APPLICATION OF SELF-EFFICACY THEORY AND THE TRANSTHEORETICAL MODEL TO EXERCISE PROGRAMME FOR MENOPAUSAL WOMEN IN CHIANG – MAI PROVINCE

CHITIMA KATONYOO

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Chitima Katonyoo

Miss. Chitima Katonyoo
Candidate

S. Tansakul

Assist. Prof. Supreya Tansakul, Ph.D.
Major-advisor

Kasem Nakornkhet

Assist. Prof. Kasem Nakornkhet, Dr.P.E.D.
Co-advisor

Roongrote Poomriew

Assoc. Prof. Roongrote Poomriew, Ph.D.
Co-Advisor

Nithat Sirichotiratana

Lect. Nithat Sirichotiratana, Dr.P.H
Co-Advisor

Rassmidara Hoonsawat

Assoc. Prof. Rassmidara Hoonsawat, Ph.D.
Dean
Faculty of Graduate Studies

Paradee Temcharoen

Assoc. Prof. Paradee Temcharoen, Dr.P.H.
Chair
Doctor of Philosophy Programme
In Public Health
Faculty of Public Health

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on
January 8, 2004

Nittaya Pensirinapa
Assoc. Prof. Nittaya Pensirinapa, Ph.D.
Thesis Defence Committee

Chitima Katonyoo
Miss. Chitima Katonyoo
Candidate

S. Nanthamongkh
Assist.Prof. Sutham Nanthamongkolchai, Ph.D.
Thesis Defence Committee

S. Tansakul
Assist. Prof. Supreya Tansakul, Ph.D.
Chair

Roongrote Poomriew
Assoc. Prof . Roongrote Poomriew, Ph.D.
Thesis Defence Committee

Kasem Nakronkhet
Assist.Prof. Kasem Nakronkhet, Dr.P.E.D.
Thesis Defence Committee

Assoc. Prof. Amornrat Podhipak, Ph.D.
Thesis Defence Committee

Nithat Sirichotiratana
Lect. Nithat Sirichotiratana, Dr.P.H.
Thesis Defence Committee

Rassmidara Hoonsawat
Assoc. Prof. Rassmidara Hoonsawat, Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Chalermchai Chaikittiporn
Assoc. Prof. Chalermchai Chaikittiporn,
Dr.P.H.(Epidemiology)
Dean
Faculty of Public Health
Mahidol University

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Chitima Katonyoo

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CHITIMA KATONYOO 4136143 PHPH/D

Dr. P.H.

THESIS ADVISORS: SUPREYA TANSAKUL Ph.D, KASEM NAKRONKHET Dr.E.D. NITHAT SIRICHOTIRATANA Dr.P.H, ROONGROTE POOMRIEW Ph.D.

ABSTRACT

This research utilized the techniques of the technical action research approach to study the effects of a constructed health education program developed from the application of Self-efficacy Theory and Transtheoretical Model to the exercise program for 7 menopausal women in Chiang Mai province. The level of readiness for exercise activity of the sample group was firstly classified using Transtheoretical Model before the following steps of the Application of Self-efficacy Theory: interviewing of fundamental information, focus group, participatory observation, questionnaire, laboratory and physiology test of the sample group at the beginning, during and end of the program. The duration of the study lasted 28 weeks from May 1st, 2002 to November 11th, 2002. The data were then evaluated and analyzed through the statistical methods including frequency distribution, percentage, mean and standard deviation, one-way ANOVA, paired t-test, and qualitative data analysis by using content analysis.

The result from the study showed that, at the end of the program, the level of knowledge concerning exercise, outcome expectation, exercise behavior, blood cholesterol, HDL, LDL, and maximum oxygen uptake of the sample group had improved significantly. However, no significant changes could be detected in the level of perceived self-efficacy, serum triglyceride, systolic blood pressure, diastolic blood pressure, pulse at rest, flexibility, and hand muscle strength.

In conclusion, the health education program gives some benefit to menopausal women. Any way, Some parameters from the study have no significant changes such as BMI. Parameters for further study should be diet related.

KEYWORDS: SELF-EFFICACY THEORY / TRANSTHEORETICAL MODEL / MENOPAUSAL WOMEN / TECHNICAL ACTION RESEARCH

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การประยุกต์ทฤษฎีการรับรู้ความสามารถตนเองร่วมกับแบบจำลองการเปลี่ยนพฤติกรรม ในการออกกำลังกายของสตรีวัยหมดประจำเดือน ในจังหวัดเชียงใหม่

APPLICATION OF SELF-EFFICACY THEORY AND THE TRANSTHEORETICAL MODEL TO EXERCISE PROGRAMME FOR MENOPAUSAL WOMEN IN CHIANG-MAI PROVINCE.

จิติมา กตัญญู 4136143 PHPH/D

ส.ด.

คณะกรรมการควบคุมวิทยานิพนธ์: สุปรียา ตันสกุล, ค.ด., เกษม นครเขตต์, Dr.E.D., รุ่งโรจน์ พุ่มริ้ว, Ph.D.,นิทัศน์ ศิริโชติรัตน์ .Dr.P.H.

บทคัดย่อ

การวิจัยครั้งนี้เป็นการวิจัยปฏิบัติการ เพื่อศึกษาผลของโปรแกรมสุขศึกษาที่ประยุกต์แบบจำลองการเปลี่ยนพฤติกรรมร่วมกับทฤษฎีการรับรู้ความสามารถตนเอง ในการออกกำลังกายของสตรีวัยหมดประจำเดือน ในจังหวัดเชียงใหม่ จำนวน 71 คน โดยใช้แบบจำลองการเปลี่ยนพฤติกรรม ในการจัดแบ่งความพร้อมในการออกกำลังกายของกลุ่มตัวอย่างก่อนที่จะประยุกต์ใช้ทฤษฎีการรับรู้ความสามารถตนเอง เก็บรวบรวมข้อมูลโดย การสัมภาษณ์ การสังเกต การใช้แบบสอบถาม การตรวจทางห้องปฏิบัติการ การทดสอบสมรรถภาพทางกายก่อน ระหว่างและหลังการเข้าร่วมโปรแกรมสุขศึกษา ดำเนินการระหว่างเดือนวันที่ 1 พฤษภาคมถึงเดือนวันที่ 11 พฤศจิกายน 2545 วิเคราะห์ข้อมูลโดยการแจกแจงความถี่ ร้อยละ ค่าเฉลี่ย และส่วนเบี่ยงเบนมาตรฐานเปรียบเทียบความแตกต่างของค่าสถิติOne way ANOVA with Scheffe, Paired Sample t – test และวิเคราะห์ข้อมูลเชิงคุณภาพด้วยการวิเคราะห์เนื้อหา

ผลการศึกษาพบว่า หลังการเข้าร่วมโปรแกรมสุขศึกษากลุ่มตัวอย่างมีความรู้ ความคาดหวังในผลลัพธ์ของการออกกำลังกาย และการออกกำลังกาย ระดับไขมันรวม ระดับไลโปโปรตีนความหนาแน่นสูง ระดับไลโปโปรตีนความหนาแน่นต่ำ ความสามารถในการใช้ออกซิเจนของร่างกาย ดีกว่าก่อนการเข้าร่วมโปรแกรมสุขศึกษา อย่างมีนัยสำคัญทางสถิติ แต่ไม่พบความแตกต่างของการรับรู้ความสามารถตนเอง ระดับไตรกลีเซอร์ไรด์ ความดันโลหิตขณะหัวใจบีบตัวขณะพัก ความดันโลหิตขณะหัวใจคลายตัวขณะพัก ชีพจรขณะพัก ความอ่อนตัว และแรงบีบมือ

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CHAPTER 1
BACKGROUND

In the past, physical activity played an important role in society. Almost everyone participated in some forms of daily physical activity to complete their necessary daily tasks. Until later in industrial period, technological advances led to the development of efficient means, especially machines, to replace human work force leading to the decrease in all levels of daily physical activity. In other words, industrialization of the society allowed people to have more time for themselves but lessen their physical activities. This phenomenon of decreasing physical activity resulted in the development of epidemiological transition i.e. while infections are still persisted in the developing world, other non-infectious diseases causing by people's behaviors also increased, or so to speak double burdens (WHO, 1997). The latest health statistics showed that the death from cardiovascular diseases were second to infectious diseases which were still the leading cause (Chuprapawan, C. 2000: 13).

Epidemiological transition can be retarded and prevented by let the people realize the importance of physical activities either in group or by themselves. Because of wide variety of physical activities, it is necessary to have clear definition of the term. Casperson et. Al, (1985: 126-130) has adopted the definition of physical activity as, "Bodily movement produced by skeletal muscle that resulted in more energy expenditure than at rest." From the definition, physical activity includes occupational activity, household activity, traveling activity, sports activity and exercise activity, etc. Furthermore, Casperson et. Al, (1985: 126-130) mentioned that physical activities are planned activities and should be repeated with the objectives of developing or maintaining one's physical strength.

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Regular participation in some kind of physical activity has a positive relation with mortality rate (USDHHS, 1996: 13) and also helps slowing down the progression of many diseases such as coronary heart diseases, hypertension, non-insulin-dependent diabetes, mellitus osteoporosis, colon cancer, stress and anxiety in both elderly and adult population (Pate et al, 1995: 402-407). This conclusion is confirmed with the Surgeon General's Report on Physical and Health which mentioned that moderate physical activity can help reducing the risk of many symptoms and illnesses such as coronary heart diseases, hypertension, diabetes, and colon cancer. Besides, it may have positive effect on mental health and good quality of life.

Women at the age of 45 to 59 years are medically classified as post-menopause group. There are many physiological changes in this group of women owing to decreasing level of estrogen hormone which has negative effects on physical health, mental health and social behavior. Being aware of these consequences the Ministry of Public Health decided to adopt Health Promotion Policy in the next five years (as appeared in the 9th NESDP) with the aim of reducing the morbidity of preventable diseases such as heart diseases, cancer and exercise related diseases. At present, there are about 3.8 million people of this group (population census, Department of Local Administration, Ministry of Interior: 1997) and it tends to increase in number resulted from the advance of medical technology. Life expectancy of this group of women is higher than in the past (Chuprapawan,C.2000:12). Anyway, above all of these health problems, post-menopause group now still play a key role both in economics and society of the family. They bring stability and happiness to their family, community and society. Their health status are not only very necessary to the foundation and development of society but also can be used as an indicator for the well-being of the elderly women. Chuprapawan, C. (2000: 13) said that this group of women was at increasing risk for developing heart disease, cancer, osteoporosis which may lead to disability and deformity or death, Besides, it was found that cardiovascular diseases was the leading cause of death in women (99.6 dead per 100,000 population).

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Having studied risk factors of cardiovascular disease in pre and post-menopause women, Razay et al, (1992: 889-896) found that there were significant difference of risk factors between pre and post-menopause women. The risks factors are: - blood lipid level, insulin level, waist to hip ratio and body mass index. The result is similar to the study in healthy pre and post-menopause women group by Matthews (1994: 337) which concluded that post menopausal women exhibited decreased High density Lipoprotein (HDL) levels and increased High density Lipoprotein (LDL) levels. Kannell et al, (1987: 413-419) also found that fibrinogen level had increased after menopause causing an increase in the prevalence of cardiovascular disease.

Cardiovascular disease is a condition that heart muscle does not received adequate blood supply owing to the dimination of blood flow to the heart. 80 to 90 percents of which resulted from narrowing and hardening of coronary blood vessels that called coronary atherosclerosis. Pathological change of the vessels begins with the deposition of fat on the inner wall of blood vessels (Intima layer) before the middle layer. Afterward, fatty streak changes into fibrinogens plaques which thicken the wall of blood vessels (Sateanchoak, P. and Chaisaeri, P.1993: 430). Mc Ardle et al, (1996) also stated that generally most cardiovascular disease caused by degenerative change of the inner wall of coronary blood vessels due to the deposition of cholesterol and low density lipoprotein on the blood vessels wall and clotting of blood inside, thereby diminishing blood circulation to heart muscle (myocardium). Oxygenation of the myocardium decreased causing the dead of myocardium (myocardial infarction) led to heart failure and dead.

The American heart association (1980) and Mc Ardle et.al (1996) study of risk factors that accelerated the development of cardiovascular disease was summarized as follows:- Controllable risk factors are hypertension, amount of total cholesterol, Triglyceride, high level of LDL, low level of HDL, lack of exercise, Diabetic mellitus, obesity, stress, hastily personality with less restrain while uncontrollable risk factors include age, sex, race, and family history.

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The risk that women of menopausal age with lower level of estrogen might suffer from cardiovascular disease is increasing. The American Heart Association's suggestion of prevention and lowered risk of being suffered from cardiovascular disease are as follows:-

Hypertension should be controlled by nutrition and drugs, reducing blood cholesterol by ingestion of low saturated fat and polyunsaturated fat from plants. Smoking is to be avoided. Regular practicing exercise in accordance with sex, age and physical fitness of the body is preferable. In case of women with diabetics, the level of sugar in blood stream should be carefully controlled. (Satheanchok, P. & Chaisaeri, P. 1993: 429-473)

From this suggestion, it can be clearly seen that exercise is one effective mean of preventing and reducing the risk of cardiovascular disease in menopausal women. As mentioned by Chintanasaree ,C. et al, (1970: 92-94), there are both anatomical and physiological body adaptation in response to exercise either acute or in long – term. These body adaptations also yielded out from regular and continually exercise practice. These response and adaptation depend on the intensity, duration, frequency, type of exercise and progressive of exercise. The most expected result of exercise is to be useful for the cardiovascular system. Exercise increases heart size and its strength, therefore the heart functions better. Exercise stimulates blood circulation system which is associated with energy expenditure or oxygen consumption of the body. Oxygen and nutrients consumption by muscle increased while exercising and also getting rid of waste products resulted from metabolism. Exercise increases blood flow to muscles, thereby supplies more oxygen and increases capacity of muscular consumption 3 times or more during exercising. Consequently, there is a wide difference of oxygen concentration in venous and arterial blood in muscles. Besides, PCO_2 (level of Carbondioxide concentration in blood), low pH (Acid-base balance), and high temperature at the site of muscular concentration are found. All previously mentioned factors accelerated the transference of oxygen from red blood cell to muscle. Whenever muscular oxygen consumption increases, cardiac output (the product of the heart rate and amount of blood pumped per heart beat) is

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also increased. In addition, the increasing heart rate while exercising depends on its intrinsic factors, Sympathetic nervous system, hormone, some chemical substances in blood, increase rate of vinous return, pumping action of contracting skeletal muscle and also Hyperventilation which causing the change of pressure in abdominal parts of the body pressing more blood to flow back to the heart (Scott K. Power et al, 1997: 151-173). Therefore, Exercise or body movement than regular movement in daily life can maintain the body capability which will decline when exercise ceased (Paenchob, W.1991: 68-71). Or so to say, the only means to maintain body capability is to exercise regularly. That is why exercise is an important component of the prevention and treatment of heart disease. It can reduce blood lipid level, body stress, weight of the over weight, and the concentration of platelets. Besides, exercise causes vascular dilatation, increase heart function which leads to increase blood flow to the heart muscle, increasing of thyroid hormone production, and more blood lipids are dissolved and absorbed (Attasue, A.1984). Exercise is also very useful to heart muscle both in size and function. Arterial blood circulation in coronary vessels increases. Systolic and Diastolic blood pressure are lowered. The low density lipoprotein level is also lowered leading to decrease of arterial blood clot. Abnormal electrocardiogram and pulse rate at rest decline. The factors mentioned before reduce the danger and severity of cardiovascular disease (Vachapat, C. 1989). American Heart Association (1981 quoted in Pollock and Wilmore, 1990) mentioned that exercise increased capacity of heart muscle, its blood vessels and lowered its oxygen consumption. Therefore, exercise appears as a mean of prevention and treatment of cardiovascular disease both economically and practicably.

Even with all usefulness of physical activity is known, most people do not exercise regularly. Survey of health status of working age population, BE 2539-2540, revealed that last year more than 45% of these people did not take part in any regular exercise and more than 50% of this group were female. Among this, people of the North is the group with the lowest percentage that participate in regular exercise. Upon dividing people according to the frequency of exercise into 3 groups- low (occasionally), medium (less than 4 times per week), and regular (more than 4 times per week), it was found that only 28.4% of male and 17.6% of female had regular

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exercise. Even though people in urban area accept to participate regular exercise more than in rural area and there are more sport and exercise facilities such as public park and gymnasium which people can go to easily in the urban area than in the rural area, there is no significant difference of participating regular exercise of female living in urban and rural area. It was found that people who exercise regularly is much high in the age group of 13-19 years, 2 times higher than the other age group (Chuprapavan,C. et al, 2000: 138). All the above study did not include any reasons of not wanting to intend any exercise or exercise regularly. Prisanyakul,S. et al. (2000: 39) mentioned that middle-aged women in Chiang Mai province have the wrong ideas about exercise which they think that exercise are sports with instruments and do not consider regular daily routines as physical activities. From the study of Lutter (1994: 263-279), it was found that the reason of low participation in exercise activities were that sport activity normally had to play as a team, needed recent equipments and it was a hard work. Besides, sport objectives give more special attraction to men than women. All of these factors cause women to deny participation of activities that might affect their whole physical structures. Hence, women of menopausal age group who do not have past experience of exercise since childhood are unable to participate in exercise activities at all.

The above-mentioned data showed that the number of Northern women participates in exercise activity is much lower than in the other part of the country. Even in Chiang Mai; the second biggest city only to Bangkok which full of material and technology development; its pace of life, social and environmental conditions have some adverse impacts on health status of menopausal women in the city. Besides, being a key figure in economics, they have a lot of activities to do, such as being the career in the family, the controller, and the manager of family owned business. In addition, they have a role of grand mother, or aunt, who take care and relay the experience to their offspring. They sometimes have to take care of their parents. This group of women is also an important resource of the society. Some of them play a role of administer or the experienced worker or the owner of different businesses. This group of menopausal women is a group of human resources with no less important than other groups, but their health was most neglected. (Chirawatanakul, S. 1997: 377)

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There are many factors that affect health status of menopausal women - life style, responsibility for their family needs, nutrition status, exposure to infections and chemical materials. Moreover, physiological changes of advanced age have much influence on them, such as cessation of menstruation, low level of estrogen and regression of body structure. These changes are not both physical and metal illness, but have many impacts on health status from mild to severe degrees that needed medical treatment. Because of performing too many role in everyday life, these women tend to pay less attention to their health. The preliminary survey of physical and mental health status among 318 women aged between 45 to 59 years old who were living in Chiang Mai, conducted by the researcher, revealed that physical health and social status were rather good, and also in mental, emotional, and spiritual status. However, 80% of these women did not exercise and it was of little concern to them which means their health status does not only be neglected by the government sectors but also by themselves as well. Consequently, the following problems are illnesses which might place a considerable dependence on the family and society.

The idea of prevention measures for the well-being of menopausal women is the one that helps them to live comfortably in the society. This can be done by turning all factors mentioned above to have positive effect on their health, and preparation for dealing with new way of life on advancing aged. Let them have the sense of efficacy, prevention of chronic disease and disability by providing education, exercise and training of regular muscular movement activity. All these prevention measures will increase the physical capability, good health, and good personality.

Exercise behavior indicators should be all set before encouraging women to pay attention to exercise because it can explain specific characters that associated with exercise.(Dishman&Sellis, 1994: 214-238) These indicators comprise of personal characteristics, environmental factors, character and type of exercise programs. One of the required personal characteristics is education which is a very significant indicator of exercise behavior. Knowledge is one main variable of exercise activity. Sallis et al (1986: 331-341) found that without the useful information about the benefits of exercise to their health, people tend to refuse to participate in exercising, Providing of clear

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information about benefits of exercise to the health status can inspire people to practice regularly. Other personal characteristics includes gender, age, income, race, biomedical history, previous history of activities from the past up to present, some psychological factors such as level of self-efficacy, self-esteem, and self-achievement. In some studies, psychological factors are indicators that would reflect the level of self- control during exercise period since setting of goals to progressing to each milestone. All these indicators can predict the substantial of exercise activities. Resonant to the above study, the qualitative study by Amy A. Eyter (1998: 640-652) concerning Physical activity and Minority women aged more than 40 years old in California and Missouri showed that, after arranging 10 focus group of 8 – 10 people, there are 2 main reasons for these women not to join the exercise activities which are personal and environmental restrictions. They gave out many environmental restrictions such as expenses of performing exercise, improper exercise patterns to their body, inconvenient transportation, risk of injury during exercise, varieties of bad weather conditions, and also cultural or race restrictions of not giving importance to exercise. Personal restrictions included time limitations, tiredness, muscle pain, afraid of heart attack, less support from people around, shyness, old age, no knowledge about proper exercise, and no confidence. Prisanyakul,S. (2000: 40) also stated, in her qualitative study of middle-aged women who had received treatments from local medical center in upper northern part of Thailand, which most women realized the importance of exercise but only few did exercise regularly. That because their misunderstanding of proper exercise, for example, some women thought exercise has to be sport with equipments while others thought working hard during the day is enough.

Apart from aforementioned indicators, adult with low sense of self regulatory efficacy will not participate in regular exercise. Most old aged people believe firmly that decline of physical capability is unavoidable with advanced age, thus the attention to take part in exercise also declines. (Witnet Quoted in Bandura 1997: 204)

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To inculcate people with self-efficacy of doing things that have positive effects on health can be done in all age group and socioeconomic status (Bandura, 1997: 205). Sutra et al (Sutra et al, quoted in Bandura, 1997: 205) mentioned that aged people with the sense of low efficacy will not try to take care of themselves and will be suffered from poor quality of life. On the contrary, those with high level of self-efficacy can solve all problems and stay alive with good mental health.

From the content mentioned above, the excuses used of not participating in exercise activity and suggestions concerning the process of adaptation and behavioral change are likely to be with in the frame of Transtheoretical model and Self-efficacy theory. Because Transtheoretical Model was divided into 6 stages and each one use different strategies to deal with the problems, it is necessary to evaluate the stage of each participant in order to start changing their behavior until help them maintaining those preferable new activities. Self-efficacy and outcome expectation are also vital as mention by Bandura (1977: 215) that the level of self-efficacy in performing some tasks would influence their behavior specifically.

From the above topics and concepts, the idea of using action research approach to encourage behavioral change in menopausal women in Chiang Mai province who might not have any intention to exercise and/or still in the stage of determination to overcome the obstacles and perform exercise activity regularly. The project is to support them to recognize their self-efficacy, self-esteem, and create their level of outcome expectation towards exercise with the help of surrounding influences as the motivation to commit to regularly and continually exercise.

Thus, being interested by the impact of health education programme on health status of menopausal women and the usefulness of action research approach, the researcher decided to study the process of health promotion on menopausal women to help them realize the importance of exercise which is one important factor that could prepare them into menopausal period. The Transtheoretical Model by Prochaska & DiClemente (1983; 1984) was applied as the guidelines to study any changes in their exercise behavior following the ‘Stage of change’ concept, along with the Self-

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efficacy theory by Bandura (1997) which is used to stimulate their level of self-efficacy in exercise activity and also their knowledge, understanding, and confidence until they continue their exercise regularly. The outcome expectation from this new habit of exercise would be that menopause women who have long term maintenance of exercise behavior could maintain the balance status of their body, preventing them from disability and chronic illnesses, good impact on both physical and mental health, graceful personality, and living a quality life.

Research problem

Can the exercise behavior of menopausal women be changed and how?

Research questions

1. Does the health promotion program which was constructed based on Action research approach through the participation of target groups have any effects on the change of behavior in groups of menopausal women who are in the stage of pre-contemplation and contemplation?

2. Can the health promotion program which was constructed based on Action research approach through the participation of target groups persuade menopausal women who are in the stage of pre-contemplation and contemplation to regularly continue their exercise?

Objective of the study

General objective

To study the effect of the health promotion program on exercise behavior of menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province.

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Specific objectives

1. To evaluate the progress on knowledge, perceived self-efficacy, outcome expectation and exercise behavior of menopausal women who participate the health education program.

2. To study the effect of exercise on menopausal women's physical change as related to the following variables:-

2.1 Body mass index, Blood pressure and pulse rate at rest

2.2 Laboratory test for blood total cholesterol, serum Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL)

2.3 Physical performance of cardiorespiratory fitness, muscular strength and flexibility

Research Hypothesizes

1. The health education program would cause menopausal women to have good improvements on the following variables:-

1.1 Knowledge concerning exercise, perceived self-efficacy, outcome expectation of exercise and exercise behavior.

1.2 The effect of exercise improve the menopausal women physiological change in:-

1.2.1 Body mass index, Blood pressure and pulse rate at rest

1.2.2 Laboratory test for blood total cholesterol, serum Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL)

1.2.3 Physical performance of cardiorespiratory fitness, muscular strength and flexibility .

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Variables of the study

1. Independent variables: - The health education program.
2. Dependent variables:- the effect of the exercise program on menopausal women in the following aspects:-
   - 2.1 Knowledge concerning exercise
   - 2.2 Perceived self-efficacy on exercise
   - 2.3 Outcome expectation of exercise
   - 2.4 Exercise behavior.
   - 2.5 Body mass index, Blood pressure and pulse rate while resting
   - 2.6 Laboratory test for blood total cholesterol, serum Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL)
   - 2.7 Physical performance of cardiorespiratory fitness, muscular strength, flexibility

Definition of Terms used in the research

1. **Menopausal women**: women aged between 45 – 59 years old who have either regular or irregular menstrual cycle or has not had menstruation bleed for the past 3-11 months or are already in the menopausal stage for more than 1 year.

2. **Health education program**: exercise activities which are arranged in the form of Exercise training adapted from Self-efficacy Theory and the Transtheoretical Model in the attempts to classify the readiness for exercise and prepare the group which is still in contemplation stage into preparation stage before the implementation of the health education program. The objective of this program is to help menopausal women to realize the importance of self-care in the aspect of knowledge concerning exercise, perceived self-efficacy, outcome expectation and exercise behavior. The activities arranged included group meeting, participatory learning, video presentation about exercise, demonstration, skill training, persuasion by live model who regularly exercise and are in good shape and health, providing of exercise manual and self-recorded exercise note which would shows the change in weight, blood pressure and

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pulse rate at rest at the end of each week after the exercise, and also encouragement by the researcher. The main exercise activities in this research are fast pacing, jogging, and aerobic exercise.

3. **Exercise**: aerobic exercises which use fat as the source of energy and oxygen in the combustion process. It should be planned, structured and repetitive, with the goal of improving or maintaining at least one of the components of physical fitness, as follows:

3.1. Cardiovascular fitness is the test for endurance of cardiovascular system on the ability to carry oxygen to parts of the body. The higher amount of oxygen being utilized means higher endurance of the body and less tired

3.2. Muscular strength is the ability of a muscle or group of muscles to exert a force against a resistance and is usually measured by performing one maximal effect

3.3. Flexibility is the test on elasticity of joints and also the angle of movement

4. **Exercise indicators**: a group of indicators which are patterned to profit the health and strength of menopausal women. That includes:

4.1 Intensity of exercise refers to how hard are working during exercise (intensity of 40 – 80 % of individual maximum heart rate (MHR)

4.2 duration of exercise refers to the length of time a particular exercise is being performed (working up to 12 – 45 minutes per session)

4.3 Frequency of exercise defines how many time per week the exercise performed (a minimum of 3 days per week)

4.4 Type of the exercise, the main exercise activities in this research are fast pacing, jogging, and low impact aerobic

4.5 Progress of the exercise, which are divided into 3 stages:

Stage 1 Initial stage for a period of 4 – 6 weeks

Stage 2 Improvement stage for a period of 6 - 27 weeks

Stage 3 Maintenance stage for a period of more than 28 weeks

5. **Body mass index** (BMI) is used to assess weight in relative to height and is calculated by dividing body weight in kilograms by squared number of height in meters.

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$$\frac{\text{Body weight in kilograms}}{(\text{Height in meter})^2}$$

The people with larger index number would have higher risk towards many illnesses. The interpretation of body mass index number is as follows:

Underweight	BMI	< 18.5
Normal	BMI	18.5 – 24.9
Overweight	BMI	24.9 – 29.9
Obesity, class		
I	BMI	30.0 – 34.9
II	BMI	35.0 – 39.9
III	BMI	> 40.0

6. **Blood pressure at rest**: measurements for blood pressure are expressed as two figures: 120/80, for example. The larger number represents Systolic pressure while the lower is Diastolic pressure. The normal blood pressure of an adult is 130/90 mm Hg

6.1 Systolic blood pressure is the pressure generated as blood ejected from the heart during ventricular systole which has the average value between 80-140 mm Hg

6.2 Diastolic blood pressure is the arterial blood pressure decreases during ventricular relaxation which has the average value between 50-90 mm Hg

7. **Pulse rate at rest**: the number of heart beat per minute while the body is in resting conditions. Normally, the average pulse rate in untrained female is 70 –80 beat per minute (Department of Health Ministry of Public Health, 1997: 73)

8. **Knowledge of exercise** : capability of menopausal woman to remember content concerning exercise which, in this research, refer to the common knowledge about exercise, its benefits for the health of menopausal women, pulse rate and exercise, exercise precription, proper clothes, and injury prevention.

9. **Perceived self-efficacy on exercise** : perception of menopausal women about their ability in performing exercise for health.

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10. **Outcome expectancies of exercise** : expectation of menopausal women concerning the benefits of exercise to help maintaining their good health and prevent them from diseases.

11. **The Transthroretical model**: The basic premise that behavior change is a process, not an event, and that individuals are at varying levels of motivational readiness for change as described below:

11.1 **Pre-contemplation stage for exercise**: the stage in which menopausal women are not intending to exercise in a foreseeable future. People in this stage might not have enough information or courage to overcome any obstacles. They tend to realize only a small benefit of exercise activity. Time frame usually measured as the next 6 months.

11.2 **Contemplation stage for exercise**: the stage in which menopausal women begin to realize the importance of exercise and are intending to start within the next 6 months. People in this stage might still hesitate over the pros and cons of the exercise. They might already make up their mind but not plan to any specific date and details yet.

11.3 **Preparation stage for exercise**: the stage in which menopausal women are intending to exercise in the immediate future, usually measured as during the next month. In this stage, their intention is linked to the rules of exercise. They might have a clearer exercise behavior and evaluate its expenses and benefits but, anyway, hesitate about their own capability to exercise.

11.4 **Action stage for exercise**: the stage in which menopausal women have regularly exercised following the arranged exercise patterns for good health.

11.5 **Maintenance stage of exercise**: the stage in which menopausal women have exercised for 6 months or more. In this stage, exercise would no more be a difficult task because of their higher level of confidence in exercise.

11.6 **Termination**: the stage in which individuals have no longer be tempted by anything to stop their exercise and have 100% self-efficacy.

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Limitations of the research

Since the research conducted in actual situation, there are limitations on research as follow: -

1. In this research, research population variables can not be controlled on the following: work schedule, eating habit, hormonal replacement, interested in receive information. The researcher will gather the data as much as possible to explain the result of this research.

2. Since this research is a dissertation project, time and other resources are limited hence the length of implementation in this research might not be up to the highest international standard but it meet physical fitness norms of their population by Sports Authority of Thailand.

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CHAPTER 2
LITERATURE REVIEW

The review of related literature was organized in 4 major parts. Firstly, Self-efficacy Theory and the Transtheoretical Model. Secondly, Knowledge of the menopause . Then, exercise and exercise prescription in menopause . Lastly, action research.

1. The Self-efficacy Theory and the Transtheoretical Model
2. Menopausal
   2.1 Demography of the menopause.
   2.2. Menstrual cycle and Physiological changes after menopause.
   2.3. Menopause symptoms.
   2.4. Health changes after menopause and its management
3. Exercise and exercise prescription.
4. Action research

1. Social cognition Theory and Self-efficacyTheory

This session will begin with a summary of self-efficacy and the Transtheoretical Model. Self-efficacy theory applied to exercise training and the Transtheoretical Model in the attempts to classify the readiness for exercise and prepare the group which is still in contemplation stage into preparation stage before the implementation of the health education program. Bandura's social cognitive theory is a theoretical framework designed to examine human behavior as a reciprocal interaction between interpersonal factors, behavior, and the external environment (Bandura, 1977:191-215). One of the integral aspects in social cognitive theory is reciprocal determinism. Reciprocal determinism refers to the continual interaction among all three factors, interpersonal, behavioral, and external environmental factors. A change in one of the factors has implications for the others (Bandura, 1977:191-

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215). For example, in the domain of physical activity, self-efficacy (an interpersonal factor) may influence the adoption of habitual physical activity. In turn, continued success in maintaining physical activity may influence enhancement of self-efficacy.

In social cognitive theory, interactions between the person and the environment may influence behavior change (Bandura,1977:191-215). For example, a person participating in an exercise program may choose to live in close proximity to an exercise facility. While participating in the program, an individual is surrounded by people who provide encouragement to continue the program. In this case, there is an interaction with both the physical (location of the facility) and the social (others surrounding the individual) aspects of the external environment. On the other hand, the person can interact and shape the environment to produce a behavior change, for example, a person enrolled in a smoking cessation program may choose to avoid bars where people smoke to be in an environment that is conducive a smoking cessation.

Within social cognitive theory, there are several components that are thought to explain an individual's regulation and motivation in established social, cognitive, and behavioral skills. self-efficacy is one of the constructs within social cognitive theory that is based on the premise that people can self-regulate their own motivation and behavior. self-efficacy can be defined as the belief in one's ability to perform a specific task despite obstacles and aversive experiences. These belief are based upon the perception of what an individual can accomplish, regardless of the specific physical skills the individual may possess (Bandura, 1977:191-215).

self-efficacy beliefs influence motivation and cognition directed toward behavior. Specifically, self-efficacy beliefs determine an individual's level of motivation by influencing the choice of behavior, the amount of effort, and the persistence put forth in the face of aversive conditions (Bandura, 1977:191-215). In the exercise domain, the mode of activity is determined by the selection of either a challenging activity that requires skills or an activity that is unchallenging. Self-efficacy would influence the choice of the level of the activity. Effort can be measured in the domain of physical activity by assessing the rating of perceived

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exertion (RPE), heart rate, maximum VO_2, or the length of time in the activity. Motivation toward task performance differs between an individual with high self-efficacy and an individual with low self-efficacy. An individual with high self-efficacy tends to expend more effort, attempt more challenging tasks, and continue to persist to achieve the tasks, even in the face of obstacles (Bandura, 1977:191-215). For example, a person who has high exercise self-efficacy will be more likely to continue in an attempt to increase minutes of daily physical activity toward achieving 30 minutes per day, despite the inclement weather restricting outdoor activities. In contrast, a person possessing low self-efficacy may sporadically participate in physical activities only on days with pleasant weather.

Self-efficacy may influence the cognitive process (or thinking patterns) in human functioning. In daily life occurrences, people may anticipate threatening situations and how they will control their responses to the events. Those individuals with high self-efficacy will envision themselves to be successful in their attempt to achieve their goals. On the other hand, those who are inefficacious will envision themselves to fail and then will ruminate about the possible events that will lead them to failure (Bandura, 1977:191-215). One who is efficacious will envision oneself to be able to complete a I mile walk while one who is inefficacious will envision oneself to stop short of completing the one mile walk because of fatigue, leg cramps, and shortness of breath.

Bandura (1977:191-215) proposes that there are four sources of self-efficacy - past performance accomplishment, vicarious experience, verbal persuasion, and the interpretation of physiological state(or emotional arousal). Performance accomplishment is the strongest source of efficacy. This source of efficacy is based on past personal experiences or mastery of a skill. As people are exposed to and are successful at a task, they will have a heightened sense of efficacy for that task. However, repeated failures attempting a task can lower performance mastery. For example, a person with prior successful experience in participating in a walking program 5 years ago will be more efficacious participating today in a walking program than someone who has never exercised.

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Vicarious experiences are the second source of efficacy. This source is based upon seeing others successfully perform the task or activities (Bandura, 1977:191-215). Guidance provided by observation of others actions in an event can help people acquire the skills to become successful in completing the task (Bandura, 1977:191-215). It can be stated as "if he can do it, so can I". For example, if a sedentary individual observes someone else of similar age, race, and body type successfully walking one half of a mile, then the individual will be more efficacious in their ability to complete a one-half mile walk.

Verbal persuasion, the third source of efficacy, can influence self-efficacy when others suggest that the individual has the capabilities to successfully master a performance (Bandura, 1977:191-215). For example, the exercise leader's encouragement of continuing to increase exercise time and intensity will raise the participant's self-efficacy. Verbal encouragement will be source of efficacy only if the participant values the resource for guidance. Verbal persuasion becomes more powerful in enhancing efficacy if combined with another source of efficacy (Bandura, 1977:191-215).

Interpretation of one's physiological state when exposed to a situation can also influence self-efficacy (Bandura, 1977:191-215). Those who understand their physiological responses continue to pursue their goal. For example, an individual may evaluate the physiological changes to exercise (increased heart rate, slight shortness of breath, leg fatigue) as a normal response. This evaluation will allow one to be less alarmed when these responses persist, and to continue participation in exercise. On the other hand, an individual who evaluates the physiological response to exercise as abnormal will be alarmed and stop the exercise when one experiences shortness of breath.

There is an important distinction between efficacy and expectation that must be addressed. An outcome expectation can be defined as the person's estimate that a given behavior or performance will lead to a certain outcome (Bandura, 1977:191-215). An example of an outcome expectation is the statement "as a result of participation in a strength training program, I will be able to lift a 10 pound bag of

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sugar from the counter-top to the shelf". Another example of an outcome expectation is the statement "after exercising regularly three times per week for two months, I will lose weight". In contrast, an example of cognitive efficacy is the statement "I have confidence in my ability to successfully engage in a strength training program".

There are three categories of outcome expectations; physical, social, and evaluative, which may be positive (incentive) or negative (disincentive) in nature (Bandura, 1977:191-215). The physical form of an outcome expectation can represent either pleasure or pain. For example, as one engages in exercise programme, the individual may expect to have the physical outcome of feeling pleasure and enjoyment or pain, exertion, and fatigue. The social outcome expectation can be both approval and interest from others or social rejection (Bandura, 1997:21-23). For example, the social outcome expectation from participating in a exercise program may be expected approval from those in the social support network who value exercise (such as the exercise leaders), or the social rejection from other friends who do not value exercise. Self-evaluative outcome expectations can be positive, such as feelings of self-satisfaction, sense of pride and self-worth, or negative, such as feelings of self-devaluation (Bandua, 1997:21-23). The positive self-evaluative outcome may be in the form of satisfaction in the exercise regimen. In contrast, expecting dissatisfaction with one's progress in the program is a negative evaluative outcome. In summary, an outcome expectation is what an individual estimates would come out from a behavior, whereas self-efficacy refers to the belief that one has to successfully engage in that behavior.

In addition to its predictive ability, efficacy has also been shown to be an out come of both acute (Ewart et al., 1983; McAuley et al., 1991) and chronic bouts of exercise (Kaplan et al., 1984). In accordance with self-efficacy theory, past mastery experiences in exercise may influence perceptions of self-efficacy either positively through success or negatively through failure (Bandura, 1977, 1997). In a review of the studies where efficacy was examined as an outcome (influenced by exercise or physical activity), McAuley (1994) demonstrated that both acute and chronic effects of exercise influenced self-efficacy.

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McAuley et al. (1991) studied the effect of acute bouts of exercise on middle aged males and females. In this study, 82 males and females aged 45-64 years old completed a sub maximal bike test and an abdominal strength test. In addition to the physiological assessments, measures of self-efficacy specific for walking/jogging, sit-ups and bicycling were administered. For each task, efficacy was measured on a hierarchical scale ranging from a low level task to a high level task. The strength of efficacy was assessed on a 100 point scale. These efficacy measures were administered before and after acute bouts of exercise. Performance of the sub maximal bike test positively influenced bike efficacy ($p<.001$) and the abdominal strength test influenced sit-up efficacy ($p<.001$) in a positive direction. These significant changes occurred following an acute bout of exercise at both baseline and at end of program follow-up time points. Walk-jog efficacy also increased following the acute bout of exercise both at baseline and at follow-up ($p<.001$). The authors of the study propose that positive changes in walking-jog efficacy supports the concept of generality as posited by Bandure (1977) where efficacy can be increased in a similar task in which performance has been mastered (McAuley et al., 1991).

Furthermore, the authors found a significant gender difference in efficacy. Women started out with a lower exercise efficacy (for the bike, sit-up and walk-jog), but after the acute bout of exercise at follow-up, the women become more efficacious and their efficacy approached the efficacy level of the males. The authors suggest that males may have been more familiar with the exercise tasks and their past mastery experiences may have led to higher baseline efficacy as compared to the females (McAuley et al., 1991).

Measurement of Self-efficacy

Self efficacy should be measured in three dimensions of generality, strength, and level (Bandura, 1997:42-46). Generality refers to the extent that enhanced self-efficacy in performance of one task will lead to the mastery of another related task (Bandura, 1977:191-215). It is imperative to understand that self-efficacy is task specific and being efficacious in one domain does not necessarily result in being

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efficacious in another. For example, one who is efficacious in riding a bike may not be efficacious in playing tennis. In this example, the skills required to complete each task are different and do not parallel to each other. However, if the skills are similar, the individual is likely to experience generalizability. For example, one who is efficacious in ice skating may be efficacious in roller skating. The level of efficacy measurement represents one's beliefs in a capability to achieve a specific goal when the tasks are of varying degrees. The tasks are often measured on a hierarchical scale (Bandura, 1997: 42-46). One may have confidence in the ability to achieve simple tasks, but may not have the efficacy to accomplish a more challenging task. For example, one may feel confident in walking continuously for 10 minutes, but may not be efficacious in walking continuously for 20 minutes. The strength of an efficacy measurement assesses the degree (or certainty) to which one believes that they can achieve the task (Bandura, 1977:191-215).

The strength of an efficacy judgment can measured on a scale of 0 -100 in gradations of 10. A score on the scale represents one's confidence in achieving the task. A score of 10 represents one having little or almost no confidence in achieving the task and a rating of 100 represents one being completely confident in one's ability to achieve the task (Bandura, 1977:191-215). For example, one may rate the confidence as 100 (completely confident) in walking for 10 minutes, while another person may rate the confidence as 10 (little confidence) in walking for 10 minutes. The overall assessment of efficacy is measured by summing up the strength ratings for each item and then dividing by the number of levels for each task (Bandura, 1977:191-215; McAuley, 1992:107-127).

There have been several measures of efficacy used in prior exercise and physical activity research. In a recent review of the measurement of exercise related self-efficacy, McAuley and Mihalko (1998:107-127) have identified six categories of efficacy measurement. The measurement categories are exercise efficacy, barriers efficacy, disease specific/health behavior efficacy, general efficacy, and finally another category labeled "other" due to multiple diverse measures. Exercise efficacy, the most common type of efficacy measurement in this review of the literature, represents an individual's beliefs about capabilities to perform physical activity in increments of intensity and duration (McAuley &

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Mihalko, 1998:107-127). Barriers efficacy is a measurement specific to one's confidence to overcome environmental (e.g. weather, location of facility), social (e.g. other people demanding time) and personal (e.g. personal stress, boredom with activity) barriers. Disease specific/health behavior efficacy is a measurement of efficacy for those involved in secondary prevention, most often in the rehabilitation phase (McAuley & Mihalko, 1998:107-127). For example, self-efficacy measures in the diabetic population were related to their adherence to a treatment regimen (Kavanaugh. Gooley, & Wilson, 1993:509-522). In some studies, a general measure of efficacy was employed. A general measure is representative of a broad overall construct and opposes Bandura's guidelines for measurement specific to the task (Bandura, 1977:191-215). Therefore, it is not surprising that general measures often show little relationship with the desired behavior. McAuley and Mihalko (1998:107-127) also identified several studies that examined varying measurement constructs that were included in the "other" category since they did not fall within the preceding categories.

The measurement of efficacy has several implications for research studies. First, self-efficacy should be measured at significant junctures during the behavior change process. A non-significant relationship between efficacy and behavior change may result if efficacy was measured at a single time point during the intervention period. Thus, there should be multiple measures throughout the intervention including at presetting, at several time points during the intervention, at the completion of the intervention, before and after a post-test, and during follow-up periods after the intervention has ceased. In addition, the use of a barriers efficacy scale in conjunction with an exercise efficacy measure should be considered in behavior research specific to physical activity of exercise. Items used on a barriers efficacy scale should be specific to the population under study (McAuley & Mihalko, 1998:107-127). For example, a middle-aged female may have time constraints to exercise because of her multiple roles, taking care of grandchildren, working part-time, and having the household responsibilities. Some of these barriers to exercise for females may not be pertinent to a middle-aged male. Along with measuring barriers specific to the population being studies, the frequency and the severity of the barriers should also be measured (McAuley &

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Mihalko, 1998:107-127). Although barriers may occur daily, they may not hinder one's attempt to exercise. In contrast, a barrier that occurs infrequently (severe rainy weather) may hinder one's attempt to exercise.

Self-Efficacy and health

Self-Efficacy has been employed in the study of a variety of health related behaviors and has provided a good theoretical base when examining personal change. For example self-efficacy may influence one's choice of a behavior and initiation of change (Bandura, 1997; O'Leary, 1985:437-451). In the change process, self-efficacy can also affect one's motivation, perseverance, and maintenance of the health behavior (Bandura, 1977, 1977). In addition, the self-efficacy approach views behavior, cognition, and the environment as interacting determinants of one another to explain how people acquire and maintain their behavior pattern (Bandura, 1977, 1997).

Self-efficacy has been shown to be a predictor of adoption and adherence to health behaviors in a variety of settings across multiple populations. In healthy adults, self-efficacy has been demonstrated to be manage of diabetes through adherence to diet and exercise (Kavanaugh et al.,1993: 509-522), and the treatment of high blood pressure through relaxation (Hoelscher. Et al., 1986:217-221). Particularly relevant to the exercise domain, self-efficacy has been tested as a predictor of peak treadmill heart rate in post myocardial infarction patients (Ewart. Et al., 1983:1076-1080)as well as a predictor of adherence to exercise prescription following percutaneous transluminal coronary angioplasty (Jensen. Et al., 1993:926-931)

Self-efficacy and Exercise

Self-efficacy theory has been employed in the examination of exercise and physical activity determinants. Specifically, Dishman (1991) has identified the three categories of determinants in exercise behavior as environmental, personal and programmatic factors. Environmental factors, often barriers to participation, may include weather facilities, and time management. Personal factors may include a wider variety of factors such as socioeconomic status (income, education

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and ethnicity), biological make-up (insulin intolerance and obesity), and habits (including previous exercise experience). The programmatic factors revolve around the actual program and include the participant's pain or discomfort level, or the type of activity in which one is participating. Social cognitive theory, specifically self-efficacy theory, is based upon the fontanel interaction between the environment, person, and behavior (Bandura, 1977). Since exercise is a complex behavior with multiple determinants that may interact (Dishman, 1991), it appears that social cognitive theory is an appropriate framework to guide the study of physical activity behavior (Bandura, 1997; McAuley, 1992).

As previously detailer, reciprocal determinism represents a continual interaction between the person, environment, and behavior (Bandura, 1977). Self-efficacy cognition changes with the environment and are specific to the behavior. Therefore, a mastery experience in physical activity or exercise may help form efficacy beliefs for continuing the activity. In turn, efficacy beliefs may influence exercise behavior, interpretation of physiological responses, and personal affect. In the Natural History of Exercise, according to Sallis and Hovell (1990), exercise is a behavior that is on a continuum of change involving transitions between sedentary activities, adoption of exercise, maintenance of exercise, and dropping out of exercise participation which may then lead to resumption of the activity of becoming sedentary. In this context, exercise is viewed as a continual process where there are no discrete stages or phases of behavior. Exercise or physical activities vary in degree of difficulty along the exercise continuum. As McAuley and colleagues (1993) have demonstrated, Self-efficacy becomes a stronger predictor of exercise when the tasks are more demanding, such as during the adoption of exercise or when a participant need to overcome barriers in order to continue to exercise.

On the other hand, self-efficacy may help to explain exercise adoption and adherence along a continuum of change. For example, in a sedentary population, people with low exercise self-efficacy should have a tailored program designed to increase their beliefs in successfully achieving a pattern of regular exercise. Such a program may include starting with small steps observing others successfully perform the exercise, obtaining verbal feedback and persuasion, and

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providing people information pertaining to the physiological responses to exercise. This type of intervention program includes the four sources of efficacy information: mastery accomplishments, vicarious experience, verbal persuasion and physiological affect (Bandura, 1977). Those with higher self-efficacy may only need general information and guidance to initialize a program.

In continuing the exercise program, self-efficacy can represent one's beliefs in their self-control to continue to exercise in the presence of personal, social, and environmental barriers (Bandura, 1997). At this point in the exercise process, Self-efficacy refers to how one is motivated to habitually use what was learned to accomplish the physical task (Bandura, 1997). After adopting the activity, there is a decrease in the challenge of the activity and it becomes part of the daily routine. The magnitude of the relationship between self-efficacy and exercise adherence decreases as one adapts to the demands of the activity (Bandura, 1997; McAuley, 1992). However, when faced with barriers, one's self-efficacy takes on an important role in predicting exercise participation.

Self-efficacy has been examined in a variety of exercise settings. Specifically, it has been studied as a predictor in acute or single bouts of exercise such as a chronic exercise or in an exercise intervention (Garcia & King, 1991; McAuley & Jacobson, 1991; McAuley, 1993; Sallis, Haskell, Fortman, Vranizan, Taylor, & Solomon. 1986). Self-efficacy has also been studies as an outcome of an acute bout of physical activity (Ewart. et al., 1983; McAuley. et al., 1991; McAuley. et al,. 1993) and of chronic exercise (Kaplan. Et al., 1984; McAuley et al., 1991). Self-efficacy has also been demonstrated to predict exercise behavior during chronic exercise in epidemiological studies (Sallis et al., 1986) and in intervention studies (McAuley, 1993; Garcia and King, 1991; Ewart et. Al.1986). In a large scale epidemiological study, Sallis and his colleagues (1986) interviewed 1,411 men and women aged 20-74 years to assess their physical activity habits. The Stanford Community Health Survey was a survey study of baseline measures with a one year follow-up period in randomly selected participants from California (Sallis et all, 1986). Participants were asked to define their usual activity status. Moderate activity was defined as taking stairs instead of using an elevator, walking instead of driving a short distance, walking during lunch hour or after dinner, or getting off the bus stop further away from

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destination. Vigorous activity was defined as swimming 2 miles per week, jogging at least 10 miles per week, playing strenuous racquet sports, or riding a bike at least 50 miles per week. Self-efficacy was measured by a four-item assessment of the participant's confidence in participating in "moderate activity for 20 minutes at least 3 times per week", "moderate activity for 20 minutes daily", "vigorous activity for 20 minutes 3 times per week", and "vigorous activity for 20 minutes daily". In addition, measures of self-control and activity attitudes were administered. The results from the assessment of the one year follow-up showed that self-efficacy predicted adoption and maintenance of activity. The adoption of vigorous activity was predicted by age, male gender, and self-efficacy specific to vigorous activity was predicted by age, male gender, and self-efficacy specific to vigorous activity. However, the maintenance of these vigorous activities was predicted only by the attitudes towards physical activity. The adoption of moderate activity was predicted by health knowledge, and maintenance of moderate physical activity was predicted by specific exercise knowledge, female gender , and self-efficacy specific to moderate activity. The self-efficacy items were specific in their prediction of activity levels in that self-efficacy measures specific for moderate physical activity predicted moderate level activity (Sallis et al., 1986). These results support the percepts put forth by Bandura that self-efficacy will be a significant predictor in challenging tasks and as people adapt to the demand of the activity, the size of the relationship between efficacy and physical activity will decrease (Bandura, 1997). In adoption of physical activity, the demand of a new habit forces people to rely more on their efficacy beliefs. However, in maintenance, the exercise becomes part of the daily routine and the need to rely on efficacy beliefs declines.

In another intervention study, 58 females (M age = 39 years) participated in an eight week exercise class that met twice per week for one hour (McAuley & Jacobson. 1991). Several measures of efficacy were administered. Prior to the start of the program, a barrier-specific exercise self-efficacy measure was completed. The items on this questionnaire formed two sub-scales relating to barriers, a lack of progress and external commitments. After completion of the program, confidence in continuing the exercise program during the next eight weeks was assessed. An overall attendance measure was constructed from attendance records and logs. Regression analyses were

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completed to examine the predictors of attendance, the instructor was the only significant predictor of attendance (R2 =.116, p<.01). However, self-efficacy approached significance (R2 = .093, p<.06). In this study, researchers examined the prediction of total exercise participation (included class attendance plus any additional exercise participation out of class). Baseline self-efficacy was the only significant predictor of total exercise participation (R2+.125, p<.05; McAuley & Jacobson, 1991).

One of the most striking findings within the exercise domain has been the documented relationship between self-efficacy and survival in a study of 119 male and female chronic obstructive pulmonary disease patients (M age = 64.8 years, SD = 7.9). A measure of self- efficacy expectation for walking had statement about one's confidence in walking specific distances within a specific time interval. Kaplan et al. (1994) reported that walking efficacy was a significant unvaried predictor of five years survival. These findings suggest that self-reports of efficacy may be important in predicting survival in this diseased population (Kaplan et al., 1994).

Self-efficacy as a Predictor of Exercise Behavior

Self-efficacy has been tested as a determinant of acute exercise as well as in the adoption and maintenance of chronic exercise. In acute bouts of exercise, pretest efficacy has been shown to be a predictor of performance (Rejeski, et al., 1996; Ewart et al., 1986). In a study of 79 subjects (70% female) with osteoarthritis of the knee, Rejeski et al., (1996) examined the relationship between self-efficacy beliefs and pain during stair climbing and lifting activities. Prior to the physical testing, the subjects' self-efficacy for each task was evaluated. The self-efficacy measures were task specific hierarchical scales for the treadmill test, knee and strength test, stair climbing, and lifting measures. Analyses revealed that self-efficacy was a significant predictor of stair climbing.

In another study, efficacy change over time was an outcome of the treadmill testing (Ewart et al., 1983). The sample was split into two groups, high and low self-efficacy groups, based on the mean efficacy baseline score. In the group with low self-efficacy prior to the test, there was a significant increase in the self-efficacy for running (p<.005) after completing the treadmill test. The increase was significant in the subjects who successfully completed the stress test

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at a high intensity. If a low self-efficacy subject had a low intensity test, the self-efficacy level of the subject did not change significantly over the course of the treadmill test. There was a similar result in the group with high initial self-efficacy in that those subjects with high self-efficacy scores prior to the test who had a successful performance at a high intensity, showed and increase in their self-efficacy over time. In addition, the counseling session enhanced self-efficacy particularly for those tasks not specific to the treadmill test (Ewart et al., 1983).

In this same study, Ewart et al. (1983) also demonstrated that pre-test efficacy was related to performance as measured by the effort exerted during the treadmill test. There was a significant correlation between pre-test self-efficacy and level of exertion as measured by maximum treadmill heart rate (r=.36, no significance level was reported) (Ewart et al., 1983). In this study of a small sample of male cardiac patients, efficacy predicted the amount of effort exerted in a single bout of activity.

Self-efficacy was also studied as a predictor of adherence four months after the end of the exercise program (McAuley, 1993). In this follow-up study, 82 of the subjects were contacted to participate in a telephone interview. Overall exercise behavior was measured as the frequency, duration, and regularity of exercise. The results demonstrated that exercise self-efficacy (measured at the end of the five month intervention) explained 13% of the variance in overall exercise behavior measured at the four month follow-up even when controlling for previous exercise experience and aerobic capacity.

In a further examination of this population, efficacy was examined as a predictor of exercise maintenance nine months following the intervention (McAuley et al., 1993). In this study, exercise maintenance was assessed by the frequency, duration, and regularity of the behavior. Twenty-four percent of the variance in exercise behavior at follow-up was predicted by the combination of maximum oxygen uptake, percent body fat, program attendance, and self-efficacy. Self-efficacy was also a unique predictor accounting for 11% of the variance in exercise maintenance. Self-efficacy was a significant predictor of compliance with the exercise Prescription. In this study, compliance was defined as the degree to which participants followed

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specific instruction or prescriptions given to them by qualified individuals (Meichenbaum & Turk, 1987)

Critique and Suggestions for Use

Because the social cognitive theory is very complex and includes the notion of a dynamic interaction among the person, the environment, and behavior, it is not possible to test the theory as a whole in a single study. For this reason that researchers choose other, simpler models to use in developing and testing health behavior interventions, often adding the construct of self-efficacy as a mediator between The Transtheoretical model constructs and behavior. Indeed, the most widely tested component of this theory is the construct of perceived self-efficacy and the extent to which it influences behavior has been well documented. The concept of outcome expectations also has been included in a number of other behavioral theories, including those addressing health behavior, often under different labels, such as pros and cons of behavior change (The Transtheoretical model of change), and perceived benefits from the health behavior. The construct of outcome expectations also has empirical support in health behavior literature. Incentive motivators also are well studied, perhaps more so outside the realm of health behavior, and studies of their role in motivating health behavior change are less prominent than studies of the other determinants.

2. The Transtheoretical model of change

The Transthroretical model of change (Prochaska & Diclemente, 1983 : 390 - 395) evolved from research with smoking creation and psychotherapy and more recently has been applied to a broad range of health behaviors . The basic premise of The Transthroretical model is that behavior change is a process, not an event, and that individuals are at varying levels of motivational readiness for change. Individual at different points on the continuum of change can benefit from different intervention strategies that are matched as the individual progressing through five “stages of change”.

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Precontemplation (Not Ready for change)

Precontemplation describes the stage in which a person is not considering change in the foreseeable future, usually defined as some time within the next 6 months. Individuals in the precontemplation stage may be uninformed or underinformed about the consequences of their behavior, demoralized about their ability to change, or simply resistant to change. In the precontemplation stage, individuals tend to underestimate the positive aspects of change and overestimate the negative aspects (i.e., pros and cons). In exercise, this stage indicates that one is not engaging in exercise and is not interested in doing so in the near future.

Contemplation (Thinking about change)

Contemplation is the stage in which individuals are seriously thinking about change. They realize that their behavior may be a problem and they are better informed and more open to feedback about their behavior. In the contemplation stage, people are more aware of the advantages of making a health behavior change, but they still overestimate the disadvantages. In other words, individuals in the contemplation stage are ambivalent about change; part of them wants to change while other does not. This indecision, in conjunction with a lack of commitment to change, is the most distinctive characteristic of the contemplation stage. In exercise, this stage indicates that one is not engaging in activity (or is irregular active) but is interested in becoming in one active.

Preparation (ready to change)

Preparation is the stage that combines intent in with a behavioral criterion. Individuals in the preparation stage are intending to take action in the near future, usually within the next 30 days, and have taken some behavioral steps toward modifying the specific behavior. The balance between the costs and benefits of engaging in the new healthy behavior has tipped to the positive side, but individuals still may have some doubts about their ability to engage consistently in the new behavior. Decision making and commitment are the most distinctive characteristics of the preparation stage. In exercise, this stage indicates that one is making small change in physical activity or exercise.

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Action (Initiating change)

Action is the stage in which a person is overtly engaged in the new behavior. To reach the action stage, strict criteria, which vary depending on the behavior, must be met. For example, with one who is beginning a new activity program, this stage was separated into 0 to 3 month early action and 3 to 6 month later action period. No differences were found between early and late action in terms of the frequency of use of change processes used to quit smoking. Therefore, the 0 to 6 month period has been used to define the action stage, which is the busiest period of change.

Maintenance (Continuing change)

Maintenance is the stage reached after 6 months of sustained action. In the maintenance stage, people do not have to work as hard as they did in the action stage because temptation to engage in the unhealthy behavior is decreasing and confidence in engaging in the new healthy behavior is increasing. Stabilizing behavior change and avoiding relapse are the hallmarks of the maintenance stage. In other words, maintenance is a continuation, not an absence, of change (Prochaska & Diclemente, 1983: 390 -395). In exercise, this stage indicates that one has been regularly active for more than 6 months.

The progressive stages are considered dynamic, yet relatively stable, and reflex reflect the varying degrees of readiness experienced by individuals engaging in a behavior. Movement through these stages can occur in a linear or cyclic pattern (Marcus & Simkin, 1994: 83-88). Progression through these stages occurs at varying rates with some individuals remaining focus at a certain stages, others progressing through stages rather quickly, and others relapsing into earlier stages. Another important aspect is the consideration of both behavior and Process of Change.

Progression through stages is related to processes change. These processes, experimental (cognitive) and behavioral, are strategies that individual utilize to successfully modify behavior (DiClemente et al., 1991: 295-304; Prochaska, et al. 1988: 520-528). These processes are in nature. Therefore, experimental processes are more important than behavioral processes for understanding and predicting progress in the earlier stages, precontemplation and contemplation. Whereas behavioral process are more indicative of the later stages, action and maintenance (DiClemente, et al.

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1991:295-304) The significance of these processes that programs accommodating need of difference stages by focusing on the appropriate may be more apt to increase adoption and maintenance of exercise behavior. (Marcus, et al. 1992: 386 -395)

The construct of decisional balance represents the cognitive and motivational aspects that individuals consider about changing their behavior. Simply stated, individuals tend to weigh the subjective benefits (pros) against the costs (cons) involved with modifying an unhealthy behavior or adopting a new healthy behavior. Research based on the Transtheoretical Model has shown that a positive decisional balance (i.e., pros outweigh cons) is a good predictor of successful change with a broad range of health behaviors.

The pattern of the pros and cons across the stages of change is revealing. The cons of changing always outweigh the pros for individuals in the precontemplation stage; the opposite is true for those in the action and maintenance stages, with the pros always outweighing the cons. The crossover in relative importance of the pros and cons always takes place before an individual takes action.

These findings with the pros and cons point out that the construct of decisional alliance is relevant for understanding and predicting transition between the earlier stages of precontemplation, contemplation and preparation. During the later stages action and maintenance, however, decisional balance is less important as a predictor of progress.

Within the framework of The Transtheoretical model, the construct of self-efficacy represents an integration of the model of self-efficacy proposed by Bandura (1997, 1986). Like the construct of decisional balance, self-efficacy has been integrated into The Transtheoretical model as one of the critical constructs for assessing intermediate outcome and predicting future success (DiClemente, et al. 1985; Velicer, et al. 1990).

The Transtheoretical model has developed measures that operationalize self-efficacy in two ways: (1) confidence, which represents the level of confidence individuals have to engage in a particular behavior across specific situations; and (2) temptation, which represents individuals' reports of how tempted they would be not to engage in the target behavior in these same situations.

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Across the stages of change, self-efficacy scores increase almost linearly from precontemplation to maintenance. More specifically, in the precontemplation stage, self-efficacy scores are the lowest; while in the action and maintenance stages, self-efficacy scores are the highest.

The Transtheoretical model and health behavior

The Transtheoretical model has been extensively applied to the measurement of a broad range of health behaviors such as smoking cessation, exercise, low-fat diet adoption, sun exposure, mammography screening, alcohol and other substance abuse, safer sex, physicians practicing preventive medicine (Prochaska ,et al. 1994).

Critique and Suggestions for Use

One of the major limitations of the transtheoretical model is that the 'stages of change' construct is based on individual intention and behavior. The other reason in stage theories, people are placed into discrete stages during the change process (Marcus, et al., 1992). Since exercise is a continual process having many determinants and multiple interactions, it appears inappropriate to use stage theories in application to exercise. In his recent review, Bandura states, "Stage theories lead one into a thicket of problems. Human functioning is too multi-faceted and multidetermined to be categorized into a few discrete stages. People do not fit neatly into fixed stages". (Bandura, 1997: 412) Specifically, Bandura believes that behavior along with the exercise continuum cannot be placed into stages as he states, "In the Stages of Change theory for exercise, the notion of stage is stripped of its meaning because the stages differ in gradation rather than type of stage. The problem occurs when a behavior that is on a continuum is arbitrarily dichotomized" (Bandura, 1997: 413)Many researchers and practitioners in the field are beginning to recognize that a "one-size-fit-all" intervention approach may not be appropriate for all individuals engaging in unhealthy behaviors. Change agents are shifting the focus of their efforts toward identifying the "best fit" between an individual's characteristics and intervention strategies. The transtheoretical model of change offers promise for this endeavor by matching behavioral interventions to where a person may be in the process of change. There also are other factors that could form the basis of an intervention that is

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matched to an individual, such as their perceived susceptibility, perceived self-efficacy, and knowledge about behavioral consequences. Such matching could be even more effective and potentially cost-effective in changing unhealthy behaviors.

In this research The transtheoretical model in the attempts to classify the readiness for exercise and prepare the group which is still in contemplation stage into preparation stage before the implementation of the health education program.

3. Menopausal

The menopause is the time of a woman's life when her reproductive capacity stops. The ovaries cease functioning and they produce fewer hormones. The body undergoes a variety of changes both because the ovaries stop functioning and because of aging. The menopause is sometimes marked by unpleasant symptoms but even though some may be disabling, none is life threatening.

The changes in hormone production affect various part of the body, most notably the bones, cardiovascular system, urogenital system, and autonomic nervous system. This usually happens between the ages of 45 and 60, but it can happen earlier. Menopause can also occur when the ovaries are surgically removed or stop functioning for any other reasons.

3.1. Demographic of the menopause

For most women, natural menopausal takes place between the age of 45 and 55. In Thailand the average age takes place between 45-59 years old. As life expectancy increase, therefore, more women spend a larger proportion of their lives in the post-menopausal state. In 1990, some 467 million women around the world were in the age bracket of 50 or over, and this is expected to be1, 200 million by the year 2030. In Thailand, 3.8 million of these groups were in the age bracket of 45-59 year old. (Vallop,T. 2001: 7) Growing numbers of these women can expect to live for several decades after the menopause.

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In 1990, 40% of menopausal women lived in the world's industrialized regions while 60% lived in developing countries. By 2030, however, although overall numbers will have increased, the proportion of post-menopausal women living in the industrialized regions will have declined to 24% and 76% will be living in developing countries.

3.2 Menstrual cycles and Physiological changes after menopausal

The menstrual cycle is controlled by a sequence of hormones, which are produced in the hypothalamus, the pituitary gland, and the ovaries. When the level of one hormone rises, the levels of other hormones decrease. This relationship is known as a negative feedback mechanism.

At the beginning of the cycle, small quantities of estrogen are produced by ripening egg follicles within the ovary. Estrogen production gradually increases until it peaks just prior to ovulation, roughly 14 days before the first day of the next period. After the release of an egg in to the Fallopian tube, the follicle changes into a structure called a corpus luteum, which secretes progesterone.

At the end of the cycle, there is a small surge of estrogen that falls away with the progesterone levels just prior to menstruation. This hormone drop causes the uterus to shed it lining.

Estrogen makes the lining of the uterus thick, and progesterone then encourages growth of blood vessels and gland so that the uterus is prepared to receive a fertilized ovum. Menstruation gets rid of the old uterine lining when fertilization does not occur, and it prepares the uterus for the beginning of a new cycle in case fertilization occurs the next month.

Menstruation is just on event in the monthly hormonal cycle. There are many effects on other organs in the body that are just as important and under the control of the hypothalamus, often described as the conductor of our hormonal orchestra. As women become menopausal, menstrual cycle is likely to change reflecting the major upheavals in hormone secretion in your body. Estrogen levels in the first two weeks of cycle get lower and lower- this is because fewer egg follicles are stimulated to grow. In addition, ovulation becomes less likely since the supply of

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eggs in running out. If ovulation does occur, conception is less likely, since the quality of the eggs released is more likely to be substandard.

Without ovulation, there is no corpus luteum to produce progesterone. As a consequence, estrogen stimulates the growth of the uterine lining in the first half of the month, which becomes unopposed by progesterone in the second half. Without progesterone the endometrium become thicker and thicker, and the result can be heavy bleeding.

Throughout the reproductive life span, women's menstrual cycles vary in both regularity and lengths. They also vary between individuals and culture groups. From the age of about 35 the menstrual cycle becomes less consistent, and in the late 30s a woman may not ovulate in every menstrual cycle. Without eggs, estrogen and progesterone are not secreted, and the symptoms of the menopause begin to appear. When estrogen levels fall too low to stimulate the uterine lining, menstruation ceases.

With the decline of estrogen and progesterone, the negative feedback mechanism, involving the hypothalamus and pituitary gland, results in larger and larger quantities of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) being secreted. The ovary cannot respond consistently despite the high hormone levels. Women may experience normal menstrual of FSH and LH alone can disturb many aspects of a woman's metabolism, including brain chemistry, mood, thyroid function, bone integrity, lipid metabolism, and blood sugar levels.

Women have two major estrogens and a breakdown product estrone. During the normal menstrual cycle, estrogen is the major hormone and it is synthesized by the developing follicle in the ovary. After the menopause, estrone takes over as the major estrogen, but rather it is being produced in the ovaries. It is made by a secondary process in fat cells and muscles. Estrogen is synthesized from the male sex hormone androstenedione, which continues to be secreted by the postmenopausal ovaries and the adrenal glands. Because estrogen is not produced cyclically after the menopause, the rate of its formation does not fluctuate in the way that it did premenopausally. Estrone is also biologically much less active than estradiol, and this can manifest itself as a relative excess of male hormones. This means that our all hormones profile begins to move nearer to that of men. The most visible signs of this shift are the appearance of the facial hair, male - pattern baldness,

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and the tendency to put on weight around the waist and the abdomen (in the premenopausal years, fat is laid down the hips rather than the waist) However, the most dangerous change is one that invisible: cardiovasicular health deteriorates, bringing the rate of female heart disease into line with the rate of male heart disease.

Physiological changes after menopausal

The physiological changes of the body after menopausal period might some great impacts over the life of menopausal women. Learning and understanding about these changes can help – them to live their life happier. The noticeable changes can be concluded as follows:

Connective tissue

After the menopause the body loses collagen, and connective tissue becomes weaker. Bones and skin, which also contain collagen, become thinner and less resistant to trauma.

Muscles and joints

With advancing age and a decline in estrogen and progesterone production, the muscular system loses its strength, bulk, and stamina. With deficient collagen synthesis at the time of the menopause, joints may become stiff and painful, particularly on walking.

Bones and Calcium metabolism

Insufficient estrogen in a woman's body during and after the menopause means that calcium is lost from the body, making bones weaker and prone to osteoporosis.

Vasomotor system

This is the system of tiny blood vessels under the skin. Dilation occurs when blood vessels relax and fill with blood, and constriction occurs when blood vessels narrow and empty. Hot flushes and night sweats result from aberrations in the way that the vasomotor system works. Both are harmless, but women often find them uncomfortable and distressing.

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Heart and blood vessels

The exact effect the menopause has on the heart and blood vessels is not fully understood. What is known is that, irrespective of age, women with functioning ovaries are less prone to heart disease than women who have gone through the menopause either naturally or after surgical removal of the ovaries. Each year over one million postmenopausal women experience a malfunction of the cardiovascular system. The heart may not pump adequately, the blood vessels may tear and form scar tissue, or dangerous fats traveling in the blood may clog and narrow the arteries – all of these affect blood circulation and deteriorate the pumping capacity of the heart, which can be fatal.

Cholesterol levels normally increase in women as they grow older. However, the levels increase at an even faster rate in women who have had their ovaries removed. Loss of ovarian function leads to an increase in the dangerous low-density cholesterol (LDL), and a reduction in the cardioprotective high-density cholesterol (HDL). These changes lead to heart disease. Recently, estrogen receptors have been found in the muscle layer of arteries. Loss of estrogen causes the muscles to tighten, which constricts the blood vessels and increases blood pressure.

Temperature-regulating mechanism

Keeping the body at a regular temperature is a complex process, but one of the body's most efficient cooling mechanisms is the production of sweat. At the menopause, the sweat glands seem to work less effectively than before because lack of estrogen changes the way in which they're programmed. Not only do the sweat glands not cool the body as efficiently as before, but there also appears to be a change in brain chemistry that affects the temperature control center in the hypothalamus. The temperature set-point for the body core is lower than normal and this triggers a dilation of blood vessels in the skin and sweating as the body attempts to reset its thermostat. These adjustments are never smooth and, often, the body overcompensates, which may be one reason why women have hot flushes.

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Fat distribution and Carbohydrate metabolism

Women who are approaching the menopause may not be secreting progesterone in the second half of the menstrual cycle. This changes their tolerance to sugar and raises the level of the baseline at which they suffer symptoms of low blood sugar. As a result, the blood sugar level does not have so far to fall before the effects of hunger are felt. Women, who could go for five or even six hours without food during most of their fertile life, find that fasting for the same length of time once they become menopausal can lead to acute cravings, particularly for carbohydrates. This can result in frequent bingeing and possible weight gain.

Brain control of emotions and behavior

New research into the effects of estrogen on receptors in the brain is very revealing and provides great insight into intellectual and emotional changes in menopausal women. The hippocampus oversees a complex system of information storage. Even during the menstrual cycle, its ability to store data changes noticeably. Estrogen controls cognitive functions, such as conceptual thinking and perceptions, and qualities such as possessing a flexible attitude to change. During the menopause these functions and qualities may become impaired.

Brain control of muscles, joints, and movement

The cerebellum controls balance and coordination, and recent research has shown that taking estrogen can bring about a threefold increase in cerebellar function within three minutes, which is not reversible within nine hours. All kinds of muscular activities are improved by estrogen stimulation, including manual dexterity. Without estrogen our abilities to perform intricate movements, such as playing the violin or guitar may be impaired.

3.3. Menopausal symptoms

A wide range of symptoms have been attributed to the menopause. However, it has been difficult to distinguish between symptoms that result from loss of ovarian function and those from the aging process or form the socio-environment stresses of mid-life years. The most common are as follow:-

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Hot flushes and night sweat

Hot flushes occur because the brain decides that the body is overheated. We now know that this is because the natural temperature set-point (above which the brain considers the body is too hot, and below which the brain considers the body too cold) becomes lowered. This means that even under normal conditions, the brain may think that the body's temperature is too high, and respond by increasing the blood flow through the skin. The heated skin reddens and begins to perspire. When the sweat starts to evaporate the body temperature cools down again.

Even though a hot flush may feel most severe in the head, face, and neck; the rise in temperature occurs throughout the body. Even the finger and toe, temperatures rise sharply at the beginning of a flush.

The night-time equivalent of the hot flush is the night sweat, in which the menopause wakes up hot and drenched in perspiration. Hot flushes and night sweats often cause insomnia and a reduction in rapid eye movement (dream) sleep so that sleep is not as refreshing, contributing to fatigue.

The prevalence of hot flushes associated with the menopause varies in different culture. A high intake of dietary phytoestrogens (estrogen-life compounds found in plants) has been suggested as a possible explanation of the lower frequency of menopausal symptoms in Japanese as compared with Caucasian women.

Muscle and joint symptoms

Collagen is a protein that provides the scaffolding for every tissue in the body, and when it begins to disintegrate at the menopause, muscles loss their bulk, strength, and coordination and joints become stiff. Muscles become more prone to soreness and stiffness after exercise, and joints may swell so that their mobility becomes restricted. If you retain fluid, you may get pins and needles or numbness in the hands. These are symptoms of carpal tunnel syndrome caused by tissues bloated with water pressing on the new to the hand and the fingers.

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Premenstrual symptoms (PMS)

The symptoms of PMS usually include fatigue, anxiety, irritability, tearfulness, breast soreness, water retention, skin problems such as mild acne, sugar cravings and insomnia. If the women suspect that their mood swings are PMS-related, you can confirm this by charting your menstrual cycle for three months and recording your symptoms on day- to-day basis.

Self-help

- Avoid sugar carvings by eating several small meals a day.
- Eat less salt as it increases water retention and bloating.
- Avoid alcohol and caffeine because they aggravate many of the emotional symptoms of PMS.
- Make sure you are getting enough calcium, magnesium, vitamin B6, and vitamin E, as these may reduce emotional symptoms.
- Get plenty of exercise; it's a great mood-lifter and help women to work off tension and anxiety.

Skin, Hair, Eye, mouth, and Nail symptoms

The lower estrogen level that occur at the menopause cause changes in the skin, hair, nails, eyes, mouth and gums. These changes are in part due to disintegration of collagen fibers and the weakening of the protein, elastin, which gives connective tissue strength and suppleness. Lack of collagen leads to decrease in skin thickness and suppleness, dry hair, brittle nails, sore eyes, mouth dryness, gum shrinkage and an increase in joint stiffness. One of the most noticeable changes is the appearance of wrinkles in the facial skin. The reduction in blood flow in the skin and the subcutaneous tissue contributes to loss of the skin firmness as does shrinkage of underlying muscles. Deterioration of nerves ending in the aging skin can lead to itchiness and a condition called fornication. This is an intense tingling that some women describe as a feeling that insects are crawling across their skin.

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Weight gain

The weight that they may gain at the menopause is due to a slower metabolism- something that affects the women as they grow older- and decline in estrogen levels, the way that fat is distributed. If your weight is posing a threat like other symptoms of the menopause, there are a number of things they can do to prevent these changes from affecting their life. Increase your intake of healthy carbohydrates, such as oats (porridge), thick homemade vegetable soup, and whole grains. All of these should quell cravings if eaten two or three times a day and they are not so fattening as sugary foods. You could also try eating small amounts of food at frequent intervals instead of three meals a day.

Body shape and Heart Disease

Before the menopause, the waist to hip ratio is less than 0.8 and there is correspondingly low risk of heart disease. After the menopause, fat distribution change and the risk of heart disease increase. The women can assess their risk by dividing their waist measurement by their hip measurement. If the resulting figure is over 0.8, you fall into a higher group for heart disease

Some of women try to excessive or faddy dieting, that is unhealthy, and it may mean that they fail to meet daily requirements. In using exercise as a means of maintaining muscle tone instead.

Heart symptoms

The earliest symptom of postmenopausal heart disease is nearly always angina. This is crushing pain in the middle of the chest brought on by effort, and alleviated by rest. Without rest, the pain can worsen and radiate up into the neck, teeth, and down the arm (usually the left arm but occasionally the right). Angina is a warning sign that insufficient oxygen is reaching the menopausal heart muscle.

Other symptoms relating to heart health are palpitations and shortness of breath on exertion.

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3.5. Health change

Heart disease

Atherosclerosis

This is a disease of the arterial wall in which the inner layer thickens, causing narrowing of the channel, reduced blood flow, and increased blood pressure (hypertension). The thickening is due to the development of raised patches called plaques inside the artery. These plaques consist of a fatty substance known as atheroma, and they tend to form in regions of turbulent blood flow, such as the junction of two arteries.

Atheroma worsens with age, causing irregularities in the smooth lining of the blood vessels and encouraging thrombus (abnormal blood clot) formation. Sometimes, a fragment of thrombus breaks off and forms an embolus, which travels in the blood stream and blocks smaller blood vessels.

Atherosclerosis is a leading cause of death in the industrial country and atherosclerotic heart disease of the coronary arteries is the single most common cause of death. Strokes resulting from interference in the blood supply to the brain are also the most common cause of death.

Atherosclerosis can also cause serious illness by impeding blood flow in other major arteries, such as those that supply the kidneys, legs, and intestines.
Prior to the menopause, women are protected from atherosclerosis, so it tends to affect men and post-menopausal women.

Risk factors

The chances of suffering from atherosclerosis are increased by obesity, smoking, high blood pressure, being menopausal and post-menopausal, lack of exercise, a high cholesterol level, poorly controlled diabetes, and a family history of arterial disease. A personality type known as type A, characterized by aggression and competitiveness, may also be a risk factor.

Atherosclerosis incidence increases with age, probably because it takes time for plaques to develop. In the 35-44 age group, coronary artery disease kills six times as many men as women. In 55-70 age group, death due to atherosclerosis is

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nearly equal in men and women, due almost entirely to the decline of estrogen during the menopause.

Prevention

Lowering risk factor especially in early adulthood and midlife can help prevent atherosclerosis developing. Women should try to give up smoking, have your blood pressure check regularly, and get high blood pressure treated. Keep your diet low in saturated fats, and if your cholesterol level still remains high, the women need medication. Meticulous control of diabetes mellitus is important, and regular exercise is essential.

Coronary artery disease

Coronary artery disease damages the heart because the blood supply becomes limited or blocked. The two most common symptoms of coronary artery disease are angina pectoris (chest pain) and acute myocardial infarction (heart attack). Both of these are caused by the inability of the narrowed coronary arteries to supply the heart with sufficient blood (and oxygen).

As estrogen levels fall during the menopause, we lose our cardio-protective umbrella and become as subject to coronary artery disease and heart attacks as men. In the 55-65 age group, the rate of heart attacks in men and women is almost equal.

Angina

The pain of angina is typically brought on by exertion such as running up blight of stairs, and it is relieved by rest. Being angry or upset can also cause an attack. Sufferers describe the sensation as a profound tightening in the middle of the chest, and pain spreading up to the neck and down the arm (usually the left arm). Alternatively, some people experience pain in the arm, neck, or even teeth, without any chest pain, although this is unusual.

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Myocardial infarction (Heart attack)

When the blood supply to part of the heart is cut off completely by a blood clot blocking one of the coronary arteries (coronary thrombosis), the result is an acute heart attack.

The main symptom of a heart attack is intense chest pain similar to angina, but unrelieved by rest, and not necessarily brought on by physical effort. The sufferer may feel cold, sweat profusely, be weakening nauseated, and even lose consciousness as the pumping action of the heart is weakened.

Hypertension (high blood pressure)

Hypertension means having a blood pressure that is higher than normal (120/80 mmHg). Although factors such as age, stress, and physical activity tend to increase blood pressure, a person with hypertension has high blood pressure for their age, even at rest.

Although there is no strict dividing line between normal and high blood pressure, a useful definition is that given by the World Health Organization, which defines hypertension as a blood pressure that is consistently above 160 mmHg systolic and95 mmHg diastolic. The condition is found more often in men than in women, and it is most common in middle-aged and elderly people.

A risk in blood pressure occurs when there is resistance in the blood vessels to the flow of blood. Resistance increases in the large vessels because of increased rigidity due to age, and occurs in the small vessels when they become constricted due to nerve or chemical control. Severe hypertension will also cause strain on the heart and blood vessels, and will increase the risk of stroke and heart failure. If it is left untreated, hypertension may cause damage to the kidneys and the retina.

Stroke

This is a potentially fatal result of hypertension. If the blood supply to the brain is interrupted, or blood leaks through the walls of blood vessels in the brain, damage to the brain will result. This can impair sensation, movement, or the function of the damaged area.

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When a thrombus or an embolus blocks an artery, the blood supply to the brain is interrupted, and the brain tissue does not receive sufficient oxygen. This results in the death of brain tissue. The other, and least common, cause of strokes is bleeding from ruptured blood vessels within or over the surface of the brain.

Risk factors: Apart from age, risk factors include high blood pressure, atherosclerosis, heart disease, diabetes mellitus, smoking, a high level of fat in the blood, a high level of red blood cells, and taking the older type of contraceptive pill, which contained a high doss of estrogen.

Symptoms: These include headaches, dizziness, visual disturbance, slurred speech, or loss of speech, and problems swallowing. If speech is affected, this may mean the dominant cerebral hemisphere of the brain is damaged.

Osteoporosis

A clinical definition of osteoporosis is “a condition where there is less normal bone than expected for a woman’s age, with an increased risk of fracture”. However, some experts restrict the term “osteoporosis” to describe low bone density where fractures have already occurred, and use the term “osteopenia” to describe women who have bones with low density, but have not suffered fractures.

Healthy bone has blood vessels and nerves and very efficient repair and maintenance system. There are special cells that cause bone breakdown, and others, called osteoblasts, that renew, repair, and lay down new bone. The activity of these cells is controlled mainly by hormones, including estrogen, which is thought to increase the repair and renewal rate of bone. If estrogen levels fall, bone is not replaced as efficiently. As estrogen and progesterone levels fall, bones begin to lost mass by 0.5-3 percent a year.

Estrogen also facilitates the uptake of calcium from the blood into the bone and inhibits its loss. A fall in estrogen levels, therefore, leads to bone disintegration. The formation of tiny holes within the bone results in two things. First, the overall structure and supporting tissue of the bone is thinned out, and, second, there is less bone matrix in which calcium can be deposited. Eventually, the tiny

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craters in bone increase to look like holes in Swiss cheese. Bones lose their thickness and density and become brittle and break comparatively easily. For a woman with severe osteoporosis of the spine, minor knocks, jolts, or falls can cause the spinal bones to fracture.

Risk factors: Aging is the main cause of osteoporosis but it can also be result of malignant disease, chronic liver disorder, or rheumatoid arthritis. Certain conditions, situations and habits, as outlined below are also contributory factors. The most significant of these is impaired peak bone density.

Low bone density: If you peak bone mass is low to begin with, the menopause have a much greater chance of developing severe osteoporosis after the menopause.

Amenorrhea: Osteoporosis occurs in some women with pre menopausal amenorrhea (lack of menstrual periods), and is related to low estrogen levels.

Hyperthyroidism: Women who have an overactive thyroid gland or who take high doses of thyroxine for thyroid deficiency are at risk of developing osteoporosis. Women over treated with thyroxine may lose bone mass at seven times the normal rate.

Premature menopause: The earlier the age of the menopause, with its depletion of estrogen, the greater the risk of Osteoporosis.

Hysterectomy and surgical removal of the ovaries: The ovaries are a woman's main source of estrogen, so it is not surprising that their removal leads to loss of bone mass. Most women show early signs of osteoporosis within four years of removal of the ovaries if HRT is not given. Even women who have had hysterectomies without having the ovaries removed are more prone to bone loss than women who retain their uterus.

Smoking: The menopause may start up to five years early in heavy smokers. Passive smokers are also at risk. Female passive smokers, on average, reach the menopause about three years earlier than women in non-smoking households. The golden rules are to stop smoking well before the menopause, or never to start in the first place, and to avoid spending time in a smoking-filled environment.

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Corticosteroids: Some of the most dangerous drugs that cause bones to become osteoporotic are steroids, such as cortisone or prednisone. These drugs treat a number of conditions, including severe cases of rheumatoid arthritis. When prescribed over long periods of time in high doses, corticosteriod usage can lead to osteoporosis. If you are taking these drugs, ask your doctor to prescribe the lowest effective dose, in order to minimize bone damage.

Preventing Osteoporosis

Since all of menopausal women are at risk of developing osteoporosis, it is important that they adopt self-help measures in order to build up their natural resistance. Fortunately, there are a number of ways in which they can change their lifestyles to help maintain healthy bones.

1. Take regular exercise

Investigators studying the relationship between bone density, prevention of bone fractures, and exercise found that the amount of weight-bearing exercise, such as jogging, relates directly to increased bone mass. Women who take exercise twice a week have denser bones than those who take exercise once a week, who in turn, have denser bones than those who never take exercise at all. Bones can be strengthened to resist the effect of estrogen depletion during the post-menopausal years.

Brisk walking will help to strengthen their bones. Try to exercise daily for 20-30 minutes, enough to moderately accelerate you pulse rate.

2. Eat a calcium-rich diet

The most important dietary advice for the early prevention of osteoporosis is to eat calcium-rich foods. Calcium is lost from the body in sweat, urine, and feces, and maintenance of the correct amount is dependent on our dietary intake of calcium, combined with the presence of estrogen and vitamin D. The bone deterioration that ends in osteoporosis begins a long time before the first fractures and the longer menopause wait to take action, the smaller their chances of recovery. Good nutrition is one of the best measures to slow down demineralization of bone. In brief, to prevent their bones from becoming brittle, they need calcium for bone mass, vitamin D to absorb the calcium into their body, and estrogen to maintain the calcium inside their bones.

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3. Consider HRT

The menopause is suggested that a sensible way of preventing osteoporosis would be to start a regular exercise routine from 35 onwards, and, once you are menopausal, to take enough estrogen to maintain bone mass, and sufficient progestogen to stimulate bone formation. Estrogen taken continuously in combination with progestogen taken for 10-13 days per month seems to optimize bone health, and prevent the incidence of life-threatening fractures

4. The exercise

Throughout the humanity, the physical activity is necessary for health improvement and well-being has been identified as an important issue. It has been shown that for both older and younger adults, participation in higher levels of regular physical activity is associated with lower all-cause mortality rates. Furthermore, individuals who regularly participate in light to moderate levels of physical activity have lower mortality rates than sedentary individuals.

Although the term ‘physical activity’ and ‘exercise’ have been used interchangeably in the past, presently the term ‘exercise’ has been used to describe a subcategory of physical activity. Exercise can be defined as “physical activity that is planned, structured, repetitive and purposive in the sense that improvement or maintenance of one or more components of physical fitness is the objective” (ACSM’s, 2000:20). Cardiovascular exercise, or aerobic exercise, is specific with relation to criteria. According to the ACSM’s, aerobic exercise includes those activities that are involve the use of large muscle group in continuous, rhythmic manner. These activities must be performed for 20 minutes at least three days a week. Cardiovascular fitness are strongest for all cause and mortality (ACSM’s, 2000: 4-5). This supported by Lie et al, (1985: 147-157) that studied a large population of cross-country skiers and found a strong, graded, positive association between physical fitness and protection from CHD. This graded benefit was also found by Ekelund et al. (1988: 1379-1384), and Sandvik et al. (1993: 533-537). These studies suggest that

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significant benefit may be derived from levels of activity that produce relatively small changes in aerobic capacity, as measured by maximum oxygen uptake which is directly related to the frequency, duration, and intensity of exercise. When exercise performs above a minimum threshold, the volume of training is an important determinant of the increase in maximum oxygen uptake which generally ranges from 10 to 30 %. The greater improvement in maximum oxygen uptake occurs when exercise involves the use of large muscle groups over prolonged period in activities that are rhythmic and aerobic in nature such as walking, hiking, running, machine-based stair climbing, swimming, cycling, rowing, combined arm and leg aerometry, dancing, skating, cross-country, skiing, rope, skipping or endurance games. The wide range of activities provides for individual variability relative to skill and enjoyment, factors that influence compliance to the exercise program and thus desired outcome. (ACSM's, 2000: 143-144) The development and progress of the exercise depend on the individual's interest, adaptation, and clinical status. Thus, it is not generally recommended as and activity for improving cardiorespiratory fitness. (Pollock ML,et al. 1998:975-991) Because cardiorespiratory fitness include in several components of physical fitness, though the fully fit person has high levels of cardiorespiratory function and mental alertness, meaningful social relationships, the ability to cope with problems, desirable levels of fat, sufficient levels of flexibility, muscular strength, and endurance, and a healthy low back.

Physical fitness is dynamic. The degree of fitness can be changed depends on when a person starts. The optional quality of life involves striving, growing, developing and becoming.

It can never be "achieved" in the fullest sense. The fit person is continually approaching the highest quality of life possible.

This study will focus on the physical fitness aspects of positive health. However, it is appropriate to briefly discuss the broader picture, so that our physical fitness emphasis can be put into perspective regarding other aspects of health, physical fitness and performance as describe below in figure 2.1

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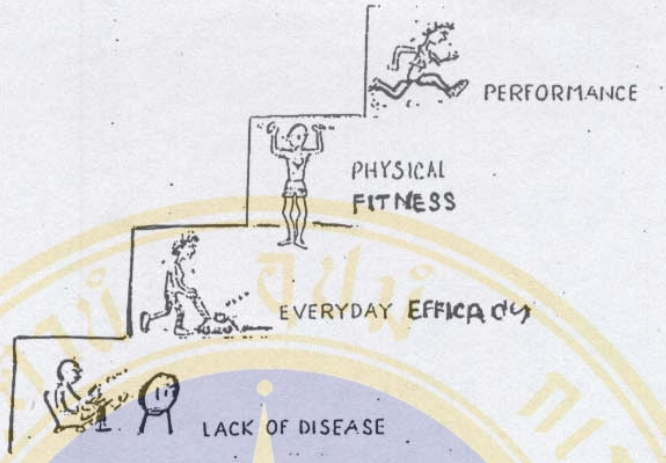

Figure 1. Health, fitness and performance: the layered look. (1989 : 7-8.)

Figure2.1. illustrates the layers of physical fitness, health and performance. These layers build upon one another. Freedom from disease and the ability to get through to the daily routine can provide the base for starting a fitness program to achieve a higher level of positive health and reduce your risk of health problems. Those interested in performing high levels of sport or other physical skills can build upon the physical fitness base by concentrating on ways to improve the specific performance.

The first level of health and fitness is the medical diagnosis that we are free from disease. This is the minimum goal for all of us.

The second layer deals with the ability to carry out typical activities at work, at home, and in leisure pursuits without undue fatigue. This ensures that you have enough energy to engage in fitness activities to enhance your health and fitness status. The final layer includes individuals who have achieved a high level of fitness and now choose to participate in certain activities. The performance element involves developing those skills and underlying abilities needed to do the activity well enough to compete with others or self at a desired level. The activities and desired level will, of course, vary among individuals. While the underlying performance abilities (e.g., agility, coordination, power, speed) and the specific sports skills will, of course, vary depending on the desired activity.

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The relationship between Physical activity, Exercise, and physical fitness

The recognition that proper amounts of physical activity for healthy living, the lessons found in the "laws of health" taught during the ancient period; to breath fresh air, eat proper foods, drink the right beverages, take plenty of exercise, get proper amount of sleep and include our emotions when analyzing our overall well-being.(U.S. Department of Health and Human Services, 1996: 11-13). And over the past two decades, expert from numerous disciplines have determined that exercise training substantially enhances physical performance and have begun to establish the characteristics of the exercise required to produce specific health benefits (Bouchard, Shephard, Stephens, 1994 in U.S. Department of Health and Human Services, 1996: 20). Several key terms defined elsewhere are reviewed here due to their importance in understanding the relationship between physical activity, Exercise, and physical fitness (ACSM's, 2000: 4-5). Physical activity is defined as bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure. Exercise, a subclass of physical activity, is defined as planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness. Physical fitness is defined as a set of attributes that people have or achieve that relates to the ability to perform physical activity. The physical fitness has almost always been viewed as a multifactorial construct that includes several components. Each component is a movement-related trait or capacity that is considered to be largely independent of the others. Health-related physical fitness typically includes:-

Cardiorespiratory fitness or cardiorespiratory endurance is ability to perform rhythmical movements using the large muscles of the body for extended amount of time. In order for the muscles to continue exercising for a prolonged period, oxygen must be present. When oxygen is being utilized during activity, it is refer to aerobic exercise. Activity such as step and low impact aerobic, walking, jogging, swimming, are examples of aerobic exercises. cardiorespiratory fitness is one of the most important components of physical fitness because of its effectiveness in reducing health risks and promoting weight loss. When performed regularly, these activities can increase the functional capacity of the heart, blood vessel, and the lung

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as well as decrease the amount of oxygen the heart and muscles require during any physical activity. In order to make gain in cardiovascular fitness, it is necessary to stress the muscles by increasing the duration or intensity of exercise over time.

Muscular strength and fitness is the ability of muscle to generate maximal force. Muscular fitness is the ability of a muscle to exert force over an extended period of time. Muscular strength and fitness develop by increasing resistance, that requires to perform in everyday tasks.

Flexibility refers to the range of motion of muscles and joints. This component is important because it helps prevent injury and maintain mobility. Flexibility is improved by stretching exercises, which should be done before and after exercise. The two most common types of stretching are ballistic and static. Ballistic stretching is a series of quick, rhythmic, even jerky movements. Although certain types of athletes use this type of stretching as part of their training, it is typically discouraged due to the high risk of injury. Static stretching is the preferred method that involves a gentle, controlled stretch that is held constant for at least 20 to 30 seconds.

Body composition is divided into two components: lean body mass and body fat. Lean body mass included muscles, bones, organs, nerves, skin, and blood. Body fat is adipose tissue that is store for later use. Some body fat is necessary for maintenance of the reproductive and immune systems and is referred to as essential body fat. Any excess fat in the body is called storage fat. Some storage fat surrounds and protects the organs, and the remainder is found just beneath the skin's surface.

The concept that underlies health-related physical fitness is that better status in each of the components is associated with lower risk for development of disease and/or functional disability. (ACSM's, 2000: 57)

This section further define the selected component, explain how it can be evaluated, and suggest the ways to improve physical fitness.

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Exercise modality.

For the strength gained, one would prescribe progressive resistance exercise; whereas for enhancement of cardiorespiratory function, one would prescribe one of many endurance types exercise program such as jogging. For the enhancing cardiorespiratory fitness, the exercise modality to be used for this purpose should be;

- Improve a large proportion of total muscle mass.
- Maximize the use of large muscles.
- Minimize the use of small muscles.
- Maximize dynamic muscle contraction
- Maximize static muscle contraction.
- Be rhythmic, allowing relaxation phase alternation with contraction phase.
- Maximize the work of the heart per unit training effect.
- Be qualifiable with respect to intensity.

Building a Total Fitness Program

The best exercise for you is the one that you will actually do. Many people are full of good and healthful intentions when they make their New Year's resolutions, but very few are able to stick to them each year. Often people feel that exercise has to be vigorous in order to see improvements. As mentioned above, moderate intensity physical activity is enough to positively affect your health and fitness level. Whether you are beginning an exercise program for the first time, or after an extended period of time, remember the following:

1. Some exercise is better than no exercise.
2. Begin slowly and increase gradually.
3. Be sure that your goals are practical and attainable.
4. Most importantly, make sure that you enjoy the activities in which you are involved. It is important consider all aspects of physical fitness
5. When design your program, particularly the five components: cardiorespiratory fitness, muscular strength, and fitness, flexibility, body composition.

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Overview of the Exercise Prescription

The essential components of a systematic, individualized exercise prescription include the appropriate mode(s), intensity, duration, frequency, and progression of activity(ACSM,2000:138-156). These five components apply when developing exercise prescriptions for persons of all ages and fitness levels regardless of the presence or absence of risk factors and disease. The optimal exercise prescription for an individual is determined from an objective of heart rate (HR), blood pressure (BP), rate perceived exertion (RPE), subjective response to exercise, electrocardiogram (EKG) when applicable, and maximum oxygen uptake measured directly exercise test is not required for all individuals before beginning a physical conditioning program. The exercise prescription, however, should be developed with careful consideration of the individual's health status (including medication.), risk factor profile, behavioral characteristics, personal goals, and exercise preferences.

Objective of the exercise program

There is good evidence that we can bring about very desirable adaptation in human functional capacities and health related parameters such as muscular strength, muscular endurance, cardiorespiratory fitness, muscular efficiency, speed movement, and flexibility. However, each of these goals requires a different and specific exercise program.

Mode of Exercise

The greatest improvement in Maximum oxygen uptake occurs when exercise involves the use of large muscle groups over prolonged periods in activities that are rhythmic and aerobic in nature (e.g., walking, hiking, running, machine-based stair climbing, swimming, cycling, rowing, combined arm and leg aerometry, dancing, skating, cross-country skiing, rope skipping, or endurance games). Clearly, this wide range of activities provides for individual variability relative to skill and enjoyment, factors which influence compliance to the exercise program and thus desired outcomes an activity for improving cardiorespiratory endurance .

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Exercise Intensity

Intensity refers to how hard you are working during exercise. Intensity can be easily monitored using one or more the following method: heart rate, perceived exertion, or the talk test .

Heart rate

The ACSM recommends an intensity of exercise corresponding to between 55 and 65% to 90% of maximum heart rate. For most individuals, intensities within the range of 70 to 85% maximal heart rate or 60 to 80% HR are sufficient to achieve improvements in cardiorespiratory fitness, when combined with an appropriate frequency and duration of training.

Perceived exertion

Perceived exertion is a subjective method used to measure exercise intensity. This method allows you to monitor how you feel based on your perceived breathing rate, heart rate, and level of fatigue. On a scale of 1 – 10, '1' represents an extremely low intensity whereas '10' represents a level near exhaustion. A light-to-moderate intensity would rate between 3 and 4; 5-7 is equivalent to an intensity that is somewhat hard, but you are not out of breath. Intensity levels of 8 and 9 are associated with heavy sweating and breathlessness.

The talk test

The talk test is another subjective method used to gauge how hard you are working during exercise. This method requires you to evaluate the level of ease or difficulty you experience when talking during exercise. Working at low intensity should allow you to carry on a normal conversation with no problem. An activity of moderate-intensity will allow you to talk, but not as easily as lower-intensity activities. As your intensity increases, you will find yourself becoming wined and grasping for air while trying to talk. This represents a level of intensity that is most likely too high for you. Although this is a valid measurement of intensity for many people, it may not be appropriate for those with higher fitness levels.

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The perceived exertion and talk test methods may be used alone or they may compliment the use of another method such as heart rate. One advantage of using the talk test or perceive exertion is that they can be performed without stopping. The heart rate method, on the other hand, requires cessation of exercise.

Summary of exercise intensity methods

Level of Intensity	%HR	Perceived Exertion	Talk Test
Low	<20	2-3	Normal conversation
Moderate	50-60	4-5	Require more effort, but still okey
Mod - High	60-70	6-7	Conversation become more brief as more effort is required
High	70-80	8-9	Speaking become difficult
Too High	80-90	10	Talking is impossible

(Pollack.et al., 1998: 975-991).

Exercise Duration (Time)

The duration of exercise refers to the length of time a particular activity is being performed. The ACSM(2000:150) recommends working up to 20 - 60 minutes of continuous or intermittent [minimum of 10-minute bouts] aerobic activity accumulated throughout the day. This should be a gradual progression, particularly for beginners. Similar to higher intensity workouts, longer sessions also tend to increase your chance of injury. The duration of the exercise bout can be increased progressively over time until the goal is achieved. The key to working out safely is to listen to your body. If you feel tired or weak, slow down.

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Exercise Frequency

Frequency of exercise defined how many times per week the activity is being performed. The American College of Sports Medicine (2000: 151) recommends a minimum of 3 days per week.

Components of the Training Session

Once the exercise prescription has been formulated, it is integrated into a comprehensive physical conditioning program, which is generally complemented by an overall health improvement plan. The exercise program consists of the following components:

Warm-up

A gradual warm-up prior to exercise is critical in preventing injury and lessening fatigue. This process leads to more efficient calorie burning by increasing the body's core temperature, metabolic rate, elasticity of the muscles, as well as range of all the motion.

The rise in the body temperature accelerates the activity level of the cells. You will be less likely to experience fatigue because fats and sugars break down more quickly and less lactic acid accumulates in the muscles. This process also leads to more efficient calorie-burning. With regards to safety, muscles that are more elastic as a result of a proper warm-up are less likely to become injured.

A proper warm up consists of two major components: an aerobic (i.e., circulatory) warm-up, and a stretching warm-up. The aerobic warm-up prepares the heart for the upcoming activity. It should generally last 5 to 10 minutes. A typical warm-up is often a slower version activity that is about to take place. In a step class, you should perform slower, less intense movements incorporating the step; in a higher impact activity, like running or jogging, you should begin with a brisk walk follow by a light jog.

The stretching components occur after the muscles have been warm-up and are more pliable. It is especially important to focus on the muscles that will be used during the workout. For most aerobic activities, it is important to stretch the quadriceps, hamstrings, and calves since they are responsible for so much of the work.

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Endurance Phase

The stimulus or endurance phase develops cardiorespiratory fitness and includes 20 to 60 minutes of continuous or intermittent per session of aerobic activity. Duration depends on the intensity of the activity; thus, moderate intensity activity should be conducted over a longer period of time (30 minutes or more), and, conversely, individuals training at higher levels of intensity (i.e., vigorous exercise) should train for at least 20 minutes or more. The most effective exercises for the endurance phase employ large muscle groups in activities that are rhythmic or dynamic in nature. This phase of the exercise session may be complemented by recreational games, resistance training, or both.

Recreational activities (optional)

The inclusion of enjoyable recreational activities during (or immediately after) the endurance phase often enhances adherence. However, game rules may be modified to decrease skill requirements, competition, and the energy cost and heart rate responses to play. Game modifications should maximize the experience of successful participation; winning or losing should be of lesser importance. Because of a potential discordance between RPE and heart rate during game activities, the latter should be monitored periodically to adjust the intensity of play.

Cool-down

During an intense session of aerobic exercise, a large amount of blood is being pumped to and from the heart. If the exercise stops abruptly, the large muscles will slow down so much that the blood tends to pool extremities, causing a decrease in blood pressure and decrease in blood flow to the brain, heart, and other organs. Side effects often associated with this condition are dizziness, nausea, fainting, or even irregular heart activity. Just simple 5-10 minutes cool-down phase of slower, larger aerobic movements will help the body adjust to the decrease in cardiovascular activity. This rhythmical cool-down should be followed by stretching and deep breathing. The hardest part is the aerobic phase, while the cool-down is a time to relax.

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While endurance training activities should be performed 3 to 5 days per week, Flexibility training can be included as part of the warm-up or cool-down, or undertaken at a separate time. The format for the exercise session should include a warm-up period, a stimulus or endurance phase and optional recreational game, and a cool-down period. Endurance and resistance training should be prescribed in specific terms of intensity (load), duration, frequency, and type of activities.

Rate of Progression

The recommended rate of progression in an exercise conditioning program depends on functional capacity, medical and health status, age individual activity preferences and goals, and an individual's tolerance to the current level of training. For some apparently healthy but sedentary individuals may not be able to attain this initial level of activity, they should be encouraged to progress to this goal during the first few weeks of the training program.

Initial Conditioning Stage

The initial stage should include light muscular endurance exercises and moderate level aerobic activities (40 to 60% of HR reserve), exercises that are compatible with minimal muscle soreness, discomfort, and injury. Exercise adherence may decrease in the program is initiated too aggressively. This stage may last up to 4 weeks, but the length depends on the adaptation of the individual to the exercise program. The duration of the exercise session during the initial stage may begin with approximately 15 to 20 minutes and progress to 30 minutes. It is recommended that individuals who are starting a moderate-intensity conditioning program should exercise 3 – 4 times per week

Improvement Stage

The goal of this stage of training is to provide a gradual increase in the overall exercise stimulus to allow for significant improvements in cardiorespiratory fitness. The improvement stage of the exercise conditioning program differs from the initial stage in that the participant is progressed at a more rapid rate. This stage typical lasts 4 to 5 months, during which intensity is progressively increased within the upper half of the target range of 50 to 85% of HR reserve. Duration is increased consistently every 2 to 3 weeks until participants are able to exercise at a moderate-to vigorous intensity for 20 to 30 minutes

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continuously. The frequency and magnitude of the increments are dictated by the rate at which the participant adapts to the conditioning program.

Maintenance Stage

The goal of this stage of training is the long-term maintenance of cardiorespiratory fitness developed during the improvement stage. This stage of the exercise program usually begins after the first 5 to 6 months of training, but may begin at any time the participant has reached preestablished fitness goals. During this stage, the participant may no longer be interested in further increasing the conditioning stimulus. Further improvement may be minimal, but continuing the same workout routine enables individuals to maintain their fitness levels.

At this point, the goals of the program should be reviewed and new goals set. To maintain cardiorespiratory fitness, it is important to include exercises and recreational activities that the individual finds enjoyable.

Training progression for the Apparently Healthy Participant

Program Stage	Week	Exercise Frequency (Session/wk)	Exercise Intensity (%HRR)	Exercise Duration (min)
Initial stage	1	3	40-50	15-20
	2	3-4	40-50	20-25
	3	3-4	50-60	20-25
	4	3-4	50-60	25-30
Improvement stage	5-7	3-4	60-70	25-30
	8-10	3-4	60-70	30-35
	11-13	3-4	65-75	30-35
	14-16	3-5	65-75	30-35
	17-20	3-5	70-85	35-40
	21-24	3-5	70-85	35-40
Maintenance stage	24+	3-5	70-85	30-45

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Maintenance of the Training Effect and maximum oxygen uptake in maximum oxygen uptake

Numerous studies have investigated the physiologic consequences of a reduced exercise dosage or complete cessation of training in physically conditioned persons. A significant reduction in cardiorespiratory fitness occurs within 2 weeks of stopping intense endurance training (Coyle. et al.,1984: 1857-1864), with participants returning to pretraining levels of aerobic fitness after 10 weeks (Fringer. et al., 1974). to 8 months of detraining (Knuttgen. et al., 1973). During periods of inactivity, initial improvements in maximum oxygen uptake will decrease over time, with half of the gains lost after only 4 to 12 weeks of detraining (Fringer. et al., 1974). Maintenance of the training effect generally shows a direct relationship to the length of time in training of injury, and specific conditioning practices.

A related series of studies examined the relative effects of decreased exercise frequency, duration, or intensity training (Hickson. et al.,1985: 492-499) on the maintenance of maximum oxygen uptake during a period of reduced training. All three studies trained young men and women for 40 minutes, 6 days per week for 10 weeks at a moderate-to-high exercise intensity, followed by 15 weeks of reduced training at one-third and two-third reductions in the frequency, duration, or intensity of training. Only when the intensity of training was reduced, there is a significant decrease in maximum oxygen uptake; moreover, most of the reduction occurred within the first 5 weeks of reduced training (Hickson. et al.,1985: 492-499). In contrast, decreasing the frequency or duration of training had little influence on the postconditioning maximum oxygen uptake, provided that the intensity was maintained. Similarly, restricted walk training resulted in rapid de-conditioning in cardiac patients who had been jogging, despite an unchanged exercise frequency and duration (Dressendorfer. et al.,1997). Collectively, these findings suggest that exercise intensity is especially important in maintaining a cardiovascular training response.

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Exercise and Mechanisms of Benefit in the Prevention and Management of Other Diseases

Circulatory Responses to Exercise

The changes in heart rate and blood pressure that occur during exercise reflect the type and intensity of exercise performed, the duration of exercise, and the environmental conditions under which the work was performed. For example, heart rate and blood pressure, at any given oxygen uptake, are higher during arm work when compared to leg work. Further, exercise in a hot/humid condition results in higher heart rates when compared to the same exercise in a cool environment. The following discuss the cardiovascular responses to exercise under varying conditions.

The cardiovascular system does response to dynamic incremental exercise. Heart rate and cardiac output increase in direct proportion to oxygen uptake. Furthermore, blood flow to muscle increases as a function of oxygen uptake .This ensures that as the need to synthesize (Adenosine triphosphateaa:ATP) to supply the energy for muscular contraction increases, the supply of oxygen reaching the muscle rises. However, both cardiac output and heart rate reach a plateau at 100% maximum oxygen uptake. This point represents a maximal ceiling for oxygen transport to exercising skeletal muscles and is thought to occur simultaneously with the attainment of maximal oxygen uptake.

This increase in cardiac output during incremental exercise is achieved via a decrease in vascular resistance to flow and an increase in mean arterial blood pressure. The elevation in mean arterial blood pressure during exercise is due to an increase in systolic pressure, since diastolic pressure remains fairly constant during incremental work.

As mentioned earlier, the increase in heart and systolic blood pressure that occurs during exercise results in an increased work load on the heart. The increased metabolic demand placed on the heart during exercise can be estimated by examining the double product. The double product is computed by multiplying heart rate times systolic blood pressure:

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Double product = heart rate x systolic blood pressure

It seems clear from the epidemiological evidence that regular physical exercise exerts a strong cardio protective effect and that the magnitude of this benefit is in the form of a dose-response relationship. The beneficial effect of exercise on mortality and morbidity from coronary heart disease appears to be conferred through more than one mechanism, as described below.

Increased Cardiovascular Efficiency

The amount of work being done by the heart at any given time can be expressed as heart rate multiplied by systolic arterial blood pressure, known as the rate pressure product (RPP), or the "double product". This is an index of myocardial oxygen consumption. Regular physical activity is associated with a drop in the resting and exercise heart rates, an increase in stroke volume and a reduction in systolic blood pressure. Thus, exercise training results in a lower RPP and decreased myocardial oxygen requirements for the same relative level of external work performed (Statement on Exercise,1992).

Direct Effects on Coronary Arteries

Several hypotheses have been proposed relating exercise to cardiovascular pathology. We shall consider two of these although more evidence is needed before definitive statements can be made.

Aerobic training appears to improve myocardial blood flow and, consequently, the oxygen supply to the heart. There are isolated reports that athletes have rather large coronary arteries, but no consistent picture emerges. Even if it did, the origin could be genetic, resulting in superior physical performance rather than vice versa.

In addition, some post-mortem evidence shows that more active individuals have less ischemic myocardial damage, coronary thrombosis and coronary atheroma than their sedentary counterparts. Morris et al. (1958:1485) had reviewed data from 3800 post-mortems of noncoronary deaths. The state of the myocardium and the coronary arteries was compared with the estimated levels of occupational activity of the individual concerned. The results showed an inverse

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relationship between occupational physical activity and frequency of total occlusion of a coronary artery, large healed infarcts and ischemic myocardial fibrosis. However, no relationship could be bound between occupational activity and the severity of atherosclerosis.

Kramsch and his colleagues (Kramsch, D. et al.1981).) studied the effects of exercise training on the progression of atheroma in the coronary arteries of a group of macaque monkeys. The animals were fed a diet heavily loaded with saturated fat and cholesterol, the intent being to induce severe coronary atheroma. Half of the monkeys were put on an exercise program consisting of one hour of running on a treadmill, three times a week. At the end of the four-year period, the sedentary monkeys were found to have severe coronary disease associated with angina as well as nonfatal and fatal heart attacks. In striking contrast, all the exercising monkeys remained in good health and had completely healthy coronary arteries. The study provides direct evidence that even in the presence of a high fat diet likely to produce large amounts of atheroma, exercise can exert a powerful protective effect.

Modification of Blood Lipids

Cholesterol does not circulate freely in the bloodstream because, like fats with which it has certain chemical properties in common, it is not soluble in liquids. Instead it is transported around the body in packages called lipoproteins, the two most important of which are low-density lipoprotein cholesterol and high-density lipoprotein.

These two forms of cholesterol have precisely opposite effects. Low-density lipoprotein cholesterol deposits cholesterol in the wall of the artery, leading to symptoms of heart disease including acute myocardial infarction (heart attack).

In contrast, high-density lipoprotein helps to remove cholesterol from the wall of the artery and therefore protects against the development of heart disease.

Although exercise is often thought to lower circulating concentrations of cholesterol, this is more likely to occur as result of associated weight loss and changes in dietary intake of saturated fat. Most recent studies suggest that exercise

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alone does not result in any significant reduction in either total cholesterol or low-density lipoprotein cholesterol concentrations but does result in a potentially beneficial rise in high-density lipoprotein (Kiens,et al., 1980:203-209). This exercise-induced increase in high-density lipoprotein cholesterol is strongly associated with changes in body weight (Tran, et al.,1985: 919-924) and a significantly reduced risk of low-density lipoprotein cholesterol (Kannel, 1983:93).

Many studies show that this beneficial increase in high-density lipoprotein cholesterol requires quite vigorous activity, but more recent observations among women indicate that even brisk walking can produce similar changes in the lipid profile Hardman, et al., 1989; 1204-1205). Evidence suggests that high-density lipoprotein cholesterol may revert quite rapidly to pretraining levels unless an exercise is maintained (Dressendorfer, et al.,1982: 1715-1718).

Effects on Blood Pressure

Numerous studies have demonstrated that hypertension is positively and independently associated with the risk of myocardial infarction, stroke and mortality from all vascular causes. Similarly, a number of population studies have demonstrated that blood pressure levels are significantly lower in physically fit persons when compared with their unfit counter parts (Blair,et al.,1984:487-490). Furthermore, several well-controlled intervention trails in mild to moderate hypertensive have showed reductions in systolic and diastolic blood pressure of (on average)130 millimeters of mercury and 90 millimeters of mercury, respectively, with regular, moderate exercise(Nelson, et al., 1986: 473-479). Despite these blood pressure lowering effects, population studies have not shown any beneficial effect in terms of stroke prevention.

Reduced Thrombotic Tendency

Although recognized only relatively recently, the thrombolic contribution to myocardial infarction and sudden coronary death is now generally accepted. A number of studies have demonstrated an independent association between the level of plasma fibrinogen and the incidence of CHD that is as strong as that for cholesterol.

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High levels of fibrinogen predispose to thrombosis through involvement in both the initiation and progression of atheroma by increasing blood viscosity and by actin as a cofactor in platelet aggregation. Regular physical activity is known to increase fibrinolysis and to reduce plasma fibrinogen levels (Ferguson,et al.,1987: 1416-1421).Taken regularly, therefore, exercise may help to protect against thrombotic events with their potentially lethal effects.

Effect on Obesity

Obesity exacerbates the effects of almost any other disease and is associated with an increased risk of heart disease, hypertension, stroke, non-insulin-dependent diabetes and some cancers sensitive to sex hormones. Moreover, there is a significant increase in morbidity from cardiovascular and musculoskeletal disease, even with moderate degrees of overweight(Manson, et al.,1992: 1406-1416).

Regular physical activity has an important part to play in preventing weight gain as well as in managing overweight and obesity when they have developed. The principal aim of any weight reduction program is to create an energy (kcal) deficit, and a program of regular aerobic physical activity will increase energy consumption not only during the period of exercise, but for several hours afterwards (Wilson, 1990: 62-68).

Prevention and Control of Diabetes

The sensitivity of body tissues to insulin increases with regular, vigorous exercise. Glucose tolerance deteriorates with increasing age and is strongly associated with obesity. Regular, moderate exercise appears to reduce the risk of developing Type II diabetes in both normal and obese middle-aged people. This finding has been confirmed in a longitudinal study of women aged 35 to 55 years (Manson. et al.,1991: 774-778). Another study has shown that Type II diabetes is much less common among physically active men (Taylor.et al.,1984). For those who already have Type II diabetes and who are therefore relatively insensitive to the insulin they produce, regular aerobic exercise has be shown to increase insulin sensitivity and cause a significant fall in fasting glucose and insulin levels (Trovati. et al., 1984:416-420).

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Exercise and Osteoporosis

Loss of bone mineral, the hallmark of osteoporosis, has considerable socioeconomic consequences in western society. The risk of a bone fracture is directly related to bone mineral content, which falls progressively with time from its peak in early adult life. Women show an accelerate decline of bone mass following the menopause. Physical inactivity [55], inadequate calcium intake, heavy alcohol consumption, cigarette smoking and prolonged periods of estrogen deficiency are all known to decrease the mineral content of bone.

Conversely, good evidence indicates that regular weight-bearing physical activity stimulates bone marrow metabolism and increases bone mass even after menopause (Chow. et al. 1987:1441-1444).

There is therefore a strong case for both pre- and post-menopausal women taking regular physical exercise to minimize the impact of osteoporosis.

The precise nature and intensity of exercise required to prevent osteoporosis has not yet been established, although the evidence strongly suggests that it should be weight-bearing. Exercise such as swimming may not be sufficient. Chow et al.(1987:1441-1444) used a daily program consisting of 5 to 10 minutes of warming-up exercises, followed by 30 minutes of walking, jogging or dance routines. Other workers have suggested that as little as one hour of walking a day, plus aerobic exercise twice weekly, will significantly increase bone mineral content in the lumber spine (Krolner. et al., 1983). Even in the elderly, regular physical activity in both men and women protects against hip fracture (Wickham. et al.,1989: 889-892).

Exercise and Osteoarthritis

In the degenerative forms of arthritis e.g. oseoarthritis, the primary aim of exercise is to increase muscle strength, improve the dynamic stability of the affected joints, and to counteract the effect of the reflex wasting of muscles that follows joints disease and injury. In osteoarthritis of the hip, for example, weakness of the gluteal muscles contributes much to the gait disturbance. Conversely, increasing the strength of the gluteal muscles improves gait and reduces pain (Simon. et al.,1981). In osteoarthritis of the knee, exercises are aimed

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at maintaining the integrity of the joint by improving the strength of the quadriceps and the strength and endurance of the hamstring.

4. Action Research

Action research is a process whereby individuals or groups desiring change (Scott,M.G., 1969: 453). Action research is a type of research that Lewin described as proceeding in a spiral of steps, each of which composed of planning, action, and evaluation of the result of the action (Kemmis & McTaggart, 1990: 8). Brown & Aberanthy quoted in Scott,M.G(1959) described action research as a process whereby individuals or groups desiring change within specific situation test the procedures which they feel may result in such change and then, upon arriving at responsibly evaluated conclusions, put these procedures into operation . Action research seeks to clarify and validate the relationship between a given action and a given goal. It is more than an individual or a group attack on a problem through which individuals may improve their understandings and skills and put these understandings and skills into operation. The purpose of action research is to change behavior. The value of action research should become clear in that it provides and orderly, disciplined base for change. The generalizations are applicable to the same or similar situation, but are not universally applicable. Action research has its roots in the social and educational fields but is of increase interest to applied health research. The action research creates links between theory and practice by generation knowledge at the same time as creating change. The main characteristics of action research according to Wilkinson, et al.(1997: 189) are: It is participatory, bringing together researchers, practitioners and participants to achieve and sustain change. It involves the testing of theory alongside practical application. It results in the development or refinement of theory from the process of implementing a new intervention.

It is cyclical, consisting of series of change: planning, acting, observing, and reflecting.

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Action research as a method of inquiry was first proposed by Kurt Lewin in social psychology shortly after World War 2 (Wilkinson, et al., 1997: 189).

The approach of action research according to consisted of three main approaches - the technical collaborative approach, the mutual collaborative approach, and the enhancement approach. Each approach has it own unique as follows:

The technical collaborative approach

Based on a pre-specified theoretical frame work, the question is to see if the intervention can be applied in a practical setting. The nature of the collaboration between the researcher and the practitioners is technical and facilitator. The underlying goal of the researcher in this approach is to test a particular intervention enters the collaboration with an identified problem and a specific intervention. The interaction between the researcher and the practitioners is aimed at gaining the practitioner's interest in the research and agreement to facilitate and help with its implementation. Generally, this approach results in an efficient and immediate change in practice.

The kind of knowledge that results from this approach is predictive knowledge and the major thrust is on validation and refinement of an existing theory and hence is essentially deductive.

Mutual collaboration approach

In the collaboration approach the researcher and practitioners come together to identify potential problem, their underlying causes and possible interventions. The type of knowledge generated from this approach is generally descriptive, moves towards the development of new theory and follows an overall inductive approach. The practitioners involved gain a new understanding of their practice and the changes implemented tend to have a more lasting character than just immediate enthusiasm caused by the change itself. However, the change tend to be connected to the individuals directly involved in the change process and, therefore. The intervention tends to be short lived when individuals leave or when many new people enter the system.

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Enhancement approach

There are two underlying goals for the researcher using the enhancement approach. As in previous approach, one is to increase the closeness between the actual problems encountered by practitioners in a specific setting and the kind of theory used to explain and resolve those problems. A second goal, which goes beyond the other two approaches, is to assist practitioners in identifying and making 3explicit fundamental problems by first raising their collective consciousness. The researcher raises questions about the underlying assumptions and unwritten laws which really govern the practice. The researcher facilitates the practitioners; discussion of underlying problems and assumptions on a personal level as well as the level of organization's culture and the possible conflicts they can generate. The emphasis here is on bringing to the surface the underlying value system, including norms and conflicts which may be at the core of the problems identified. Local theory emerges from reflective discussions between the researchers and practitioners. Changes are focused on personal and cultural norms and tend to have a lasting character as the negative forces of the organizational unconscious can be dissipated and a meaningful change can be achieved and sustained. Hence the emerging patterns of new practice and new theoretical insights stem from the newly formed culture of practice. Two kinds of knowledge emerge out of this collaboration; descriptive and predictive. As the cyclical of the four fundamental aspects of the action research on planning, acting, observing and reflecting has more detail as Kemmis & Mcttaggart (1990) have described as followed:

The plan

The plan is constructed action and by definition must be prospective to action it must be forward looking. It must recognize that all social action is to some degree unpredictable and therefore somewhat risky. The general plan must be flexible enough to adapt to unforeseen effects and previously unrecognized constraints. The action prescribed by the plan must be critically informed in two senses. First, it must take account of the risks involved in social change and recognize real constraints, material and political, in the situation. Second, critically informed action should be chosen

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because it allows practitioners to act more effectively over a greater range of circumstances, more wisely and more prudently. As part of the planning process, participants must collaborate in discussion (both theoretical and practical discourse) to build a language by which they must analyze and improve their understandings and action in the situation.

Action

Action in the sense included here is deliberate and controlled, it is a careful and thoughtful variation of practice, and is critically informed. It recognize practice as ideas in action and uses action as a platform for the further development of the later action, action with a critically informed educational intent. Action is guided by planning in the sense that it looks back to planning for it rational. But critically informed action is not completely controlled by plans. It is essentially risky. As a result, plans for action must always have a tentative and provisional quality; they must be flexible and open to change in the light of circumstances. Action is thus fluid and dynamic, requiring instant decisions about what is to be done, and the exercise of practical judgment.

Observation

Observation has the function of documenting the effects of critically informed action it looks forward, providing the basis for reflection now, but more so in the immediate future as the present cycle runs its course. Careful observation is necessary because action will always be limited by constants of reality and all of these constants will never be clear in advance. Observation must be planned, so that there will be a documentary basis for subsequence reflection, but it must not be too narrow. It must be responsive, open eyed and open mined. Peripheral vision must be sensitized to pick up unexpected. Observation categories (and measurements) planned in advance will be insufficient. Like the action itself, observation plans must be flexible and open to record the unexpected. Action researchers should always maintain a journal to record observations additional to those collected in planned observation categories. Action researchers need to observe the action process, the reflects of action (intended and unintended), the circumstances of and constraints on

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action, the way circumstances and constraints limit or channel the planned action and its effects, and other issues which arise. Observation will always be guided by the intent to provide a sound basis for critical self reflection. Observation fore shadows the achievements of reflection.

Reflection

Reflection recalls action as has been recorded in observation, but it is also active. Reflection seeks to make sense of processes, problem, issue, and constrains made manifest in strategic action. Reflection is usually aid by discussion among participants. Through discourse, group reflection leads to the reconstruction of the meaning of social situation and provides the basis for the revised plan. Reflection has an evaluative aspect – it asks action researchers to weigh their experience to judge whether effects (and issues which arose) were desirable, and suggest ways of proceeding. But there is also a sense in which reflection is descriptive it allows reconnaissance, building a more valid picture of life and work in the situation, constraints on action and more importantly, of members as actors committed to group goals.

Action research is dynamic process in which these four moments are to be understood not as static steps, complete in themselves, but rather as moments in the action research spiral of planning, action, observation and reflecting. (Kemmis & Mctaggart, 1988: 8-15)

Some important key points about action research:

In order to be success in action research implementation it is essential to keep in mind some very important key points which Kemmis & Mctaggart (1990) have suggested as follow:

- Action research is participatory: it is research through which people work towards the improvement of their own practices (and only secondary on other people practices).
- Action research develops through the self reflective spiral of cycles of planning, acting, (implementing plans), observing (systematically), reflecting and then re-planning, further implementation, observation and reflecting.

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From the reviewing of the related literatures in this chapter, the guidelines for the implementation can be concluded as follows:

In the early stage of the study, the researcher used the Transtheoretical Model to classify the readiness for exercise of the sample group before the implementation of the health education program. The reason of choosing the Transtheoretical Model in this stage is because exercise is a continual process which consisted of many determinants and multiple interactions. And it appears that self-efficacy theory is an appropriate framework to guide the study of physical activity (Bandura, 1997: 412) during the implementation of action research process and health education program to develop the level of self-efficacy in the sample group. The 4 main sources of self-efficacy are past performance accomplishment, vicarious experiences, verbal persuasion, and emotional arousal. At the same time, outcome expectation, which consisted of physical and evaluative outcome expectation, is used to set the expected goals from the exercise program. Moreover, self-efficacy may help to explain exercise adoption and adherence along with the continuum of change and also refer to how one is motivated to habitually use what was learnt to accomplish the physical task. After the adoption of activity, the challenge of the activity decreases and it becomes a part of the daily routine. Also, the magnitude of the relationship between self-efficacy and exercise adherence decreases as one adapts to the demand of activity (McAuley, 1982).

In this situation, the spiral of action research is the most suitable procedure to be used to reflect the studied behavior back to the sample group and researcher. The reflected outcomes and problems were evaluated before the activity would be re-planned and implemented again to achieve the goals in physical, social, and evaluative outcome expectation as expected by the group. All the afore-mentioned procedures can be concluded into the framework as shown in figure 2.

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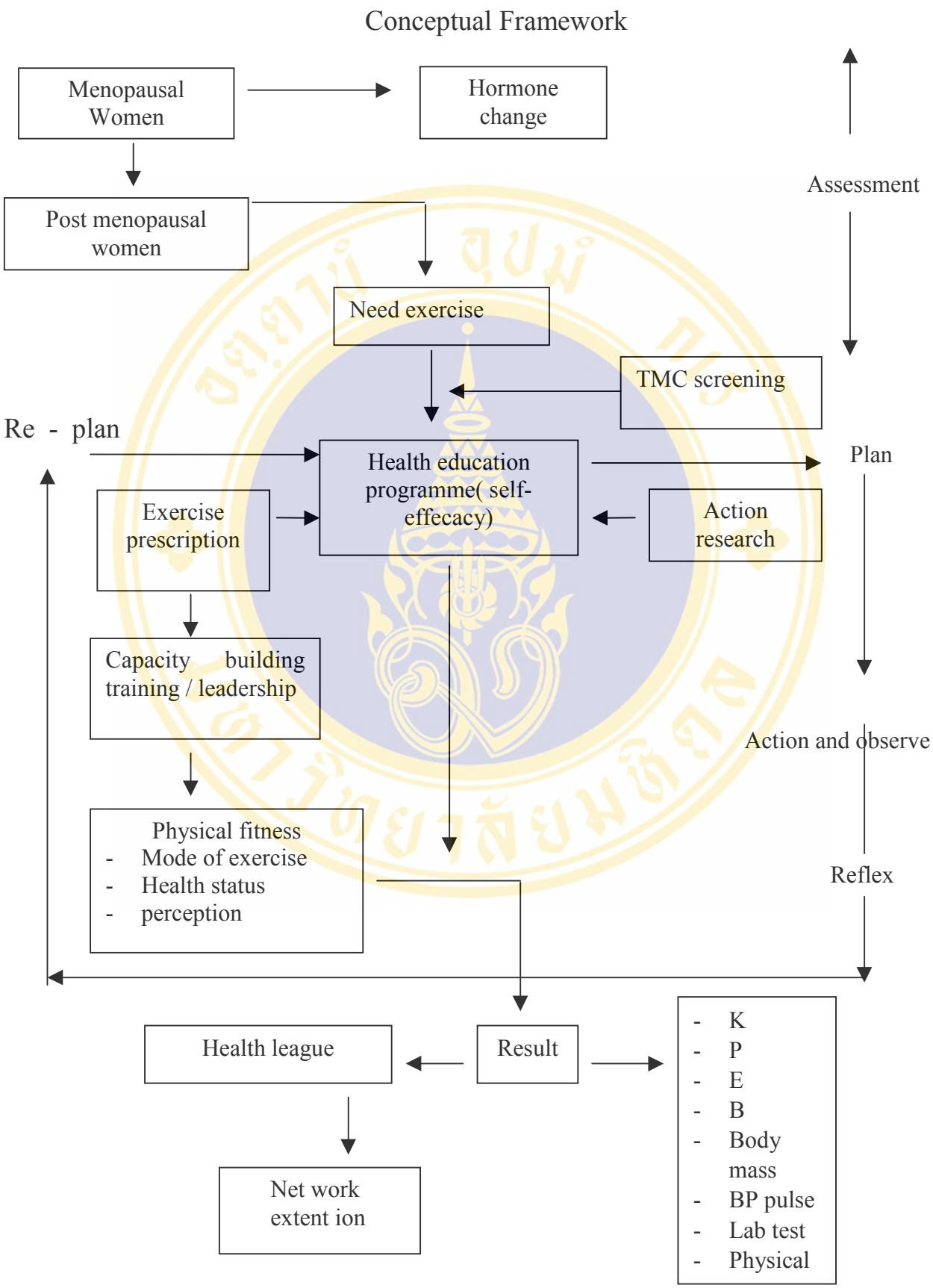

Figure 2 Conceptual Framework

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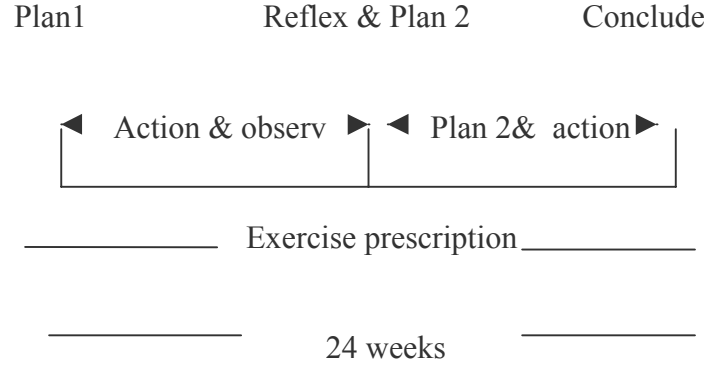
CHAPTER 3
RESEARCH METHODOLOGY

This research is the study about the application of Self-efficacy Theory and the Transtheoretical Model to exercise program for menopausal women in Chiang Mai province. Its objective is to find out about the effectiveness of the constructed exercise program on menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province. The research methodology is presented here in 5 major parts.

1. Research Design
2. Population and Sample group
3. Research Instruments
4. Implementation and Data Collection
5. Data Analysis

1. Research Design

The researcher had constructed the study following technical action research approach which consisted of planning, implementation, following-up, and outcome reflection of sample groups. The research design can be presented as shown in figure 1.



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Plan 1 = Participatory in processes of sample groups before start the program
Plan 2 = Participatory in processes of sample groups after reflect the program
Conclude = Conclude and close program
Program = Model got from research to be implement another areas

2. Population and Sample of study

2.1 Selection of studied community

In order to select the proper community to be studied by the method of technical action research with the researcher as the instructor on solving the problems concerning exercise in the community, the process of selection are as follows:

2.1.1 Selection criteria which consists of

a. the area which is not too far (less than 50 kilometers) from the city and easy to access by the researcher
b. no any exercise activities for the people in the community yet
c. has convenient means of transportation for the people in the community to participate the program
d. already own a proper area to perform the activities

2.1.2 Choosing of the study area

2.1.3 Data collection and community survey

2.1.4 Choosing of the proper community

According to the above criteria, the researcher had chosen Nong Tong sub-district, Hang Dong district, Chiang Mai province as the area of study with the proper qualifications as follows:

This sub-district is located in suburban area, 30 kilometers southwest of Chiang Mai city. It is easy to access by car using the public highway number 108 (Chiang Mai – Hod) then turn left at Lumpoon – Bahn Klang junction for another 6 kilometers which takes about 40 minutes from the city.

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Alternatively, it can also be accessed using Chiang Mai – Lumpoon road to Lumpoon province before turning right at Lumpoon national museum for another 13 kilometers which takes about 1 hour from Chiang Mai province.

Nong Tong sub-district has 1,632 household and resides the population of 5,783 people which are 2,759 men and 3,024 women. The density of the population is 600 people per squared kilometer. There are 596 women aged between 45-59 years old which can be used as the target population for the research.

It is consisted of 14 villages and has 2 medical centers - Buak Krok medical centre and Nong Krai medical centre–to be in charged of the health welfare of the people in the area.

Buak Krok medical centre has the responsibility over 8 villages that includes

Moo	1	with the population of	110	people
Moo	2	with the population of	110	people
Moo	3	with the population of	103	people
Moo	4	with the population of	64	people
Moo	5	with the population of	51	people
Moo	6	with the population of	58	people
Moo	12	with the population of	14	people
Moo	13	with the population of	70	people

Within these 8 villages, there are 572 women aged between 45-59 years old which can be used as the target population for the research. (Public health data: recorded on 20th of February 2002)

Nong Krai medical centre has the responsibility over 6 villages that includes

Moo	7	with the population of	3	people
Moo	8	with the population of	7	people
Moo	9	with the population of	3	people
Moo	10	with the population of	8	people
Moo	11	with the population of	2	people
Moo	14	with the population of	1	people

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Within these 6 villages, there are 24 women aged between 45-59 years old which can be used as the target population for the research. (Public health data: recorded by Nong Krai medical centre on 20th February 2002)

The researcher had finally chosen the area under the responsibility of Buak Krok medical centre as the study area according to the following qualifications:

1. the distance from the city is around 30 kilometers
2. there are no any exercise activities arranged for the people in these 8 villages yet
3. it already has convenient means of transportation for the people in the villages to participate the program
4. it also owns the proper places to perform the activities which includes group meeting, exercise, or presentation. The area locates the awarded temple and the local administration office.
5. the community leaders show good sign of participation and supports in the study.

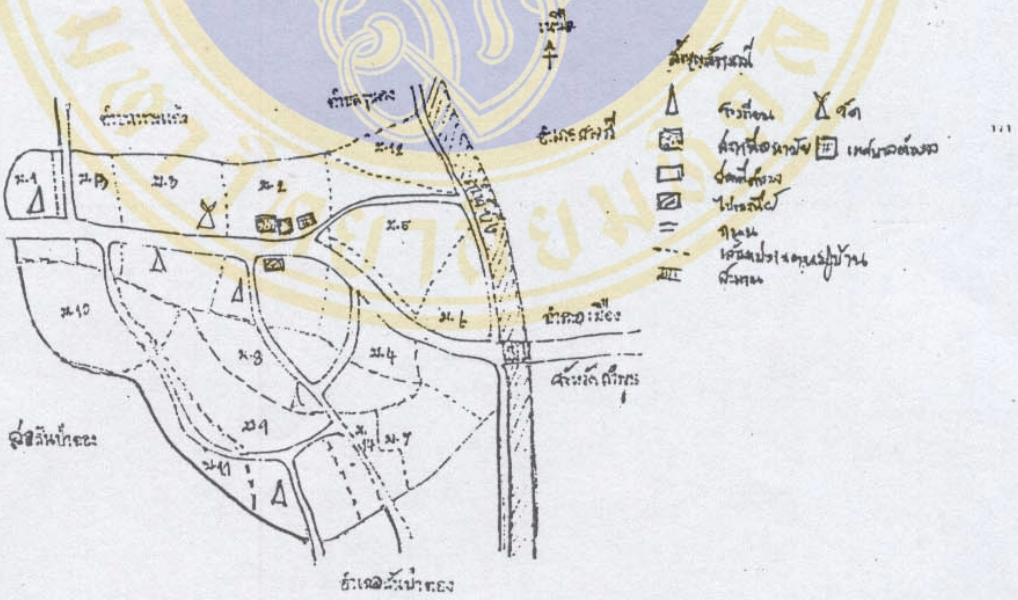

Figure 3 Map of Non Tong sub-district

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Target group acquisition

The target population for the research was 572 women aged between 45-59 years old being the resident in 8 villages, under the responsibility of Buak Krok medical centre

The criteria used to select the sample group according to the objectives of the research are

1. women age between 45-59 years old with good health which remain menstruation or not
2. being the resident in 8 villages under the responsibility of Buak Krok medical center
3. willing to participate in the study

Working along with the head of Buak Krok medical centre, the researcher had designed on the working plans as follows:

The researcher, with the help from head of Buak Krok medical centre and public health volunteers from 8 villages in the area of study, arranged the formal meeting with the women in the target group to introduce herself and assistance, explain the objectives of the study, the benefits for the participants and also to the development of the community. The researcher named this action research 'the project on helping menopausal women to develop self capacity through exercise, Nong Tong sub-district, Chiang Mai province'. The numbers of target groups attended the meeting were as follows:

Moo	First submitted	After extend
1	8	1
2	9	2
3	15	2
4	-	3
5	3	2
6	6	3
12	6	2
13	7	2
total	54	17

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Altogether, there were 54 people attended the meeting which is less than expected. The reasons might be because the time for the program to be promoted the target group was too short while they need or still were in the decision period and also, on the day of the meeting, they had other activities in the village such as funeral or wedding ceremony to attend. Thus, the researcher decided to extend the application period for 1 more week which yielded out for another 17 women had applied to join the program. All in all, there were 71 women aged between 45-59 years old participate in the program.

3. Research Instruments

The instruments used in this research consisted of questionnaires, tools used to manage the change concerning questions, and tools used during the implementation of the program.

The steps in developing of the research instruments

1. study and review books, documents and related theories related to the field of study which is health education program.
2. study and analyze the acquired knowledge from the earlier step to choose the proper behavioral theories.
3. define the scope and structure of the contents according to the chosen theories and develop the questionnaire to accurately cover the objectives of the study.
4. present the developed instruments/tools to the thesis committee and related experts to check and revise the reliability of the questionnaire concerning the content validity, structure validity, language suitability. Then the tools were modified according to the experts' advice.
5. the tools were tried out with the group of 30 women which shared the similar characteristics with the sample group. The collected data were analyzed to find the power of discrimination of each question, difficulty of the knowledge, and the reliability of the questionnaire.

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a. The analysis of the power of discrimination. The score from the questionnaire were arranged in the descending order before divided into 2 groups_ high and low. The student t-test was used to analyze the data in order to discriminate the different between 2 groups. The questionnaire with the score more than 1.75 were considered to have a reliable power of discrimination.
b. The analysis of specific knowledge. The prefer level of the difficulty of each knowledge ranged between 0.2 – 0.8.

Instruments used in the study can be divided into 3 main groups which were instruments used during the preparation stage of the study, instruments used during the study and instruments used during the evaluation.the sample group.

3.1 instruments used during the preparation stage of the study

- Questionnaire on Socio-demographic characteristics of the of the population in the area
- Questionnaire concerning activities of menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province which includes regular work activities, Leisure time activities, exercise. The questions ask about the frequency of the activities. Before implementation, this set of questionnaire was tested with the reliability of 0.81.
- Questionnaire concerning their intention towards exercise following the Transtheoretical model. It consisted of 10 questions with 2 multiple choices of ‘yes’ or ‘no’.
- Physical Activities Readiness Questionnaire (PAR-Q). It consisted of a set of questions with 2 multiple choices of ‘yes’ or ‘no’. Before implementation, this set of questionnaire was tested with the reliability of 0.81.

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3.2 instruments used during the study

3.2.1 Questionnaire concerning exercise activities which can be divided into 2 parts:

Part I Questionnaire on Socio-demographic characteristics of sample group

Part II Questionnaire concerning their intention towards exercise following the Transtheoretical model. It consisted of 10 questions with 2 multiple choices of 'yes' or 'no'

3.2.2 Questionnaire used before and after the exercise which the researcher developed from Self-efficacy theory as guidelines. It was divided further into 5 parts as follows:

Part 2 Questionnaire about the knowledge concerning exercise. The questionnaire had 11 questions with 3 multiple choices. The member would receive 1 point with every right answer. The score would range between 0 – 11 points and was interpreted into 3 levels following the scale suggested by Sehree Lachroj (2537: 65-68) as follows:

The level of knowledge	The score	Note
Low	0 – 5	0.0 - 39.9 percent
Medium	6 – 8	Between 40 – 79.9 percent
High	9 – 11	more than 80 percent

Part 3 Questionnaire about the perception on self efficacy from the exercise behavior. The contents of the answer were consisted of both positive and negative statements. It would then be scored in 3 ranges of the level of confidence _ descending order (3 – 2 – 1) for the positive statement and ascending order (1 – 2 – 3) for negative statement. The details were described below.

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Positive statement on perception		Negative statement on perception	
Strongly agree	3 points	Strongly agree	1 points
Partially agree	2 points	Partially agree	2 points
Less agree	1 points	Less agree	3 points

The questionnaire consisted of 18 questions. The score would range between 18 – 54 points and was interpreted into 3 levels following the scale suggested by Sehree Lachroj (2537: 65-68) as follows:

Level	score
Low	15 – 29
Medium	30 – 41
High	42 – 54

Part 4 Questionnaire about the outcome expectation from the exercise behavior. It consisted of 18 questions with the contents of the answer in both positive and negative statements. The rating scale was described below.

Positive statement on expectation		Negative statement on expectation	
Strongly agree	3 points	Strongly agree	1 points
Partially agree	2 points	Partially agree	2 points
Less agree	1 points	Less agree	3 points

The final score was interpreted in the same scale as for the questionnaire about the perception on self efficacy in part 3

Part 5 Questionnaire about the exercise behavior. The questionnaire had 15 questions concerning the exercise behavior. There are 3 choices of answer and points as shown:

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Positive statement on exercise behavior		Negative statement on exercise behavior	
Always	3 points	Always	1 points
Seldom	2 points	Seldom	2 points
Never	1 points	Never	3 points

The overall score would range between 15 – 45 points and was interpreted into 3 levels following the scale suggested by Sehree Lachroj (2537: 65-68) as follows:

Level	score
Low	15 – 25
Medium	26 – 35
High	36 – 45

The final score was interpreted in the same scale as for the questionnaire about the perception on self efficacy in part 3

Instrument validation

1. Content validity was proved by 3 specialists which consisted of
   - specialist in behavioral science
   - specialist in physical education and sport administration
   - specialist in medicine
2. Try out

2.1 After the revision according to the comments from the specialists, Questionnaire concerning exercise activities was tested on 50 people who shared the similar characteristics with the target group to analyze and adjust for better and more accurate questions. It was then, again, tested with a group of menopausal women who were not in the sample group before analyzed for Cronbach's Alpha Coefficiency which had the coefficient of 0.81.

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2.2 Questionnaire used before and after the exercise was also tested, after the revision according to the comments from the specialists, with 36 people who shared the similar characteristics with the target group. Before, again, it was tested with a group of menopausal women who were not in the sample group to find out the reliability of the questionnaire which had the results as follows:

- Reliability coefficient of questionnaire concerning the knowledge about exercise is 0.742
- Reliability coefficient of questionnaire concerning perceived self-efficacy after exercise is 0.843
- Reliability coefficient of questionnaire concerning outcome expectation from exercise is 0.656

3.2.3 Guidelines for Focus group arrangement in order to plan an exercise routine in Formal exercise approach, activities arrangement, date and time for the continuity of exercise and activities.

3.2.4 Teaching schedule about exercise to be suitable for characteristics of the sample group.

3.2.5 Information, leaflet, photographs, poster about exercise including other media involved.

3.2.6 Leader of the exercise group who has the same sex and age with the sample group to demonstrate and train the proper skill of exercise such as fast pacing, jogging, low impact aerobic exercise, exercise using stick or local classical dance, dancing and also other recreation activities which can move the body and make pulse rate to reach the target points.

3.2.7 Role model who is in the same sex and age with the sample group to exchange their success experiences in regular and continual exercise.

3.2.8 Exercise manual for a proper exercise, health record form, exercise record form, along with self-assessment form concerning exercise.

3.2.9 Blood pressure, scale and stop watch.

3.2.10 Instrument for stamina test.

3.2.11 Group representatives to be trained as the exercise leader at the 10^{th} health centre.

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3.2.12 Exercise program since the Starting period until the Maintenance stage (6 months).

3.2.13 Record of physical stamina.

3.2.14 Action plan which was arranged by researcher and group member.

Instruments used during the evaluation

Instruments used to collect the required information in this stage are the questionnaire which can be divided into 8 parts as follows:

Part 1 Questionnaire regarding Socio-demographic characteristics of sample group age, weight, height, blood pressure, pulse rate while resting, and menstruation record

Part 2 Questionnaire concerning the knowledge about exercise

Part 3 Questionnaire concerning perceived self-efficacy after exercise

Part 4 Questionnaire concerning outcome expectation from exercise

Part 5 Behavioral record on exercise and the level of satisfaction

Part 6 Blood test record and Record of physical stamina

Part 7 Diary of exercise activity

Part 8 Record on the intention to exercise regularly and continually

4. Implementation and Data Collection

The procedures in applying of Self-efficacy Theory and the Transtheoretical Model to exercise program for menopausal women in order to help develop their knowledge and skills can be divided into stages as follows:

Stage 1

Selection of studied community

1. Revision of related concepts, theory, and literature concerning exercise for menopausal women from books, researches and involving documents

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2. Coordination with the community

The researcher approached the community for the permission to perform the research in the area in following steps:

2.1.1 the formal letter was sent to the sheriff of Hang Dong district, Chiang Mai province for advices and permission to study in the area

2.1.2 the meeting with the head of Buak Krok medical centre was arranged to describe the objectives and details of the impact that might happen within and outside the community

2.1.3 the meeting with the public health volunteers from all 8 villages was arranged to describe the objectives and ask for their coordination during the program

2.1.4 the formal meeting with target groups was arranged to explain the benefits of this technical action research on the development of the community and also persuade them to accept and participate in the program performed by the researcher and assistance.

3.Study of current situation concerning exercise for menopausal women in the community which started by

3.1 the researcher arranged the meeting with head of Buak Krok medical center to introduce the program, its objectives and ask for their coordination

3.2 Interview with community leaders, head of housewife group, and public health volunteers about exercise activities in the community. The results can be concluded as they mentioned that ‘there are not any exercise activities in the community yet - neither on their own nor as a group’. Concerning their interest and intention to start exercise, they agreed that ‘people in the community needs leader to instruct them about exercise because they do not know the proper way to. Exercise leaders might help supporting more chances of the activities’.

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4. From the questionnaire concerning regular activities and exercise of 250 menopausal women aged between 45-59 years old in Nong Tong sub-district and their intention using Sample random sampling method and random house number, 156 questionnaires (64 %) had been returned; it can be concluded that, within the target group, 73.3 percent had finished their primary school and now mostly works as a housewife (69.9 percent) with the household income of around 3,000 baht/month. Watching television and listening to the music are activities in their leisure time and 76 percent did not exercise regularly.

5. According to the record of Buak Krok medical centre, the first 5 illnesses found in the community are pneumonosis, gastroenteritis, and dermatitis, respectively.

From the interview with community leaders, head of housewife group, and public health volunteers about exercise activities in the community, they said

Stage 2

Establishment and development of theoretical conceptional framework for menopausal women.

After considering the collected data from the first stage, The researcher applied all the information and concepts collected into the conceptual framework of the exercise program to be most suitable for the community, especially menopausal women, in Nong Tong sub-district, Hang Dong district, Chiang Mai province. The researcher then decided that the application of technical action research coupled with the use of the Transtheoretical Model and Self-efficacy Theory is the proper method to be used in the construction of exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province. Some good reasons are that the afore-mentioned theories would be implemented through real activities, brainstorming, fairly record of daily situations before those information would be systematically analyzed and concluded. (Kemmis and McTaggart, 1990: 22 – 25) With these characteristics along with the application of Self-efficacy Theory and the Transtheoretical Model, the procedures are likely to be useful in developing an exercise program for menopausal women in order to help develop their knowledge and skills so that they can maintain their good health in a long run.

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Stage 3 Action research procedures

Along with the use of Behavior intervention method as mentioned before, which consisted of planning, action, observation, reflection, and re-planning of the program, along with the Transtheoretical Model and Self-efficacy Theory in order to increase the level of self-efficacy and exercise skills in the sample group, researcher had set up the Progression of physical activity following exercise prescription procedure by ACSM's (2000: 154 – 156) in the research pattern and constantly evaluate the program to improve the activities according to the agreement and lifestyles of the sample group in the community. The program which lasted for 6 months was arranged as follows:

1. The meeting was arranged with all 71 member of the group in order to present the objectives of the program.

2. After the closure of the application period, the sample group was asked to answer the questionnaire about their readiness for exercise activity. The result showed that 52 women (73.2 %) were in the stage of Preparation while the rest of the group (19 women or 26.8%) were in Contemplation stage.

3. As for the group of 19 women (26.8%) who were still in Contemplation stage, researcher arranged for them another 2 focus groups of 9-10 people on May 1st, 2002 to learn more about their attitudes and reasons of avoiding exercise, their understanding on health topics, awareness of self-health, obstacles, and, later, present them the proper practice for good health in order to persuade them to have better attitude towards exercise and eventually change their behaviors.

4. Later, the researcher arranged another meeting on May 9th, 2002 with all 71 members of the sample group at the meeting room in Nong Tong temple, Hang Dong district, Chiang Mai province. In this meeting, the specialists on Empowerment organized the activities to support the group with high self-efficacy and also, using game, to make the sample group realize their ability and the right outcome expectation from exercise that is proper to sex and age group.

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5. The researcher introduced the project and team member before using Buddy game to create friendly atmosphere with the sample group and, also, among the members in the group themselves because they came from 8 villages which might not yet have known each other before.

6. The agreement from the meeting was settled that the exercise activity would start in the week of May 2nd, 2002 around 17:00 o'clock on Monday, Wednesday, and Friday which is the right frequency. Assistance researcher worked as the exercise leader while the researcher herself would control the intensity, duration and progress of the exercise. The period of study lasted 6 months and with the hypothesis that all the member in sample group was untrained before.

7. In order to follow the concepts and procedures of the plan which consisted of planning, action, observation, reflection, and re-planning of the program, the exercise skill development activities were revised periodically throughout 6 months period of the research in order to encourage the group to continue on with the activities and expand the established exercise network in the community. The planned guidelines for activity arrangement consisted of

7.1 Meeting of sample group to agree on the commitment to exercise for their health.

7.2 Sign the informed consent in joining the program.

7.3 Planning meeting concerning types, place and time of the exercise.

7.4 Receiving the description on using exercise diary provided by the researcher.

7.5 Setting of physical check-up dates before, during, and at the end (6 months) of the program.

7.6 Blood test for the level of fat before the program.

7.7 Physical check-up, lecture on heart disease and golden age.

7.8 Evaluation of blood test results and physical check-up before being informed to each participant.

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7.9 2nd check-up and evaluation on benefits of the exercise to emphasize to participants about their level of self-efficacy and outcome expectation.

7.10 Adjustments of exercise activities according to the needs of the group.

7.11 Evaluation of results from the exercise for each participant to be aware of their progression.

7.12 3rd check-up at the end of the program (6 months).

7.13 Blood test on the level of fat after the program.

7.14 Evaluation of the check-up, blood test, and physical stamina of the whole group and each member.

7.15 Foundation of Rak Sukapab Nong Tong Group (Nong Tong Health Care Group) for each village can continue with their exercise activities at their local medical centre by having 10th Public Health Centre as their supporter.

7.16 Closure of the program

Data Analysis

After the collection of the required information, the data were scored and coded to be analyzed using specialized computer program. The statistics methods used in order to analyze the data were:

1. socio-demographic characteristics data was analyzed using descriptive statistics

2. Paired t-test used to test the different between the mean score of exercise knowledge, the level of self-efficacy and outcome expectation, and exercise behavior.

3. The difference of Body Mass Index, Pulse rate at rest, Systolic blood pressure, and Diastolic blood pressure was evaluated using the Analysis of varience: One-way ANOVA.with Scheffe's test

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4. Paired t-test used to compare the different between the mean score of laboratory test for blood cholesterol, serum Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) before and after the exercise program.

5. The mean score in physical fitness test for cardiorespiratory fitness, muscular strength, and flexibility was assessed using the Analysis of varience: One-way ANOVA.

6. Furthermore, Qualitative data collected by researcher and the assistance from Focus group, meetings and participatory observation was used to explain behavioral change in exercise of the sample group.

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CHAPTER 4
DATA ANALYSIS

This research utilized the techniques of the technical action research approach to study the results of health education program developed from the application of Self-efficacy Theory and the Transtheoretical Model into the exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province. The study started with the survey using constructed questionnaire adapted from Transtheoretical Model in order to classify the readiness of the sample group and improve their opinions towards exercise before implementation of the health education program. The socio-demographic data concerning knowledge about exercise, level of self-efficacy, outcome expectation, and exercise behaviors were then collected before and after the research along with the evaluation of health conditions of the sample group with the Self-efficacy Theory, physical fitness test, and laboratory test on factors which involved in the exercise.

The results from the study were presented here in 3 parts as follows:

Part 1 socio-demographic characteristics of the sample group,

Part 2 results according to the hypotheses, and

Part 3 following results after the implementation of the qualitative research.

Part 1 Socio-demographic characteristics of the sample group

The information in part 1 was collected by the researcher during the spatial evaluation of the area. From the sample group of women aged between 45-59 years old who inhibited in 8 villages of Nong Tong sub-district, Hang Dong district, Chiang Mai province; all 71 members had not regularly and continually exercised before the study. All aspects of socio-demographic characteristics were concluded as shown in table 1.

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Table 1 Socio-demographic characteristics of the sample group

Socio-demographic	number	percentage
Age (years old)		
45-49	31	43.7
50-54	33	46.4
54-59	7	9.9
Marital status		
Single	9	12.7
Married	49	69.0
Widowed	10	14.1
Divorced / Separated	3	4.2
Education		
No education	1	1.4
Primary school	55	77.5
Secondary school	12	16.9
High school and higher	2	2.8
Missing	1	1.4
Occupation		
Housewife	19	26.8
Retailer	25	35.2
Employee	17	23.9
Government employee	1	1.4
Agriculture	9	12.7
Household income (Baht/month)		
< 1,000 baht	3	4.2
1,001 - 5,000 baht	42	59.1
5,001 – 10,000 baht	10	14.0
10,001 – 15,000 baht	5	7.0
15,001 – 20,000 baht	4	5.6
> 20,001 baht	2	2.8
Missing	5	7.0

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From the survey, it can be concluded that the main part of the group were women aged between 50-54 years old. Most of them were married and worked as a retailer or housewife. Because of working as retailers, the level of household income of each woman varied considerably between the highest and lowest level. However, it can be concluded that their household income mainly ranged between 1,001 – 5,000 baht/month. Concerning their level of education, the main part of the group had finished their primary school.

Table 2 Number and percentage of members according to free time activities*

Free time activities	number	percentage
Listening to music	24	33.8
Watching TV	55	77.5
Reading	12	16.9
Sports	3	8.5
Exercise	23	32.4
Others	7	8.5
No answer		

* One may answer more than 1 activity

From table 2, 55 women (77.5%) had chosen ‘watching television’ as their most preferable activity during their free time while 24 (33.8%) picked ‘listening to music’ and 23 (32.4%) chose exercise activities through the mean of housework or watering the lawn. Sports are the least likable activity among them with only 3 women (8.5%).

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Table 3 Exercise situation of the sample group before the program

Exercise situation	number	percentage
Regularly	12	16.9
Never	59	83.1
Total	71	100.0

Table 3 shows that only 12 women (16.9%) in the group had exercised regularly with the main part of the group which never exercised before.

Table 4 Reasons of avoiding exercise

Reasons	number	percentage
No time	22	37.29
No knowledge	15	25.42
No support	11	18.64
Laziness	6	10.17
Too busy	5	8.74
Total	59	100.0

From table 4, 'No time' is the main reason of 22 women (37.29%) to avoid exercise while 15 women (25.42%) had an excuse of having no knowledge on performing exercise activities, 11 (18.64%) with no supports, 6 (10.17%) of laziness, and 5 (8.74%) with the excuse of too busy to exercise.

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Table 5 Readiness condition of the sample group before implementation of health education program

Exercise situation	number	percentage
Contemplation	20	28.2
Preparation	51	71.8
Action	-	-

Table 5 shows that, before the implementation of health education program, the sample group had never exercised or, at least, not regularly and continuously enough to have influence over the strength of coronary systems. The exercise intention of the group were divided into 2 stages of contemplation (20 members or 28.2%) and preparation (51 members or 71.8%).

Table 6 Level of participation in the exercise program for the sample group throughout the health education program.

exercise conditions	Pretest Period		Adoption Period		Maintenance	
	N	percentage	N	percentage	N	percentage
- not exercise	59	83.10				
- regularly	12	16.90				
- participate regularly			28	39.44	22	30.98
- not participate regularly			42	59.15	48	67.61
- quit exercise			1	1.41	1	1.41
Total	71	100.0	71	100.0	71	100.0

From table 6, in Pretest period, most of the participants in the program (59 members or 83.10%) had not performed any exercise activities, while the rest of the members (12 women or 16.90%) had exercised regularly and continuously.

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After joining in the constructed program of 20-30 minutes exercises every 3 – 5 days, even though 28 women (39.44%) had changed their behaviors to exercise regularly, 42 members (59.15%) could not intend the exercise despite of their career restrictions. However, the latter group agreed to perform the activities at home and keep the record in their exercise diary until they could come back to join the group again.

At the end of the program, it can be concluded that 48 women (67.61%) had continuously and regularly participated with the group while only 1 woman had decided to leave the program.

Table 7 Group participation percentage of the members

◄◄——►►	Action	Reflex	Re-planning
Percentage of participation	May – Aug 2003 n / (%)		May – Nov 2003 n / (%)
< 50	34 / (47.89)		23 / (32.39)
50 -74.9	23 / (32.39)		36 / (50.71)
75 – 100	14 / (19.72)		12 / (16.90)
Total	71 / (100.0)		71 / (100.0)

Considering the participation frequency of the members in this technical action research, in the first 3 months, 14 women (19.72%) had joined the activities more than 75%, 23 members (32.39%) had joined in between 50-74.9% of the time while all the rest (34 women or 47.89%) had participated in the activities less than 50%.

In the last 3 months, the number of members who participated more than 75% had decreased slightly to 12 women (16.90%), while 36 members had joined the exercise between 50-74.9% and 23 others (32.39%) had joined less than 50% of the time.

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Table 8 Opinions towards their health condition before and after the program

Health condition	before the program		after the program	
	number	percentage	number	percentage
good	49	69.0	55	77.5
poor	18	25.4	13	18.3
no answer	4	5.6	3	4.2
Total	71	100.0	71	100.0

Table 8 shows that, before the program, 69.0% of the members (49 women) considered themselves to be in good shape while 25.4% (18 women) had thought in the opposite ways. Most of the members (77.5%) had believed to have a better health after the program.

Part 2 Results of the study according to the hypotheses

The implementation of constructed health education program, with the application of self-efficacy theory and the Transtheoretical Model into the exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province, had influenced some useful changes in the sample group. After joining the activities which was aimed to develop, following the stages in exercise prescription, to reach the intensity of 60-70% HR $_{max}$ reserve, duration of more than 20 minutes at the frequency of 3 – 4 times per week, the results from the study can be presented here according to the research hypothesis as follows:

Hypothesis 1

1.1 The constructed health education program would cause menopausal women to have good improvements on knowledge concerning exercise, perceived self-efficacy, outcome expectation and exercise behavior.

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Table 9 The level of knowledge concerning exercise, perceived self-efficacy, outcome expectation and exercise behavior of the sample group before and after joining the health education program

Variables	Before the program		6 months after the program		t-value	df	P-value
	$\bar{x}$	SD	$\bar{x}$	SD			
1. Knowledge concerning exercise	5.51	1.64	6.91	2.25	4.87	70	<0.05
2. Perceived self-efficacy	47.68	5.25	47.54	4.76	0.21	70	0.836
3. Outcome expectation	49.92	3.37	51.08	3.61	2.53	70	<0.05
4. Exercise behavior	39.18	4.21	40.38	3.27	2.12	70	<0.05

The average score of the level of knowledge concerning the exercise of the sample group had improved after joining the program. The average score rose from 5.51 (SD = 1.64) to 6.91 (SD = 2.25), or through the use of statistic methods, the average score after the program had increased significantly ($P < 0.05$) as shown in table 9.

The average score of the level of perceived self-efficacy in the sample group had decreased slightly after joining the program. The average score descended from 47.68 (SD = 5.25) to 47.54 (SD = 4.76), or through the use of statistic methods, the average score before and after the program had not changed significantly ($P = 0.836$).

The average score of the level of outcome expectation in the sample group had improved after joining the program. The average score rose from 49.92 (SD = 3.37) to 51.08 (SD = 3.61), or through the use of statistic methods, the average score after the program had increased significantly ($P < 0.05$).

The average score of the level of exercise behavior of the sample group had improved after joining the program. The average score rose from 39.18 (SD = 4.21) to 40.38 (SD = 3.27), or through the use of statistic methods, the average score after the program had increased significantly ($P < 0.05$)

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Hypothesis 2

1.2 Exercise program had influenced the change of body mass index, pulse at rest, systolic and diastolic blood pressure.

Table 10 Comparison between body mass index, pulse at rest, systolic blood pressure and diastolic blood pressure before and after the program

Test period	Body Mass Index		Pulse		Systolic B.P.		Diastolic B.P.	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Pre test	26.67	4.82	81.02	15.22	122.48	20.53	72.93	11.53
Third month	25.99	4.74	77.74	11.66	120.74	19.60	71.67	11.08
Sixth month	25.87	4.69	79.07	10.67	125.93	22.38	82.15	9.69
P-value	0.563		0.307		0.095		0.282	

Body Mass Index

Before the program, the average score of BMI of the sample group was 26.67 kilogram per square meters (SD = 4.82). After 3 months and 6 months after the program, the number had changed to 25.99 (SD = 4.74) and 25.87 (SD = 4.69) kilogram per square meters, respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of body mass index of the sample group had not changed significantly (P = 0.563).**

Pulse at rest

Before the program, the average score of pulse at rest of the sample group was 81.02 beats per minute (SD = 15.22). After 3 months and 6 months after the program, the number had changed to 77.74 (SD = 11.66) and 79.07 (SD = 10.67) beats per minute, respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of pulse at rest of the sample group had not changed significantly (P = 0.307).**

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Systolic Blood Pressure at rest

Before the program, the average score of systolic blood pressure of the sample group was 122.48 millimeters Hg (SD = 20.53). After 3 months and 6 months after the program, the number had changed to 120.74 (SD = 19.60) and 125.93 (SD = 22.38) millimeters Hg, respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of systolic blood pressure of the sample group had not changed significantly (P = 0.095).**

Diastolic Blood Pressure at rest

Before the program, the average score of diastolic blood pressure of the sample group was 72.93 millimeters Hg (SD = 11.53). After 3 months and 6 months after the program, the number had changed to 71.67 (SD = 11.08) and 82.19 (SD = 9.07) millimeters Hg, respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of diastolic blood pressure of the sample group had not changed significantly (P = 0.282).**

Hypothesis 3

1.3 Exercise program had influenced the changes in laboratory test for blood cholesterol, serum triglyceride, low density lipoprotein (LDL), and high density lipoprotein (HDL).

Blood Cholesterol

The average score of the level of blood cholesterol of the sample group had changed after joining the program. The average score rose from 256.75 (SD = 54.26) to 243.59 (SD = 48.26), or through the use of statistic methods, the average score after the program had decreased significantly (P < 0.001).

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Table 11 Laboratory test results of Blood Cholesterol, Serum Triglyceride, Low Density Lipoprotein (LDL), and High Density Lipoprotein (HDL)

Variables	before the program (n = 69)		6 months after the program (n = 69)				
	$\bar{x}$	SD	$\bar{x}$	SD	t-value	df	P-value
Blood Cholesterol	256.75	54.26	243.59	48.26	3.25	68	<0.001
Serum Triglyceride	153.96	108.70	170.23	142.31	1.64	68	0.107
LDL	178.27	48.18	154.53	40.63	6.04	68	<0.001
HDL	51.20	13.91	58.07	13.08	5.51	68	<0.001

Serum Triglyceride

The average score of the level of Serum Triglyceride of the sample group had changed only slightly after joining the program. The average score rose from 153.96 (SD = 108.70) to 170.32 (SD = 142.31), or through the use of statistic methods, the average score after the program had not changed significantly (P = 0.107)

Low Density Lipoprotein (LDL)

The average score of the level of LDL of the sample group had changed after joining the program. The average score rose from 178.27 (SD = 48.18) to 154.53 (SD = 40.63), or through the use of statistic methods, the average score after the program had decreased significantly (P < 0.001).

High Density Lipoprotein (HDL)

The average score of the level of HDL of the sample group had changed after joining the program. The average score rose from 51.21 (SD = 13.91) to 58.07 (SD = 13.08), or through the use of statistic methods, the average score after the program had increased significantly (P < 0.001).

1.4 Exercise program had influenced the changes in physical fitness test for flexibility, muscular strength, and cardiorespiratory fitness.

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Table 12 physical fitness test result for flexibility, hand muscle strength, and maximum oxygen uptake

Test period	Flexibility		Hand muscle strength		VO_2 max	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Pre test	11.84	5.77	0.418	9.48	21.12	9.14
Third month	12.53	6.00	0.427	9.99	29.45	8.05
Sixth month	13.35	7.28	0.446	8.45	30.59	8.60
P-value	0.378		0.197		<0.001	

Flexibility

Before the program, the average score on flexibility of the sample group was 11.84 (SD = 5.77). After 3 months and 6 months after the program, the number had changed to 12.53 (SD = 6.00) and 13.35 (SD = 7.28), respectively. While considering these 3 scores together using statistic methods, it showed that **the average score on flexibility of the sample group had not changed significantly (P = 0.378).**

Hand muscle strength

Before the program, the average score of hand muscle strength of the sample group was 0.418 (SD = 9.48). After 3 months and 6 months after the program, the number had changed to 0.427 (SD = 9.99) and 0.446 (SD = 8.45), respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of hand muscle strength of the sample group had not changed significantly (P = 0.197).**

Maximum Oxygen Uptake

Before the program, the average score of maximum oxygen uptake (VO_2 max) of the sample group was 21.12 (SD = 9.14). After 3 months and 6 months after the program, the number had changed to 29.45 (SD = 8.05) and 30.59 (SD = 8.60), respectively. While considering these 3 scores together using statistic methods, it showed that **the average score of Body Mass Index of the sample group had not increased significantly (P < 0.001).**

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Part 3 following results after the implementation of the qualitative research

This research utilized the techniques of the technical action research approach to study the results of health promotion program developed from the application of Self-efficacy Theory and the Transtheoretical Model into the exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province. The sample group was 71 menopausal women in 8 villages of Nong Tong sub-district who were willing to participate in the program. During the research period, researcher was provided with some useful advices and coordination from Buak Krok medical centre. In this part, the results from the study were examined using qualitative analysis and presented here in parts as follows:

1. Exercise conditions of menopausal women in the area before implementation of the program
2. Exercise conditions of menopausal women in the area during implementation of the program
3. Evaluation of exercise results of the sample group
4. Exercise conditions of the sample group after implementation of the program.

1. Exercise conditions of menopausal women in the area before implementation of the program

The results in this part yielded out from the survey using questionnaires concerning exercise activities created by the researcher. Within 8 villages, the house numbers were chosen randomly through Sample random sampling method from the data in the public health record of Buak Krok medical centre. 250 women were picked out from 572 women aged between 45-59 years old which are considered as a target group. The information collected included regular work activities, leisure time activities, regular exercise and also the willingness to exercise of the target groups. From 156 questionnaires (64%) which had been returned; it can be concluded that, within the target group, 73.3 percent had finished their primary school and now mostly works as a housewife (69.9 percent) with the household income of around

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3,000 baht/month. Watching television and listening to the music are activities in their leisure time and only 19.2 % has regularly exercised 76 percent did not exercise regularly. With these obvious points of poor health behaviors, the researcher had continued on to arrange the informal interviews with community leaders, head of housewife group, and public health volunteers about exercise activities in the community. The results can be concluded as they mentioned that '*there are no any exercise activities in the community yet - neither on their own nor as a group*'.

Concerning their interest and intention to start exercise, they agreed that '*people in the community, more or less, want to exercise. They used to pay the shares on hiring exercise leader to instruct them because they do not know the right way of proper activities. But it did not last long. Loads of people had joined at first. Then it died down until it had to stop because there was not enough money to pay the exercise leader. Thus exercise leaders might help supporting more chances of the activities*'.

2. Exercise conditions of menopausal women in the area during implementation of the program

After the procedure in stage 1, the researcher gathered together 71 menopausal women who had untrained exercise and were willing to participate in the program. The sample group was asked to answer the questionnaire about their readiness for exercise activity. The result showed that 59 women (73.2 %) were in the stage of Preparation while the rest of the group (12 women or 26.8%) were in Contemplation stage. The Preparation stage is the stage that individuals are ready and agree to change their behavior, in this case, are intending to exercise in the immediate future, usually measured as during the next month. In this stage, their intention is linked to the rules of exercise. They might have a clearer exercise behavior and evaluate its expenses and benefits but, anyway, hesitate about their own capability to exercise. While, in Contemplation stage, individuals might start to gather the information related to exercise for their decision making but they might not prepare their readiness for exercise. Thus, in order to equalize the basic knowledge, understanding, and awareness concerning exercise to all members of the group, the researcher arranged 2 focus groups of 9-10 people on May 1st, 2002 for 19 women (26.8%) who were still in

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contemplation stage before implementation of health education program. The objectives of this focus group are to learn more about their attitudes and reasons of avoiding exercise, their understanding on health topics, awareness of self-health, obstacles, and, later, present them the proper practice for good health.

There are some interesting topics which can concluded from focus groups sessions of 19 women in Contemplation stage and was described here as follows

Concerning health topics, even some do not have a clear picture of good health, most of them agreed that '*Physical health is the first to be concerned but, anyway, physical and mental should be considered together*'.

About the topic of good health, they concluded that '*good health means healthy body, no illnesses, no pain, no tiredness, no worries, good emotions, positive attitude, and being sociable.*'

As to their awareness of self-health, many of them mentioned that '*my health now is worse than when I was younger, especially during menopausal period. I had to face many discomforts such as feeling nervous, frustrated, annoyed, tremor, light sleep, and sweaty. Many times I had to get up and take a shower at night. Some has to take hormones prescribed by doctors for a long time, some doesn't*'.

Most of the members did not understand the importance of health promotion. But some gave the ideas of '*good health leads to happiness. So health should be one of the first priorities in life. Prevention is better than cure. I believe good health should start within yourself, then your family and community.*'

Regarding to means used in health promotion, the group gave the importance to '*nutrition, exercise, and relaxation. Concerning exercise, most of the members realize its benefits. But with the wrong understanding of the expenses and the need for equipments, they tend to put off the idea. Some considered working hard on everyday regular activities as exercise while some were too shy because of old age. Time limitation and laziness are among the reasons because they had to arrange a new time table or wanted to just stay at home after work.*'

About their opinions on self-efficacy concerning exercise, some said '*because some of us never joined in any kinds of sports or exercise in the past but now everyone wants to have good health conditions, having exercise leaders and/or trainers might help encourage the activities in the community.*'

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In conclusion, considering the willingness of joining the exercise program arranged to develop the knowledge, level of self-efficacy and outcome expectation in menopausal women, the sample group showed good sign of interest because working as a group would help deter their shyness and/or laziness but exercise leaders and/or trainers should be provided.

After Focus group, exercise specialist came in to give lecture to the member on the topics of easy and proper way to exercise according to sex and age group, and also the benefits of regular and continual exercise on menopausal women in order to persuade them to have better attitude towards exercise and eventually change their behaviors.

Following the preparation stage of contemplation group, the researcher arranged the specialists on Empowerment to organize the activities in order to empower the entire group with higher level of self-efficacy and outcome expectation. 68 volunteers joined the activities with 2 women missing and 1 other sent her husband in her place. From the meeting, it could be found that 59 of them (83.10%) did not perform any exercise activities while the rest of the group (12 women or 16.90%) had exercised before but not regularly. After the empowerment activities, the sample group planed together to choose the meeting room of Nong Tong temple as the exercise ground and picked Aerobic exercise, fast pacing, and jogging as the starting activities. The exercise would start around 17:00 o'clock on Monday, Wednesday, and Friday which was after the common household activities. Besides, the researcher suggested the group which aged over 35 years old and were untrained exercise that they should consider the following procedures:

1. Evaluation of health condition before, during and after the exercise
2. Medical check-up with a doctor before the exercise to prevent any exercise-related injuries
3. Building up the confidence of the sample group by presenting 3 life models who were in the same age group to exchange the successful exercise experiences with them
4. Building up the confidence of the sample group by providing them with useful knowledge, skills development following the program, variations of the activities and also evaluation of the intensity of the exercise by pulse counting.

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5. Self-recorded exercise diary of the sample group which was checked regularly by the researcher for its correction.

Then, for 2 weeks, the exercise leaders started to train any required exercise skills as programmed by the researcher at the meeting room of Nong Tong temple. At that moment, 10 members of the group mentioned the problems about the cultural suitability that *'it is not suitable for groups of women to perform aerobic exercise in temple area. Can we change the exercise ground somewhere else?'*

As the researcher asked for the more suitable area, most of the group mentioned that *'we should ask for the permission to use the lawn area in front of Nong Tong local administration organization. They also have meeting rooms in case of rain so we can use it if needed.'* The proposed area is situated around 700 meters away from the temple. They gave the permission to use the area which the group had used it until the end of the research project.

The exercise activities were implemented according to the plan organized by the researcher and the group. At the beginning of the 4th month, the researcher evaluated the physical fitness of the group for the second time before analyzing the acquired data using statistic methods.

3. Evaluation of exercise results of the sample group

After the implementation of constructed health education program with the sample group, their exercise behavior had improved positively. Within 3 months, 59.15 % of the sample group had participated regularly and followed the progressive of the exercise program. 39.44 % did not join the activities with the excuse of career restrictions. Because the area of study was a large loganberry market during July to August, some members with agriculture-related career could not join the group frequently. However, they said *'I really want to join the activities. But, after Loganberry was collected during the day, we have to sell it in the evening. It is our main income of the year so we have to make the most out of that or we would short of money later.'* They also mentioned *'we do exercise at home and record it every time in the provided diary. When the harvest season is over, we will go back to join the group.'*

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At the beginning of August which was the 4th month of the activities and the end of the harvest period, researcher and the assistance encouraged the temporary-abandoned group to join back in the activities by asking the regularly-attained members to ask their friends and neighbors to participate again.

As most of the group came back together, researcher and the assistance had presented them with the results from the evaluation of health status and physical fitness from the first and the second test, both as an individuals and the whole group. The results showed that the average score of Systolic blood pressure, Maximum oxygen uptake, and Body weight had improved significantly ($P < 0.001$). While considering Pulse at rest, Diastolic blood pressure, flexibility, and hand muscle strength, the average score of all these parameters showed no different in the significant value ($P = 0.004$, 0.004, 0.047, and 0.207, respectively) as shown in table 13.

Table 13 Average score of Pulse at rest, Systolic blood pressure, Diastolic blood pressure, Maximum oxygen uptake, Flexibility, Hand muscle strength, and Body weight

Variables	before the program (n = 69)		3 months after the program (n = 69)				
	$\bar{x}$	SD	$\bar{x}$	SD	t-value	df	P-value
Pulse at rest	81.22	15.30	78.00	11.55	2.97	68	0.004
Systolic B.P.	122.37	20.66	119.88	18.90	4.71	67	<0.001
Diastolic B.P.	72.91	11.62	70.09	10.44	3.01	67	0.004
VO_2 max	2.44	1.67	3.61	1.53	4.50	69	<0.001
Flexibility	3.10	1.59	6.47	1.59	2.03	69	0.047
Hand muscle strength	2.44	1.41	2.64	1.34	1.27	69	0.207
Body weight	61.87	12.10	61.06	11.74	1.17	70	<0.001

The activity in this period of the study was the reflex of the outcome from the exercise program throughout the past 3 month implementation of the program, both advantages and obstacles which could be used to redevelop the procedures in the next stage.

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Some good points include:

1. better health and not easily exhausted
2. sleep deeply
3. more fun and friends
4. lessen stresses

Some opinions from the sample group were

"Since joining the exercise group, my health is getting better. I feel relieved from stress and not easily exhausted. Pains in my joints and waist lessen. My mental health is getting better too from meeting more new friends and chatting with them makes me feel good. I also gain more knowledge about exercise."

"I have exercised for 2 months now. I feel good and lose 2 kilograms already. I used to have the operation to remove stones from my kidney. It left me with pain around my waist. But it is getting better, less pains, and more friends."

"After being participate in the exercise, many good things have happened to me. That includes better digestive system, sleep more soundly, not waking up during the night, longer concentration on work, and better mental health."

Problems and obstacles that were mentioned by the group were the starting time of the exercise, varieties of the activities, and the way to sustain the group after the closure of the program. The group gave the reasons of:

"Because it is approaching wintertime and getting dark quicker during the day, the members who live far away find it inconvenient. We suggest that the exercise should start earlier."

"The current exercises are good. But can we have any other activities which are more suitable with sex and age of the members in the group?"

"I would like to say thank you for giving this opportunity to the community so we can improve our health, agility, and also lessen any muscle pains. I hope this program would stay on for longer."

"After the exercise, we have gained better mental health, less stress, sleep deeply, feel more cheerful and more energetic. If this program has to close, we hope

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that the related authorities would coordinate to continue the kind of activities which benefits the people of Nong Tong community."

From the suggestions, the researcher and the sample group agreed to find the solutions for the problems which can be concluded as follows:

1. The activities would start half an hour earlier. It would be changed from 17:00 o'clock to 16:30 o'clock on Monday, Wednesday, and Friday since the 3rd week of August.

2. The group suggested the local classical dance, exercise activity using staff formulated by Aunt Boonmee, and basic dance sport as more suitable activities. The researcher explained to the group that these selected activities had less intensity than aerobic exercise, and jogging that they might need to extend the exercise duration so that the exercise will reach the intensity target. The re-arranged exercise schedule is as shown.

Monday	exercise using staff basic dance sport for 1 ½ hour
Wednesday	exercise using staff aerobic classical dance for 45 minutes
Friday	exercise using staff aerobic for 45 minutes

3. Concerning the sustainable of the group, they agreed that 5-7 people in the area should still act as the exercise leaders after the closure of the program. 5 women from the sample group and 3 other women from Nong Tong sub-district who regularly participated in the exercise activities were sent to training program for exercise leader to introduce the exercise activities to the community, arranged by 10th medical centre in year 2002. Moreover, the researcher had arranged for aerobic trainers to help developing skills and confidence of the members in the group towards exercise.

4. Regarding the supporting party, the sample group agreed to set up an exercise club, which they will take turn to manage, with Buak Krok medical centre as the main supporter

Moreover, the researcher arranged the lecture on the proper exercise for good health and self evaluation of exercise intensity by pulse counting and talk test. The suggestions made during the study were presented to the group before being implemented until the end of the program.

At the end of 6 month period of the Health Education Program as planned by researcher and the group, the data were collected and it can be concluded that 48

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women (67.61%) in the sample group had participated the exercise regularly. And also, the foundation of Rak Sukapab Nong Tong Group (Nong Tong Health Care Group) was succeeded before the closure of the program on November 14th, 2002.

4. Exercise conditions of the sample group after implementation of the program.

After the study period, all members of the sample group became a part of Nong Tong Health Care Group which has the objectives to

1. become a role model on health care
2. create a unity and help each others, and
3. develop the potentials of the group on encouraging families, neighbors, and other groups in the community to realize the benefits of exercise

At the beginning, the group started with 98 members and 12 of those worked as the management board which would be re-elected every year. Part of the income was donated by the members who joined each exercise session. The group was also supported by Nong Tong Administration Organizations and health network fund from Thai health organization in 2003. The building up of network is now being processed.

The members of the group, especially the ones who participated in the constructed health education program before, work on Tuesday and Thursday as exercise leaders for the nearby villages and come back to exercise together at the lawn area of Nong Tong local municipality on Monday, Wednesday, and Friday.

Conclusion

This study had helped stimulating the community to realize the importance of health care. One other supporting reason might come from the policy from the government concerning exercise at the same time of the study.

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CHAPTER 5
DISCUSSION

This research had utilized the techniques of technical action research approach to study the results of health promotion program developed from the application of Self-efficacy Theory and the Transtheoretical Model into the exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang Mai province. The results from the study were discussed here in 2 parts as follows:

Part 1 The results from action research

Part 2 The results following the research objectives and hypothesis

Part 1 The results from action research

The main objectives of this research were to empower the sample group, which were menopausal women in the area, to develop their level of self-efficacy and outcome expectation and also to encourage them to regularly perform the proper exercise practice without exercise-related injuries in order to maintain their good physical and mental health conditions.

From the survey, the sample group was mainly married women aged between 50-54 years old and finished their primary school. Their occupation was retailer, housewife, employee, agriculture, and government employee in the descending percentage. And because most of them were retailers, their household income varied considerably with the main range of 1,000 – 5,000 baht per month. All 71 members were in good health and willing to participate in the program but they were under untrained exercise and did not join in any sporting activities

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before. With this reason, the readiness to exercise was different among the sample group which was needed to be screened and prepared before providing of knowledge, understanding, and their mastery experiences through skills training concerning exercise. Thus, the researcher organized the session to evaluate their readiness before implementation of health education program. From the evaluation, the group was divided into 2 subgroups – 52 members (73.23%) were in preparation stage and 19 members (26.77%) were in contemplation stage – which indicated that 52 women had already made their decisions and were willing to change their behavior in the near future that is normally within 1 month (Sally A. Shumaker, et al., 1998, 59-61). In order to reduce the drop out rate and prepare the readiness of the contemplation group which was the group that starts collecting exercise information but delays their decisions because of the hesitancy about their own ability to adjust to any new behaviors, researcher arranged for them 2 focus groups of 9-10 people on May 1st, 2002 to learn more about their attitudes and reasons of avoiding exercise, their understanding on health topics, awareness of self-health, obstacles, and, later, present them the proper practice for good health in order to persuade them to have better attitude towards exercise and eventually change their behaviors.

From the focus groups session, the researcher found that the reasons of avoiding exercise of the sample group were mainly personal barriers, for example, lack of time, lack of knowledge, motivation, and confidence, other health concerns and age issue. The similar result was reported by Amy A. Eyler et al. (1998: 640-652) in the study to explore patterns of physical activity among minority women older than age 40 in California and Missouri which indicates that the lack of exercise in the sample group caused by several barriers such as personal lack of time, health concerns, lack of motivation, lack of social network, age issue, lack of knowledge, lack of self-esteem and other environmental factors such as access, safety, weather, race and cultural issues. The main excuses that hinder the exercise in menopausal women included lack of time due to their duties and responsibilities in their social life, less concern about their health from their wrong perception that no illness is good health, and lack of exercise experiences that lower their

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confidence towards exercise. These topics can be improved through empowerment procedures, correction of their wrong perceptions, and also learning encouragement through all of four sources of self-efficacy, past performance accomplishment, mastery experiences, verbal persuasion, and the interpretation of physiological state(Bandura,1977) using exercise skills training to prevent any exercise-related injuries

After the sample group was prepared to be all in preparation stage, the empowerment activities were performed to help them strengthen their level of self-efficacy and outcome expectation. The activities included participation of menopausal women to fully arrange their preferred exercise activities (Suwan,P. 2540: 34-37), exchange of vicarious experiences from exercise with life models that were in the same age with the sample group, and use of Symbolic model such as Posters, leaflets, or video presentation which Bandura (1977: 104) believed to be an effective mean to develop their level of self-efficacy through direct experiences. Thus, in order to increase the level of self-efficacy in the sample group, the researcher had to develop their confidence that exercise would be practiced correctly, safe and beneficial to their health. Verbal persuasion and sincerity from the researcher helped creating the positive thinking and the readiness to join exercise activities. Also, the clarification of implementation procedures and exchange of opinions with the group created the better understanding between the group and researcher. The study was divided into 4 phases as follows:

1. Planning phase

After the activities to prepare the sample group to be ready for the exercise, the group and researcher planed together the program arrangement for the next 6 months such as targets of exercise behaviors, frequency and duration, exercise recording, and goals of exercise evaluation. The group picked Aerobic exercise, fast pacing, and jogging as the starting activities. The exercise would start around 17:00 o'clock on Monday, Wednesday, and Friday which was after the common household activities.

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2. Implementation and observation

After the planning stage, the sample group had to follow the procedures suggested by ACSM's (2000) which mentioned that, before starting the exercise, the group of participants who aged more than 35 years old and were under untrained exercise conditions need the physical check-up and health evaluation from the doctor to prevent any injuries that might happen from the exercise.

At the beginning of the exercise program, the group was trained their exercise skills by exercise leaders who was standardized before by the researcher and also their skill on intensity evaluation by pulse counting and talk test. Their confidence was built up by attending the lecture given by experts on health education and exercise practice. During the implementation of the exercise program, the progress of the group was evaluated and supported periodically such as through compliments given to the members who regularly participate in the exercise. The problems and obstacles also were pointed out to be brainstormed for the solutions. One example was the problems about exercise ground that, while using the meeting room of Nong Tong temple, members of the group mentioned the problems about cultural suitability that 'it is not suitable for groups of women to perform aerobic exercise in temple area. Can we change the exercise ground somewhere else?'

As the researcher asked for the more suitable area, most of the group mentioned that 'we should ask for the permission to use the lawn area in front of Nong Tong local administration organization. They also have meeting rooms in case of rain so we can use it if needed.' The proposed area is situated around 700 meters away from the temple. They gave the permission to use the area which the group had used it until the end of the research project.

During the exercise program as planned together by researcher and sample group, the researcher continued to evaluate the progress of the sample group through participatory learning and found that the group could exercise correctly with more energetic movements and unison every time they signed up for the exercise. Within 3 months of the implementation of the program, 59.15 % of the sample group had participated regularly and followed the progressive of the exercise program. 39.44 % did not join the activities with the excuse of career restrictions. Because the area of study was a large loganberry market during July to August, some members with

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agriculture-related career could not join the group frequently. However, this part of the group agreed to exercise at home and recorded in the provided exercise diary before coming back again at the end of the loganberry season.

At the beginning of August which was the 4th month of the activities and the end of the harvest period, researcher and the assistance encouraged the temporary-abandoned group to join back in the activities by asking the regularly-attained members to ask their friends and neighbors to reduce the dropout rate and to participate with the group again.

3. Reflection

After most members in the sample group had came back to exercise together, researcher and the assistance presented the evaluation of their health and other physical conditions between the first and the second test, both as a whole group and individuals. From the analysis, the exercise program caused the good and significant improvements ($p<0.001$) in the average score of maximum oxygen uptake, and body weight of the sample group.

The group also presented the incentives to the member who lost most weight, the less absent members, and the members who regularly shared the successful stories about their time management with the group. These successful members had also become the role models for the whole group.

The activities in this stage were the reflex of the outcome from the exercise back to the sample group and also the discussion of problems and obstacles in the past 3 months of the activities to be used in the next stage of the program.

The obstacles that the group found and needed improvements to be more suitable with the spatial conditions and current situations can be divided into topics as follows:

a. Personal issue
   - Their responsibility to look after their grandchildren while the parents was still away at work, which was at the same time as the exercise session.
   - Their personal occupation as retailers that could not find anyone to substitute their positions while away to the exercise.

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b. Environmental issue
   - heavy rain and flood in the area
   - From October, which is the beginning of winter, the starting time of the exercise at 17.30 o'clock was a bit late because it was dark by the end of the activities and the members found it difficult to go back home.

c. Community issue

   - Most members of the sample group were worried about lack of exercise leader after the closure of the program and also needed other types of exercise skills.

4. Re-planning

After the obstacles had been gathered, the sample group and researcher came together to plan for the solutions of these problems which can be concluded as follows:

a. Personal issue
   - Concerning their responsibility to look after their grandchildren, the group suggested that the members should take the children with them to the exercise ground as the area has fences and lawn for the safety and space for the children already.
   - About their occupation as retailers, the group agreed that, only on Monday, Wednesday, and Friday which were chosen for the activities, they would ask the member in their family to substitute in their positions while away to the exercise.

b. Environmental issue
   - Concerning heavy rain and flood in the area, it was already near the end of the rainy season by the end of the first 3 months.
   - The group agreed to move the starting time up earlier to 16.30 o'clock so that it would be more convenient and safe for the members to go back home.

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c. Community issue

i. The group suggested the local classical dance, exercise activity using staff formulated by Aunt Boonmee, and basic dance sport as more suitable activities. The researcher explained to the group that these selected activities had less intensity than aerobic exercise, and jogging that they might need to extend the exercise duration so that the exercise will reach the intensity target. The re-arranged exercise schedule is as shown.

Monday	exercise using staff	basic dance sport for 1 ½ hour
Wednesday	exercise using staff	aerobic classical dance for 45 minutes
Friday	exercise using staff	aerobic for 45 minutes

ii. Concerning the sustainable of the group, they agreed that 5-7 people in the area should still act as the exercise leaders after the closure of the program. 4 women from the sample group and 3 other women from Nong Tong sub-district who regularly participated in the exercise activities were sent to training program for exercise leader to introduce the exercise activities to the community, arranged by 10th medical centre in year 2002. Moreover, the researcher had arranged for aerobic trainers to help developing skills and confidence of the members in the group towards exercise.

At the end of 6 month period of the Health Education Program as planned by researcher and the group, the data were collected and it can be concluded that 48 women (67.61%) in the sample group had participated the exercise regularly. From all 71 members, only 1 woman was dropout from her personal reasons that forced her to quit the activities before the end of the program.

The rest of the members continued to work on the foundation of Rak Sukapab Nong Tong Group (Nong Tong Health Care Group) and was succeeded before the closure of the program on November 14th, 2002. Later, Fond Jerng, another local traditional dancing with lively music, was adapted to be used as one more exercise activity. Furthermore, the members of the group, especially the ones who participated in the constructed health education program before, work on Tuesday and Thursday as exercise leaders for the nearby villages and

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come back to exercise together at the lawn area of Nong Tong local municipality on Monday, Wednesday, and Friday.

Following outcomes after the closure of the program

Apart from the development of exercise skills to change the health behaviors of the sample group, the study also inspired more health-related activities. After the study period, all members of the sample group became a part of Nong Tong Health Care Group which has the objectives to

1. become a role model on health care
2. create a unity and help each others, and
3. develop the potentials of the group on encouraging families, neighbors, and other groups in the community to realize the benefits of exercise

At the beginning, the group started with 98 members and 12 of those worked as the management board which would be re-elected every year. Part of the income was donated by the members who joined each exercise session. The group was also supported by Nong Tong Administration Organizations and health network fund from Thai health organization in 2003. The building up of network is now being processed with the sign-up members of 350 already.

Part 2 The results following the research objectives and hypothesis

Hypothesis 1

After the Health education program, the sample group has good improvements on knowledge concerning exercise, perceived self-efficacy, outcome expectation and exercise behavior.

Knowledge concerning exercise

From the study, it can be concluded that, **after the Health promotion program, the knowledge concerning exercise of the sample group had improved significantly** (table 9). The details of the acquired knowledge included patterns of

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exercise for good health, various exercise methods, benefits of the exercise, possible drawback of the exercise, cautions during the exercise, and likely injuries from the exercise which was provided to the group through the given lectures, exercise handbook, and group discussion. ChanMolee, S.(2543: 113-120) mentioned that giving lecture is the most popular and easiest means in participatory learning, especially when used along with group discussion and exchange of questions. This method was adapted effectively to be used with group of menopausal women who were in the same age group, nearby neighborhood, and dealt with the same physical changes. Furthermore, the application of Self-efficacy Theory and the Transtheoretical Model as the guidelines for activities arrangement, providing of knowledge, skills training, practicing, group discussion, and conclusion of important topics had helped developing the average score of knowledge concerning exercise of the sample group. This result was supported with the study by Traetulakarn, W. (2541: abstract) who applied Self-efficacy Theory and learning participatory into the health promotion program for the group of first year nursing student from Boromrajchonnee Sritanya nursing college. The study concluded that the levels of knowledge concerning exercise, perceived self-efficacy, outcome expectation and exercise behavior after the exercise program were improved significantly. Another study by Elizabeth, M. et al (2000: abstract) about the influence of social encouragement and self-efficacy theory over physical activity of menopausal women in Pennsylvania state also echoed the result. It was found that the level of maximum oxygen uptake of the body, leg muscle strength, perceived self-efficacy, and exercise skills on running, walking, and cycling had improved significantly when compared with the records before attaining the program and that of the control group. Furthermore, these results contribute to the literature that examine the effects of exercise participation suggesting that the interventions that include physical activity participation and address determinants of activity participation may have positive outcomes.

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Perceived self-efficacy concerning exercise

The level of perceived self-efficacy of the sample group had no significant change after the program (table 9). The reason was that the sample group perceive the beneficial of exercise from their experience. It was described in the survey that, more than 6 months before the study, the group had came together to hire an exercise leader. But the activities did not last long from the unequal skills of the members, which caused high dropout rate and closure of the group at the end. However, the group still possessed the strong will to exercise from their perception of the importance of exercise on health. Bandura(1977) interpreted that, one' s physiological state when exposed to a situation can also influence self-efficacy. Those who understand their physiological response continue to pursue their goal.

With this past experience of the exercise, their level of self-efficacy was still kept in high standard after that. Even with other supporting strategies including positive empowerment by means of reward and verbal persuasion by the researcher and assistance during the implementation of the program, their level of self-efficacy still had no significant difference at the end of the study. The other possibility was that, during the beginning period of the program, the government released new campaign of '30 Baht to cure all illnesses' and one of the strategies used to support the idea was the campaign to encourage all level of population to exercise regularly. These campaigns were introduced through many public media such as television, radio, and poster that might be another stimulus on helping the sample group to realize their level of self-efficacy.

However, the preparation of exercise experiences in the study, empowerment and encouragement from people around such as family, and verbal persuasion by researcher and assistance might influence the level of self-efficacy of the sample group to increase slightly. Boonweerabud, S.(2541: 65) also mentioned that perceived self-efficacy is an important and necessary thing over the development of the ability of good sportsman. It has great influence over the inspiration and sporting performance. Pride and awareness of their ability are not automatically built up. But it needs good preparation of sporting experiences, reflection, and encouragement from people involved such as parents, trainers, and teammates to create a good perceived self-efficacy and further development of their ability.

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Outcome expectations from the exercise

After participating in the constructed health education program, the level of outcome expectation of the sample group had improved significantly (table 9). It showed the success of the arranged session to build up the confidence of the sample group by presenting 3 life models that were in the same sex and age with the group to present the successful exercise experiences with them. Among members, the group had also exchanged their progress on physical health including weight, blood pressure, and pulse at rest. The results of physical fitness evaluation were presented to the group, both as a whole and each individual, periodically. After 3 months of the activities, for example, it showed that regular exercise had good influence over the average score of Diastolic blood pressure, maximum oxygen uptake, and body weight of the sample group significantly ($p<0.001$). All these activities gave positive direct experiences to the sample group, which helped increasing their level of outcome expectation. Bandura(1977) has identified outcome expectation as the person's estimate that a given behavior or performance will lead to a certain outcome. There are three categories of outcome expectation ; physical, social, and evaluative which may positive or negative in nature. In this research outcome expectation mostly positive self evaluative outcome in the form of satisfaction in exercise regimen.The result was echoed in the study concerning the adaptation of self-efficacy theory to create the effectiveness of Health Promotion program using self-efficacy theory compared with that using social support theory to change the behavior of 2nd type diabetes patients in Srikorapoom hospital, Surin province by Hongpipat, R.(2544: abstract) It was concluded that, after the program, the first sample group had acquired significant changes in the level of knowledge concerning diabetes, outcome expectation, practice, sugar level in blood and blood circulation when compared with that of the control group. While, in the second group, the level of knowledge concerning diabetes, social supports, practice, sugar level in blood and in blood circulation had improved significantly after the program and were better than that of the control group. It also was found that the knowledge concerning diabetes of the first sample group was better than that of the second group; even it could not be noticed in practice.

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Exercise behavior

From the study, it can be concluded that, **after the health education program, the average score of exercise behavior in the sample group had improved significantly** (table 9). The implementation of Health Education Program adapted from self-efficacy theory and the use of role models showed the sample group the proper activities to be compared with their own practices and helped improving the level of their perceived self-efficacy and outcome expectation that they are able to reach the same goals of good health as did the role models. This had encouraged their level of determination, willing, and patience on practicing their proper exercise skills according to sex and age in order to maintain their good health conditions. Periodically, the researcher and assistance also utilized the empowerment procedures by means of reward and persuasive conversation to accelerate the expected outcomes of behavioral change. Moreover, with the participatory observation on the involvement of the members throughout the study period by the researcher, most members of the sample group had attained the exercise activities on the planned date and time. In the early stage of the exercise program, the provided exercise leaders had led the group's activities, given the instructions on proper exercise such as evaluation of each individual's proper intensity by pulse counting or their level of tiredness, and also the proper dress for exercise such as proper socks and shoes to prevent any possible injuries from the exercise. After 3 months of the program, the candidates from the group were chosen to be trained as the exercise leaders and agreed to take turn to have the responsibilities as group leader. With these strategies, the group would be provided with enough knowledge and skills concerning exercise to continue their practice after the closure of the study. These methods, coupled with verbal persuasive by the researcher, also encouraged the willingness and participation among the sample group which indicates that the adaptation of self-efficacy theory with the exercise program had successfully helped the sample group to change their exercise behavior. The study by Elizabeth, M. et al (2000: abstract) about the influence of social encouragement and self-efficacy theory over physical activity of menopausal women in Pennsylvania state also echoed the result. It was found that menopausal women with high level of self-efficacy and outcome expectation had realized the importance of arranging some extra time from their routine activities to exercise at

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least 30 minutes a day for 3 days a week and recorded the performed activities into their exercise diary.

Besides the aforementioned research, Hongpipat,R. (2544: abstract) had studied the effectiveness of Health education program using self-efficacy theory compared with that using social support theory to change the behavior of 2nd type diabetes patients in Srikorapoom hospital, Surin province. After the program, the first sample group had acquired significant changes in the level of knowledge concerning diabetes, outcome expectation, practice, sugar level in blood and blood circulation when compared with that of the control group. While, in the second group, the level of knowledge concerning diabetes, social supports, practice, sugar level in blood and in blood circulation had improved significantly after the program and were better than that of the control group. It also was found that the knowledge concerning diabetes of the first sample group was better than that of the second group; even it could not be noticed in practice.

Hypothesis 2

After the Health education program, the sample group has good physiological change on Body Mass Index, Pulse at rest, Blood pressure.

2.1 Body Mass Index

The average score of body mass index before and after the program did not show any significant different (table 10). Body Mass Index is a mean to evaluate the level of protein and energy of the body which can be easily performed with fewer expenses. It can be calculated by dividing of body weight in kilograms with square of height in meters. From the reviewed literature, body mass index has a direct relationship with body fat but, on contrary, has very little relationship with height (Tunpaichit,W. 2536: 60-61). Normally, there are many factors that influenced the change on Body Mass Index such as dietary, exercise and behavioral changes which leads to the imbalance of the energy received from food and that used in routine life. The reduction of body fat takes time in order to cause no harm to the body. In this study period, only the exercise had been performed without controlling of other influencing factors which might slow down the change in

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Body Mass Index. The study by Chayakul,C. (2538: 107) and Pomboonmee, K. (2538: 68) found that the average score of elderly did not change after arranging of the exercise session.

2.2 Pulse at rest, diastolic blood pressure, and systolic blood pressure

Pulse at rest

The average score of pulse at rest of the sample group decreased slightly with no significant value after the program (table 10). This can be explained that, according to the physiology of individual under untrained exercise, their physiology responses to aerobic conditioning included increase of maximum oxygen uptake, decrease of pulse at rest and exercise heart rate with no change in maximum heart rate. These changes are negatively correlated with age (ACSM, 1998: 156-158). Thus, the average score of pulse at rest of the sample group, which consisted women aged between 45-59 years old and under untrained exercise conditions, showed no significant different between before and after the program.

Systolic Blood pressure at rest

The average score of systolic blood pressure had no significant change after the program (table 10). The reason might be because, according to the physiology of individual under untrained exercise, their physiology responses to aerobic conditioning included maximum ventilation, stroke volume, cardiac output, and blood volume (resting) with no change in systolic blood pressure. That might be the reason of no changes in systolic blood pressure after the exercise program with the intensity of 65-75 % of maximum heart rate. The recommendations by Hagberg (1990: quoted in Bourchard and Despres, 1991: 268-275) mentioned that the maximum pulse rate has a diverse relationship with the intensity of aerobic exercise($r = -0.40$) which means that while the exercise intensity is low, the decrease rate of systolic blood pressure at rest would be high and vise versa. The study by Triseang, A. also concluded that there were no different in maximum pulse rate between the studied groups of elderly who exercise at the different intensity of 60-65, and 70-75 % and that of the control group at the end of 24 weeks of the study.

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Diastolic blood pressure at rest

The reason that the average score of Diastolic blood pressure had no significant different before and after the program might be because the Diastolic blood pressure of the sample group before the program were ranged between 71-82 millimeter Hg which is in the normal range according to their age (age 40-49 = 76±12, age 50-59 = 78±11). Pollock and Wilmore (1990 quoting National Institutes of Health, 1984) mentioned that the level of diastolic blood pressure at less than 85 millimeter Hg is considered normal and also stated later (1990) that the level of diastolic blood pressure at rest in adult after aerobic exercise, which is the exercise that cause positive result over heart and coronary systems, has no different or only little change. Blomquist (1981: quoted in Goldberg and Elliot, 1994) also concluded that exercise causes no changes or insignificant difference in diastolic blood pressure. Thus, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had no influence over the level of diastolic blood pressure in menopausal women.

After the Health promotion program, the sample group has good improvements on blood cholesterol, serum Triglyceride, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL)

Blood cholesterol

The average score of the level of blood cholesterol of the sample group had decreased significantly after joining the program (P < 0.001). That was because the constructed exercise program consisted of aerobic exercise which immediately lowers the level of blood cholesterol. Energy is needed every time that any muscles contracts. In the early stage of contraction, muscles utilize its source of energy within itself which are fatty acid and glycogen. Once the exercise period lasts long enough and the source of energy within the muscle was spent, Glucose and fatty acid in blood is used which cause the movement of fat outside the muscle to be used as the source of energy. After 20 minutes duration of exercise, 50% of glucose and 50% of fat would be burned. The longer the exercise duration lasts, the higher rate of burning would be. Thus, the arrangement of aerobic exercise for the sample group which lasts 30-45 minutes, 3-5 times a week, and the exercise intensity of 70-75% of maximum pulse rate would help lowering the

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level of blood cholesterol. Moreover, the decrease of blood cholesterol might come from the higher level of high density lipoprotein which helps carrying cholesterol in blood and tissues back to be destroyed at kidneys (Lohleka, P. 2536). Exercise also cause the higher level of lipoprotein Lipase which lowers the level of low density lipoprotein and lower the overall blood cholesterol. The reason is that low density lipoprotein carries cholesterol and phospholipids to tissues. When the level of low density lipoprotein is lower, less cholesterol adhere to blood vessels which cause the better circulation of blood (Lohleka,P. 2536). The results was echoed by the study of the effects of exercise program on chemical substances in blood of middle-aged women by Pitak-unnop,W. which concluded that the level of blood cholesterol in 3 sample groups decreased significantly after the program ($p = 0.05$). The study by Chawruayhak, N. about the effects of walking exercise at different times of day and the change of fatty substances in blood of elderly women mentioned that, after the program, the level of blood cholesterol in the sample group decreased significantly ($p = 0.05$). The similar result was mentioned in the study by Hyeewiyom,C. about the effects of self care using exercise to lower the level of blood pressure and cholesterol in blood of elderly women which concluded that, after 26 weeks of the program, the level of blood cholesterol in the sample group decreased significantly ($p = 0.05$). Therefore, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had decreased the level of blood cholesterol in menopausal women.

Low density lipoprotein (LDL)

The average score of the level of low density lipoprotein in blood of the sample group had decreased significantly after joining the program ($P = 0.05$). The lower level of LDL might be because exercise causes the higher level of lipoprotein Lipase which lowers the level of low density lipoprotein and lower the overall blood cholesterol. The reason is that low density lipoprotein carries cholesterol and phospholipids to tissues. When the level of low density lipoprotein is lower, less cholesterol adhere to blood vessels. The other reason is the increasing of LDL receptor that causes more LDL to be utilized. These reactions need more than 24 weeks of exercise (Lohleka,P. 2536) as also mentioned in the study by Chawruayhak, N. about the effects of walking exercise at different times of day and the change of blood

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cholesterol, serum Triglyceride in blood of elderly women that, after the program, the level of low density lipoprotein in blood of the sample group decreased significantly (p = 0.05) when compared with that of the control group. Thus, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had decreased the level of Low density lipoprotein in menopausal women.

High density lipoprotein (HDL)

The average score of the level of high density lipoprotein in blood of the sample group had increased significantly after joining the program (P < 0.001). The higher level of HDL might be because exercise has direct effects on the production of HDL and also the lower of Hepatize Lipase which is the enzyme in kidney that cause the change of cholesterol, increase the effectiveness of lipoprotein in lipid fixation and release more HDL into blood circulation. However, Woods et al. (1983: quoted in Goldberg and Iliad, 1944) mentioned that, in order to cause any physiological change and increase the level of HDL, the duration of the exercise should last more than 4-12 weeks at the intensity of 50 % of maximum heart rate as the lowest intensity. Consequently, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had increased the level of high density lipoprotein in menopausal women.

Serum Triglyceride

The average score of the level of serum triglyceride of the sample group had not changed significantly (P = 0.107) after joining the program. That was because the level of serum triglyceride in blood of the sample group was in normal level before joining the exercise program. Lohleka,P. (2536) stated that the suggested level of serum triglyceride should be kept under 250 milligram per one deciliter of blood. Bouchard and Despres (1995) mentioned that exercise can cause obvious changes in the level of serum triglyceride only if that level before the activities was high. Only very little changes could be detected if the level of triglyceride was normal. As a result, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate for 24 weeks had no influences over the level of High density lipoprotein in menopausal women.

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After the Health promotion program, the sample group has good improvements on Maximum oxygen uptake, Hand muscle strength, and Flexibility

Maximum Oxygen Uptake

From the study, it can be concluded that **the average score of maximum oxygen uptake of the sample group had increased significantly after joining the program (P < 0.001)** as shown in table 16**.** That is because the sample group was under untrained exercise conditions before the study. After the participation in the exercise program, which consisted of 3 stages – warm up, exercise, and cool down, some physiological changes occur to their blood circulation system and increase the level of maximum oxygen uptake. The warm up stage of the exercise is the stage in which the muscles are stretched by walking and jogging. The activities in exercise stage are mainly consisted of many types of aerobic exercise such as fast pacing, jogging, and low impact aerobic exercise. Each session of the exercise lasted between 30-45 minutes for 3 times a week. The exercise were arranged to increase its intensity gradually following the stages of improvement of initial stage, improvement stage, and maintenance stage, which all together lasted 24 weeks. The sample group would be trained to get used to the exercise at the intensity of 70-75 % of maximum pulse rate which benefits the functions of the heart, lungs, coronary and blood circulation system, and also increase the level of maximum oxygen uptake (ACSM's, 2000: 4-5). These benefits yielded out from these following reasons:

1. Exercise helps strengthen the muscle related to breathing system and reduce the resistance of airflow that, in consequence, let the air to flow in and out of lungs easier.
2. Exercise benefits in better functions of the heart, causes more volume of blood flow per each beat, better airflow with oxygen from lungs to the heart, and more effective oxygen transfer to parts of the body.
3. After the exercise, every muscles of the body strengthen. Improvement of blood circulation system and its function helps reducing blood pressure and the heart from overworked.

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4. Exercise improves the volume of blood flow and red blood cell that carries oxygen to parts of body. These physiological changes improves the functions of the heart and coronary systems, breathing systems, and muscles to be more effectively that yielded out in higher level of maximum oxygen uptake.

The same results were concluded in the study by Poonsawat.K. (2527: abstract) that, after the arrangement of exercise activities for 2 groups of 20 male students to exercise by jogging and bicycling respectively for 20 minutes a day, 3 times a week for 8 weeks, the level of maximum oxygen uptake had improved in both groups. In the study about the effects of exercise frequency over the physiological changes of the body by Chaisri, P (2530: abstract), 30 high school male students were divided into 2 groups to exercise by bicycling at 2 different levels of frequency. The exercise lasted 10-20 minutes each session at the intensity of 60-80 % of maximum heart rate for 8 weeks. It was found that, after the training, the level of maximum oxygen uptake had improved in both groups. Mahaniyom, S (2532: abstract) also stated the same results in the study about the effects of exercise at different intensity and duration over the physiological changes in male students. The sample group was 88 male students aged between 18-22 years old, which were divided into 4 groups to exercise by bicycling at the different programs for 8 weeks. At the end of the program, the level of maximum oxygen uptake of all 4 groups had improved significantly. Also, the study by Suwanwong, C (2531: abstract) about the effects of jogging and aerobic dance on physical conditions of high school female students concluded the same results. The group of 30 female high school students was divided into 2 subgroups to exercise by jogging and aerobic dancing for 8 weeks. After the program, their overall physical conditions had improved as well as the level of maximum oxygen uptake. Thus, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had increased the efficiency of maximum oxygen uptake in menopausal women.

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Hand muscle strength

The average score of hand muscle strength of the sample group had not changed significantly after joining the program. From the exercise program, the activities - which consisted of 3 stages of warm-up, aerobic exercise, and cool-down - were constructed with stretching exercise, isometric exercise, and exercise using their own body weight. These exercise movements in warm-up and cool-down stages such as arm stretching, arm swinging, arm bending, press-up, sit-up, and triceps dip are the functions training of shoulder, arms, hands, and joints muscles by letting them stretch under the resistance. This training would be more effective if the muscles are gradually under the resistance or increasing weight for an extended period of time that the muscles works a little bit over their normal capacity. This works put on the muscles might cause the confusion of the body in the early stage (2-3 days) then the body would adjust to the conditions which normally takes about 25-30 days. After the adjustments, the level of normal capacity would increase which means the muscles are stronger. But the improvement of muscle strength in the group of aged people as in the sample group of this study is not easy. As mentioned by Pollock et al. (1998: 9) and ASCM (1998: 156-158), the improvement of muscle strength is negatively correlated with age. Consequently, from this study, it can be concluded that the exercise program at the intensity of 65-75 % of maximum heart rate had no influences over the level of hand muscle strength in menopausal women.

Flexibility

From the study, it can be concluded that **the average score of flexibility of the sample group had no significant changes after joining the program.** That is because the sample group already possessed the high level of flexibility before the program. During the participation with the program, the exercise movements in warm-up stage consisted of the stretching exercise, both in stand up and sit down positions then reach down for their toes, and also the paired exercise by letting each other to pull their limbs to stretch the muscles until the related joints strained while the other forced the movements in the opposite ways for 10 seconds before relaxing and repeated again for 3 times. These 2 movements are the

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techniques to stretch the back muscles, leg muscles, and joints to improve their level of flexibility. This so-called passive stretching is a very popular technique for physical therapist to stretch the muscles and joints of the patients with joint problems. It also is called Proprioceptive neuromuscular facilitation (PNF) with the concepts that light stretch in parts of the body might decrease the stretch reflex of the muscle because Golgi tendon which is the sensor part of muscle are refrained and let the tension of muscles cease. When the muscles are under relax conditions, the flexibility of muscles and joints of the moving parts increase and work effectively. But from the reason mentioned before that the sample group had already possessed the high level of flexibility, the exercise program at the intensity of 65-75 % of maximum heart rate for 24 weeks had no influences over the level of flexibility in this group of menopausal women.

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CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

This study was the implementation of action research along with the participatory learning of the sample group. Its objective was to study the effect of health education program developed from Self-efficacy Theory and the Transtheoretical Model on exercise behavior of menopausal women in Nong Tong sub-district, Hang Dong district, Chiang-Mai province.

The sample group used was 71 menopausal women aged between 45-59 years old and resided in Nong Tong sub-district, Hang Dong district, Chiang-Mai province. The duration of the study lasted 28 weeks from May 1st, 2002 to November 11th, 2002.

Questionnaires developed from the Transtheoretical Model were used to classify the level of readiness for exercise activity of the sample group and to adjust their attitudes before the implementation of the health education program. The information about knowledge concerning exercise, level of perceived self-efficacy, outcome expectation, and exercise behavior along with the changes in health of the sample group was collected before and after the program. All data was evaluated at the end of the exercise activities using computer program

Conclusions of the study

1. Characteristics of the population and the sample group

From the survey, the sample group was mainly married women aged between 50-54 years old and finished their primary school. Their occupation was retailer, housewife, employee, agriculture, and government employee in the descending percentage. And because most of them were retailers, their household income varied considerably with the main range of 1,000 – 5,000 baht per month. Most of the members considered themselves to have good health. The rest of the group complained of their personal illness such as blackout, fatigue, back pain,

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arthritis, hypertension, and diabetes. Their favorite activity in their spare time was watching television. Concerning exercise behavior, the group hardly exercised with the excuses of having no time, no knowledge on correct and proper exercise, no support from friends, and no intention to exercise, respectively. After evaluation of the readiness for exercise before the implementation of the health education program, it was found that most of the group was in preparation stage while the rest was still in contemplation stage. In the latter stage, individuals started to determine about the outcome of the activity but hesitate to make any decisions and might stuck in chronic contemplation that the researcher needed to improve their readiness to match the rest of the group before the exercise program.

1. Evaluation of the average score on knowledge concerning exercise, outcome expectation, and exercise behavior of the sample group before and after the participation in health promotion program.

After the program, the average score of knowledge concerning exercise, outcome expectation, and exercise behavior had increased significantly which followed the research hypothesis.

2. Evaluation of the average score on perceived self-efficacy of the sample group before and after the participation in health education program.

The average score on perceived self-efficacy had no significant change after the program, which was against the research hypothesis.

3. Evaluation of the average score on body mass index, pulse at rest, systolic blood pressure and diastolic blood pressure at rest of the sample group before, during, and after the participation in health education program.

The average score on body mass index, pulse at rest, systolic blood pressure and diastolic blood pressure had no significant changes after the program, which was against the research hypothesis.

4. Evaluation of the average score from blood test for blood cholesterol, triglyceride, high density lipoprotein (HDL), and low density lipoprotein (LDL) of the sample group before, during, and after the participation in health education program.

After the program, the average score of blood cholesterol and low density lipoprotein (LDL) had decreased significantly while the level of High density lipoprotein (HDL) had significantly increased which followed the research hypothesis.

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However, the average score of serum triglyceride had no significant changes after the program, which was against the research hypothesis.

5. Evaluation of the average score from physical test for maximum oxygen uptake, hand muscle strength, and flexibility of the sample group before, during, and after the participation in health education program.

After the program, the average score of maximum oxygen uptake had increased significantly which followed the research hypothesis.

However, the average score of hand muscle strength and flexibility had no significant changes after the program, which was against the research hypothesis.

6. Evaluation of qualitative data

After the implementation of the constructed health education program, the sample group had acquired better knowledge and outcome expectation from regular exercise. These changes were the success of the health education activities arranged together by the sample group and researcher. The activities were arranged to point out the proper exercise behaviors according to their age and sex and also improper exercise activities through the lecture by exercise experts, video presentation, poster, leaflets, and exercise leaders. Role models with successful exercise stories were also used to exchange their vicarious experiences with the group along with the successful members of the group chosen by means of social dimension. Using the members in the group as role models helped others to have more confidence on their ability and outcome expectation which influenced their exercise practice. In this study, the researcher used the results from physiological test of the members in the group as the case study to persuade and compliment after the good and correct practice by putting their name up on the notice board and presenting them with reward. These results from physiological test were important stimulus for the group to realize the benefits of exercise and encourage their behavioral changes.

Furthermore, setting up each member's expected outcomes from the exercise was another strategy to shape up their behavior following each individual's expectation magnitude. For example, on a 'wish' board, the ones who are anticipating the beauty accomplishments should put their best photograph up while the ones who are concerned about health can stick their expectations on the

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board as well. Also, one more activity used was the paired-discussion of the feelings towards each other to stimulate the behavioral changes.

As performing the exercise activity following the intensity assigned in each phase, the group also was trained the skills for exercise intensity evaluation by pulse counting to evaluate the proper intensity for themselves and to realize the benefits from the exercise.

2. The implementation of health education program developed from the application of Self-efficacy Theory and the Transtheoretical Model into the exercise program for menopausal women in Nong Tong sub-district, Hang Dong district, Chiang-Mai province was one application of technical action research. Its objective was to find the solutions for the lack of exercise activities in menoposal women from Nong Tong sub-district. The researcher started out as coordinator in the program before fading away gradually from the activities with the hope that the group can continue their abilities to solve the problems effectively. The research procedures can be described as follows:

1. Choosing of target community systematically started with the collection of its socio-economic data.

2. Creating the welcoming atmosphere in the community. This study had received some good responses from the community. That might be because of the government's policies concerning health promotion program and development of behavioral potentials in the community with the target of 60% of all population to attain some form of exercise regularly.

3. Identification of limitations and needs of the community.

4. Planning of the exercise activities which were related to the objectives, duration and types of the activities, and resources needed for planning.

5. Implementation of the program as planned with the sample group.

6. Evaluation and reflection. The sample group and researcher agreed to record all management procedures and activities which were related to the program in the provided diary to keep any useful information. These useful data were evaluated and the problems were solved periodically during the program. At the end of 24 weeks, the final evaluation was implemented in order to explain the proper procedures used for the progress of the program and its success. The success of this researcher was due to regular follow-up and evaluation of the situations.

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7. Spirals and System setting of Technical action research. This stage occurred when parts of the group could not attend the exercise during Loganberry harvest period. Its objectives were to prevent any Exercise relapsing of the sample group, and to gradually transfer the responsibility on exercise management to the representative of each 8 villages in the sample group and exercise leaders by reducing the ratio of responsibility of the researcher from 75-25, 50-50, to 25-75 until completely leaving all responsibility to the group.

Recommendations

From this study, the researcher divided the recommendations into 2 parts – recommendations following the results of and future directions – as follows:

Recommendations for use

From the study about the effectiveness of health education program adapted from Self-efficacy Theory and the Transtheoretical Model, the sample group had acquired the higher level of knowledge concerning exercise, and outcome expectation which led to proper exercise behaviors. With this experience of the exercise, sample group who understand their physiological responses and may evaluate the physiological changes to exercise as a normal response for example, increase in maximum oxygen uptake, weight lost. This evaluation will allow one to continue participate in exercise. Bandura(1997)interpretation, of one's physiological state expose to a situation can also influence self efficacy. In addition, the program was implemented through various health education procedures, for example discussion, role modeling, presentation, and skills training including the encouragement from the researcher and others members in the group. These activities helped menopausal women to build up their self-confidence and outcome expectation levels that encourage the group to make their own decisions concerning the proper exercise practice. The procedures used in this study can be adapted to use in other aspects of behavioral changes in women such as food consumption behavior, diet behavior, or stress management.

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2. A limitation lies in the dynamic nature of the examined study. Exercise participation and self-efficacy are both constantly changing over time. For example, exercise participations might vary at different points along the continuum. In addition, changing of efficacy perception can impact the exercise continuum at various points of time. This study was designed to examine the effects of these multiple dynamic processes. However, it is difficult to capture the dynamic nature of these effects with the current measure and statistic methods. As previously discussed, it is difficult to assess exercise participation and future efficacy perceptions related to exercise.

3. The exercise policy formation should be a fully participatory from every relevant party : community members, local authorities, sport and exercise organization and potential participants. The participation of relevant parties is very essential to implementable policy and successful outcomes.

Recommendations for future study

1. Future directions in this area of research should include follow-up of this sample group to examine their consistency of joining the program by assessing change in exercise participation.

In addition, examination of efficacy perceptions at specific time points compare to the overall change in activity levels might add insight to the adoption and maintenance of exercise and the role that efficacy might play in the dynamic process of exercise participation.

From a public health perspective, the result from this study can be interpreted that efficacy change in menopausal women may be useful on prediction of cardiovascular and strength changes. Particularly, it may be relevant to incorporate exercise with someone who is in attempt to increase exercise activity levels. Incorporating exercise activity may allow menopausal women to become efficacious in their own activity and to continue participation despite their barrier. In addition, program that provides strategies to overcome the barrier to participate in the exercise may help in the adoption and maintenance of exercise participation.

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The study of exercise participation should be examined in other targeted populations including younger and older adults in randomized clinical controlled trial in an attempt to understand the behavioral correlation of physical activity and exercise training from a public health perspective.

2. For further study, Social support theory should be adapted along with Self-efficacy Theory to study the effect of social support on participation level of the population and, eventually, use in the activity arrangement to suit the needs of the community.

3. Concerning the arrangement of health education program and exercise, food consumption and diet behavior should also be put into practice.

4. To conduct research on the role of emotion on exercise and maintenance, the outcome of this research would be very useful in exercise promotion and academic knowledge.

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APPENDIX

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แบบสอบถาม

สำหรับสตรีวัยหมดประจำเดือน

ในการตอบแบบสอบถาม โปรดอ่านคำชี้แจงในแต่ละข้อคำถามโดยตอบตามความเป็นจริง และตรงกับความคิดเห็นของท่านมากที่สุด

ส่วนที่ 1 ข้อมูลทั่วไป

โปรดเติมคำในช่องว่าง หรือทำเครื่องหมาย / ลงในช่องว่างตามความเป็นจริงเกี่ยวกับตัวท่าน

1. ชื่อ…… ……..สกุล…….
2. ปัจจุบันท่านอายุ……ปี (เศษของปี ถ้าเกิน 6 เดือนนับเป็น 1 ปี)
3. น้ำหนัก……..กิโลกรัม ส่วนสูง……เซนติเมตร
   (โปรดระบุเดือนที่ชั่งครั้งสุดท้าย……)
4. ท่านมีโรคประจำตัวหรือไม่
   ( ) 1 ไม่มี
   ( ) 2 มี ระบบโรค/อาการ……
5. ท่านคิดว่าสุขภาพโดยรวมของท่านอยู่ในเกณฑ์ใด
   ( ) ดี เพราะ……...
   ( ) ไม่ดี เพราะ……
6. ท่านมีเพื่อนสนิทหรือไม่
   ( ) มี ระบุจำนวน……คน
   ( ) ไม่มี เพราะ…….
7. ปัจจุบันท่านออกกำลังการหรือไม่ (ถ้าเลือกข้อ 1. ให้ตอบคำถามในข้อ 8 ต่อไป)
   ( ) 1. ออกกำลังกาย ครั้งละ ……นาที/ชั่วโมง
   สัปดาห์ละ……..วัน
   ( ) 2. ไม่ออกกำลังกาย เพราะ……..
8. จากข้อ 7 ท่านใช้วิธีการใดในการออกกำลังกาย……
   ……
   ……..
   ……

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ส่วนที่ 2 ความรู้ในเรื่องการออกกำลังกาย

คำชี้แจง โปรดตอบคำถามในแต่ละข้อโดยเลือกใส่เครื่องหมาย / หน้าความที่ท่านคิดว่าถูกต้องที่สุดเพียงข้อเดียว

1. การออกกำลังกายที่ได้ผลต่อร่างกาย ควรใช้เวลาเท่าไรจึงจะเหมาะสม
   ก. 15 นาที ข. 30 นาที ค. 60 นาที
2. ข้อใดคือ ความหมายของการออกกำลังกายแบบแอโรบิค
   ก. การออกกำลังกาย อย่างต่อเนื่องนาน 30 นาที 3-5 ครั้งต่อ/สัปดาห์
   ข การออกกำลังกายด้วยการเดินเร็วใช้ระยะทาง 4-5 กิโลเมตร
   ค. ถูกทุกข้อ
3. ข้อใดไม่ใช่ผลจากการออกกำลังกายแบบแอโรบิค
   ก. ป้องกันโรคหัวใจและโรคเสื่อมต่างๆ
   ข. ช่วยทำให้ผ่อนคลายความเครียดได้
   ค. ทำให้กล้ามเนื้อขยายใหญ่ได้เป็นบางส่วน
4. ท่านคิดว่า การออกกำลังกายที่มีประโยชน์และไม่เป็นอันตรายต่อหัวใจควรออกกำลังกายให้หัวใจเต้นอัตราเท่าไร ถ้าขณะนี้ท่านอายุ 50 ปี
   ก. 130 ครั้ง ต่อ นาที ข. 140 ครั้งต่อ นาที
   ค. 150 ครั้ง ต่อ นาที
5. การออกกำลังกายเป็นประจำจะมีสารที่ร่างกายหลังออกมา ซึ่งมีฤทธิ์คล้ายมอร์ฟีน สารดังกล่าวคือข้อใด
   ก. อินซูลิน ข. เอนโดฟิน
   ค. อะดีนาลีน
6. สารดังกล่าวในข้อ 5 มีฤทธิ์ต่อร่างกายอย่างไร
   ก. ทำให้รู้สึกเบื่ออาหารและง่วงซึม
   ข. ทำให้คลายเครียด และสดชื่น
   ค. ทำให้ตื่นตัวตลอดเวลา
7. ขั้นอบอุ่นร่างกาย (Warm up) คือข้อใด
   ก. การแกว่งแขน ขาก่อนออกกำลังกาย
   ข. การบริหารก่อนออกกำลังเพื่อกระตุ้นให้หัวใจเต้นเร็วและแรงขึ้น
   ค. เป็นการบริหารเพื่อปรับให้กล้ามเนื้อและหัวใจได้ผ่อนคลาย

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8. ผู้ที่มีภาวะในข้อใดไม่ควร ออกกำลังกาย
   ก. มีอาการป่วย เช่นมีไข้ ท้องร่วง
   ข. มีอาการข้อเท้าแพลง กระดูกหัก กล้ามเนื้ออักเสบ
   ค. ถูกทุกข้อ

โปรดอ่านข้อความต่อไปนี้และใช้ตอบคำข้อ

น.ส. นก อายุ 49 ปี รู้สึกว่าตนเองอ้วนขึ้น มีน้ำหนักเพิ่มจากเดิม 3 กิโลกรัม น.ส.นก จึงไม่รับประทานอาหารเย็น และออกกำลังกาย ครั้งละ 60 นาที ทุกวัน โดยเน้นเฉพาะบริเวณสะโพก และขา และไม่ออกกายบริหารกล้ามเนื้อส่วนอื่น ๆ อีกเลย

9. การปฏิบัติตนของ น.ส.นก ท่านคิดว่าถูกต้องหรือไม่
   ก. ถูกต้อง เพราะการออกกำลังกายดังกล่าวช่วยลดน้ำหนักได้
   ข. ถูกต้อง เพราะการออกกำลังกายเฉพาะส่วนและงดอาหารจะทำให้ได้ผลเร็วขึ้น
   ค. ไม่ถูกต้อง เพราะการออกกำลังกายซ้ำๆที่เดียวกันจะทำให้เกิดการบาดเจ็บของกล้ามเนื้อได้

10. จากข้อ 9 ท่านคิดว่า น.ส.นกควรปฏิบัติตนเช่นไร
   ก. ปฏิบัติวิธีเดิม และงดอาหารเช้าร่วมด้วย
   ข. ปฏิบัติวิธีเดิม และเพิ่มออกกำลังกายเป็น 90 นาที
   ค. ควรออกกำลังกายทุกส่วนของร่างกายครั้งละ 30 นาที และรับประทานอาหารเย็น

11. ข้อใด <u>ไม่ใช่</u> การออกกำลังกายเพื่อสุขภาพ
   ก. ออกกำลังการแบบแอโรบิค ครั้งละ 30 นาที
   ข. การลดน้ำหนักควรงดอาหารบางมื้อร่วมกับออกกำลังกาย
   ค. หลังออกกำลังกายควรมีการผ่อนคลาย (Cool down)

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ส่วนที่ 3 แบบวัดการรับรู้ความสามารถตนเองในเรื่องการออกกำลังกาย

ส่วนที่ 4 แบบวัดความคาดหวังในผลลัพธ์ของการออกกำลังกาย

<u>คำชี้แจง</u> โปรดใส่เครื่องหมาย / ลงในช่องที่ตรงกับความคิดเห็น / ความรู้สึกของท่านมากที่สุด

ใช่ หมายถึง ผู้ตอบเห็นด้วยกับข้อความนั้น

ไม่แน่ใจ หมายถึง ผู้ตอบเห็นว่าไม่แน่ใจกับข้อความนั้น

ไม่ใช่ หมายถึง ผู้ตอบไม่เห็นด้วยกับข้อความนั้น

ส่วนที่ 3 การรับรู้ความสามารถตนเอง

	ข้อความ	ใช่	ไม่แน่ใจ	ไม่ใช่
1.	ฉันสามารถเป็นตัวอย่างที่ดีทางสุขภาพได้			
2.	ฉันสามารถแบ่งเวลาเพื่อออกกำลังกายได้อย่างเหมาะสม			
3.	ฉันสามารถออกกำลังกายแบบแอโรบิคได้สัปดาห์ละ 3 ครั้ง			
4.	การออกกำลังกายเป็นประจำเป็นส่วนหนึ่งในชีวิตของฉัน			
5.	สำหรับฉันการออกกำลังกายทำให้ฉันคลายเครียด			
6.	ฉันสามารถออกกำลังกายได้ครั้งละ 20-30 นาที			
7.	การลดน้ำหนักของฉันเป็นผลจากการออกกำลังกาย			
8.	ฉันออกกำลังกายได้แม้จะรู้สึกปวดเมื่อยไม่สบาย			
9.	ฉันสามารถออกกำลังกายได้แม้ว่าอากาศจะร้อนหรือหนาว			
10.	ฉันสามารถออกกำลังกายเพียงลำพังโดยไม่มีเพื่อน			
11.	ฉันสามารถออกกำลังกายจนเหนื่อยมากทุกครั้ง			
12.	สำหรับฉันแล้วการออกกำลังกายสามารถทำได้ทุกสถานที่			
13.	ฉันสามารถอบอุ่นร่างกายก่อนออกกำลังกาย			
14.	ฉันสามารถออกกำลังกายได้แม้ว่าฝนจะตก			
15.	ฉันสามารถผ่อนคลายกล้ามเนื้อ หลังออกกำลังกาย			
16.	ฉันสามารถออกกำลังกายโดยไม่ต้องใช้อุปกรณ์			
17.	ฉันสามารถออกกำลังกายได้แม้ว่าอยู่ในภาวะที่หดหู่			
18.	ฉันรู้สึกว่าตัวเองดูดีขึ้นหลังจากออกกำลังกายไประยะหนึ่ง			

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ส่วนที่ 4 ความคาดหวังในผลดีของการออกกำลังกาย

	ข้อความ	ใช่	ไม่แน่ใจ	ไม่ใช่
1.	ฉันออกกำลังกายเพราะต้องการมีสุขภาพดี			
2.	การออกกำลังกายครั้งละ 20-30 นาทีทำให้ร่างกายแข็งแรง			
3.	การออกกำลังกายจะทำให้กล้ามเนื้อแข็งแรงกระชับขึ้น			
4.	การออกกำลังกายทำให้เหนื่อย จนไม่สามามารถทำงานได้			
5.	การออกกำลังกายเป็นประจำป้องกันโรคหัวใจได้			
6.	การออกกำลังกายทำให้ร่างกายได้สัดส่วนงดงาม			
7.	การออกกำลังกายช่วยให้ฉันสนุกสนาน			
8.	การออกกำลังกายเป็นวิธีที่ช่วยทำให้ฉันหายเครียด			
9.	การออกกำลังกายอย่างต่อเนื่องเกิดประโยชน์แก่ร่างกายมากที่สุด			
10.	การออกกำลังกายทำให้ฉันมีเพื่อนมากขึ้น			
11.	การออกกำลังกายช่วยทำให้ปอดแข็งแรง			
12.	การอบอุ่นร่างกาย ก่อนออกกำลังกายเป็นสิ่งจำเป็น			
13.	การออกกำลังกายทำให้หลอดเลือดฝอยมีการกระจายเพิ่มขึ้น หัวใจทำงานลดลง			
14.	ถ้ามีสถานที่ที่เหมาะสมจะทำให้ฉันออกกำลังกายได้อย่างสม่ำเสมอ			
15.	หากมีอุปกรณ์ในการออกกำลังกายจะทำให้สามารถออกกำลังกายได้อย่างสม่ำเสมอ			
16.	หลังออกกำลังกายต้องมีการผ่อนคลายกล้ามเนื้อ			
17.	การออกกำลังกายจะช่วยเผาผลาญไขมันส่วนเกินทำให้น้ำหนักลดลงได้			
18.	การออกกำลังกายที่ถูกต้องทำให้ฉันสุขภาพแข็งแรง			

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ส่วนที่ 5 แบบวัดพฤติกรรมการออกกำลังกายเพื่อสุขภาพ

คำชี้แจง โปรดทำเครื่องหมาย / ลงในช่องทางขวามือ ตามที่ท่านได้ทำกิจกรรมหรือปฏิบัติตามความเป็นจริง โดยพิจารณาจาก

เป็นประจำ หมายถึง การปฏิบัติเป็นประจำสม่ำเสมอทุกครั้ง

นาน ๆ ครั้ง หมายถึง การปฏิบัติน้อยมาก

ไม่ปฏิบัติ หมายถึง ไม่เคยปฏิบัติเลย

	ข้อความ	เป็นประจำ	นาน ๆ ครั้ง	ไม่ปฏิบัติ
1.	ฉันออกกำลังกายโดยเคลื่อนไหวกล้ามเนื้อทุกส่วน			
2.	ฉันใช้อุปกรณ์ช่วยเมื่อออกกำลังกาย			
3.	ฉันออกกำลังกายเมื่อมีเวลาว่าง			
4.	ฉันออกกกำลังกายด้วยการเต้นแอโรบิค			
5.	ก่อนออกกำลังกายฉันจะอบอุ่นร่างกายประมาณ 10 นาที			
6.	ฉันใช้เวลาช่วงเช้าเพื่อการออกกำลังกาย			
7.	เมื่อมีอาการเหนื่อยมากฉันจะหยุดออกกำลังกาย			
8.	ฉันออกกำลังกายอย่างน้อยวันละ 15-30 นาที			
9.	ฉันใช้เวลาในช่วงเย็นเพื่อออกกำลังกาย			
10.	ชุดที่ออกกำลังกายต้องระบายความร้อนได้ดี			
11	ฉันออกกำลังกายด้วยการเดินเร็ว หรือ วิ่งเหยาะ ๆ			
12.	หลังจากออกกำลังกายฉันจะผ่อนคลายกล้ามเนื้อ(Cool down) ประมาณ 5 นาที			
13.	ฉันออกกำลังกายสัปดาห์ละ 3 ครั้ง			
14.	ในการออกกำลังกายท่านสวมรองเท้าสำหรับออกกำลังกาย			
15.	ฉันออกกำลังกายเพียงลำพัง			

ขอขอบคุณที่ท่านสละเวลาในการตอบแบบสอบถาม

ผู้วิจัย

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แบบสอบถามระดับความพร้อมในการออกกำลังกาย

คำชี้แจง การออกกำลังกายสม่ำเสมอ หมายถึงการออกกำลังกาย อย่างน้อย 3 ครั้งต่อสัปดาห์ เป็นเวลา 30 นาที

	ใช่	ไม่ใช่
1. ปัจจุบันฉันไม่เคยออกกำลังกายหรือเดินอย่างสม่ำเสมอ และยังไม่มีความตั้งใจที่จะเริ่มออกกำลังกายในอนาคตอันใกล้นี้	☐	☐
2. ปัจจุบันฉันไม่เคยออกกำลังกายหรือเดินอย่างสม่ำเสมอ แต่กำลังมีความคิดที่จะเริ่มออกกำลังกาย	☐	☐
3. ปัจจุบันฉันไม่เคยออกกำลังกายทุกวัน แต่กำลังคิดว่าจะออกกำลังกายให้ได้ 2-3 วันต่อสัปดาห์ในอีก 1 เดือนข้างหน้า	☐	☐
4. ปัจจุบันฉันไม่เคยออกกำลังกายทุกวัน แต่กำลังเตรียมการที่จะออกกำลังกายให้ได้ 3-5 วันต่อสัปดาห์ในอีก 2 เดือนข้างหน้า	☐	☐
5. ฉันกำลังพยายามเริ่มออกกำลังกายหรือเดินในระหว่าง 1 เดือน ที่ผ่านมาถ้ามีเวลาพอ	☐	☐
6. ในช่วง 1 เดือนที่ผ่านมาฉันได้เริ่มออกกำลังกายหรือเดินเมื่อมีโอกาสหรือในวันหยุดเท่านั้น	☐	☐
7. ในอดีตฉันไม่เคยออกกำลังกาย แต่ใน 2 เดือนที่ผ่านมาฉันออกกำลังกายเกือบทุกวัน	☐	☐
8. ฉันออกกำลังกายสม่ำเสมอ อย่างน้อย 3 ครั้งต่อสัปดาห์เป็นเวลา 30 นาทีขึ้นไป	☐	☐
9 .ปกติฉันออกกำลังกายสม่ำเสมอ แต่ในช่วง 3 เดือนที่ผ่านมาฉันไม่ได้ออกกำลังกายเลย	☐	☐
10. ปกติฉันออกกำลังกายสม่ำเสมอ แต่ในช่วง 6 เดือนที่ผ่านมาฉันไม่ได้ออกกำลังเลย	☐	☐

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แบบสอบถามความพร้อมสำหรับกิจกรรมการออกกำลังกาย

(Physical Activity Readiness Questionnaire : PAR-Q)

<u>คำชี้แจง</u>

1. แแบสอบถามนี้เหมาสมที่สำหรับการสอบถามความพร้อมด้านร่างกายในบุคคลที่มีอายุระหว่าง 15-69 ปีที่จะเริ่มต้นออกกำลังกาย
2. แบบสอบถามนี้นำมาใช้ในการตรวจสอบความพร้อมในการทำกิจกรรมการออกกำลังกายก่อนที่จะให้แพทย์เป็นผู้ประเมินด้วยวิธีทางการแพทย์อีกครั้งหนึ่งโดยเฉพาะบุคคลเพศชายที่มีอายุตั้งแต่ 40-69 ปี และเพศหญิงที่มีอายุตั้งแต่ 50-69 ปีถ้าหากผู้ที่ตอบคำถามตอบว่า “ใช่” เพียงหนึ่งข้อหรือมากกว่า
3. บุคคลที่มีอายุตั้งแต่ 69 ปีขึ้นไปจะต้องได้รับการตรวจและประเมินทางการแพทย์ก่อนที่จะเริ่มทำกิจกรรมการออกกำลังกายแม้ว่าจะตอบว่า “ไม่ใช่” ทั้งหมดก็ตาม
4. แบบสอบถามนี้เป็นการประเมินความพร้อมสำหรับการออกกำลังกายในเบื้องต้นเท่านั้น
5. แบบสอบถามนี้สามารถที่จะพยากรณ์ความผิดปกติของหัวใจในขณะออกกำลังกายได้ประมาณ 80 % และมีขีดจำกัดต่อความไว (Sensitivity)ประมาณ 35%

โปรดเขียนเครื่องหมาย / ลงในช่องที่กำหนดให้ในแบบสอบถาม ตามสภาพอาการที่ท่านเป็นอยู่

ใช่	ไม่ใช่	
☐	☐	1. แพทย์เคยบอกกับท่านว่าท่านมีปัญหาเกี่ยวกับหัวใจ และการทำกิจกรรมการออกกำลังกายควรอยู่ภายใต้การดูแลของแพทย์เท่านั้น
☐	☐	2. ท่านรู้สึกมีอาการเจ็บบริเวณหน้าอกเมื่อท่านออกกำลังกาย
☐	☐	3. ในช่วง 1 เดือนที่ผ่านมาท่านมีอาการเจ็บบริเวณหน้าอกในขณะที่ไม่ได้ทำกิจกรรมการออกกำลังกาย
☐	☐	4. ท่านเคยมีอาการเวียนศีรษะ หรือสูญเสียการทรงตัว ใช่หรือไม่ ?
☐	☐	5. ท่านมีปัญหาเกี่ยวกับกระดูกและข้อ ซึ่งมีผลทำให้ต้องลดกิจกรรมการออกกำลังกายลงหรือไม่ ?
☐	☐	6. ปัจจุบันท่านใช้ยาลดความดันโลหิต หรือยารักษาโรคหัวใจอยู่
☐	☐	7. ท่านรู้เหตุผลของการไม่ได้ออกกำลังกายของท่าน

1. ถ้าท่านตอบว่า “ ใช่ ” เพียง 1 ข้อหรือมากกว่า ท่านจะต้องได้รับการตรวจจากแพทย์ก่อนที่จะเริ่มออกกำลังกาย
2. ถ้าท่านตอบว่า “ไม่ใช่ ” ทุกข้อสำหรับทุกคนที่มีอายุ 19-69 ปีท่านสามารถเริ่มออกกำลังกายได้ทันที แต่อย่างไรก็ตาม บุคคลเพศชายที่มีอายุ 40 ปีขึ้นไปหรือเพศหญิงที่มีอายุ 50 ปีขึ้นไปควรได้รับการตรวจจากแพทย์ก่อนที่จะออกกำลังกายที่มีความปลอดภัยมากขึ้น

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ขอความร่วมมือในการตอบแบบสอบถาม

เรียน ผู้ตอบแบบสอบถาม

ด้วยดิฉันนางสาว จิติมา กตัญญู นักศึกษาระดับปริญญาเอกภาควิชาสุขศึกษาและพฤติกรรมศาสตร์ คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดลร่วมกับนางสุภัทรา หอมมณีและนางศรีพรรณ คุณา ได้ทำ ร่วมกับแบบจำลองการเปลี่ยนพฤติกรรมในการออกกำลังกายของสตรีวัยหมดประจำเดือนในจังหวัดเชียงใหม่

ในการวิจัยนี้แบบสอบถามเป็นส่วนหนึ่งของเครื่องมือในการรวบรวมข้อมูล ท่านเป็นบุคคลที่สำคัญยิ่งในการให้ข้อมูลครั้งนี้ จึงใคร่ขอความร่วมมือจากท่านได้กรุณาตอบคำถาม ความคิดเห็น ความรู้สึกและการปฏิบัติที่แท้จริงของท่าน คำตอบที่ได้จากท่านจะสรุปออกมาเป็นภาพรวมและคำตอบที่แท้จริงของท่านจะมีคุณค่า และเป็นประโยชน์อย่างยิ่งในการวางแผนเพื่อหารูปแบบส่งเสริมการออกกำลังกายเพื่อสุขภาพที่เหมาะสมและสอดคล้องกับความต้องการที่แท้จริงสำหรับสตรีวัยหมดประจำเดือนต่อไป

ขอขอบคุณที่กรุณาสละเวลาในการตอบแบบสอบถาม

(จิติมา กตัญญู)

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Exercise Program

หลักการสำคัญของ Exercise Program

- ความสำคัญของงาน (Intensity)
- ระยะเวลา (Duration)
- ความบ่อย (Frequency)
- ชนิดของกิจกรรมการออกกำลังกาย (Mode of Physical activity)
- ความก้าวหน้าของการออกกำลังกาย (Progression of physical activity)

ขั้นตอนของการออกกำลังกาย

- ช่วงอบอุ่นร่างกาย 10 นาที
- ช่วงเสริมสร้างกล้ามเนื้อ 15 – 30 นาที
- ช่วงออกกำลังกายแบบแอโรบิค 20 – 60 นาที
- ช่วงผ่อนคลาย 5 – 10 นาที

ความก้าวหน้าของการออกกำลังกาย

(Progression of Physical activity)

- ระยะที่ 1 ระยะเริ่มต้น 4 – 6 สัปดาห์
  (Initial Stage)
- ระยะที่ 2 ระยะพัฒนา 4 – 5 เดือน
  (Improvement Stage)
- ระยะที่ 3 ระยะรักษาสภาพ ภายหลัง 6 เดือน ขึ้นไป
  (Maintenance Stage)

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ตารางแสดงโปรแกรมการออกกำลังกายสำหรับบุคคลที่มีสภาพร่างกายปกติ

ระยะการฝึก	สัปดาห์	ความหนักของงาน % Vo2 max หรือ HR max reserve	ความบ่อย (ครั้ง/สัปดาห์)	เวลาฝึก (นาที)
ระยะเริ่มต้น (Initial Stage)	1	40-50	3	12
	2	50	3	14
	3	60	3	16
	4	60-70	3	18
	5	60-70	3	20
ระยะพัฒนา (Improvement Stage)	6-9	70-80	3-4	21
	10-13	70-80	3-4	24
	14-16	70-80	3-4	24
	17-19	70-80	4-5	28
	20-23	70-80	4-5	30
	24-27	70-80	4-5	30
ระยะรักษาสภาพ (Maintenance Stage)	28+	70-80	3	30-45

ลักษณะโปรแกรมการออกกำลังกายที่ดี

โปรแกรมการออกกำลังกายที่ดีต้องครอบคลุมองค์ประกอบของสมรรถภาพที่มีความสัมพันธ์กับสุขภาพ (Health-Related Fitness) ซึ่งเรียกว่า Well-rounded exercise program ประกอบด้วย

- กิจกรรมแบบแอโรบิค
- กิจกรรมที่ฝึกความแข็งแรงและความอดทนของกล้ามเนื้อ
- กิจกรรมที่เป็นแนวทางสำหรับการควบคุมน้ำหนัก
- กิจกรรมที่ฝึกความอ่อนตัว

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แนวทางการกำหนดโปรแกรมการออกกำลังกาย

สมรรถภาพทางด้านระบบเวียนเลือดและหายใจ (Cardiorespiratiory Fitness)

ความแข็งแรง / ความอดทนของกล้ามเนื้อ (Muscular Strength and Muscular Endurance)

ความอ่อนตัว (Flexibility)

ส่วนประกอบของร่างกาย (Body Composition)

แนวทางการกำหนดโปรแกรมการออกกำลังกาย

สมรรถภาพ	องค์ประกอบ	ข้อแนะนำ
สมรรถภาพทางด้านระบบไหลเวียนเลือด และหายใจ (Cardiorespiratory Fitness)	ความหนักของงาน (Intensity) ระยะเวลา (Duration) ความบ่อย (Frequency) ชนิดของกิจกรรม(Mode of activity) ความก้าวหน้า(Progression of activity)	60-90 % HR max 50-85 % HR max reserve 50-85 % Vo2 max 20-60 นาที 3 – 5 วัน ต่อสัปดาห์ การเดิน การวิ่งเหยาะๆว่ายน้ำ กระโดดเชือก ถีบจักรยาน แอโรบิคด๊านซ์ - ควรเพิ่มเวลาก่อนที่จะเพิ่มความหนักของงาน - การเพิ่มเวลาจะเพิ่มไม่เกิน 40 % ของระยะเวลาเดิม ความหนักของงานและระยะเวลาจะเพิ่มทุกๆ 2-3 สัปดาห์

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สมรรถภาพ	องค์ประกอบ	ข้อแนะนำ
2. ความแข็งแรง/ความอดทนของกล้ามเนื้อ (Muscular Strength and Muscular Endurance	ความหนักของงาน(Intensity) ระยะเวลา (Duration) ความบ่อย (Frequency) ชนิดของกิจกรรม(Mode of activity) ความก้าวหน้า (Progression of activity)	60-90 % ของความสามารถสูงสุดจากการทดสอบ One repetition maximum (Strength) 50-70 % ของความสามารถสูงสุด จากการทดสอบ one repetition (Endurance) 15-30 นาที ไม่น้อยกว่า 2 วันต่อสัปดาห์ - Isometric (Static) ความหนักของงาน 2/3 ของความสามารถสูงสุด ปฏิบัติ 5-10 ครั้งๆละ 1-6 วินาที - Isometric (Dynamic) ฝึกที่อัตราความเร็วสูงดีกว่าความเร็วต่ำ 3 ชุด/วัน วันละ 6-8 ท่า / ชุด - Isometric (Dynamic) 8-12 ครั้ง/ท่า 8-10 ท่า/ชุด 3 ชุด/วัน - ควรเพิ่มจำนวนครั้งก่อนที่จะเพิ่มน้ำหนัก - ควรเปลี่ยนน้ำหนักทุกๆ2-3 สัปดาห์ -

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สมรรถภาพ	องค์ประกอบ	ข้อแนะนำ
3. ความอ่อนตัว(Flexibility)	ความหนักของงาน(Intensity) ระยะเวลา (Duration) ความบ่อย (Frequency) ชนิดของกิจกรรม(Mode of activity) ความก้าวหน้า (Progression of activity) จำนวนครั้ง / ท่า เวลา / ครั้ง ในแต่ละท่า	ยืดเหยียดกลุ่มกล้ามเนื้อมัดใหญ่ ให้พอรู้สึกว่าตึง ๆ แต่จะต้องไม่เกิดอาการเจ็บปวด 10 – 20 นาที ไม่น้อยกว่า 3 วันต่อสัปดาห์ - Static - Dynamic - Propriocetive Neuromuscular Facilitation (PNF) - ปฏิบัติทุกครั้งในช่วงอบอุ่นร่างกายและช่วงผ่อนคลาย - เพิ่มเวลาในการยืดเหยียดแต่ละท่าให้นานขึ้น - 3 – 5 ครั้ง / ท่า - 10 – 30 วินาที

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แบบทดสอบสมรรถภาพทางกายผู้เข้าร่วมโครงการวิจัย
การสร้างเสริมพลังสตรีวัยหมดประจำเดือนในการออกกำลังกายเพื่อสุขภาพ

ชื่อ……..อายุ……ปี อาชีพ……หมู่ที่……..

ประวัติสุขภาพ

การเจ็บป่วยและการผ่าตัด…….

โรคประจำตัว…….

ประวัติการเจ็บป่วยของบุคคลในครอบครัว

▶ เบาหวาน ▶ ความดันโลหิตสูง

▶ มะเร็ง ▶ อื่นๆ

ปัญหาสุขภาพปัจจุบัน ▶ ไม่มี ▶ มี ระบุ……

พฤติกรรมสุขภาพ ▶ สูบบุหรี่ ▶ ดื่มสุรา ▶ ใช้สารเสพติด

▶ ออกกำลังกาย ▶ 1 ครั้ง/สัปดาห์ ▶ 1-2 ครั้ง/สัปดาห์

▶ 3 ครั้ง หรือมากกว่า/สัปดาห์

อาการเจ็บป่วยที่เป็นบ่อย…….

.

รายการ /ว/ด/ป				
น้ำหนัก(กก.)				
ส่วนสูง(ซม.)				
ชีพจร				
ความดันโลหิต				
ดัชนีมวลกาย				
สมรรถภาพการใช้ออกซิเจน				
ความจุปอด (ลบ/นน.ตัว)				
ความอ่อนตัว(ซม.)				
แรงบีบมือ กก./นน.ตัว				
% ไขมัน 4 จุด กก./นน.ตัว				

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สมุดบันทึกการออกกำลังกาย

ชื่อ……นามสกุล……..

ที่อยู่ปัจจุบัน…….

……โทรศัพท์…….

อาชีพ……..สถานที่ทำงาน……..

…….

ประวัติสุขภาพ

น้ำหนัก……..กิโลกรัม ส่วนสูง……เซนติเมตร

ความดันโลหิต……มม. ปรอท หมู่เลือด…….

ชีพจรขณะพัก……ครั้ง/นาที

โรคประจำตัว……

การเจ็บป่วยและการผ่าตัด…….

อาการเจ็บป่วยที่เป็นบ่อย……..

ยาที่ใช้เป็นประจำ……..

แพ้ยา…….

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ทำไม? ฉันไม่ได้ออกกำลังกาย

	ใช่	ไม่ใช่
ไม่มีเวลา	❑	❑
อายเพราะอายุมากแล้ว	❑	❑
ไม่มีพื้นฐานด้านกีฬา	❑	❑
อากาศร้อน / เย็นมากเกินไป	❑	❑
มีโรคประจำตัว	❑	❑
ไม่มีสถานที่ออกกำลังกาย	❑	❑
เสียค่าใช้จ่ายมาก	❑	❑
ไม่มีอุปกรณ์การออกกำลังกาย	❑	❑
ไม่มีเพื่อนออกกำลังกาย	❑	❑
ไม่มีความรู้เรื่องการออกกำลังกาย	❑	❑

(ถ้าตอบมากกว่า 2 ข้อ แสดงว่าท่านไม่ได้ให้ความสนใจสุขภาพตนเองเลย และหาเหตุผลมากมาย ที่จะไม่ต้องออกกำลังกาย)

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. การออกกำลังกายสม่ำเสมอมีผลดีต่อร่างกายอย่างไร

- ลดความเสี่ยงต่อการเกิดโรคหลอดเลือดหัวใจ
- ลดระดับไขมันในหลอดเลือด
- ลดความดันโลหิต
- ช่วยควบคุมระดับน้ำตาลในเลือด
- ป้องกันการเกิดภาวะกระดูกพรุนบาง
- ทำให้รูปร่างได้สัดส่วน
- สุขภาพกายและใจดีขึ้น
- เสริมสร้างความมั่นใจในตนเอง

การออกกำลังกายทำได้อย่างไร?

ทุกคนสามารถทำได้ โดย

- ให้โอกาสตนเองเรียนรู้ทักษะการออกกำลังกาย
- สร้างความมั่นใจให้กับตนเองว่าสามารถออกกำลังกายอย่างสม่ำเสมอได้
- วางแผนการออกกำลังกายอย่างสม่ำเสมอ
- สร้างความคาดหวังในผลลัพธ์ที่ได้จากการออกกำลังกาย ทั้งด้านร่างกาย จิตใจ และสังคม

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. เตรียมตัวอย่างไรบ้าง

1. ตรวจสอบประวัติการเจ็บป่วย
2. บันทึกกิจวัตประจำวัน
3. ประเมินสภาวะสุขภาพ
4. ตั้งเป้าหมายระยะสั้น
5. ตั้งเป้าหมายระยะยาว
6. ทำข้อตกลงร่วมกับกลุ่ม
7. หาวิธีดำเนินงานร่วมกัน
8. เลือกกลยุทธ์ที่เหมาะสมและเป็นไปได้
9. เรียนรู้ทักษะในการออกกำลังกาย
10. ประเมินความสามารถของตนเอง
11. ปรับปรุงและเรียนรู้ทักษะในการออกกำลังกายเพิ่มเติม
12. ปฏิบัติอย่างต่อเนื่อง

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ไม่ได้ออกกำลังกายเลย

ทำงานที่มีเครื่องทุ่นแรง

กินอาหารไขมันสูง

ความเครียดสูง

ระดับฮอร์โมนลดต่ำลง

ป่วย

สุขภาพแข็งแรง

ต้องปรับเปลี่ยนพฤติกรรมเช่น
ออกกำลังกายอย่างต่อเนื่อง

พักฟื้นโดยมีความหวังว่าจะ
ดีขึ้นหรือหายเป็นปกติ

รักษา

เริ่มต้นออกกำลังกายตั้งแต่วันนี้ดีกว่า

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ข้อแนะนำการออกกำลังกายเพื่อสุขภาพ

1. การออกกำลังกายเพื่อสุขภาพ คือ การออกกำลังชนิดที่เสริมสร้างความอดทนของปอดหัวใจและระบบไหลเวียนเลือด รวมทั้งความแข็งแรงของกล้ามเนื้อและความอ่อนตัวของข้อต่อต่าง ๆ ของร่างกาย
2. ขั้นตอนของการออกกำลังกายเพื่อสุขภาพ ประกอบด้วย 3 ระยะ คือ
   2.1 ระยะอบอุ่นร่างกาย ประมาณ 5 นาที เพื่อยืดเหยียดกล้ามเนื้อและเสริมสร้างความแข็งแรงของกล้ามเนื้อและความอ่อนตัวของข้อต่อ
   2.2 ระยะฝึกฝนร่างกาย ประมาณ 10-30 เพื่อฝึกบริหารความอดทนของปอดหัวใจและระบบไหลเวียนเลือด
   2.3 ระยะผ่อนคลายร่างกาย ประมาณ 5 นาที เพื่อยืดเหยียดกล้ามเนื้อและความอ่อนตัวของข้อต่อรวมระยะเวลาที่ออกกำลังกาย ติดต่อกันทั้งสิ้น อย่างน้อย 20-30 นาที ต่อวัน
3. การออกกำลังกายที่จะมีผลต่อสุขภาพ จะต้องปฏิบัติอย่างสม่ำเสมอ อย่างน้อยวันเว้นวัน หรือ 3 วัน ต่อสัปดาห์เป็นอย่างน้อย

ข้อควรปฏิบัติสำหรับการออกกำลังกาย

1. เลือกกิจกรรมที่เหมาะสมกับเพศและวัยของตนเอง
2. เริ่มออกกำลังกายจากน้อยไปหามาก , เบาไปหาหนัก
3. เลือกกิจกรรมที่ง่าย ประหยัดทั้งเศรษฐกิจและเวลา
4. ออกกำลังกายในสภาพอากาศที่พอเหมาะ เช่น เช้า เย็น
5. พักผ่อนให้เพียงพอหลังจากการออกกำลังกาย
6. ต้องหมั่นตรวจสมรรถภาพทางกายของตนเอง เช่น จับชีพจรหลังจากตื่นนอนก่อนที่จะทำธุระส่วนตัว
7. เมื่อมีปัญหาในการออกกำลังกายให้ปรึกษาแพทย์
8. โปรดจำไว้ว่า การออกกำลังจะต้องทำอย่างสม่ำเสมอจึงจะเกิดประโยชน์
9. เพื่อให้เกิดความเพลิดเพลินสนุกสนานควรออกกำลังเป็นกลุ่มหมู่คณะ

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รูปแบบการออกกำลังกายเพื่อสุขภาพ

การออกกำลังกายเพื่อสุขภาพ จะต้องเลือกกิจกรรมที่เหมาะสมกับอายุ โดยกิจกรรมนั้นจะต้องใช้กล้ามเนื้อส่วนใหญ่ ๆ ของร่างกายให้ออกแรงติดต่อกันเป็นระยะเวลานานพอ จึงจะมีผลต่อการเสริมสร้างความอดทนของปอด หัวใจ และระบบไหลเวียนเลือด ซึ่งขึ้นอยู่กับความหนักของการออกกำลังกาย โดยกิจกรรมที่แนะนำมี ดังนี้

* เดินเร็ว	อย่างน้อยวันละ 30 นาที
* ถีบจักรยาน	อย่างน้อยวันละ 30 นาที
* วิ่งเหยาะ	อย่างน้อยวันละ 20 นาที
* เต้นแอโรบิก	อย่างน้อยวันละ 20 นาที

ข้อควรระวังในการออกกำลังกาย

1. ผู้ป่วยโรคหัวใจ , ความดันสูง, เบาหวาน , ผู้สูงอายุ ควรปรึกษาแพทย์ก่อนออกกำลังกาย และทำตามคำแนะนำของแพทย์อย่างเคร่งครัด
2. ควรหยุดออกกำลังกายทันทีเมื่อมีอาการต่อไปนี้

- รู้สึกเหนื่อยผิดธรรมดา
- อาการใจสั่น (ชีพจรเกิน 140 ครั้ง / นาที)
- อาการหายใจขัด หรือหายใจไม่ทั่วท้อง
- อาการคลื่นไส้ , เวียนศีรษะ
- อาการหน้ามือการเคลื่อนไหวร่างกายควบคุมไม่ได้
-

(เมื่อพักแล้ว หากรู้สึกเป็นปกติอาจออกกำลังกายต่อไปอีกได้ แต่ต้องลดความหนักลง หากพักแล้วยังมีอาการผิดปกติต้องปรึกษาแพทย์)

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ข้อห้ามสำหรับการออกกำลังกาย

1. ขณะเจ็บป่วย เช่น มีไข้ มีอาการอักเสบ , ท้องร่วง เป็นต้น
2. หลังจากฟื้นไข้ใหม่ ๆ และในระหว่างการพักฟื้นจากการบาดเจ็บ การผ่าตัด หรือแพทย์ยังไม่อนุญาตให้ออกกำลังกาย
3. หลังจากรับประทานอาหารอิ่มใหม่ (ควรออกกำลังกายภายหลังรับประทานอาหารธรรมดา 2 ชั่วโมง และภายหลังรับประทานอาหาร ที่มีไขมันมาก 3 ชั่วโมง)
4. ในเวลาที่อากาศร้อนจัด,อบอ้าวมาก หรือหนาวจัด
5. ผู้ที่ได้รับอุบัติเหตุจากการออกกำลัง เช่น ข้อเท้าแพลง กล้ามเนื้ออักเสบ กระดูกหัก เป็นต้น

ประเมินภาวะอ้วน/ผอมทำอย่างไร ?

ค่าดัชนีมวลกาย (BODY MASS INDEX)

นิยาม ค่าดัชนีมวลกาย (Body mass index : BMI) เป็นมาตรฐานที่ใช้ประเมินภาวะอ้วนผอมในผู้ใหญ่ ตั้งแต่อายุ 20 ปีขึ้นไป ทุกคนสามารถกระทำได้ด้วยตนเอง โดยการชั่งน้ำหนักเป็นกิโลกรัมและวัดส่วนสูงเป็นเมตรและนำมาคำนวณหาค่าดัชนีมวลกาย ดังนี้

$$\frac{\text{น้ำหนักตัวเป็นกิโลกรัม}}{(\text{ส่วนสูงเป็นเมตร})^2}$$

ดังนั้นค่าดัชนีมวลกายจึงมีหน่วยเป็นกิโลกรัม/ตารางเมตร (กก./ม.^{2})

ตัวอย่าง อายุ 50 ปี นน. 52 กิโลกรัม สูง 160 เซนติเมตร

ดัชนีมวลกาย = 52

= 1.60 x 1.60

= 20.31 ก.ก./ ตาราง ม.

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ค่าปกติ

จากการศึกษาทางระบาดวิทยาพบว่าค่าดัชนีมวลกายมีความสัมพันธ์กับอัตราการตาย โดยผู้ที่มีดัชนีมวลกายมากกว่า 24.9 กิโลกรัม ต่อตารางเมตร หรือน้อยกว่า 18.5 กิโลกรัมต่อตารางเมตร มีอัตราตายสูงกว่าผู้ที่มีค่าดัชนีมวลกายอยู่ระหว่าง 18.5 – 24.9 กิโลกรัมต่อตารางเมตร ดังนั้นจึงมีเกณฑ์การประเมินภาวะดัชนีมวลกายของกิจกรรมงานดังนี้

ภาวะ	ดัชนีมวลกาย(กก./ตารางเมตร)
ผอม	ต่ำกว่า 18.5
ปกติ	18.5 – 24.9
น้ำหนักเกิน	25.0 – 29.9
อ้วนระดับ 1	30.0 – 34.9
อัวนระดับ 2	35.0 – 39.9
อ้วนระดับ 3	มากกว่า 40

ผลการตรวจเลือด

วันที่/เดือน/ปี	ค่าปกติ	ครั้งที่ 1	ครั้งที่ 2
คอเลสเตอรอล	200 mg/dl		
ไตรกลีเซอไรด์	10-200 mg/dl		
HDL	> 35-100 mg/dl		
LDL	< 155 mg/dl		
น้ำตาลในเลือด	70-90 mg/dl		
หมายเหตุ			

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ผลการตรวจสุขภาพเบื้องต้น

พบแพทย์ **ครั้งที่**

1……

……..

……

……..

ดัชนีมวลกาย = ……..กก./ม.2

พบแพทย์ **ครั้งที่ 2**……..

……

……

……..

ดัชนีมวลกาย = ……..กก./ม.2

บันทึกผลการทดสอบสมรรถภาพทางกาย

รายการ วัน/เดือน/ปี	ค่าจริง	ค่าสัมพันธ์	แปรผล	ค่าจริง	ค่าสัมพันธ์	แปรผล	ค่าจริง	ค่าสัมพันธ์	แปรผล
สมรรถภาพการใช้ 02 สูงสุด									
ความจุปอด (ลบ./นน.ตัว)									
ความอ่อนตัว (ซม.)									
แรงบีบมือขวา (กก./นน.)									
เปอร์เซนต์ไขมันของร่างกาย									
	ครั้งที่ 1			ครั้งที่ 2			ครั้งที่ 3		

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แบบบันทึกกิจกรรมการออกกำลังกายของผู้เข้าร่วมโครงการวิจัย

วัน / เดือน / ปี	ระยะเวลา/นาที	สถานที่ เดิน-วิ่ง ขี่จักรยาน-แอโรบิค	หมายเหตุ

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ศูนย์ส่งเสริมสุขภาพเขต 10
ถนนประชาสัมพันธ์ ตำบลช้างคลาน
อำเภอเมือง เชียงใหม่ 50100

สวัสดี สุภาพสตรีที่รักทุกท่าน

ด้วย นางสาวจิติมา กตัญญู พยาบาลวิชาชีพระดับ 7 โรงพยาบาลแม่และเด็ก ศูนย์ส่งเสริมสุขภาพ เขต 10 เชียงใหม่ นางสุภัทรา หอมมณี เจ้าหน้าที่บริหารงานสาธารณสุข 6 สำนักงานสาธารณสุขจังหวัดเชียงใหม่ และนางศรีพรรณ คุณา ประธานกลุ่มแม่บ้านตำบลหนองตอง อำเภอหางดง จังหวัดเชียงใหม่ ได้ทำโครงการวิจัยร่วมกันในหัวข้อเรื่อง “การสร้างเสริมพลังสตรีวัยหมดประจำเดือนในการออกกำลังกาย” โดยมีวัตถุประสงค์เพื่อเสริมสร้างให้สตรีวัยหมดประจำเดือนรับรู้ความสามารถตนเอง สามารถคาดหวังผลจากการออกกำลังกายที่มีต่อสุขภาพและสามารถปฏิบัติกิจกรรมการออกกำลังกายได้อย่างถูกต้องและสม่ำเสมอ

ในการทำวิจัยครั้งนี้วางแผนในการรวบรวมข้อมูล จากการสัมภาษณ์ การตอบแบบสอบถาม การทดสอบสภาวะสุขภาพของสตรีวัยหมดประจำเดือนและความตั้งใจในการออกกำลังกาย รวมทั้งข้อมูลอื่นๆ ที่เกี่ยวข้อง การทำกิจกรรมกลุ่มเพื่อสร้างเสริมความสามารถตนเองในการออกกำลังกายและร่วมในโปรแกรมการออกกำลังกายด้วยการเดินและวิ่ง เป็นเวลา 24 สัปดาห์ ผู้ร่วมวิจัยทุกคนจะได้รับการตรวจและทดสอบสมรรถภาพร่างกายเป็นระยะๆ ในระหว่างที่ดำเนินการวิจัยจะมีวิทยากรที่มีความรู้ และความชำนาญคอยช่วยเหลือแนะนำอย่างใกล้ชิดเพื่อความปลอดภัยของผู้เข้าร่วมการวิจัย จนกระทั่งสิ้นสุดการทำวิจัย

ข้อมูลที่ได้จากการทำวิจัยครั้งนี้ ผู้วิจัยจะนำเสนอโดยภาพรวมโดยไม่เปิดเผยชื่อจริงของท่านเป็นรายบุคคล ผลของการวิจัยครั้งนี้จะเป็นข้อมูลที่สามารถนำไปใช้ในการพัฒนาศักยภาพและสร้างเครือข่ายของสตรีในการออกกำลังกายที่เหมาะสมและสอดคล้องกับความต้องการของสตรีวัยหมดประจำเดือน รวมทั้งกระตุ้นเตือนให้ครอบครัว ชุมชน และรัฐบาลเห็นความสำคัญของการออกกำลังกายที่มีต่อสภาวะสุขภาพของสตรีวัยหมดประจำเดือนต่อไป

คณะผู้วิจัยเห็นว่าท่านเป็นผู้หนึ่งที่มีความเหมาะสมในการให้ข้อมูลและร่วมทำกิจกรรมดังกล่าวข้างต้น จึงใคร่ขอความร่วมมือจากท่านในการทำวิจัยครั้งนี้และขอขอบคุณมา ณ โอกาสนี้

ขอแสดงความนับถือ
คณะผู้วิจัย

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ใบแสดงความยินดีเข้าร่วมโครงการวิจัย

ดิฉัน(นาง , นางสาว).....นามสกุล.....

ได้รับทราบจากคณะผู้วิจัยเรื่อง “การสร้างเสริมพลังสตรีวัยหมดประจำเดือนในการออกกำลังกาย” โดยดิฉันได้รับการอธิบายถึงวัตถุประสงค์ ขั้นตอนในการเก็บรวบรวมข้อมูล และการนำเสนอข้อมูล โดยไม่มีการเปิดเผยชื่อผู้เข้าร่วมการวิจัยเป็นรายบุคคล รวมถึงประโยชน์ของการออกกำลังกายที่มีต่อสุขภาพอย่างละเอียด และมีความยินดีเข้าร่วมในกิจกรรมของโครงการดังกล่าวข้างต้น

ลงชื่อผู้เข้าร่วมการวิจัย.....

ชื่อผู้เข้าร่วมวิจัย(ตัวบรรจง).....

วันที่.....

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ศูนย์ส่งเสริมสุขภาพเขต 10
ถนนประชาสัมพันธ์ ตำบลช้างคลาน
อำเภอเมือง เชียงใหม่ 50100

วันที่ พฤษภาคม 2545

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. เรียนนายกเทศมนตรีเทศบาลตำบลหนองตอง

ด้วย นางสาวจิติมา กตัญญู พยาบาลวิชาชีพระดับ 7 โรงพยาบาลแม่และเด็ก ศูนย์ส่งเสริมสุขภาพ เขต 10 เชียงใหม่ นางสุภัทรา หอมมณี เจ้าหน้าที่บริหารงานสาธารณสุข 6 สำนักงานสาธารณสุขจังหวัดเชียงใหม่ และนางศรีพรรณ คุณา ประธานกลุ่มแม่บ้านตำบลหนองตอง อำเภอหางดง จังหวัดเชียงใหม่ ได้ทำโครงการวิจัยร่วมกันในหัวข้อเรื่อง "การสร้างเสริมพลังสตรีวัยหมดประจำเดือนในการออกกำลังกาย" โดยมีวัตถุประสงค์เพื่อเสริมสร้างให้สตรีวัยหมดประจำเดือนรับรู้ความสามารถตนเอง สามารถคาดหวังผลจากการออกกำลังกายที่มีต่อสุขภาพและสามารถปฏิบัติกิจกรรมการออกกำลังกายได้อย่างถูกต้องและสม่ำเสมอ

ในการทำวิจัยครั้งนี้วางแผนในการรวบรวมข้อมูล จากการสัมภาษณ์ การตอบแบบสอบถาม การทดสอบสภาวะสุขภาพของสตรีวัยหมดประจำเดือนและความตั้งใจในการออกกำลังกาย รวมทั้งข้อมูลอื่นๆ ที่เกี่ยวข้อง การทำกิจกรรมกลุ่มเพื่อสร้างเสริมความสามารถตนเองในการออกกำลังกายและร่วมในโปรแกรมการออกกำลังกายด้วยการเดินและวิ่ง เป็นเวลา 24 สัปดาห์ ผู้ร่วมวิจัยทุกคนจะได้รับการตรวจและทดสอบสมรรถภาพร่างกายเป็นระยะๆ ในระหว่างที่ดำเนินการวิจัยจะมีวิทยากรที่มีความรู้ และความชำนาญคอยช่วยเหลือแนะนำอย่างใกล้ชิดเพื่อความปลอดภัยของผู้เข้าร่วมการวิจัย จนกระทั่งสิ้นสุดการทำวิจัย ผลของการวิจัยครั้งนี้จะเป็นข้อมูลที่สามารถนำไปใช้ในการพัฒนาศักยภาพ และสร้างเครือข่ายของสตรีในการออกกำลังกายที่เหมาะสมและสอดคล้องกับความต้องการของสตรีวัยหมดประจำเดือน รวมทั้งกระตุ้นเตือนให้ครอบครัว ชุมชน และรัฐบาลเห็นความสำคัญของการออกกำลังกายที่มีต่อสภาวะสุขภาพของสตรีวัยหมดประจำเดือนต่อไป

ในการทำกิจกรรมดังกล่าวข้างต้นต้องใช้พื้นที่ในการฝึกทักษะการออกกำลังกาย จึงใคร่ขอความอนุเคราะห์ด้านสถานที่จากท่านเพื่อใช้ในการทำวิจัย เรียนมาเพื่อโปรดพิจารณา

ขอแสดงความนับถือ
คณะผู้วิจัย

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การทดสอบสมรรถภาพทางกายประกอบด้วย

1. การตรวจร่างกายทั่วไป ได้แก่การชั่งน้ำหนัก วัดส่วนสูง ชีพจร และความดันโลหิต

การวัดความดันโลหิต (Blood pressure)

อุปกรณ์การทดสอบ

1. เครื่องวัดความดันเลือด แบบดิจิตอล (Digital blood pressure/pulse monitor) ยี่ห้อ Omron รุ่น HEM-700C ผลิต โดยบริษัท Omron corporation ประเทศญี่ปุ่น
2. หูฟัง (Stethoscope) ขนาดความยาว 28 นิ้ว ยี่ห้อ Littmann รุ่น Classic II ผลิตในประเทศสหรัฐอเมริกา

วิธีดำเนินการทดสอบ

1. ก่อนทำการทดสอบให้ผู้เข้ารับการทดสอบนั่งพักตามสบาย บนเก้าอี้ที่มีพนักพิงหลัง แขนทั้งสองข้างวางบนพนักพักแขนสบาย ๆ ประมาณ 10-15 นาที
2. ทำการวัดความดันเลือดในท่านั่ง โดยให้ผู้เข้ารับการวัดความดันเลือดบริเวณเหนือข้อพับของข้อศอกทั้งสองข้างก่อน และในการวัดครั้งต่อไปให้ทำการวัดแขนข้างที่มีความดันเลือดสูงกว่า (ส่วนใหญ่มักจะเป็นแขนข้างที่ถนัด)
3. เลือกขนาดของผ้าที่ใช้รัดพันแขน (Cuff) สำหรับการวัดความดันเลือด
   ขนาด 17-26 เซนติเมตร เหมาะสมกับผู้ใหญ่ (ปกติ)
   ขนาด 32-42 เซนติเมตร เหมาะสมกับผู้ใหญ่ (ที่มีขนาดร่างกายใหญ่)
4. ใช้ผ้าที่ใช้รัดพันแขน (Cuff) พันรอบแขนเหนือข้อพับของข้อศอก ประมาณ 1 นิ้ว
5. คลำหาชีพจรที่ Brachial artery แล้ววางหูฟัง (Stethoscope) ลงบนตำแหน่งชีพจรที่คลำได้
6. กดปุ่มเปิดเครื่อง (on/off)
7. ตั้งระดับความดันเลือดประมาณ 200 มิลลิเมตรปรอท
8. กดปุ่มเริ่ม (start) เครื่องวัดความดันเลือดทำงาน
9. สังเกตบริเวณหน้าปัดของเครื่องวัดความดันเลือดจะแสดงตัวเลขออกมาเป็นค่าความดันเลือด ค่าแรกเป็นค่าความดันเลือดขณะหัวใจบีบตัวขณะพัก (Resting systolic blood pressure) ค่าที่สองเป็นค่าคามดันเลอืดขณะหัวใจคลายตัวขณะพัก (resting diastolic blood pressure)
10. หน่วยวัดความดันเลือดเป็นมิลลิเมตรปรอท (mm Hg)

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2. การทดสอบความแข็งแรงของกล้ามเนื้อ

2.1 การวัดแรงบีบมือ

เครื่องมือ แฮนด์ กริพ ไดนาโมมิเตอร์

วิธีการ 1. ปรับระดับที่จับของเครื่องมือให้เหมาะกับมือข้างที่ถนัดของผู้รับการทดสอบ

2.ให้ผู้ทดสอบปล่อยแขนตามสบายไม่ให้แขนแนบลำตัว ใช้มือจับที่จับของเครื่องมือ

3. ออกแรงบีบที่จับของเครื่องมือให้เต็มที่ โดยทำ 2 ครั้งบันทึกค่าครั้งที่มากที่สุด

หน่วยวัดเป็นกิโลกรัม นำผลที่ได้มาหารด้วยน้ำหนักตัวผู้ถูกทดสอบ แล้วเทียบกับเกณฑ์มาตรฐานแรงบีบมือสำหรับประชาชนทั่วไป ของการกีฬาแห่งประเทศไทยในกลุ่มเพศและอายุเดียวกัน

2.2 การวัดความอ่อนตัว

เครื่องมือ ม้าตั้งวัดระยะ

วิธีการ 1. ให้ผู้รับการทดสอบนั่งเหยียดขาตรง ฝ่าเท้าชิดกันตั้งฉากกับพื้นยันที่กั้นเท้าของเครื่องมือ

2. เหยียดแขนตรงไปข้างหน้าแล้วค่อยๆโน้มตัวไปข้างหน้าให้ปลายนิ้วทั้งสองข้างแตะแป้นบอกหมายเลขของเครื่องมือ

3. ห้ามโยกตัวหรืองอตัวอย่างแรง เพราะอาจเป็นอันตรายต่อกระดูกสันหลัง ขณะโน้มตัวเข่าทั้งสองข้างต้องตึง

4. คิดคะแนนจากระยะทางจากปลายนิ้วมือถึงปลายนิ้วเท้า

หน่วยการวัด เป็นเซนติเมตร นำผลที่ได้เทียบกับเกณฑ์มาตรฐานความอ่อนตัวสำหรับประชาชนทั่วไป ของการกีฬาแห่งประเทศไทยในกลุ่มเพศ และอายุเดียวกัน

2.3 การทดสอบความสามารถในการใช้ออกซิเจนสูงสุด (Maximal oxygen consumption: VO2 max)

อุปกรณ์การทดสอบ

1. จักรยานวัดงาน (Bicycle Ergometer) แบบคอมพิวเตอร์ ยี่ห้อ Cateye Ergociser รุ่น อีซี 1000 (Model EC-1000)
2. เครื่องวัดความดันเลือด แบบดิจิตอล (Digital blood presure/pulse monitor) ยี่ห้อ Omron รุ่น HEM-700C ผลิตโดยบริษัท Omron corporation ประเทศญี่ปุ่น
3. หูฟัง (Stethoscope) ขนาดความยาว 28 นิ้ว ยี่ห้อ Littmann รุ่น Classic II ผลิตในประเทศสหรัฐอเมริกา

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4. เครื่องตรวจนับอัตราการเต้นของหัวใจแบบคาดหน้าอก (Heart rate monitor) ยี่ห้อโพล่า (Polar) ผลิตในประเทศฟินแลนด์
5. นาฬิกาจับเวลาที่สามารถวัดได้ละเอียดถึง 1 ใน 100 วินาที
6. เครื่องชั่งน้ำหนัก แบบดิจิตอล ที่สามารถบอกน้ำหนักได้ละเอียดถึง 1/1000 กรัมใน 1 กิโลกรัม

การเตรียมตัวสำหรับผู้เข้ารับการทดสอบ

1. ในวันที่ทำการทดสอบผู้เข้ารับการทดสอบจะต้องดสูบบุหรี่ สุรา และกาแฟ
2. ในวันก่อนที่จะทำการทดสอบจะต้องได้รับการพักผ่อนอย่างเต็มที่ ไม่นอนดึก ไม่ใช้ความคิดที่หนัก และงดออกกำลังกายที่หนัก
3. การรับประทานอาหารก่อนการทดสอบจะเป็นไปตามปกติ และถ้ามีการรับประทานอาหารจะต้องรับประทานอาหารก่อนการทดสอบอย่างน้อย 2 ชั่วโมง
4. การแต่งกายสำหรับผู้เข้ารับการททดสอบจะต้องแต่งกายด้วยชุดที่มีความสะดวกสบายเคลื่อนไหวได้ง่าย พร้อมกับสวมรองเท้ากีฬา ถุงเท้าอย่างเหมาะสม

ขั้นตอนดำเนินการทดสอบ

1. ให้ผู้เข้ารับการทดสอบนั่งพักตามสบายเพื่อให้ร่างกายอยู่ในสภาวะปกติ โดยใช้เวลาพักอย่างน้อย 15 นาที ต่อจากนั้นทำการวัดอัตราการเต้นของหัวใจขณะพัก ความดันเลือดขณะพัก
2. ให้ผู้เข้ารับการทดสอบขึ้นนั่งบนอานจักรยายวัดงาน ปรับอานและที่จับให้เหมาะกับผู้เข้ารับการทดสอบ อยู่ในท่าที่สบาย ขาข้างใดข้างหนึ่งยืดเหยียดให้สุดแต่จะต้องไม่ตึงเกินไป เข่างอเล็กน้อย
3. ให้ผู้เข้ารับการทดสอบซ้อมถีบจักรยานก่อนเข้ารับการทดสอบ โดยไม่มีน้ำหนักถ่วงนาน ประมาณ 3 นาที ด้วยอัตราความเร็วคงที่ 50 รอบต่อนาที และอัตราการเต้นของหัวใจขณะซ้อมถีบนี้ไม่เกิน 100 ครั้งต่อนาที
4. ให้ผู้เข้ารีบการทดสอบพักนาน 2 นาที
5. กำหนดอัตราการเต้นของหัวใจสูงสุด **จากสูตร 220 - อายุ**
6. สอบถามผู้เข้ารับการทดสอบว่าในระยะ 3 เดือนที่ผ่านมา ได้มีการออกกำลังกายเป็นประจำอย่างน้อย 3 วันต่อสัปดาห์ และอย่างน้อยวันละ 15 นาทีขึ้นไปหรือไม่ ทั้งนี้เพื่อจะได้ไปเลือกกำหนดน้ำหนักถ่วงได้ ทั้งนี้น้ำหนักถ่วงจะต้องสัมพันธ์กับน้ำหนักตัวของร่างกายด้วย

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เกณฑ์ในการเลือกน้ำหนักถ่วงเพื่อใช้ในการทดสอบความสามารถในการใช้ออกซิเจนสูงสุด

น้ำหนักตัวของร่างกาย	**การออกกำลังกาย**	
(กิโลกรัม)	**ไม่เคย**	**เคย**
น้อยกว่า 73 กิโลกรัม	A	A
74-90 กิโลกรัม	A	B
มากกว่า 90 กิโลกรัม	B	C

7. กำหนดหาอัตราการเต้นของหัวใจที่เป็นเป้าหมาย ๖ 70 เปอร์เซ็นต์ของอัตราการเต้นของหัวใจสำรองสูงสุด) จากสูตรของ Karvonen method

อัตราการเต้นของหัวใจที่เป็นเป้าหมาย = **(**อัตราการเต้นของหัวใจสูงสุด - อัตราการเต้นของหัวใจขณะพัก**) x** เปอร์เซนต์ความหนักของงาน + อัตราการเต้นของหัวใจขณะพัก

THR = (HR max – HR rest) x .70 + HR rest

THR หมายถึง อัตราการเต้นของหัวใจที่เป็นเป้าหมาย

HR max หมายถึง อัตราการเต้นของหัวใจสูงสุด คำนวณจากสูตร 220- อายุ

HR rest หมายถึง อัตราการเต้นของหัวใจขณะพัก

8. เริ่มต้นทดสอบโดยให้ผู้เข้ารับการทดสอบถีบจักรยานวัดงานด้วยอัตราความเร็วคงที่ 50 รอบ/นาที ใช้ความหนักของงาน (น้ำหนักถ่วง) เริ่มต้นตามตารางที่กำหนดให้ และต้องสัมพันธ์กับน้ำหนักตัว การเพิ่มความหนักของงานจะเพิ่มทุก ๆ 2 นาที แล้วบันทึกอัตราการเต้นของหัวใจและความดันเลือด ภายหลังจากถีบจักรยานวัดงานไปแล้วโดยทำการวัดใน 15 วินาทีสุดท้ายของนาทีที่ 2, 4, 6 หรือ 8 ตามลำดับ
9. จะทำการหยุดทดสอบเมื่อวัดการเต้นของหัวใจถึงเป้าหมาย หรือมีข้อบ่งชี้ที่จะต้องหยุดการทดสอบ
10. ให้ทำการถีบจักรยานวัดงานต่อไปอีกประมาณ 1-2 นาที โดยไม่มีน้ำหนักถ่วงและให้อัตราการเต้นของหัวใจต่ำลงมากกว่า 100 ครั้งต่อนาที
11. นำเอาจำนวนครั้งของอัตราการเต้นของหัวใจที่นับได้ในนาทีที่ 2, 4, 6 หรือ 8 คูณด้วย 4 เป็นอัตราการเต้นของหัวใจใน 1 นาที (จำนวนครั้งต่อนาที)

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การแปลการทดสอบความสามารถในการใช้ออกซิเจนสูงสุด

1. นำเอาปริมาณงานในการทดสอบ (น้ำหนักถ่วงที่มีหน่วยเป็นกิโลกรัม-เมตรต่อนาที) และอัตราการเต้นของหัวใจขณะทดสอบที่ปริมาณงานระดับเดียวกัน (จำนวนครั้งต่อนาที) ไปกำหนดลงบนกราฟ ที่แสดงถึงความสัมพันธ์สัมพันธ์ของอัตราการเต้นของหัวใจกับปริมาณงาน (Work load) ของผู้เข้ารับการทดสอบแต่ละคน จะได้ปริมาณงานสูงสุดที่ได้จากการพยากรณ์ โดยใช้วิธีการวิเคราะห์การถดถอยอย่างง่าย (Simple regression)
2. เปลี่ยนปริมาณงานสูงสุดที่ได้จากการพยากรณ์ เป็นค่าความสามารถในการใช้ออกซิเจนสูงสุด (Vo2 max) ตามสูตร

Vo2 = (Kgm x 2) + {1 MET x body weight (kg)}

เมื่อ Vo2 หมายถึงอัตราการใช้ออกซิเจน มีหน่วยวัดเป็นมิลลิเมตรต่อนาที

Kgm หมายถึง ปริมาณงานในการทดสอบ (น้ำหนักถ่วง) มีหน่วยวัดเป็น กิโลกรัม-เมตรต่อนาที

2 หมายถึง อัตราการใช้ออกซิเจนเป็นมิลลิลิตรต่อนาที เมื่อทำงานหนัก 1 กิโลกรัม-เมตรต่อนาที

MET หมายถึง หน่วยของการใช้ออกซิเจน ซึ่งกำหนดค่า 1 MET เท่ากับ อัตราการใช้ออกซิเจนในขณะพัก มีค่า 3.5 มิลลิลิตร ต่อ กิโลกรัมต่อนาที (ml/kg –1/min-1)

Body weight (kg) หมายถึง น้ำหนักตัวของผู้เข้ารับการทดสอบ มีหน่วยวัดเป็นกิโลกรัม ความสามารถในการใช้ออกซิเจนสูงสุด (Vo2 max) ที่คำนวณได้มีหน่วยวัดเป็นมิลลิลิตรต่อนาที เมื่อหารด้วยน้ำหนักตัวของผู้เข้ารับการทดสอบ จะมีหน่วยวัดเป็นมิลลิลิตรต่อกิโลกรัมต่อนาที

ข้อบ่งชี้ให้หยุดการทดสอบ

1. เมื่ออัตราการเต้นของหัวใจขณะออกกำลังกายถึงเป้าหมายที่กำหนดได้ คือ 70 เปอร์เซนต์ของอัตราการเต้นของหัวใจ สำรองสูงสุด
2. เมื่อผู้เข้ารับการทดสอลบมีอาการดังต่อไปนี้

2.1. มีอาการเจ็บปวดเค้นบริเวณหน้าอก (Progressive Angina) ถ้าถึงขั้นที่ 3+ ต้องหยุดทันที

Angina scale

1+ เบา, ไม่มีอาการที่สังเกตได้

2+ ปานกลาง, น่ารำคาญ

3+ รุนแรงและไม่สบาย

4+ รุนแรงมากที่สุด อาการเจ็บปวด

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2.2. เมื่อมีการเพิ่มความหนักของงาน (น้ำหนักถ่วง) มากขึ้น แต่ความดันเลือดขณะหัวใจบีบตัว (Systolic blood pressure) ไม่เพิ่มขึ้น และกลับลดลงมากกว่า 20 มิลลิเมตรปรอท

2.3. วิงเวียนศีรษะ (Lightheadedness) สับสนงงงวย (Confusion) การทำงานของกล้ามเนื้อแขนขาไม่ประสานกัน (Ataxia) ผิวหนังซีดขาว (Pallor) หน้าเขียวคล้ำเนื่องจากขาดออกซิเจน (Cyanosis) คลื่นไส้ (Nausea) หรือมีสัญญาณบ่งบอกถึงการไหลเวียนเลือดขาดประสิทธิภาพอย่างรุนแรง

2.4. ค่าความดันเลือดขณะหัวใจบีบตัว (Systolic blood pressure) มากกว่า 250 มิลลิเมตรปรอท และ/หรือ ค่าความดันเลือดขณะหัวใจคลายตัว (Diasstolic blood pressure) มากกว่า 120 มิลลิเมตรปรอท

2.5. อัตราการเต้นของหัวใจขณะทำการทดสอบช้าลงอย่างไม่เหมาะสม (Inappropriate bradycardia)

2.6. สภาพร่างกายอ่อนแอลง กล่าวคือ ความหนักของงาน (Load) เพิ่มขึ้น แต่ความดันเลือด (Blood pressure) และ อัตราการเต้นของหัวใจ (Heart rate) ไม่เพิ่มขึ้น

2.7. ผู้รับการทดสอบขอหยุดการทดสอบด้วยตนเอง

2.8. เกิดจากความผิดพลาดจากเครื่องมือทดสอบ เช่น เครื่องมือเสีย หรือบกพร่องทำงานต่อไปไม่ได้

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ใบกำกับการดำเนินงานวิจัยปฏิบัติการ

Session I ยินดีต้อนรับเข้าสู่กิจกรรมทางกาย

ต่อไปนี้จะเป็นข้อความที่ถูกนำอภิปรายใน session ที่ 1

1. คำจำกัดความของกิจกรรมทางกาย, การออกกำลังกาย และสมรรถภาพ
2. อัตราการออกกำลังกายของสตรีไทย
3. ความสัมพันธ์ระหว่างการออกกำลังกายกับกระบวนการเกิดโรคในสตรีโดยเฉพาะ โรคหลอดเลือดหัวใจ, กระดูกพรุนบาง และมะเร็ง
4. แนวทางของการออกกำลังกายกาย
5. การประเมินผลการทดสอบสมรรถภาพเฉพาะส่วน
6. การอภิปรายเพื่อทำทางออกสำหรับบุคคลแต่ละคนในการเพิ่มกิจกรรมการออกกำลังกาย
7. การอภิปรายถึงการรับรู้ถึงความระดับของความพยายาม โดยการกำกับความหนักของกิจกรรผ
8. ร่วมวิจัยกับนักวิจัยจะวางเป้าหมายในช่วงสั้นๆ ที่จะต้องก้าวไปให้ถึงในช่วง 2 อาทิตย์ข้างหน้า
9. ผู้ร่วมวิจัยและนักวิจัยร่วมกันวางเป้าหมายระยะยาวเพื่อพัฒนาร่างกายตลอดสิ้นสุดโครงการ

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Session II การฟันฝ่าอุปสรรค

ครอบคลุมสิ่งต่อไปนี้

1. ผู้ร่วมวิจัยและนักวิจัยทบทวนกการออกกำลังกาย โดยเฉพาะอย่างยิ่งการประเมินความสำเร็จของเป้าหมายช่วงสั้นๆ ด้วยการทดสอบและการอภิปราย
2. การอธิบายถึงอุปสรรคที่จะต้องเจอ
3. การเตรียมตัวอย่างของอุปสรรคขัดขวางการออกกำลังกายในสตรีที่จะเข้าร่วมในโปรแกรม
4. อุปสรรคมีอิทธิพลอย่างไรในการร่วมกิจกรรม
5. ผู้ร่วมวิจัยช่วย บันทึกอุปสรรคที่คาดว่าน่าจะเกิดในกลุ่มของตนเอง
6. กลยุทธ์ที่จะเอาชนะอุปสรรคต่างๆ โดยการร่วมกันอภิปราย
7. กำหนดเป้าหมายช่วงสั้นๆ ของ 2 อาทิตย์ต่อไป

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Session III กิจกรรมตลอดโครงการ

1. ผู้ร่วมวิจัยและนักวิจัย จะทบทวนบันทึกประจำวันในการออกกำลังกาย และการประเมินเป้าหมายย่อยใน session ที่ผ่านมา
2. ฤดูกาล อากาศ เป็นสิ่งแวดล้อมที่อาจเป็นอุปสรรคต่อการออกกำลังกายอย่างไร ของผู้ร่วมวิจัย
3. การอภิปราย ตัวแปรด้านฤดูกาลที่อาจเป็นอุปสรรคต่อการออกกำลังกายของผู้ร่วมวิจัย เช่น ฤดูเก็บผลไม้ประจำถิ่น
4. ผู้ร่วมวิจัยและนักวิจัยร่วมกันวางแผนสำหรับการออกกำลังกายของผู้ร่วมวิจัย เมื่อฤดูกาลมีท่าทีว่าจะเป็นอุปสรรคในการออกกำลังกาย
5. เป้าหมายอีก 2 อาทิตย์ต่อไปจะต้องร่วมกันวางระหว่างผู้ร่วมวิจัยและนักวิจัย

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Session V การปรับรูปแบบของการออกกำลังกาย

การอภิปรายเริ่มต้นตามลำดับดังต่อไปนี้

1. ทบทวน การออกกำลังกายและการประเมินเป้าหมายย่อย และเป้าหมายรวม
2. ทบทวนคำจำกัดความของกิจกรรมทางกาย, การออกกำลังกาย, สมรรถภาพทางกาย
3. อภิปรายถึงระดับของความหนักปานกลางในการออกกำลังกาย และการฝึกทักษะประเมินความหนักของงาน ด้วยการจับชีพจร, talk test และ การรับรู้ความเหนื่อย
4. ผู้ร่วมวิจัยอภิปรายกันเกี่ยวกับสิ่งอำนวยความสะดวกในพื้นที่ (เช่น ทางจักรยาน, สวนสาธารณะ, สถานที่ออกกำลังกาย)
5. ผู้เข้าร่วมวิจัย อภิปรายถึงชนิดของการกำลังกายที่สนใจในการออกกำลังกาย
6. อภิปรายวิธีการเริ่มโปรแกรมการออกกำลังกายว่าจะทำอย่างไร โดยเฉพาะอย่างยิ่งในประเด็นของการเริ่มต้นออกกำลังกาย ซึ่งควรจะเริ่มด้วยความหนักและความนานอย่างไร
7. การวางเป้าหมายต่อเนื่องในระยะยาวอีก 3 เดือน และ 6 เดือนต่อไป

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แผนการจัดกิจกรรมสุขศึกษา
ครั้งที่ 1

การสร้างความรู้เกี่ยวกับการออกกำลังกาย และการรับรู้ความสามารถตนเองในการออกกำลังกาย

วัตถุประสงค์ทั่วไป

เพื่อพัฒนาให้สตรีวัยหมดประจำเดือน มีความรู้เกี่ยวกับการออกกำลังกายว่าเป็นเรื่องที่มีความสำคัญต่อสุขภาพ รวมทั้งพัฒนาให้เกิดความเชื่อมั่นในตนเอง และการรับรู้ความสามารถตนเองในการออกกำลังกายเพื่อสุขภาพและการฝึกทักษะการออกกำลังกาย

วัตถุประสงค์เชิงพฤติกรรม

หลังเข้าร่วมกิจกรรมแล้วสตรีวัยหมดประจำเดือนสามารถ

1. บอกถึงประโยชน์ของการออกกำลังกายได้
2. บอกถึงผลเสียของการขาดการออกกำลังกายได้
3. บอกความคิดเห็นของตนเองในการอภิปรายร่วมกันได้
4. มีพฤติกรรมในการมีส่วนร่วมในการวางแผนแก้ไขปัญหาจากการขาดการออกกำลังกายได้
5. ออกกำลังกายที่เหมาะสมกับวัยได้อย่างถูกต้อง

แนวคิดหลัก

1. การทำกระบวนการกลุ่ม(Focus groups) กระบวนการเรียนรู้แบบมีส่วนร่วมเป็นกระบวนการสร้างความรู้ด้วยตัวผู้เรียนเองโดยยึดผู้เรียนเป็นศูนย์กลาง โดยให้ผู้เรียนนำประสบการณ์เดิมของตนมาพัฒนาเป็นองค์ความรู้ และมีโอกาสแสดงออกแลกเปลี่ยนความคิดเห็น สร้างความเข้าใจเพื่อนำไปสู่ความคิดรวบยอด และประยุกต์ใช้ในสถานการณ์ได้ ทำให้เกิดความรู้สึกว่าตนเองมีความสามารถเกิดความเชื่อมั่นในตัวเองและกล้าแสดงออก

สื่อและอุปกรณ์

1. เทปบันทึกเสียงพร้อมอุปกรณ์
2. แนวคำถามในการทำกระบวนการกลุ่ม
3. เอกสารคู่มือกายออกกำลังกายเพื่อสุขภาพ
4. แบบบันทึกด้วยตนเอง

วิธีการ

1. กิจกรรมกลุ่มสัมพันธ์โดยการแนะนำผู้ร่วมโครงการ แลผู้ดำเนินโครงการ
2. สนทนากลุ่มระหว่างผู้ร่วมโครงการ และผู้ดำเนินโครงการ ในหัวข้อเรื่องอาการจากการภาวะหมดประจำเดือน การปฏิบัติตัวเพื่อส่งเสริมสุขภาพ

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3. ออกกำลังกายที่มีความหนัก ความนาน และความบ่อยทำให้หัวใจทำงานหนักได้เพียงพอ ทำให้เกิดการเปลี่ยนแปลงที่เป็นประโยชน์ต่อร่างกาย โดยสอดคล้องกับวิถีชีวิตได้
4. สรุปแนวทางที่ถูกต้องให้กับผู้ร่วมโครงการ

อุปกรณ์

แผ่นพับเรื่องภาวะการหมดประจำเดือน การปฏิบัติตัวเพื่อส่งเสริมสุขภาพ

การประเมินผล

สังเกตจากการแสดงความคิดเห็น และความสนใจขณะเข้าร่วมกิจกรรม

กิจกรรมสุขศึกษา
ครั้งที่ 2

วัตถุประสงค์เฉพาะ

หลังเข้าร่วมกิจกรรมแล้วสตรีวัยหมดประจำเดือนสามารถ

1. บอกอาการที่เกิดจากการเปลี่ยนแปลงจากสภาวะการหมดประจำเดือน
2. บอกแนวทางการปฏิบัติตนเกี่ยวกับสุขภาพอนามัยในวัยหมดประจำเดือนได้
3. ออกกำลังกายที่เหมาะสมกับวัยได้

เนื้อหา

1. อาการเริ่มต้น และอาการในระยะต่อมาของการหมดประจำเดือน
2. ปัจจัยเสี่ยงต่อการเกิดโรคกระดูกพรุน และโรคหัวใจ
3. ประโยชน์ และแนวทางการปฏิบัติตัวในการส่งเสริมสุขภาพของสตรีวัยหมดประจำเดือน
4. ความรู้เรื่องการเลือกรับประทานอาหารที่เหมาะสมกับความต้องการของวัย และการผ่อนคลายความเครียด
5. การออกกำลังกาย

วิธีการ

1. กิจกรรมกลุ่มสัมพันธ์โดยการแนะนำผู้ร่วมโครงการ แลผู้ดำเนินโครงการ
2. สนทนากลุ่มระหว่างผู้ร่วมโครงการ และผู้ดำเนินโครงการ ในหัวข้อเรื่องอาการจากการภาวะหมดประจำเดือน การปฏิบัติตัวเพื่อส่งเสริมสุขภาพ
3. สรุปแนวทางที่ถูกต้องให้กับผู้ร่วมโครงการ

อุปกรณ์

แผ่นพับเรื่องภาวะการหมดประจำเดือน การปฏิบัติตัวเพื่อส่งเสริมสุขภาพ

การประเมินผล

สังเกตจากการแสดงความคิดเห็น และความสนใจขณะเข้าร่วมกิจกรรม

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กิจกรรมสุขศึกษา
ครั้งที่ 3

วัตถุประสงค์เฉพาะ

หลังเข้าร่วมกิจกรรมแล้วสตรีวัยหมดประจำเดือนสามารถ

1. จับชีพจรด้วยตนเองได้
2. คาดหวังในความสามารถตนเองในการส่งเสริมสุขภาพ

วิธีการ

1. การสนทนากลุ่มของผู้ร่วมโครงการเกี่ยวกับการปฏิบัติตัวเกี่ยวกับการส่งเสริมสุขภาพ
2. ฝึกทักษะการจับชีพจร
3. สตรีวัยหมดประจำเดือนที่มีสุขภาพแข็งแรงสมบูรณ์พูดถึงการปฏิบัติตนในการส่งเสริมสุขภาพ

อุปกรณ์

ตัวแบบสตรีวัยก่อนหมดประจำเดือน ที่มีสุขภาพแข็งแรงสมบูรณ์

การประเมินผล

1. สังเกตจากการแสดงความคิดเห็น และความสนใจขณะเข้าร่วมกิจกรรม
2. สังเกตจากการฝึกทักษ

กิจกรรมสุขศึกษา
ครั้งที่ 4

วัตถุประสงค์เฉพาะ

หลังเข้าร่วมกิจกรรมแล้วสตรีวัยหมดประจำเดือนสามารถ

1. ออกกำลังกายที่มีความหนัก ความนาน และความบ่อยทำให้หัวใจทำงานหนักได้เพียงพอทำให้เกิดการเปลี่ยนแปลงที่เป็นประโยชน์ต่อร่างกาย โดยสอดคล้องกับวิถีชีวิตได้
2. ปฏิบัติตนในการส่งเสริมสุขภาพ

วิธีการ

1. การสนทนากลุ่มของผู้ร่วมโครงการเกี่ยวกับปัญหาที่พบเกี่ยวกับการปฏิบัติตัวในการส่งเสริมสุขภาพ

การประเมินผล

1. สังเกตจากการความสนใจ และความร่วมมือแก้ไขปัญหาในกลุ่ม

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มาออกกำลังกายกันเถอะ

การที่คนเราจะมีสุขภาพพลานามัยที่สมบูรณ์ แข็งแรง คือการกินดีอยู่ดี ฝึกความพร้อมทางจิตใจและการออกกำลังกาย ศาสตราจารย์นานแพทย์สนอง อุนากุล เคยกล่าวไว้ว่า “คนเราจะมีสุขภาพดี อายุยืนและไม่แก่ก่อนวัย หากรู้จักปฏิบัติตัวให้ถูกต้องในเรื่องการกิน การออกกำลังลังกาย การหายใจในที่ ๆ มีอากาศบริสุทธิ์ การพักผ่อน มีจิตใจที่ร่าเริงแจ่มใส ไร้ความกังวล”

สุขภาพ คือ อะไร สุขภาพก็คือ คามสุขปราศจากโรค ความสบายคนที่จะมีสุขภาพดี คือ คนที่ไม่เป็นโรคและมีสมรรถภาพดี

หมายคนคงสงสัยว่าทำไมจึงต้องออกกำลังกาย เพราะว่าในขณะนี้นักศึกษาอยู่ในช่วงวัยรุ่น เป็นวัยที่แข็งแรงไม่จำเป็นต้องออกกำลังกาย เพราะว่าในขณะนี้นักศึกษาอยู่ในช่วงวัยรุ่น เป็นวัยที่แข็งแรงไม่จำเป็นต้องออกกำลัง แต่ควรออกกำลังกายเพราะเมื่อมนุษย์มีอายุมากขึ้น จะมีการเสื่อมสมรรถภาพทางร่างกายลงเรื่อย ๆ ตั้งแต่หัวใจ ปอด กล้ามเนื้อ การออกกำลังกายจะเป็นวิธีการทางธรรมชาติอีที่จะช่วยชลอความเสื่อมโทรมได้ดี ดังนั้นเราควรเตรียมความพร้อมให้ร่างกายให้แข็งแรงไว้เพื่ออนาคตได้ด้วยการออกกำลังกายเพื่อสุขภาพนั่นเอง

การออกกำลังกายเพื่อสุขภาพ คือการออกกำลังกายแบบแอโรบิคที่มีการใช้ไขมันเป็นพลังงาน ใช้ออกซิเจนในการสันดาป เป็นระยะเวลานานพอติดต่อกัน เพียงพอให้เกิดความอดทนของปอด หัวใจ และระบบไหลเวียนของเลือด จึงจะมีผลต่อสุขภาพโดยมีหลัก 3 ประการ คือ

1. ความหนัก คือ การออกกำลังกายให้หนักพอเพื่อให้อัตราชีพจรสูงถึง 170-อายุครั้ง/นาที
2. ความนาน คือ ออกกำลังกายให้ติดต่อกันอย่างน้อย 15-20 นาที
3. ความบ่อย คือ ออกกำลังกายวันเว้นวัน หรืออย่างน้อย 3 ครั้ง/สัปดาห์

ประโยชน์ของการออกกำลังกายแบบแอโรบิค

1. ทำให้หัวใจ ปอด กล้ามเนื้อ ข้อต่อ เอ็น ผิวหนังแข็งแรง
2. ป้องกันความอ้วน
3. ลดไขมันในเส้นเลือด Cholesterol, Triglyceride
4. ลดความเครียด ช่วยให้หลับดีขึ้น ความจำดีขึ้น
5. ลดความดันโลหิต
6. ช่วยป้องกันโรคเบาหวาน
7. ลดการทำงานของหัวใจ (ชีพจรเต้นช้าลง)
8. ช่วยให้ความเชื่อมั่นสูง สง่าผ่าเผย
9. ป้องกันความเสื่อมของร่างกายตามธรรมชาติ

หลายคนคงคิดว่า การออกกำลังกายจะทำให้เหนื่อยไม่มีสมาธิในการเรียนและไม่ทำให้หายเครียดได้ แต่ในความเป็นจริงมีผู้ค้นพบว่า เมื่อมีการออกกำลังกายอย่างสม่ำเสมอเป็นระยะเวลานานพอสมควร ร่างกายจะหลั่งสาร Endorphins มีคุณสมบัติคล้ายมอร์ฟีน เมื่อร่างกายขับสารนี้ออกมาจะทำให้ร่างกายสดชื่นกระปี๋กระเปรา และทำงานได้อย่างมีความสุข มีสมาธิในการเรียนได้ดีขึ้น

การขาดการออกกำลังกายจะทำให้อวัยวะของร่างกายเสื่อมโทรมลงไปอย่าง ช้า ๆ ร่างกายจะเริ่มสะสมไขมันส่วนเกินตามส่วนต่าง ๆ ของเนื้อเยื่อและเส้นโลหิต โรคต่าง ๆ จะเริ่มเข้ามาสู่ร่างกาย เช่น โรคหัวใจ โรคความดันโลหิตสูงและเบาหวาน ด้วยเหตุนี้ทางที่จะทำให้สุขภาพแข็งแรงสมบูรณ์ คือ การออกกำลังอย่างสม่ำเสมอ และมีความสนุกสนานเพลิดเพลินจากการออกกำลังกายนั้น

ข้อแนะนำทั่วไปเกี่ยวกับการออกกำลังกาย

1. กรณีไม่ใช่ช่วงวัยหนุ่มสาว ควรให้แพทย์ตรวจร่างกายก่อนเสมอ
2. ถ้าผู้ออกกำลังกายป่วยหรือบาดเจ็บภายหลังจากการออกกำลังกายควรปรึกษาแพทย์

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3. ตั้งจุดมุ่งหมายของการออกกำลังกาย การบรรลุจุดมุ่งหมายต้องใช้เวลานานพอสมควร อย่าคาดหวังว่าจะบรรลุผลสำเร็จในเวลาอันสั้น โดยแท้จริงการออกกำลังกายเป็นสิ่งที่ควรปฏิบัติตลอดชีวิต เพื่อให้ร่างกายมีสุขภาพที่แข็งแรงตลอดเวลา
4. กำหนดเวลาที่จะออกกำลังกายที่แน่นอน และพยายามบรรจุการออกกำลังกายให้เป็นส่วนหนึ่งของชีวิตประจำวัน
5. ควรมีการอบอุ่นร่างกายก่อน และค่อย ๆ เริ่มสู่ช่วงการออกกำลังกาย ปฏิบัติถูกหลักการและมีช่วงผ่อนคลาย หลังจากการออกกำลังกาย
6. มีอาการผิดปกติ เช่น เหนื่อยมากเกินไป เจ็บหน้าอก หายใจไม่ทัน ควรหยุดออกกำลังกายทันที
7. พยายามออกกำลังกายโดยใช้กล้ามเนื้อทุก ๆ ส่วนของร่างกาย

<u>กิจกรรมการออกกำลังกายแบบแอโรบิค</u>

ต้องเป็นกิจกรรมที่เหมาะสมกับสภาพร่างกาย เพศ วัย และสภาพแวดล้อม เช่น กิจกรรมต่อไปนี้

เต้นแอโรบิค วิ่งเหยาะ เดินเร็ว ว่ายน้ำ ถีบจักรยาน เป็นต้น

1. เดินเร็ว (Walking) เหมาะสำหรับทุกเพศ ทุกวัย การเดินที่ดี ควรเดินก้าวเท้ายาว ๆ และแกว่งแขนแรงระยะเริ่มควรใช้เวลาประมาณ 15-30 นาที ทั้งนี้ขึ้นอยู่กับสภาพเดิมของแต่ละคน เมื่อร่างกายแข็งแรงขึ้นแล้วเพิ่มเป็น 1 ชั่วโมง หรือมากกว่า
2. ถีบจักรยาน (Biking) เหมาะสำหรับผู้ที่มีปัญหา เรื่องเข่า ข้อเท้าและผู้มีน้ำหนักมากเพราะลดแรงกระแทกจากน้ำหนักตัว
3. ว่ายน้ำ (Swimming) เหมาะสำหรับผู้ที่มีน้ำหนักตัวมาก และผู้มีปัญหาของข้อต่อต่าง ๆ สำหรับผู้ที่ว่ายน้ำไม่เป็นอาจทำกายบริหารในน้ำก็ได้
4. วิ่งเหยาะ (Jogging) เป็นการออกกำลังกายแบบแอโรบิคชนิดหนึ่งที่ทำได้ง่าย เพราะไม่มีเทคนิคที่ซับซ้อน เพียงแต่มีรองเท้าผ้าใบหรือ รองเท้าวิ่ง เพื่อกันแรงกระแทกก็เพียงพอ
5. เต้น แอโรบิค (Aerobic dance) เป็นการผสมผสานของท่ากายบริหาร, การเคลื่อนไหวร่างกายเบื้องต้น และจังหวะการเต้นรำมาผสมกับดนตรี โดยจัดความหนักเบาให้ต่อเนื่องเหมาะสมกับท่าเต้น

<u>หลักและขั้นตอนของการฝึกแอโรบิค</u>

ขั้นตอนการฝึกเต้นแอโรบิค แบ่งเป็น 3 ขั้นตอนคือ

1. **ขั้นอบอุ่นร่างกาย** (Warm up) เป็นการเตรียมความพร้อมให้อวัยวะที่เกี่ยวข้องกับการเคลื่อนไหวตื่นตัว แบ่งออกเป็น 2 ส่วนคือ
   <u>ส่วนที่ 1</u> การทำให้ร่างกายอบอุ่น โดยการสะบัดแข้งขา แกว่งแขนขา หรือวิ่งเหยาะ ๆ ในช่วงเวลาหนึ่ง
   <u>ส่วนที่ 2</u> การยืดกล้ามเนื้อและเอ็น เพื่อช่วยให้การเคลื่อนไหวของกล้ามเนื้อเอ็นและข้อต่อต่าง ๆ พร้อมที่จะรับงานหนักได้
2. **ขั้นการฝึก** (Training) ท่าในการฝึกต้องเลือกให้เหมาะสมกับสภาพของแต่ละบุคคล โดยเน้นการเสริมสร้างความแข็งแรง ความทนทาน โดยเน้นกล้ามเนื้อมัดใหญ่ ๆ เช่น แขน ขา ลำตัว หน้าท้อง

<u>จุดมุ่งหมายของขั้นนี้คือ</u>

1. ต้องการให้หัวใจเต้นเร็วและแรงขึ้น เพื่อจะได้สูบฉีดโลหิตได้มากขณะฝึกและช่วยให้หลอดเลือดใหญ่และเล็กขยายตัว ทำให้เลือดไปเลี้ยงส่วนต่าง ๆ ของร่ากายได้
2. ช่วยแก้ไขสัดส่วนของร่างกายให้มีรูปร่างดี
3. มีสุขภาพแข็งแรงและสร้างภูมิต้านทานโรค

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3. **ขั้นผ่อนคลาย** (Cool down หรือ Warm down) เป็นการบริหารอย่างช้า ๆ เพื่อให้กล้ามเนื้อที่เพิ่งทำงานหนักค่อย ๆ ผ่อนคลายรวมทั้งปรับการทำงานของหัวใจให้เข้าสู่ภาวะปกติ เน้นการหายใจเข้า-ออกช้า ๆ เป็นกิจกรรมที่ใช้เวลาประมาณ 3-5 นาที

วิธีการฝึกเต้นแอโรบิค

1. เลือกท่าฝึกให้เหมาะกับสภาพ วัย เพศ
2. ฝึกจากท่าง่ายไปหายาก จากเบาไปหาหนัก
3. ควรฝึกในที่มีกาอาการถ่ายเทสะดวก
4. เวลา สถานที่ฝึกไม่จำกัด ว่างเมื่อใด ที่ไหนก็ได้
5. เลือกฝึกท่าบริหารให้ครบทุก ๆ ส่วนของร่างกาย โดยทำติดต่อกันประมาณ 15-30 นาที และปฏิบัติสม่ำเสมอ
6. ชุดที่ฝึก ควรใส่สบายไม่คับและระบายความร้อนได้ดี

อันตรายที่อาจเกิดขึ้นจากการเต้นแอโรบิค

โดยทั่วไปการเต้นแอโรบิคถือเป็นการออกกำลังกายที่มีอันตรายน้อย แต่ถ้าปฏิบัติไม่ถูกต้องอาจเกิดอันตรายได้

1. สาเหตุภายนอก เช่น พื้นไม่เรียบ การใช้อุปกรณ์การฝึกไม่เหมาะ เช่น สวมรองเท้าพื้นยางกระโดดบนพื้นคอนกรีต ทำให้อุ้งเท้าบาดเจ็บ
2. สาเหตุภายใน เช่น เราเคลื่อนไหวในท่าที่กล้ามเนื้อไม่ประสานกัน ทำให้กล้ามเนื้ออันตรายถึงฉีกขาด
3. อันตรายจากการออกกำลังกายเกินขนาด เกิดจากการเร่งรัดร่างกายมากเกินไป ทำให้กล้ามเนื้อแข็งตัวและอักเสบเรื้อรังได้ หรืออาจเป็นลมเนื่องจากเสียเหงื่อมากไป

การวิ่งเพื่อสุขภาพ

การวิ่งเพื่อสุขภาพเป็นการออกกำลังกายแบบแอโรบิคที่ทำได้ง่ายและไม่ซับซ้อนและมีอันตรายน้อยเมื่อเทียบกับการออกกำลังกายชนิดอื่น

อุปกรณ์การวิ่ง

1. ชุดที่ใส่ ควรทำด้วยวัสดุที่ซับเหงื่อได้ดี และควรเป็นเสื้อ แขนสั้น กางเกงไม่รัดแน่นที่ขอบเอว และขายาวมากไป
2. รองเท้าควรเป็นรองเท้าหุ้มส้น ขนาดพอดีกับเท้า พื้นรองเท้าควรหนาและนุ่ม

สถานที่วิ่ง

ควรมีพื้นเรียบ ไม่เป็นหลุมเป็นบ่อ ระหว่างทางอาจมีเนินชันหรือทางลาดลงบ้างได้แต่ไม่ควรชันเกินไป

เวลาวิ่ง

เลือกเวลาที่สะดวกและสามารถทำเป็นประจำสม่ำเสมอได้หลีกเลี่ยงการวิ่งหลังกินอิ่มใหม่ ๆ และการวิ่งในอากาศร้อนจัด

หลักของการวิ่งเพื่อสุขภาพ

1. ท่าวิ่ง โดยส่วนใหญ่เวลาลงเท้าใช้ส้นเท้าสัมผัสพื้นก่อน จึงวางเท้าเต็มที่และยกส้นเท้าขึ้น เข่าไม่ยกสูงมากและไม่เหยียดสุด ลำตัวและศีรษะตั้งตรงและงอเข่าเล็กน้อย กำมือหลวม ๆ ในบางช่วง
2. ความหนัก ความนาน ความบ่อยของการวิ่ง

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ความหนักควรใช้ความเร็วทำให้รู้สึกเหนื่อยต้องหายใจแรงแต่ไม่ต้องกับถึงหายใจทางปากหรือหอบ เมื่อวิ่งแล้ว 4-5 นาที ควรมีเหงื่อออก ความเร็วอาจคงที่ตลอดระยะทางหรือวิ่งเร็วสลับช้าได้

ความนาน ควรวิ่งติดต่อกันไม่ต่ำกว่า 10 นาที

ความบ่อย อย่างน้อย 3 วันต่อสัปดาห์

ความบ่อยและความนานต่ำสุดและสูงสุดที่ได้ผลดีต่อสุขภาพคือ

ความบ่อย (วันละครั้ง)	ต่ำสุด (นาที/ครั้ง)	สูงสุด (นาที/ครั้ง)
ทุกวัน	10	30
4 วัน/สัปดาห์	15	40

3 .การอบอุ่นร่างกายก่อนวิ่งและผ่อนคลายหลังวิ่ง

ควรมีการอบอุ่นร่างกายและผ่อนคลาย ประมาณ 4-5 นาที โดยวิ่งเหยาะด้วยความเร็วน้อยกว่าที่ใช้ในการวิ่งจริง

การเริ่มวิ่ง

การวิ่งให้ได้ติดต่อกัน 10 นาที ไม่ง่ายนักสำหรับผู้ไม่ได้เล่นกีฬาหรือวิ่งประจำการวิ่งสลับกับการเดินก้าวยาว ๆ โดยไม่หยุดวิ่งในวันแรก ๆ เป็นสิ่งถูกต้อง และในวันต่อไปควรเพิ่มเวลาการวิ่งเหยาะได้ติดต่อกันนานเกินกว่า 10 นาที โดยไม่ต้องสลับกับการเดิน

อาการที่แสดงว่าควรหยุดวิ่ง

1. เวียนศีรษะ คลื่นไส้ หน้ามืดเป็นลม
2. รู้สึกคล้ายหายใจไม่ทันหรือหายใจไม่ออก
3. ใจสั่น แน่น เจ็บบริเวณหน้าอก
4. ลมออกจากหู และหูตึงกว่าปกติ
5. การเคลื่อนไหวของร่างกายควบคุมไม่ได้

ถ้ามีอาการดังกล่าวให้ชะลอความเร็วลง และเปลี่ยนเป็นเดินถ้ายังมีอาการดังกล่าวให้นั่งหรือนอนราบจนกว่าอาการจะหายไป ถ้าไม่หายควรปรึกษาแพทย์

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BIOGRAPHY

NAME	Miss. Chitima Katonyoo
DATE OF BIRTH	1 July 1958
PLACE OF BIRTH	Chiang- Mai, Thailand
INSTITUTION ATTENDED	Thai Red Cross College of Nursing, 1980: Bachelor of Nursing Chiang- Mai, University, 1995: Master of Education (Health Promotion)
POSITION&OFFICE	Health Center Region 10 Chiang-Mai, Thailand Position : Public health technical officer Tel. 053-276856 ext. 214, 215
HOME ADDRESS	109/1 Moo 4, Chiang-Mai-Lumphun rd., Amphur Sarapee, Chiang-Mai , 50140

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