิจกรรมการเคลื่อนไหวสำหรับผู้หญิงทำงานเพื่อป้องกันการเกิดโรคหัวใจและหลอดเลือด

และข้อคำถามเกี่ยวกับความคิดเห็นต่อความเหมาะสมในการใช้โปรแกรมนี้สำหรับการส่งเสริมการมีกิจกรรมการเคลื่อนไหวในผู้หญิงทำงาน คำถามเหล่านี้ไม่มีคำตอบที่ถูกหรือผิด

คำตอบทุกคำตอบจะเป็นประโยชน์อย่างยิ่งสำหรับการพัฒนาโปรแกรมสำหรับใช้ในที่ทำงานต่อไป โปรดตอบทุกคำถามตามความคิดเห็นและความรู้สึกของท่านด้วยตัวท่านเองลงในช่องว่างที่จัดให้

1. คุณรู้สึกอย่างไรกับการสัมภาษณ์และสนทนาตลอดการเข้าร่วมในโปรแกรม

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2. ส่วนใดของการสัมภาษณ์หรือสนทนาที่คุณรู้สึกชอบ

.....

.....

.....

3. มีส่วนใดในการสัมภาษณ์หรือสนทนาหรือไม่ ที่ทำให้คุณรู้สึกไม่สบายใจ โปรดอธิบายเพิ่มเติม

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.....

.....

4. การสัมภาษณ์หรือสนทนาที่คุณได้รับส่งผลต่อการมีกิจกรรมการเคลื่อนไหว/
การออกกำลังกายของคุณอย่างไร

.....

.....

.....

โปรดพลิกไปด้านหลัง →

5. คุณคิดว่าทำอะไร โปรแกรมนี้จึงจะมีประโยชน์ต่อคุณมากขึ้น

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6. คุณคิดว่าโปรแกรมนี้เหมาะสมในการใช้กับผู้หญิงทำงานหรือไม่

โปรดอธิบายว่าทำไมจึงเหมาะสมหรือไม่เหมาะสม

.....

.....

.....

7. คุณรู้สึกอย่างไรกับแบบสอบถามที่ใช้ถาม ก่อน ขณะและหลังการเข้าร่วมใน โปรแกรม

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.....

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8. คุณมีสิ่งใดอีกหรือไม่ที่ต้องการจะบอกเราเกี่ยวกับ โปรแกรมนี้

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.....

ขอขอบคุณ อย่างยิ่งที่ให้ความร่วมมืออย่างดีในการศึกษาครั้งนี้

คณะผู้วิจัย

Appendix H
Recruitment materials

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Dear Thai working women

Have you ever tried participating in a regular exercise program? We have considered that for some reason, you might not know where to start. Or, you might have started many times, but you have not been successful in achieving the results you sought.

We have another option for you!

My name is Yupawan Thongtanunam. I am a doctoral student at the School of Nursing, Oregon Health & Science University, Portland, Oregon. I am conducting a research program to change health behavior in Thai working women. This program centers around being physically active to prevent cardiovascular disease and promoting better health among working Thai women aged 40-65 years.

If you participate in this study, you will give information which benefits both yourself and other Thai working women who want to increase their physical activity for the purpose of promoting better health. **Participation will consist of filling out a questionnaire and participating three times in the health coaching program to promote moderate physical activity. This study will last for 6 weeks. You can withdraw from the study at anytime.**



If you are interested, please contact me by telephone at 503-382-9511 from 8am to 8pm on Monday through Saturday. Thank you for your cooperation.

**Yupawan
Thongtanunam**

ลัวส์ดีค่ะ



คุณก็เป็นคนหนึ่งใช่ไหมที่ต้องการออกกำลังกายอย่างสม่ำเสมอ แต่ไม่รู้จะเริ่มได้อย่างไร หรือเคยพยายามอยู่หลายครั้ง แต่ก็ไม่เคยประสบความสำเร็จ.....

ดิฉันชื่อ ยูพาวรรณ ทองตะนูนาม กำลังศึกษาอยู่ที่คณะพยาบาลศาสตร์

มหาวิทยาลัยโอเรกอนเฮลท์ไซน์ เมืองพอร์ตแลนด์ รัฐโอเรกอน

ดิฉันสนใจเกี่ยวกับการปรับเปลี่ยนพฤติกรรม

ออกกำลังกายอย่างสม่ำเสมอเพื่อป้องกัน โรคหัวใจและส่งเสริมสุขภาพของ

ผู้หญิงทำงาน อายุระหว่าง 40 – 65 ปี

การเข้าร่วมในการศึกษานี้

จะเป็นประโยชน์อย่างยิ่งแก่คุณและผู้หญิงทำงานคนอื่นๆที่ต้องการเพิ่มการออกกำลังกายเพื่อสุขภาพ หากท่านยินดีเข้าร่วมในการศึกษานี้ ท่านจะต้องตอบแบบสอบถามและเข้าร่วมโปรแกรมให้คำปรึกษาเกี่ยวกับการส่งเสริมการเคลื่อนไหวเพื่อสุขภาพ จำนวน 3 ครั้ง รวมเวลาในการศึกษาทั้งสิ้น 6 สัปดาห์

ท่านสามารถขอไม่ร่วมในการศึกษาเมื่อใดก็ได้ตามที่ต้องการ



หากท่านสนใจเข้าร่วมการศึกษา กรุณาติดต่อ ทีเบอร์ โทรศัพท์

503-382-9511 เวลา 08:00-20:00 น.

ขอขอบพระคุณในความร่วมมือ

ยูพาวรรณ ทองตะนูนาม

eIRB #4539



คุณเคยเป็นคนหนึ่งใช่ไหม
ที่ต้องการออกกำลังกายอย่างสม่ำเสมอ
แต่ไม่รู้จะเริ่มต้นอย่างไร
หรือเคยพยายามอยู่หลายครั้ง แต่ไม่เคยประสบความสำเร็จ.....

เราคือคณะผู้วิจัยจาก คณะพยาบาลศาสตร์ มหาวิทยาลัยโอเรกอนเฮลท์แอนด์ไซน์
เมืองพอร์ตแลนด์ มลรัฐโอเรกอน เราสนใจเกี่ยวกับ
การปรับเปลี่ยนพฤติกรรมออกกำลังกายอย่างสม่ำเสมอ
เพื่อป้องกันโรคหัวใจและส่งเสริมสุขภาพของ
ผู้หญิงทำงานอายุระหว่าง 40-65 ปี



การเข้าร่วมในการศึกษาครั้งนี้ จะเป็นประโยชน์อย่างยิ่ง
แก่คุณและผู้หญิงทำงานคนอื่น ๆ ที่ต้องการเพิ่มการออกกำลังกายเพื่อสุขภาพ
หากคุณยินดีเข้าร่วมในการศึกษาครั้งนี้ คุณจะได้รับการให้คำปรึกษา
เกี่ยวกับการเคลื่อนไหวร่างกายเพื่อสุขภาพและร่วมตอบแบบสอบถาม
เพื่อประเมินความก้าวหน้าของกิจกรรมการเคลื่อนไหวเพื่อสุขภาพของคุณ
ท่านสามารถขอยุติการเข้าร่วมในการศึกษาเมื่อใดก็ได้ตามที่ต้องการ



หากท่านสนใจเข้าร่วมการศึกษา กรุณาติดต่อ ที่เบอร์โทรศัพท์

085 118 6423 เวลา 08:00-18:00 น.

****มาร่วมกันศึกษาและดูแลสุขภาพกันนะคะ****

ผู้รับผิดชอบโครงการ

ยุพาวรรณ ทองตะนูนาม
นักศึกษาระดับปริญญาเอก คณะพยาบาลศาสตร์
มหาวิทยาลัยโอเรกอนเฮลท์แอนด์ไซน์

ดร. แคทเธอริน ซาเวอรซัน
รองศาสตราจารย์
มหาวิทยาลัยโอเรกอนเฮลท์แอนด์ไซน์

**หากคุณสนใจเข้าร่วมโปรแกรม
กรุณาติดต่อ**

ยุพาวรรณ ทองตะนูนาม

085 118 6423



Using Motivational Interviewing
for Promoting
Physical Activity
among Middle aged
Thai Working Women



Contact the Study:
Catherine Salvesson, PhD, RN
1 -503- 4943558
Oregon Health & Science University
School of Nursing

Funded by:
Sigma Theta Tau: Beta Psi chapter

การส่งเสริมการมีกิจกรรม

**การเคลื่อนไหวของ
ผู้หญิงทำงาน**



**โดยใช้เทคนิคการสัมภาษณ์
เพื่อสร้างแรงจูงใจ**



การศึกษาที่เกี่ยวข้องกับอะไร



เราสนใจศึกษาเกี่ยวกับการส่งเสริม
พฤติกรรมสุขภาพเพื่อป้องกันการเกิด
โรคหัวใจและส่งเสริมสุขภาพในผู้หญิง
ทำงาน ดังนั้นวัตถุประสงค์ของการศึกษาคือ
เพื่อส่งเสริมการเคลื่อนไหวร่างกายอย่างสม่ำเสมอ
โดยใช้เทคนิคการสัมภาษณ์เพื่อสร้างแรงจูงใจ
เพื่อลดความเสี่ยงต่อการเกิดโรคหัวใจและหลอดเลือด
ในผู้หญิงทำงาน

ทำไมเราจึงสนใจที่จะศึกษาเรื่องนี้



ปัจจุบันรายงานจำนวนมากสนับสนุนว่า
การไม่มีกิจกรรมการเคลื่อนไหวอย่าง
สม่ำเสมอ นั้น เป็นสาเหตุหลักของการเกิดโรคหัวใจ
และหลอดเลือด แม้ว่าเราจะรับรู้ประโยชน์ของกรรม
กิจกรรมการเคลื่อนไหวอย่างสม่ำเสมอเพิ่มขึ้น
แต่การปรับเปลี่ยนพฤติกรรมเป็นเรื่องยากต่อการ
ปฏิบัติ ผู้หญิงทำงานอายุ 40-65 ปี ต้องเผชิญกับการ
เปลี่ยนแปลงทั้งด้านร่างกายและบทบาทหน้าที่ต่าง ๆ
การมีกิจกรรมการเคลื่อนไหวอย่างสม่ำเสมอจึงเป็นเรื่อง
ท้าทาย แต่ถ้าหากสามารถปฏิบัติได้จะเกิดประโยชน์
อย่างยิ่งที่ต่อสุขภาพกายและจิตใจในปัจจุบัน และยัง
เสริมสร้างให้เป็นผู้สูงอายุที่มี
สุขภาพดีในอนาคตด้วย



กิจกรรมที่คุณจะต้องเข้าร่วมในโปรแกรม

หากคุณเข้าร่วมในการศึกษาคุณอาจได้รับการสุ่มเข้า
อยู่ในกลุ่มการส่งเสริมการมีกิจกรรมการเคลื่อนไหว
อย่างสม่ำเสมอโดยใช้เทคนิคการสัมภาษณ์เพื่อสร้าง
แรงจูงใจ หรือกลุ่มการส่งเสริมการมีกิจกรรมการ
เคลื่อนไหวอย่างสม่ำเสมอโดยการให้เทคนิคการให้
สุศึกษา
ถ้าหากคุณได้รับการสุ่มเข้าอยู่ในกลุ่มการใช้เทคนิค
การสัมภาษณ์เพื่อสร้างแรงจูงใจ คุณจะได้รับการ
สัมภาษณ์แบบพบตัวจำนวน 3 ครั้งและทางโทรศัพท์
จำนวน 2 ครั้ง



ถ้าหากคุณได้รับการสุ่มเข้าอยู่ในกลุ่มการให้สุศึกษา
คุณจะได้รับการศึกษาแบบพบตัวจำนวน 1 ครั้ง
และทางโทรศัพท์จำนวน 2 ครั้ง



นอกจากนั้น เราจะขอความร่วมมือให้คุณตอบคำถาม
เกี่ยวกับการรับรู้ประโยชน์และอุปสรรคต่อการมีกิจกรรม
การเคลื่อนไหวร่างกาย และลักษณะและจำนวนของ
การมีกิจกรรมการเคลื่อนไหวของคุณในแต่ละวัน
รวมถึงความมั่นใจในการมีกิจกรรมการเคลื่อนไหว
อย่างสม่ำเสมอและอิทธิพลของครอบครัวและเพื่อน
ต่อการมีกิจกรรมการเคลื่อนไหวอย่าง
สม่ำเสมอของคุณ



คุณสมารถเข้าร่วมโปรแกรมนี้ได้หรือไม่

- 1 หากคุณอายุระหว่าง 40- 65 ปี
- 2 ออกกำลังกายน้อยกว่า 3 วันต่อสัปดาห์
ในช่วง 3 เดือนที่ผ่านมา
- 3 สนใจเข้าร่วมในโปรแกรม

คุณสามารถติดต่อขอรับการประเมิน
ความพร้อมของร่างกายเพื่อเข้าร่วม
ในโปรแกรมได้ตามหมายเลขโทรศัพท์ที่ให้ไว้

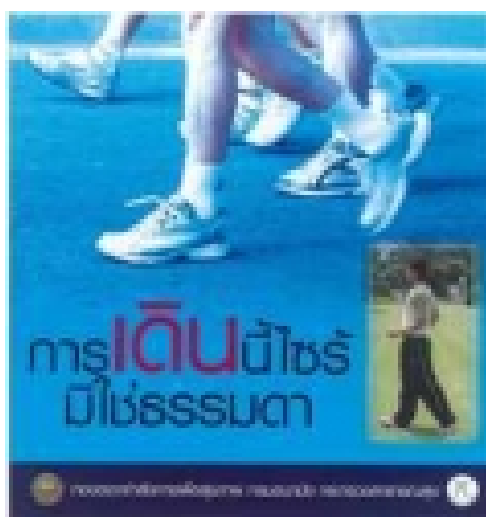
คุณจะต้องเข้าร่วมในโปรแกรมนี้นานเท่าไร

เราทราบดีว่าเวลาของคุณเป็นสิ่งที่มีค่า ดังนั้นในการ
เข้าร่วมกิจกรรมในโปรแกรมแต่ละครั้ง คุณจะใช้เวลา
เพียงครั้งละ 15-30 นาที ประมาณเดือนละ
2 ครั้ง และสามารถเลือกเวลาใน
การทำกิจกรรมต่าง ๆ ให้สอดคล้อง
กับตารางการทำงานของคุณได้
เพื่อให้การเข้าร่วมในโปรแกรมนี้
ส่งผลกระทบต่อเวลาทำงานของคุณน้อยที่สุด
ซึ่งการเข้าร่วมในโปรแกรมนี้จะใช้เวลาทั้งสิ้น
3 เดือน




**การเข้าร่วมในโปรแกรมนี้ไม่มีค่าใช้จ่าย
และไม่มีการผูกพันใดๆ**

Appendix I
Study Materials



Physical activity log

สมุดบันทึกการมีกิจกรรมการเคลื่อนไหว



ขอบคุณอย่างยิ่งที่กรุณาให้ความร่วมมือ
ขอให้ท่านมีสุขภาพแข็งแรงตลอดไปนะคะ

ด้วยความปรารถนาดีจาก
คณะผู้วิจัย

ID _____

วันที่ _____ ถึง _____

วันที่	กิจกรรมการเคลื่อนไหว	ระยะเวลา (นาที)	ข้อมูลจากเครื่องนับก้าวเดิน
จันทร์ ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
อังคาร ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
พุธ ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
พฤหัสบดี ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
ศุกร์ ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
เสาร์ ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	
อาทิตย์ ____/____/____	1	1	จำนวน.....ก้าว CAL.S.....Calories Total CAL.S.....calories b.....calories
	2	2	
	3	3	
	4	4	
	5	5	

สรุปผล: คุณผู้วิจัยสุขภาพทุกท่าน

สมุดบันทึกเล่มนี้จัดทำขึ้นเพื่อใช้ประกอบการบันทึกกิจกรรมการออกกำลังกายของคุณท่านในแต่ละวันและเพื่อเข้าร่วมโครงการวิจัยเพื่อส่งเสริมการมีกิจกรรมการเคลื่อนไหวในผู้ใหญ่น่าสนใจอายุระหว่าง 40-65 ปี เพื่อความแข็งแรงของกระดูกสันหลังสามารถบันทึกกิจกรรมต่างๆของคุณได้ทุกวัน ก่อนเข้านอนและจะและเพื่อไปดูผลและค่าในการบันทึกการมีชื่อและนำในการบันทึกข้อมูลวิจัยคือ

1. การบันทึกที่ถูกต้องทำให้การบันทึกกิจกรรมของวันนี้ดู
2. ระบุกิจกรรมการออกกำลังกายโดยมีจุดไว้ในแต่ละวัน โดยคุณอาจจะมีมากกว่า 1 กิจกรรมในแต่ละวัน กิจกรรมการออกกำลังกายหลายกิจกรรมจะรวมผลการบันทึกการออกกำลังกายหลายกิจกรรมค่าสังเกตในส่วนนอกค่าสังเกตซึ่งการบันทึกจำนวนและรวมมีกิจกรรมที่จุดเดียวคุณใช้ทำเป็นปกติหรืออย่างยาก
3. โปรดระบุระยะเวลาที่ใช้ในแต่ละกิจกรรม ลงในช่องว่างกิจกรรมนี้ดู
4. ถ้าหากคุณไม่บันทึกกิจกรรมให้บันทึกเป็นวัน

คุณบันทึกข้อมูลของคุณลงในข้อที่ 1 ถึง 4

- a. จำนวนก้าวเดินของคุณในแต่ละวัน (Step)
- b. จำนวนแคลอรีที่คุณใช้ในแต่ละวัน (Total Calories)
- c. จำนวนแคลอรีที่คุณใช้ในแต่ละพัก (b)
- d. จำนวนแคลอรีที่คุณใช้เพื่อการออกกำลังกายในแต่ละวัน (CAL)

หากคุณมีข้อสงสัยเกี่ยวกับงานบันทึกข้อมูล โปรดสอบถามที่หมายเลข 085-118-0423
ขอสงวนลิขสิทธิ์ในข้อมูลนี้โดยงานวิจัย นพ. ณ โสภณดีละ
คณะผู้วิจัย

ตารางการคำนวณระยะทางจากจำนวนก้าวเดิน (ไมล์/ กิโลเมตร)

จำนวนก้าวเดิน	ระยะของก้าวเดิน									
	1'		1' 5"		2'		2' 5"		3'	
	ไมล์	ก.ม.	ไมล์	ก.ม.	ไมล์	ก.ม.	ไมล์	ก.ม.	ไมล์	ก.ม.
1000	0.2	0.32	0.3	0.48	0.4	0.64	0.5	2.41	0.6	0.96
2000	0.4	0.64	0.5	0.80	0.8	1.29	0.9	1.45	1.1	1.177
3000	0.6	0.96	0.8	1.29	1.1	1.77	1.4	2.25	1.7	2.74
4000	0.8	1.29	1.1	1.77	1.5	2.41	1.8	2.90	2.3	3.70
5000	0.9	1.45	1.3	2.09	1.9	1.45	2.3	3.70	2.8	4.51
6000	1.1	1.77	1.6	2.57	2.3	3.70	2.7	4.35	3.4	5.47
7000	1.3	2.09	1.9	3.06	2.7	4.35	3.2	5.15	4	6.44
8000	1.5	2.41	2.1	3.38	3	4.83	3.7	5.95	4.5	7.24
9000	1.7	2.74	2.4	3.86	3.4	5.47	4.1	6.60	5.1	8.21
10000	1.9	3.06	2.7	4.35	3.8	6.12	4.6	7.40	5.7	9.17
11000	2.1	3.38	3	4.83	4.2	6.76	5	8.05	6.3	10.14
12000	2.3	3.70	3.2	5.15	4.5	7.24	5.5	8.85	6.8	10.94
13000	2.5	4.02	3.5	5.63	4.9	7.88	5.9	9.50	7.4	11.91
14000	2.7	4.35	3.8	6.12	5.3	8.53	6.4	10.30	8	12.87
15000	2.8	4.51	4	6.43	5.7	9.17	6.9	11.10	8.5	13.68
16000	3	4.83	4.3	6.92	6.1	9.82	7.3	11.75	9.1	14.65
17000	3.2	5.15	4.6	7.40	6.4	10.30	7.8	12.55	9.7	15.61
18000	3.4	5.47	4.8	7.72	6.8	10.94	8.2	13.20	10.2	16.42
19000	3.6	5.80	5.1	8.21	7.2	11.59	8.7	13.52	10.8	17.38
20000	3.8	6.12	5.4	8.69	7.6	12.23	9.2	14.81	11.4	18.35

สูตรการคำนวณส่วนแคลอรีจากจำนวนก้าวเดิน

จำนวนแคลอรีที่ใช้ไปในการเดิน

$$= (0.5 \text{ Kcal/ lb/ min}) \times (\text{น้ำหนักกิโลกรัม} \times 2.2) \times \text{ระยะทางที่เดินจากจำนวนก้าวเดินเป็นไมล์}$$

ตัวอย่างการคำนวณจำนวนแคลอรีสำหรับคนที่น้ำหนัก 55 กิโลกรัม มีระยะของก้าวเดินเท่ากับ 1 ฟุต 5 นิ้ว และเดินได้ระยะทาง 6000 ก้าว

$$\text{ดังนั้นจำนวนแคลอรีที่ใช้ไปในการเดิน} = 0.5 \times (55 \times 2.2) \times 1.6 = 96.8 \text{ กิโลแคลอรี}$$

ID.....

Change Plan Worksheet

The changes I want to make (or continue making) are:

The reasons why I want to make these changes are:

The steps I plan to take in changing are:

The ways other people can help me are:

I will know that my plan is working if:

Some things that could interfere with my plan are:

What I will do if the plan isn't working:

Appendix J
PowerPoint




Feasibility Study of Using Motivational Interviewing for Promoting Physical Activity among Middle Aged Thai Working Women

Yupawan Thongtanunam RN, MNS
Oregon Health & Science University
School of Nursing

April 8th, 2010 at 3 – 5 pm

Background

- Worldwide
 - Cardiovascular disease (CVD) is the major cause of death in women because of:
 - Increased life expectancy
 - Industrialization

2

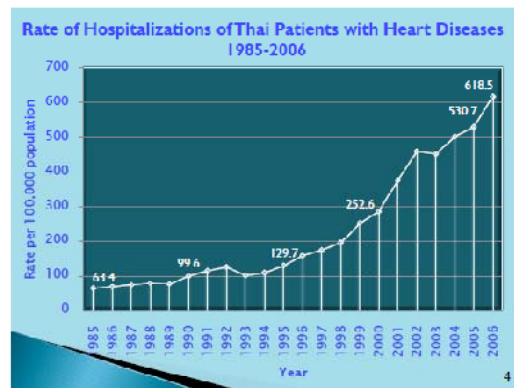
In Thailand

- CVD has become the leading cause of mortality and morbidity among Thai people age 45 and older.
(Thailand Health Profiles during 2005-2007, 2008)



- The mortality rate from CVD is 28.4 per 100,000 population.
(Thailand Health Profiles during 2005-2007, 2008)

3



Elderly Trends In Thailand

Year	Male (years)	Female (years)
1970	64.5	70.0
1980	68.0	73.0
1990	71.3	76.0
2000	74.0	80.3

- Increased life expectancy
- Increased percentage of elderly


- Increasing concern about health and health care system
- Increasing need for strategies for healthy aging and the prevention of chronic disease

5


Physical Activity (PA) & Cardiovascular Disease (CVD)

In the US

- The evidence shows that physical inactivity is one of the risk factors for CVD.



- 32% of coronary heart disease risk in women aged 34 to 59 is explained by physical inactivity and obesity.
(Rana & Manson, 2006)



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PA of Middle Aged Thai Working Women

(Thai National Survey of Health Status, 2006)



- 32% of the women living in the central Thailand report physical inactivity and 20% of these women aged 45-59.
- Women in urban settings report less PA than women in rural settings.
- PA decreases with age.

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How To Improve PA?

The effectiveness of intervention for improving PA is based upon:

- Lifestyle programs focused on encouraging the accumulation of PA.
- The interventions generally centered on a cognitive-behavior approach to PA.
- Providing tailored intervention
- Enhancing motivation to be physically active

3

The Traditional Health Education Programs in Thailand

- Emphasis on information models
- Information not tailored to each client
- Focus on extrinsic factors rather than intrinsic factors
- Have not explicitly included MI in the health promotion program



9

What is Motivational Interviewing (MI)?

- Definition of MI
 - A directive, client-centered counseling style for eliciting behavioral changes by helping clients to explore and resolve ambivalence about adopting a change
- Key aims of MI
 - Building client's intrinsic motivation to adopt recommendations for improved health
 - Resolving client's ambivalence about behavioral changes

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Principles and Spirit of MI

- Essential principles of MI
 - Expression of empathy
 - Development of discrepancy
 - Rolling with resistance
 - Support for self-efficacy
 - Evoking change talk
- Spirit of MI
 - Collaboration
 - Evocation
 - Autonomy

(Miller & Rollnick, 2002)

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Using Motivational Interviewing (MI) in promoting PA

MI has been used in various populations :

- patients (Brodie & Inoue, 2005; Ang et al., 2007; Velicer, 2007)
- cancer survivors (Bennett et al., 2007)
- people with health risks (Harden et al., 2000; Carob, et al., 2007)
- healthy people (Perry et al., 2007; Niles, et al., 2003)

MI has also been used in various settings:

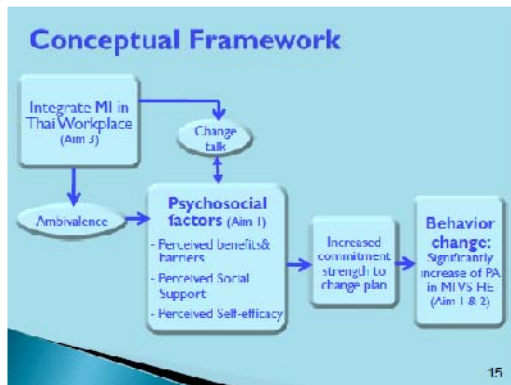
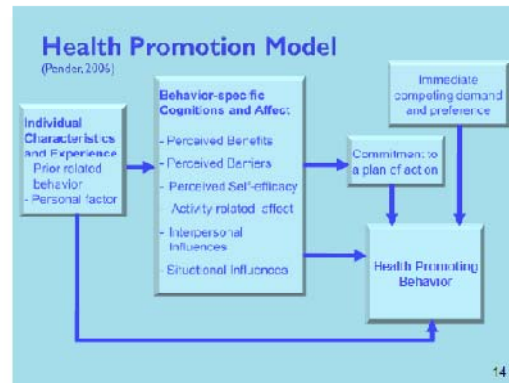
- hospitals (Brodie & Inoue, 2005; Ang et al., 2007; Velicer, 2007)
- primary care units (Harden et al., 1999; Hardcastle, 2008)
- communities (Perry et al., 2007; Bennett et al., 2005; Niles, et al., 2003)
- workplaces (Suteworth, et al., 2006; Prochaska, 2008)

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Specific Aims

1. Describe the PA, perceived benefits and barriers, self-efficacy to overcome barriers, and social support for being physically active.
2. Test the efficacy of a MI-Based Health Coaching Program (MI) compared to a standard health education program (HE).
3. Describe the feasibility of using MI Program among Thai working women.

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Research Design and Methods

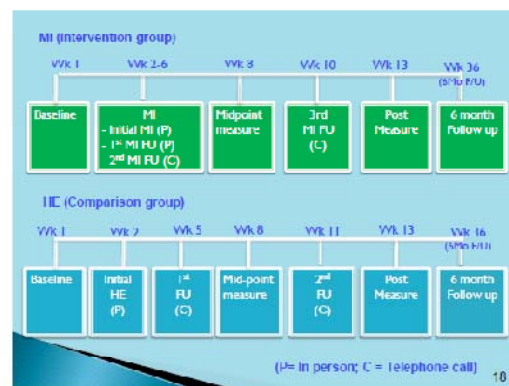
> **Design**

- A parallel group controlled clinical trial with subjects randomized to 10 wks of MI or HE

> **Target Population**

- Middle aged Thai women aged 40-65

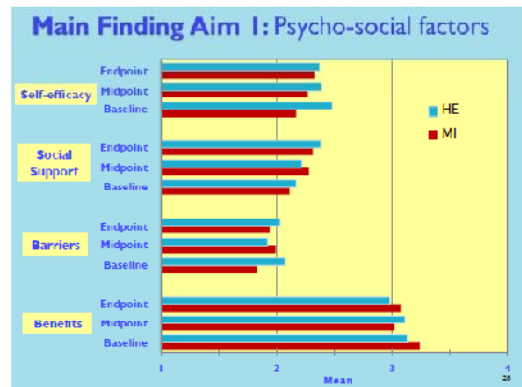
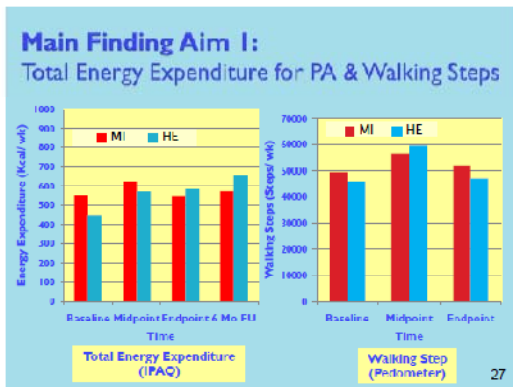
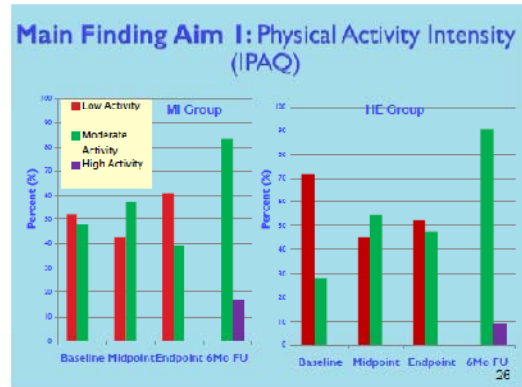
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Data Analysis

- Aim 1
 - To describe the PA, perceived benefits and barriers, self-efficacy to overcome barriers, and social support for being physically active at baseline
- Data Analysis
 - Descriptive statistics including mean and standard deviation
 - The Pearson Correlations

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Bivariate correlation of study variables at baseline

Outcome Variables	Total Minutes for PA	Total EE	Total step walking	Benefit	Barrier	Social support from family	Social support from friend
Total EE	.98 ^{***}	-					
Total steps	-.32	.29	-				
Benefit	.09	.08	-.12	-			
Barrier	-.31 [*]	-.31 ^{**}	-.18	-.32 ^{**}	-		
Social support from family	.1	.08	-.17	-.38 ^{***}	.001	-	
Social support from friend	-.25 [*]	.26	-.001	.13	.02	-.34 ^{**}	-
Self-efficacy	-.6	.16	.23	-.46 ^{***}	-.10	-.37 ^{**}	-.35 [*]

^{*} p < .05, ^{**} p < .01, ^{***} p < .001

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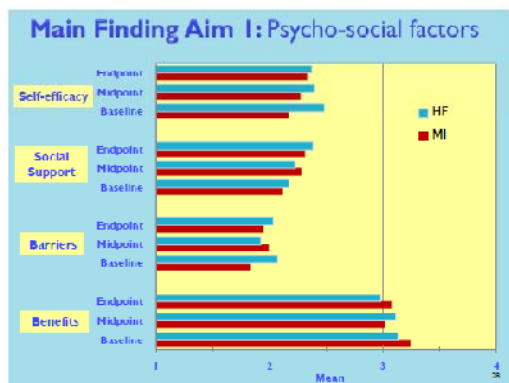
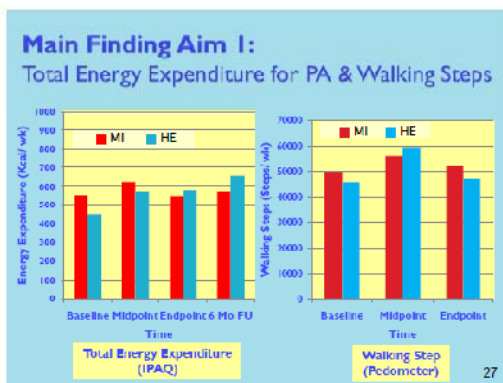
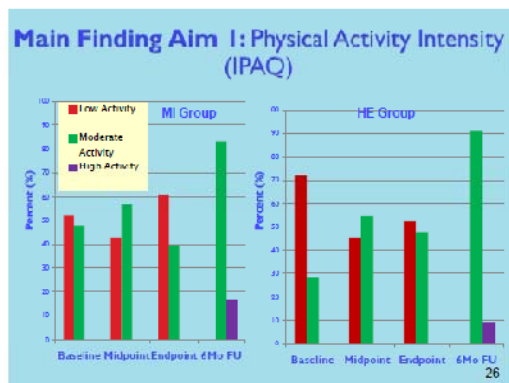
Data Analysis

- Aim 2
 - To test the efficacy of a MI Program compared to HE program.
- Hypothesis: women in the MI group will have a greater change in their physical activity data as well as selected psycho-social outcomes over times than changes seen in the HE group.
- Data Analysis
 - The mixed design ANOVA was used to analyze the primary and secondary outcomes.

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Data Analysis

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Bivariate correlation of study variables at baseline

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total ee	.98**	-					
Total steps	.25	.39	-				
Benefit	.09	.08	-.10	-			
Barrier	-.31*	-.31*	-.18	-.32*	-		
Social support from family	-.11	.08	.37	-.38**	.001	-	
Social support from friend	.29*	.24	.001	.13	.02	-.34*	-
Self-efficacy	-.16	.14	.35	.46**	-.10	.37**	.35*

* p < .05, ** p < .01

Data Analysis

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- Hypothesis: women in the MI group will have a greater change in their physical activity data as well as selected psycho-social outcomes over times than changes seen in the HE group.
- Data Analysis
 - The mixed design ANOVA was used to analyze the primary and secondary outcomes.

Main Findings for Aim 2: Psycho-social factors

- The different time point measured and the interaction between Time X Coaching style had some small effect on changing the perceived benefit for PA scores, $\omega^2 = .04$ and $.01$

Time Point	MI	HE
Baseline	3.2	3.1
Midpoint	3.0	3.0
Endpoint	3.0	2.9

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Main Findings for Aim 2: Psycho-social factors

- The interaction between Time X Coaching style had some small effect on changing the perceived barriers over times, $\omega^2 = .02$

Time Point	MI	HE
Baseline	1.8	2.0
Midpoint	2.0	1.9
Endpoint	1.9	2.0

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Main Findings for Aim 2: Psycho-social factors

- The time point measured had some small effect on perceived social support, $F(2, 80) = 3.40, p = .04, \omega^2 = .05$

Time Point	MI	HE
Baseline	2.1	2.2
Midpoint	2.3	2.2
Endpoint	2.3	2.4

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Main Findings for Aim 2: Psycho-social factors

- The coaching style had some small effect on perceived self-efficacy to overcome barriers over times, $\omega^2 = .05$

Time Point	MI	HE
Baseline	2.2	2.5
Midpoint	2.3	2.4
Endpoint	2.4	2.4

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Main Findings for Aim 2: Physical Activity (IPAQ)

- No statistical changes in the total minutes for PA across four time points related to the two different coaching styles.
- The coaching style has a small effect on the total minutes PA across three time points, $\omega^2 = .01$

Time Point	MI	HE
Baseline	550	450
Midpoint	620	580
Endpoint	550	550
6 Mo FU	550	650

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Main Findings for Aim 2: Steps (Steps from pedometer)

- The coaching style moderately affected the number of walking steps overtimes, $F(2, 26) = .76, p = .05, \omega^2 = .10$
- Only steps of walking were statistically changed overtimes, $F(2, 26) = 4.85, p = .02, \omega^2 = .07$
- Only step at midpoint differed from the baseline, $F(1, 13) = .70, p = .02$

Time Point	MI	HE
Baseline	4800	4500
Midpoint	5500	6000
Endpoint	5000	4800

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Suggestions for Future Study

- Increase sample size
- Increase study sites
- Increase the number of experimenters and using blind and naïve experimenters
- Add group support activity to the protocol
- Provide incentives for completion of questionnaires
- Include biometric evaluation for a randomized group

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Acknowledgement

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 - OHSU Dean Award
 - Sigma Theta Tau Award
 - Thai Nursing Council Award



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