SELECTED FACTORS PREDICTING EXERCISE BEHAVIOR OF PREGNANT WOMEN

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ABSTRACT

This descriptive research aimed to describe the relationships between personal factors (age, income, educational level, number of pregnancy and gestational age), perceived benefits of exercise, perceived barriers to exercise, perceived self-efficacy of exercise and exercise behaviors of pregnant women, including finding which variables could predict exercise behaviors of pregnant women. A sample of 240 pregnant women at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan, Thailand was recruited by using purposive sampling. All data were collected using questionnaires, including a personal characteristics form, exercise behavior questionnaire, perceived benefits of/barriers to exercise scale, and perceived self-efficacy of exercise questionnaires. Data were analyzed using descriptive statistics, Pearson's Product Moment Correlation, and multiple regression analysis.

The results revealed that pregnant women had moderate exercise behavior, moderate perceived benefits of exercise, low perceived barriers to exercise, and low perceived self-efficacy of exercise. Age, educational level and gestational age were positively correlated to exercise behaviors. All variables, including age, income, educational level, number of pregnancy, gestational age, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy of exercise could jointly explain 16.5% of variance in exercise behaviors of pregnant women with statistical significance ($p < .001$). Therefore, these findings partially support Pender's Health Promotion Model.

Based on results of this study, nurses who provide care for pregnant women should assess exercise behavior and related factors contributing to exercise in pregnant women.

KEY WORDS: EXERCISE BEHAVIOR PREGNANT WOMEN

122 pp.

ปัจจัยคัดสรรในการทำนายพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์ (SELECTED FACTORS PREDICTING EXERCISE BEHAVIOR OF PREGNANT WOMEN)

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บทคัดย่อ

การศึกษาครั้งนี้เป็นการวิจัยเชิงบรรยาย โดยใช้รูปแบบจำลองพฤติกรรมส่งเสริมสุขภาพของเพนเดอร์เป็นกรอบแนวคิดในการวิจัย มีวัตถุประสงค์ เพื่อศึกษาความสามารถในการทำนายของปัจจัยส่วนบุคคล (ได้แก่ อายุ รายได้ ระดับการศึกษา จำนวนครั้งของการตั้งครรภ์ และอายุครรภ์) การรับรู้ประโยชน์ การรับรู้อุปสรรค การรับรู้สมรรถนะแห่งตน ต่อพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์ กลุ่มตัวอย่างคือหญิงตั้งครรภ์ที่ถูกเลือกโดยการเจาะจงคุณสมบัติตามที่ระบุไว้ จำนวน 240 ราย จากแผนกฝากครรภ์ โรงพยาบาลส่งเสริมสุขภาพ เขต 8 จ.นครสวรรค์ เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามจำนวน 5 ชุด คือ แบบสอบถามข้อมูลส่วนบุคคล แบบสอบถามพฤติกรรมการออกกำลังกาย แบบสอบถามการรับรู้ประโยชน์ของการออกกำลังกาย แบบสอบถามการรับรู้อุปสรรคของการออกกำลังกาย และแบบสอบถามการรับรู้สมรรถนะแห่งตนของการออกกำลังกาย วิเคราะห์ข้อมูลด้วยสถิติบรรยาย สหสัมพันธ์เพียร์สัน และการวิเคราะห์ถดถอยพหุคูณโดยใช้โปรแกรมคอมพิวเตอร์

ผลการศึกษาพบว่า กลุ่มตัวอย่างมีพฤติกรรมการออกกำลังกายระดับปานกลาง การรับรู้ประโยชน์ของการออกกำลังกายระดับปานกลาง การรับรู้อุปสรรคของการออกกำลังกายระดับต่ำ และการรับรู้สมรรถนะแห่งตนของการออกกำลังกายระดับต่ำ อายุ ระดับการศึกษา และอายุครรภ์มีความสัมพันธ์ทางบวกกับพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์อย่างมีนัยสำคัญทางสถิติ อายุ รายได้ ระดับการศึกษา จำนวนครั้งของการตั้งครรภ์ และอายุครรภ์ การรับรู้ประโยชน์ของการออกกำลังกาย การรับรู้อุปสรรคของการออกกำลังกาย การรับรู้สมรรถนะแห่งตนของการออกกำลังกาย ร่วมกันอธิบายพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์ได้ร้อยละ 16.5 อย่างมีนัยสำคัญทางสถิติ ผลการวิจัยสนับสนุนรูปแบบจำลองพฤติกรรมส่งเสริมสุขภาพของเพนเดอร์บางส่วน

ผลการวิจัยครั้งนี้จะเป็นประโยชน์ในการส่งเสริมพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์ เพื่อใช้เป็นข้อมูลพื้นฐานทั้งในระดับปฏิบัติ และระดับนโยบายในการจัดโปรแกรมส่งเสริมการออกกำลังกายที่เหมาะสม และมีประสิทธิภาพสำหรับหญิงตั้งครรภ์

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CHAPTER I
INTRODUCTION

Background and Significance of study

Nursing professional is responsible for health promotion of individuals, family and community (Somchit Hanucharuenkul, et al., B.E. 2000: 19) under the Act of Professional Nurse and Midwifery (Thailand Nursing Council, B.E. 2004). The Health Promotion Policy in the 9th National Socioeconomic Plan during 2002-2006 (The Ninth National Health Development Plan Steering Committee, B.E. 2001: 49-55) emphasizes that people should be in the good health. The first major strategy of health promotion focuses on major factors to enhance good health combining with reinforce rules and mechanism of systematic health promotion and disease prevention. It is consistent with Exercise Promotion Plan of Department of Health underlining with the exercise for better health of all, particularly pregnant women (Areerat Suputthithada, Somchai Leethongin, et. al., B.E. 2003: 27) who are one of the important populations, because pregnancy is the time to start a new life. According to the Policy of Safe Motherhood (Mother and Child Health Work, B.E. 2002), good health of mothers generates direct impact on fetal health (Ubonwan Kulson, B.E. 2002: 1).

Pregnancy has impact on physiological changes (Rattanaporn Lairat, B.E. 1989: 3). Pregnant women face with abdominal enlargement due to the enlarged uterus, which easily reduce body balance and lead to lordosis that causes back pain. Ligament and fascia around pelvic are more flexion because of progesterone hormone generating the alteration of pelvic joint and bone that could be easily injured. Hence, pregnant women have to walk with widespread legs and swaying hip that cause leg pain. They also obtain heavy cardiac workload according to increase blood volume around 30%-40% and higher metabolism affecting to tachycardia during rest (Wanarat Jongcharoennond, et al., B.E. 2000: 176-196; Murray, McKinney & Gorrie,

2002: 120-152; Pillitteri, 2003: 206-225; Poungnoy Sakornratanagul & Chantima Khanobdee, B.E. 2004: 16-40; Jeranoun Tadsri, 1993: 30-49).

American College of Obstetrics and Gynecology (ACOG) advises pregnant women to obtain proper exercise during pregnancy at least 30 minutes daily and 3 days a week (ACOG Committee Opinion, 2002: 79-81). Benefits of exercise for pregnant women are effective control of energy use, increase blood circulation, prevention from diabetes, good emotional status, reduce back pain and leg clamp, better sleeping, higher endurance to delivery pain, less worry with the delivery and quicker recovery. Benefits of exercise for fetuses are normal fetal weight during the pregnancy, stress resistance and increasing fetal development (Da Costa, Rippen, Drista & Ring, 2003: 111-119; Akekachai Piensriwatchara, B.E. 2002: 56-57; Areerat Suputthithada, Somchai Leethongin, et. al., B.E. 2003: 116-125). There is no side effect of proper exercise for pregnant women and fetuses according to the advice of ACOG (Lynch, et al., 2003: 163-171; Orr, Garry, James, Blackmore-Prince & Newton, 2001; Zeanah & Schlosser, 2004).

Although the benefits of proper exercise for pregnant women and fetuses are enormous but pregnant women seldom exercise. The reports showed that pregnant women did not perform muscular exercise of body because they had no time, had to work, lack of education, and were afraid of harm to their fetuses (Boonsom, 1997: 49-50; Darinee Suwaphabh, B.E. 1999: 137-139; Swangtook, 1996: 73). However, pregnant women performed exercise less than 3 times a week (Piravej & Saksirinukul, 2001: 276-282). There were only 10-15% of pregnant women participating in exercise program in the first trimester and 9-11% in the second and third trimesters (Areerat Suputthithada, Somchai Leethongin, et. al., B.E. 2003: 53). Hence, promotion for exercise behaviors of pregnant women is very important and it is necessary for nurses to know about relevant factors relate to exercise among pregnant women.

In the present, the research about exercise behaviors of pregnant women involve with leisure time, particularly merge with other health promoting programs such as nutrition condition etc. There is no research about physical exercise underlining with proper frequency and duration of exercise for pregnant women. There were many research studies related to relevant factors of exercise behaviors conducted in many populations, such as elders in Chiangmai province (Panyotee,

1996), nurses in Nan Hospital, Nan province (Sriaka, 2000), female instructors, Chiangmai University (Parinya Dasa, B.E. 2001), postpartum mothers (Teeintong, 2002) and undergraduate students, Ratchapat College in Bangkok (Chareampon Suthijanya, B.E. 2003), but not in pregnant women. Therefore, the researcher would like to study the factors that associate with exercise behaviors of pregnant women using Pender's Health Promotion Model (Pender, 2002).

Theoretical Framework

The theoretical framework of this study is based on Pender's Health Promotion Model which emphasizes on the promotion of physical, mental, emotional and spiritual health including personal environment (Pender, 2002: 16-20). An individual initiates his or her own health-promoting behavior. He or she is able to judge his or her own health status and can take care of personal health and environment (Pender, 2002: 8-9). Individual health-promoting behavior is any activities to improve quality of health and life that related to healthy lifestyle, such as nutrition, physical activity etc. (Pender, 2002: 61, 74). The relevant health-promoting behavior in this study is the exercise, it can improve health, and quality of life. Major factors influence individual health- promoting behavior are three major concepts including individual characteristics and experiences, behavior-specific cognition and affect, and behavioral outcome.

Individual characteristics and experience have both an indirect influence through behavior-specific cognitions and affects and a direct influence on behavioral outcome. Pender (2002: 68-71) emphasized that behavior-specific cognitions and affect were important factors that influence health-promoting behavior. They were sensitive to nursing actions. Moreover, she suggested that perceived barriers and perceived self-efficacy were the strongest predictors of health-promoting behavior while perceived benefits were only moderate predictor.

Perceived benefits of action are proposed as directly motivating behaviors as well as indirectly motivating behaviors through determining the extent of commitment to a plan of action to engage in the behaviors from which the anticipated

benefits will result (Pender, 2002: 69-70). If pregnant women perceived benefits of action, they would obtain health-promoting behavior. Perceived barriers to action affect health- promoting behavior directly by serving as blocks to action as well as indirectly through decreasing commitment to a plan of action (Pender, 2002: 70). If pregnant women perceived barriers to action e.g. time, expenses, and location of activity, those may increase difficulty of having health-promoting behaviors. Perceived self-efficacy motivates health-promoting behavior directly by efficacy expectation and directly by affecting perceived barriers of action and commitment to a plan of action (Pender, 2002: 70-71).

The researcher selected three factors of behavior-specific cognitions and affect: perceived benefits, perceived barriers, and perceived self-efficacy and one factor of individual characteristics and experience, personal factors such as age, income, educational level, number of pregnancy and gestational age. These factors may affect exercise behaviors in pregnant women, as see in Figure 1.

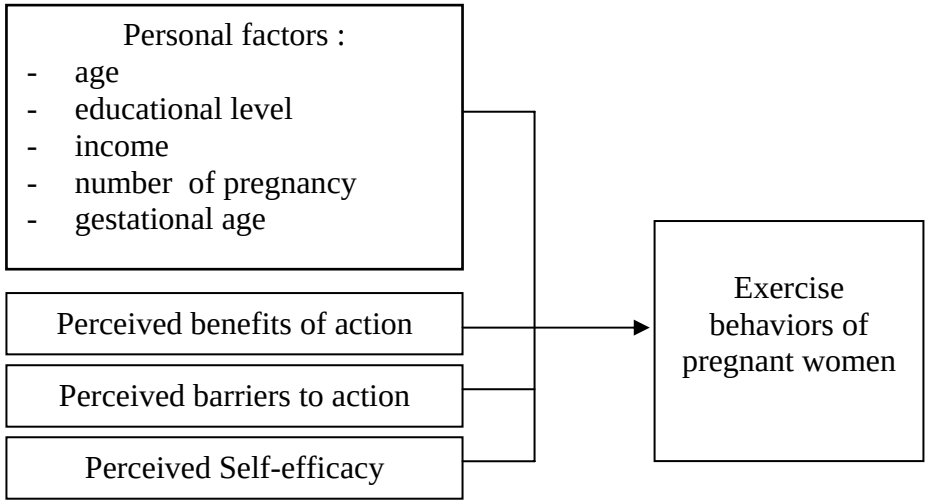


Figure 1 Theoretical Framework of this Research

Personal factors represent specific characteristics of pregnant women (Pender, 2002: 69) including age, income, educational level, number of pregnancy and gestational age that have impact on exercise behavior (Gracia, et al., 1995). Age indicates development and maturity of pregnant women. It was associated with health-promoting behavior in pregnant women (Boonsom, 1997: 52-57; Wilawan

Thanomroob, B.E. 2000: 69-72). The pregnant women with mature age can adjust to changes well and responsible for their own health (Boonsom, 1997: 21-22). Income represents their socioeconomic status, indicative of their ability to seek benefits and help for health-promoting behavior (Kannika Kantharaksa, B.E. 1984: 125). Pregnant women with low income may have limitation of resources for health-promoting behavior. Income had correlation with exercise behaviors of postpartum mother (Teeintong, 2002: 74-81). The educational level signifies the level of ability to perceive, understand, reason and access services for health promotion (Swangtook, 1996: 30). Pregnant women who have high educational level have a better chance to access to information on health promotion than those with lower educational level. Educational level had correlation with health-promoting of pregnant women with Thalassemia (Pornpimol Viriyawattana, B.E. 2002: 83-104). The number of pregnancy means the number of time each woman has been pregnant. Women who have been pregnant before can understand problems and solve them better than women in their first pregnancy (Kannika Kantharaksa, B.E. 1984: 129). Number of pregnancy indicates socio-emotional changes and adjustments to become a mother (Rawan Somboon & Teamsorn Thongsawad, B.E. 2002: 29-57).

Perceived benefits of exercise offer intrinsic advantages e.g. increasing enthusiasm, reduce exhaustion and extrinsic advantages e.g. reward or assets. According to Perceived benefits of action is related to health-promoting behavior (Pender, 2002), Perceived benefits of exercise is positively related to exercise behavior in teenage pregnant women (Nirattaradorn, B.E. 1996: 90-92), pregnant workers in industrial manufactory (Darinee Suwaphabh, B.E. 1999: 126), and diabetic pregnant women (Tanaporn Wongchan, B.E. 2001: 126-127).

Perceived barriers to action had correlation with health-promoting behavior. Barriers may be imagined or real which consist of perceptions concerning the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular action (Pender, 2002: 70). It addressed negative correlation with health-promoting behavior of pregnant women workers in industrial manufactory (Darinee Suwaphabh, B.E. 1999: 126-127). Perceived barriers to action had negative correlation with health-promoting behavior of pregnant women (Wilawan Thanomroob, B.E. 2000: 68-69).

Perceived self-efficacy of exercise is a personal judgment of one's ability to carryout a particular course of action (Bandura, 1986: 65). People with high self-efficacy, are likely to succeed. From numerous studies, perceived self-efficacy was positively related to health promoting lifestyle behavior (Waller, et al., 1998: 17-32; Weitzel & Waller, 1990: 26-34; Wandee Yamchanchai, B.E. 1995: 44-46). Moreover, perceived self-efficacy was viewed as an important variable related to physical activity and exercise behavior (Clark, 1995: 355; Gillis, 1994: 13; Kwanngen, 1994: 721; McAuley, 1993: 109; Simon, et al., 1997: 48-50).

Therefore, the researcher want to conduct research to find out relationship and predictability of relevant factors for exercise behavior of pregnant women.

Research Questions

1. Are there relationships between personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy; and exercise behavios of pregnant women ?
2. Can the study variables predict exercise behaviors of pregnant women ?

Purposes of the Study

1. To examine the relationships between personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy; and exercise behaviors of pregnant women.
2. To examine the predictability of the study variables for exercise behaviors of pregnant women.

Research Hypotheses

1. Personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy are correlated with exercise behaviors of pregnant women.

2. The study variables can predict the exercise behaviors of pregnant women.

Scope of the Study

This study is a descriptive correlational study aimed to explore personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of pregnant women, including to identify the relationships and the predictability of these factors for exercise behaviors. The sample consisted of 240 pregnant women who seek antenatal care at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan, Thailand during February 2006 to May 2006.

Expected Outcome of the Study

Nursing practice: Health care team may use the results of this study as basic information to develop intervention plans for promoting and supporting pregnant women to do antenatal exercise.

Nursing education: Knowledge derived from this study can be utilized for research and development of learning programs in nursing schools and bring about more effective promotion of exercise for pregnant women.

Nursing research: The results of this study can be used as a guide for further study, with other variables that may affect exercise behavior in pregnant women, such as interpersonal influences, and commitment to a plan of exercise.

Definition of Variables

1. Personal factors refer to age, income, educational level, number of pregnancy, and gestational age. It will be gathered by the Personal Characteristics Form developed by the researcher.

- Age is defined as the number of full years of age of pregnant women, computing at the date of survey, not including the remaining months.
- Income is defined as the monthly aggregated income of pregnant women and spouse, totally in the unit of Thai Bath.
- Educational level is defined as the total number of years ofeducational, counting from the primary level to the highest level of education of pregnant women.
- Number of pregnancy is defined as the number of times that a woman has been pregnant including abortion, preterm, term, and dead fetus in utero, counting to date of data collection
- Gestational age is defined as the number of full week of gestational time, counting from date of the last menstrual period to date of data collection.

2. Perceived benefits of exercise is defined as the perception or expectation of the advantages of exercise, including life enhancement/improved psychological outlook, physical performance, social interaction, and health promotion and illness prevention. It was measured by the Perceived Benefits of/Barriers to Exercise Scale developed by Teeintong (2002). High scores mean that the pregnant women perceive more benefits of exercise.

3. Perceived barriers to exercise is defined as the perception or expectation of hindrances to exercise, including time expenditure, exercise milieu factors, lack of family or social support, and physical exertion. It was measured by the Perceived Benefits of/Barriers to Exercise Scale developed by Teeintong (2002). High scores mean that the pregnant women perceive more barriers to exercise.

4. Perceived self-efficacy is defined as the perception, expectation, consideration or beliefs of pregnant women to judge their abilities to perform exercise successfully. It was measured by the Perceived Self-Efficacy of Exercise

Questionnaire developed by Garcia, et al. (1995). High scores mean that the pregnant women perceive more self-efficacy of exercise.

5. Exercise behaviors is defined as the pregnant women's leisure-time and lifestyle exercise with moderate intensity, duration at least 15-20 minutes per time, and frequency at least three times per week. Leisure-time exercise is composed of sport and formal exercise, such as physical exercise, swimming, jogging, or a myriad of other recreational activities. Lifestyle exercise consists of physical activity in daily life, such as walking, household work, and child-care (Pender, 2002: 170). It was measured by the Exercise Behavior Questionnaire developed by Teeintong (2002). High scores mean that pregnant women have more exercise behaviors.

CHAPTER II
LITERATURE REVIEW

This study was a descriptive research to explore personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of pregnant women, including the relationship and the predictability of these factors for exercise behaviors. The researcher review literature as follows:

1. Exercise in pregnant women
2. Exercise behaviors of pregnant women
3. Pender's Health Promotion Model
4. Relationships of study variables to exercise behavior
    - Personal factors: age, income, educational level, number of pregnancy and gestational age
    - Perceived benefits of exercise
    - Perceived barriers to exercise
    - Perceived self-efficacy of exercise

Exercise in Pregnant Women

Definition of Exercise

The definition of exercise varies widely according to different researchers. In this study, researcher defines exercise as a leisure-time exercise and a lifestyle exercise (Pender, 2002: 170). Leisure-time exercise is a structured, repetitive and planned physical activity. It composed of sport and formal exercise, such as jogging, bicycling, swimming, or a myriad of other recreational activities. Generally, leisure-

time exercise consists of three phases, warming up, endurance exercise, and cooling down. Lifestyle exercise is defined as physical activity that can be planned and integrated in numerous short bouts into the activities of daily living, and it has been suggested as a new strategy for promoting physical activity in the population. It is composed of walking, household work, child-care, gardening, and stair climbing. Therefore, leisure-time exercise and lifestyle exercise can increase daily energy expenditure and improve and maintain health.

Pregnancy is associated with several physiologic changes and response to exercise. Women are different in the pregnant state than in the non-pregnant state (Ezmerli, 2000: 260). Hence, the researcher should know physical alterations during pregnant and exercise, as follows:

Physical Alterations of Pregnant Women and Exercise

1. **Respiratory alteration**: Volume of each inhalation in pregnant women is increased along the gestational period to elevate sufficient oxygen for fetus. During the exercise, it is possible to have difficult breathing causing the reduction of oxygen to fetus particularly in the first trimester. Exercise in the first trimester should be careful about breathing and which proper exercise is suitable for which period (Pivarnik, Rivers & Stein, 2001; Pivarnik, Stein & Rivera, 2002; Wolfe, Weissgerber & Davies, 2004). If pregnant women feel tired, they should stop immediately and rest. Exercise more than 5 times a week or exercise requiring heavy power is more likely related to the evidence of acute respiratory distress (cold and flu) (Walling, 2002: 2156-2157).

2. **Musculoskeletal alteration**: Uterus is enlarged causing forward center of gravity so the body tries to balance by increasing lordosis curve of the back that generates back pain. As hormonal effect, pelvic joints can move a bit that the preparation for delivery. Exercise is possible to make musculoskeletal injury. However, there is no incidence of injury from exercise if proper exercise is done (Areerat Suputthithada, et al., B.E. 2002: 59-72). Swimming is the best exercise to

increase strength of muscle, heart and lung and also weight-barrier assistant that may prevent joint injury (Lynch, et.al, 2003: 163-171).

3. Metabolism alteration: Metabolism is higher during pregnancy. Exercise also increases metabolism of carbohydrate and many cause hypoglycemia. Hence, pregnant women should consume high-calories diet prior to exercise (Franklin, 2000: 230-234).

4. Cardiovascular alteration: Pregnant women obtain 40% higher of blood circulation with heart rate increased as 10-15 times/minute that is the adaptation to elevate oxygen to fetus. Enlarged uterus would generate poor blood circulation referring to dizziness and faint while exercise. Hence, heart rate should not be over 140 times/minute (Pivarnik, Stein & Rivera, 2002).

5. Hematologic alteration: Anemia can be found in pregnant women because of increasing plasma (Artal, Toole & White, 2003: 6-12; Wirun Laopattrakaseam, 1994: 252-256). It also causes the decrease of oxygenation to all organs affecting to ability of exercise that may cause dizziness, fatigue and difficult breathing. Pregnant women with anemia who need to exercise should consume high iron diet and high vitamin C that will promote iron absorption (Akekachai Piensriwatchara, B.E. 2002: 56-57; Wang & Michiganuni, 1998).

Effects of Exercise on Pregnant Women

1. Cardiovascular effects: During exercise, blood flow from abdominal organs to muscles, skin, lung and heart increase. Generally, moderate exercise by pregnant women will have no effect to the decrease of portal vein blood flow that may cause insufficient blood supply to uterus referring to the reduced oxygenation to fetus (Pivarnik, Rivers & Stein, 2001; Pivarnik, Stein & Rivera, 2002).

2. Thermal control effect: Exercise increase body temperature around 0.1-0.3˚C. Hence, they should not exercise when the weather is quite warm. Exercise should be performed in good ventilation area (Artal, Toole & White, 2003: 6-12; Franklin, 2000: 230-234).

3. Neurological effect: Exercise increasing body thermal that generate more production of norepinephine assisting to reduce depression and increase blood circulation to heart and kidney. Norepinephine promote uteromuscular contraction but not labor contraction (Wirun Laopattrakaseam, B.E. 1994: 252-256; Akekachai Piensriwatchara, B.E. 2002: 56-57).

4. Labor effect: There is no complication in labor period but pregnant women who exercise have shorter second phase of labor than others with no exercise (Magann, Evans, Weitz & Newnham, 2002: 466-472). There is no phenomenon of pre-term labor contraction in pregnant women who have proper moderate exercise e.g. swimming, walking, jogging and so forth at least 30 minute, 3 times a week (Davies, Wolfe, Mottola & MacKinnon, 2003; Orr, et al., 2001; Zeanah & Schlosser, 2004). However, pregnant women who have heavy exercise may have pre-term delivery (Hatch, Levin, Shu & Susser, 1998: 1528-1534; Leiferman & Evenson, 2001) and broken amnion prior to labor pain (Wang & Michiganuni, 1998).

5. Fetal effect: Exercise does not increase risk of abortion, congenital abnormally, ectopic pregnancy and abnormal placenta. It also has no effect on fetal movement. Fetal heart rate and stress accomplishment represent normal Apgar Score at 1, 5 and 10 minutes and there is no oxygen insufficiency in the newborn (Areerat Suputthithada, et al., B.E. 2002: 59-72). Exercise has no correlation with premature baby and fetal death (Orr, Garry, et al., 2001; Schramm, Stockbauer & Hoffman, 1996: 461-462; Zeanah & Schlosser, 2004). However, if there are more exercise ≥ 5 times/week or heavy exercise, it has correlation with premature baby (Leiferman & Evenson, 2001; Walling, 2002: 2156-2157). Exercise in high-risk pregnant women is associated with the increase of fetal death in the second trimester (Weallans, Clark, Macintyre & Gargoin, 2002).

Recommendations of Exercise in Pregnancy

American College of Obstetrics and Gynecology (ACOG) (ACOG committee opinion, 2002: 79-81) and American College of Sport Medicine (ACSM) (Burroughs, 1997: 121-122; Franklin, 2000: 230-234; Preboth, 2001) proposed the recommendations of exercise for pregnant women, as follows:

1. During pregnancy, women can continue to exercise and derive health Benefits even from mild to moderate exercise routines (40-59 percents of preconceptional maximal aerobic capacity or 55-69 percents of maximal heart rate). Regular exercise (at least 3 times per week) is preferable to intermittent activity. Duration of exercise least than 15-20 minutes per time.

2. Women should avoid exercise in the supine position after the first trimester. Such a position is associated with decreased cardiac output will be preferentially distributed away from splanchnic beds (including the uterus) during vigorous exercise, such regimens are best avoided during pregnancy. Prolonged periods of motionless standing should also be avoided.

3. Women should be aware of the decreased oxygen available for aerobic exercise during pregnancy. They should be encouraged to modify the intensity of their exercise according to maternal symptoms. Pregnant women should stop exercising when fatigued and not exercise until exhaustion. Weight-bearing exercises may under some circumstances be continued at intensities similar to those prior to pregnancy throughout pregnancy. Non-weight-bearing exercise, such as cycling or swimming, will minimize the risk of injury and facilitate the continuation of exercise during pregnancy.

4. Morphologic changes in pregnancy should serve as a relative contraindication to types of exercise in which loss of balance could be detrimental to maternal or fetal well-being, especially in the third trimester. Further, any type of exercise involving the potential for even mild abdominal trauma should be avoided.

5. Pregnancy requires an additional 300 kcal per day to maintain metabolic homeostasis. Thus, women who exercise during pregnancy should be particularly careful to ensure an adequate diet.

6. Pregnant women who exercise in the first trimester should augment heat dissipation by ensuring adequate hydration, appropriate clothing, and optimal environmental surroundings during exercise.

7. Exercise during pregnancy should be resumed gradually based on a women's physical capability.

Absolute Contraindications to Exercise during Pregnancy (ACOG Committee Opinion, 2002: 79-81; Franklin, 2000: 230-234; Preboth, 2001)

1. Hemodynamically significant heart disease
2. Restrictive lung disease
3. Incompetent cervix
4. Multiple gestation at risk for premature labor
5. Persistent second or third trimester bleeding
6. Placenta previa after 26 weeks of gestation
7. Premature labor during the current pregnancy
8. pregnancy-induced hypertension
9. Ruptured membranes

Relative Contraindications to Exercise during Pregnancy (ACOG Committee Opinion, 2002: 79-81; Franklin, 2000: 230-234; Preboth, 2001)

1. Severe anemia
2. Unevaluated maternal cardiac arrhythmia
3. Chronic bronchitis
4. Poorly controlled type 1 diabetes
5. Extreme morbid obesity: BMI > 33
6. Extreme underweight: BMI < 12
7. History of extremely sedentary lifestyle
8. Intrauterine growth restriction in current pregnancy
9. Poorly controlled hypertension
10. Orthopedic limitations

11. Poorly controlled seizure disorder
12. Poorly controlled hyperthyroidism
13. Heavy smoker

Warning Signs to Terminate Exercise while Pregnant (ACOG Committee Opinion, 2002: 79-81; Franklin, 2000: 230-234; Preboth, 2001)

1. Vaginal bleeding
2. Dyspnea prior to exertion
3. Dizziness
4. Headache
5. Chest pain
6. Fainting
7. Palpitation and arrthymia
8. Muscle weakness
9. Calf pain and swelling, need to R/O thrombophlebitis
10. Pre-term labor
11. Decreased fetal movement
12. Amniotic fluid leakage

If pregnant women had these signs and symptoms, they should stop the exercise and seek medical attention.

Steps of Physical Exercise during Pregnancy

Step 1 : Warm up

Step 2 : Exercise to strengthening arms and hip

Step 3 : Physical exercise for strengthening abdominal and pelvic muscles

Step 4 : Cool down technique

Step 1: Warm Up

Position 1 Shoulder rotation

Exercise method

Sit in diamond posture; point the tips of fingers to both shoulders by both elbows attached to trunk; rotate arms forward and sideward; and then turn to the beginning posture. It should be repeating forward arm rotation at least 10 times and be changed to rotate in the opposite way for 10 times.

(Physical Power for Health Division, 2004)

Position 2 Abdominal stretching

Exercise method

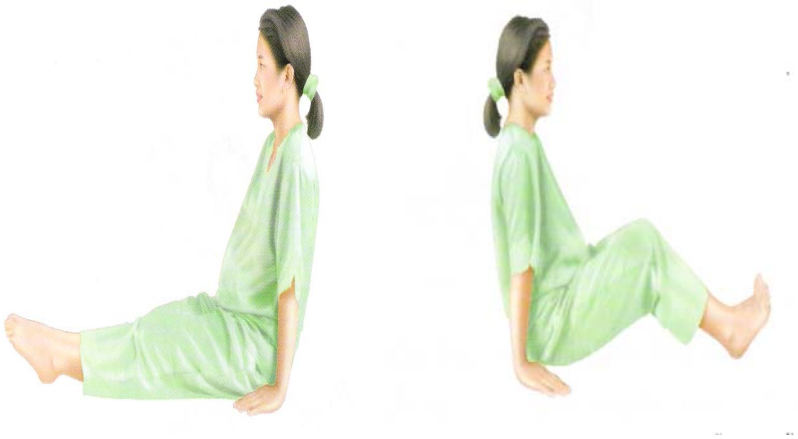
Sit in diamond position with one hand on the floor, lean another arm over the head to the left and then return to straight posture that need to repeat 10 times. Repeating the exercise with opposite arm leaning to the right should be done 10 times.

(Physical Power for Health Division, 2004)

Position 3 Foot exercise

Exercise method

Sit with straight back with stretching both legs and feet forward, both arms along the trunk and then slightly flexing and extending both knees, repeat to do it 10 times.



(Physical Power for Health Division, 2004)

Position 4 Abdominal extension

Exercise method

Sit in diamond posture, both hands on the floor, eyes look straight, and twist abdomen to the left with left hand behind the back on the floor for being support base. Repeat to do the same with opposite side, 10 times for each side.

(Physical Power for Health Division, 2004)

Position 5 Hip and thigh extension

Exercise method

Sit with bending knees and legs and stretch arms with both hands behind the back on the floor, slightly lift hip up for stretching hip and thighs and then put it down, do it 10 times.

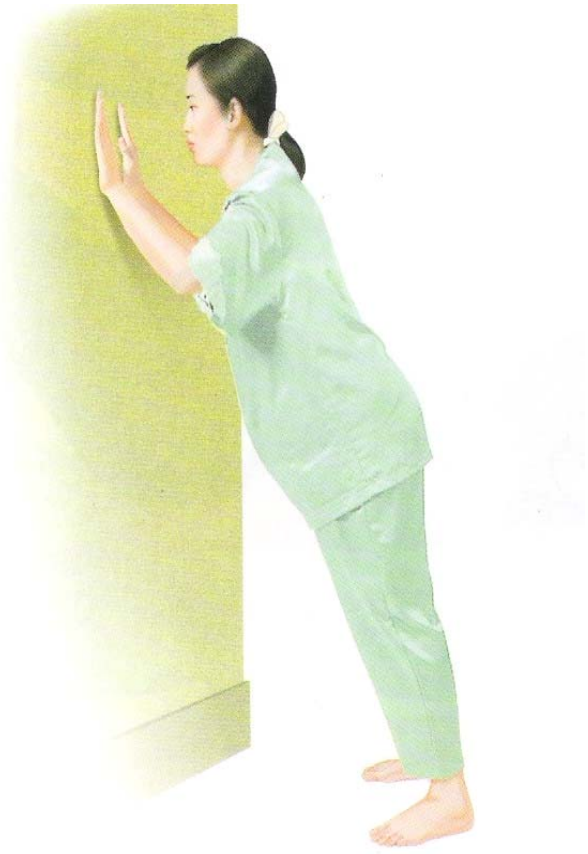
(Physical Power for Health Division, 2004)

Step 2: Exercise to Strengthening Arms and Hip

Position 1 To maximize muscular strength of arms and shoulders

Exercise method

Stand with face against the wall, distance of both feet should equal to shoulder width, tips of feet point to the wall, both palms against the wall at shoulder level, bend elbows with forward leaning of trunk to the wall, both feet completely attach the floor, stay in contract posture for a while combining with exhalation counting 1-5 then relax, backward from the wall with inhalation, repeat to do it 10-12 times.



(Physical Power for Health Division, 2004)

Position 2 To maximize muscular strength of hip

Exercise method

Be in supine position with both knee bending, lift the hip up from the ground and stay in that position while exhalation and count 1-5 then relax and put the hip down, repeat to do it 10-12 times

Pregnant women should not practice this position longer than 5 minutes and should stop it when the gravidism is over 6 months.

(Physical Power for Health Division, 2004)

Position 3 To maximize muscular strength of hip

Exercise method

Be in crawl posture, lift one leg with stretching hip, knee can be stretched or bend with exhalation, stay in that position with 1-5 counting, then relax, put that leg down with inhalation, be careful not to stretch hip over 80 degree. Repeat the process again in the opposite leg, do 10-12 times per leg.

(Physical Power for Health Division, 2004)

Step 3: Physical Exercise for Maximizing Strength of Abdominal and Pelvic Muscles

Position 1 Exercise abdominal muscles for reducing the establishment of abdominal stretch mark and line

Exercise method

Be in supine position with both knees bending, hands seem to be around chest, deep breathing with lifting head up above the ground, contract abdomen with exhalation and use both hands push muscles both sides into mid of abdomen, stay in that posture for counting 1-5, then put head down slowly with breathing in and relax hands and abdominal wall (relax abdominal muscles, repeat it 10-12 times.

(Physical Power for Health Division, 2004)

Position 2 Exercise abdominal and pelvic muscles together

Exercise method

Do as the same as position 1: be in supine position with both knees bending, hands seem to be around chest, deep breathing with lifting head up above the ground, contract abdomen with exhalation and use both hands push muscles both sides into mid of abdomen, stay in that posture for counting 1-5, then put head down slowly with breathing in and relax hands and abdominal wall but add to suppress the anal sphincter and lift the hip a bit but the back should be on the floor while do abdominal tension and exhalation, stay contract for 1-5 counting then relax and inhalation, repeat 10-12 times.

(Physical Power for Health Division, 2004)

Position 3 Exercise abdominal and pelvic muscles together

Exercise method

Be in supine position with bending both knees, deep breathing, contract abdomen, suppress anal sphincter and stretch both legs away from trunk, breathing out with counting 1-5, then pull back both legs and relax including breathing in, repeat it for 10-12 times.

(Physical Power for Health Division, 2004)

Position 4 Exercise abdominal and pelvic muscles together

Exercise method

Be in scrawl position, deep breathing, contract abdomen, suppress anal sphincter, lift the back at wrist level up, breathing out and count 1-5 then relax, put the back to normal position, breathing in, repeat it 10-12 times.

(Physical Power for Health Division, 2004)

Step 4: Cool down after exercise

Exercise method

Lay down in comfortable posture, periodically contract and relax muscles starting from ankles, leg muscles, thigh, pelvic, hip, abdomen and arms, for doing this perception on muscular contract and relax should be detected, slightly breath out while muscular contraction and then release muscular tension while breathing in, music or speech during the exercise may increase psychological relaxation.

(Physical Power for Health Division, 2004)

Besides physical exercise above, pregnant women should perform cardiovascular exercise for strengthening heart and lung. However, if actual routine daily workload is sufficient to be the exercise, physical exercise alone may be enough. It is very important that before exercise, warm up is necessary by slowly walk 5 minutes and after exercise, immediately stop should be avoid and cool down by slowly walk 5 minutes should be provided for preventing fainting and reducing muscular pain after exercise.

Exercise for Cardiovascular Strength

1. Walking is the best exercise for pregnant women who had never exercised before. Exercise should be started with light one to moderate one by walking 20-30 minutes/time, at least 3 days a week and walking distance should not be over 1-2 kilometer daily. Walking area should be convenience and safe. Pregnant women can walk until 60 minutes/time but slight increased time should be in every week. Warm up includes with slow walk in the first 5 minutes and then walk faster until even. Cool down should be performed in the end by slow walk in the last 5 minutes. When gestation age is higher, walking rhythm should be adjusted. Pregnant women should drink sufficient water during walking and be careful with quite warm or high humidity atmosphere. The proper time of walking should be the time with comfortable weather e.g. morning or evening

- 1st trimester: can walk daily that will assist reducing discomforts. If there is severe morning sickness referring to fatigue, walking period should be adjusted.
- 2nd trimester: if walking has been done continuously, they should feel healthy and earn much life energy. Slow walk with wide step should be performed switching with quick walk with short step. They should drink much water.
- 3rd trimester: periodically walking in the short distance by selecting the familiar trial with smooth surface and comfortable shoes. The selected trial should have rest area and restroom if needed.

2. Swimming is the most proper exercise for pregnant women that can be done along duration of pregnancy because water support the body weight, promote muscular relaxation of back and legs and lower risk of injury than others. Swimming is famous at present. Chlorine agent in water does not harm mothers and fetuses but guard the bacteria and other organisms. Temperature in swimming pool should not be too cold or too warm. Inappropriate things of swimming for pregnant women are: swimming in chest-stroke position and butterfly position in the 3rd trimester, jumping into the pool and diving or heavily shoving from the edge of the pool because those can cause uterus injury.

3. Jogging Warm up by walking is recommended before jogging as well as physical preparation, especially big muscles e.g. things, calves, ankle and back for preventing injury. They should slowly run and should change from running to walking immediately when having the uterus contraction.

- 1st trimester: jogging in the morning reduces morning sickness. If severe morning sickness with weight loss is posted, stopping jogging will be a good idea until the weight is gained up as normal.
- 2nd and 3rd trimesters:Decreasing the volume of jogging as of larger uterus around 30%-40% from the 1st trimester.

4. Aerobic dance should be performed with slow beat music and should not move with heavy pressure to all joints. Heart rate should not go up to 140 beats times/minute or do not exercise until so tired that cannot speak to people.

5. Spinning bicycle is a good exercise for pregnant women because they do not need to carry body weight. Spinning unmovable bicycle is better than movable one as the balance of pregnant women should not be too good that might cause fall. (Physical Power for Health Division, 2004)

Summary, pregnant women who have no risk during pregnancy can exercise. Exercise can be beneficial to the pregnant women and fetuses and has no side effect if pregnant women obtain proper exercise.

Exercise Behaviors of Pregnant Women

Pregnant women obtain leisure-time exercise and lifestyle exercise. Leisure-time exercise consists of sport exercise and formal exercise e.g. swimming, jogging, spinning bicycle etc. Lifestyle exercise comprises physical activity in daily life (Pender, 2002: 170) e.g. walking, household work, childcare. Exercise for pregnant women should be in medium level, 15-20 minutes daily at least 3 times a week. Proper duration of warm up and cool down in each trimester of pregnancy should be necessary. It will promote physical strength and good health of both mother and child.

As literature review, exercise behavior of pregnant women is still low. Eighty-one percent of the pregnant women had never exercised any muscles relating to the labor became they had no time, lack of knowledge and understanding to exercise and misunderstood about regular work was exercise (Swangtook, 1996: 73). Thirty-one percent of adolescent pregnant women had never exercised at arms, legs and abdomen because they claimed to have no time and no knowledge of proper exercise (Nirattharadorn, 1996: 80). Pregnant adolescence had improper self-care exercise behavior. Thirty-five percent stated that they had not enough time and no idea of proper exercise positions (Reudee Pungbangkadee, B.E. 1997: 75). Sixty-three percent of pregnant women had poor health-promoting behavior in term of physical exercise of arms, legs and abdomen and as 15.9% had no exercise with the reasons as no time and fear of injury (Boonsom, 1997: 49-50). Adolescent pregnant women as 90.5% presented poor health-promoting behavior as well as no exercise because did not know the benefits, no time, negligence, and tired after exercise (Rapeeporn Prakorbsap, B.E. 1998: 78). Exercise promotion behavior of pregnant workers was poor because they lacked of knowledge of proper exercise and tiredness from daily work (Darinee Suwaphabh, B.E. 1999: 124-125). Fifty-seven percent of pregnant women who attended ANC clinic of King Chulalongkorn Memorial Hospital had no exercise and 42.36% had exercise in the afternoon by walking but had fewer exercise than 3 times a week (Piravej & Saksirinukul, 2001: 276-282). There were 38.8% of pregnant women perform exercise (Wilawan Thanomroob, B.E. 2000: 67). Pregnant women who joined exercise program, 10-15% and 9-11% performed exercise in the

1st trimerter and the 2nd-3rd trimerters respectively (Areerat Suputthithada, Somchai Leethong-in, et al., B.E. 2003: 53). Thirty-nine percent of pregnant women in United Kingdom had exercise behavior 3 times a week as (Clarke & Gross, 2004) and pregnant women had the decreased physical activity from pre-pregnancy (Melanie & O'Connor, 2004).

In summary, the number of research on exercise behaviors of pregnant women is still low. Hence, the researcher would like to study exercise behaviors focusing on factors related to exercise behaviors in pregnant women.

Pender' Health Promotion Model

Pender' Health Promotion Model (Pender, 1996) explored the complex biopsychosocial processes that motivated individual to take health-promoting behaviors (Pender, 2002: 59), such as health responsibility, physical activity or exercise, nutrition, interpersonal relations, spiritual growth, and stress management (Pender, 2002: 61). Pender's Health Promotion Model was composed of three components: Individual Characteristics and Experiences; Behavior-Specific Cognition and Affect; and Behavioral Outcome (Pender, 2002: 67-74).

1. Individual characteristics and experience

Individual characteristics and experience influence future behaviors. Significant effects of those depend on objective behavior, previous behavior and individual characteristics. Those factors affect to flexibility of health promotion pattern. Some of them show high relevance in some behavior or in some group of population, details as follows:

- **Prior related behavior** includes frequency of familiar or the same behaviors in the past that may relate to present behaviors.
- **Personal factors** consist of personal biological factors e.g. gender, age, fertility, pregnancy, exercise ability; personal psychological factors e.g. self-esteem, personal capability, perceived health status; and personal sociocultural factors e.g. race, nationality, educational level, socioeconomic status. Some of those factors

cannot be changed. Hence, it is not good to bring personal factors to use in the health behavioral adjustment. However, this research aims to study the correlation among personal factors such as age, educational level, income, number of pregnancy, gestational age and exercise behavior of pregnant women because those factors may be affect to it. They cannot be changed but those can be the basic data to create proper exercise promotion for pregnant women.

2. Behavior-specific cognition and affect

Behavior-specific cognition and affect is the significant factor inducing to cognition of behaviors. Nurses take them to use in behavioral adjustment as follows:

- **Perceived benefits of action**: One's plan to engage in particular behavior often depends on the anticipated benefits or outcomes that will occur. According to the expectancy-value theory, a person will engage and persist in a given action when the outcome of the taken action is of positive personal value and is based on available information that is likely to bring about the desired outcome. In the Health Promotion Model, perceived benefits are proposed as directly motivating behavior as well as indirectly motivating behavior through determining the extent of commitment to a plan of action to engage in the behaviors from which the anticipated benefits will result.

- **Perceived barriers of action**: affect health promoting behaviors directly by acting as a blockage to action as well as indirectly through the decrease of commitment to a plan of action. Barriers may be imagined or real which consist of perceptions concerning the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular action. Barriers are often viewed as the blocks, hurdles, and personal costs of undertaking a given behavior. Barriers usually arouse motives of avoidance in relation to a given behavior. If the readiness to act is low and barriers are high, action is unlikely to occur. However, if the readiness to act is high and barriers are low, the probability of action is much greater.

- **Perceived self-efficacy** is the judgement of one's abilities to accomplish a certain level of performance, whereas an outcome expectation is a judgment of the likely consequences (e.g. benefits, costs) such behavior will produce. Perceptions of skill and competence in a particular domain motivate individuals to

engage in those behaviors that they excel in. Feeling of efficacious and skills in one's performance is likely to encourage one to engage in the target behavior more frequently than feelings of inept and unskilled. In Health promotion Model, perceived self-efficacy is proposed as being influenced by activity related effects. The more positive the effect, the greater the perceptions of efficacy. In turn, self-efficacy is proposed as influencing perceived barriers to action, with higher self-efficacy resulting is lowered perception of barriers to the performance of the target behavior. Self-efficacy motivates health promoting behavior directly with efficacy expectations and indirectly by affecting perceived barriers and commitment or persistence in pursuing a plan of action.

- **Activity-related effect** is proposed as influencing health promoting behaviors directly as well as indirectly through self-efficacy and commitment to a plan of action. The affect associated with the behavior reflects a direct emotional reaction of level response to the through of the behavior, which can be positive or negative and may also be fun, delightful, enjoyable, averse, or unpleasant. Behaviors associated with positive affect are likely to be avoided. For some health promoting behaviors, both positive and negative feeling statuses will be induced. Thus, the relative balance between positive and negative effects prior to, during, and following the behavior is important to ascertain. Based on social cognitive theory, emotional responses either positive or negative and their induced physiologic status during a behavior serve as sources of self-efficacy.

- **Interpersonal influences** are the acknowledgement of behaviors, belief and attitude of friends, family and medical staffs in norms, social support and modeling. Individuals vary in the extent to which they are sensitive to the wishes, examples, and praises of others. However, given sufficient motivation to behave in a way consistent with interpersonal influences, individuals are likely to undertake behaviors for which they will be admired and socially reinforced. Susceptibility to the influence of others may vary according to development and be particularly evident in adolescence.

- **Situational influences** are the acknowledgement of situation that can motivate or behaviors such as perception of options availability, demand characteristics and aesthetic features of the environment. Individuals are drawn to and

performed more competently in situations or environmental contexts in which they feel compatible rather than incompatible, related rather than alienated, safe and reassured rather than unsafe and threatened. Environments that are fascinating and interesting are also desirable for the performance of health behaviors.

3. Behavioral outcome

Determining the intention for planning is the beginning of behavior. Intention is the potent to generate people behaviors as follows:

- **Commitment to a plan of action**: people have strong intention to act that behavior. It is positive intention but it is no relevant with health promoting behavior.

- **Immediate competing demands and preferences**: It is immediately happened in subconscious of people. Competing demands and preferences are alternative behaviors of thought that people are poor in controlling it. If there is no response to the demands, negative impact would be occurred to themselves and their love ones. Immediate competing preferences are alternatives offering more returns over the control as a high level that would stop health-promoting behavior.

- **Health promoting behavior** is the action in the term of health promotion that maintains positive health outcome of individual combining with healthcare lifestyle, as see in figure 2:

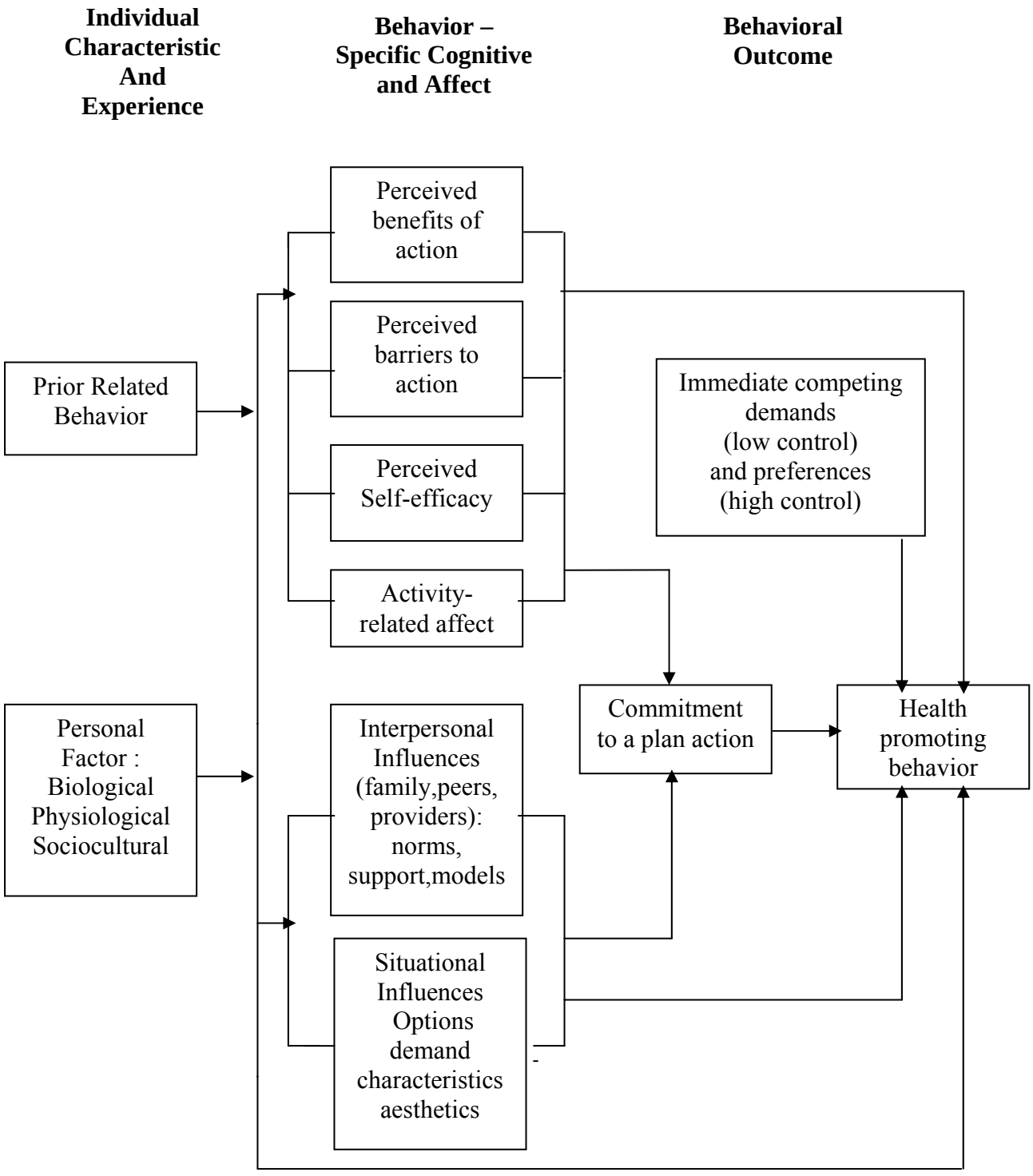


Figure 2 Pender's Health Promotion Model

(Pender, 2002: 60)

This research focuses on relevant factors related to exercise behavior of pregnant women. These factors are personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise and perceived self-efficacy of exercise.

Personal Factors Related to Exercise in Pregnant Women

Personal factors present specific characteristics of population (Pender, 2002: 69). In this study, they are age, income, educational level, number of pregnancy and gestational age.

1. Age: Ages of pregnant women is an indicator of behavior to promote health and determine how much exercise behavior pregnant women should have. Adult pregnant women earn better health-promoting behavior than pregnant teenagers do because they are more maturity that assist them to have better flexibility and adjustment during the pregnancy. They have good consciousness, learning from experiences, perceived benefits of action and physical and psychological promptness (Kannika Kantharaksa, B.E. 1984: 119). Older ages increase high risk of pregnancy that make pregnant women have more alert and inducement to carry health-promoting behavior (Angkhana Nuonyong, B.E. 1992: 97-98).

Age had been found as a significant factors of exercise in pregnant women (Gracia, et al., 1995). Pregnant women with younger age had less exercise than adult pregnant women (Boonsom, 1997: 52-57; Tanaporn Wongchan, B.E. 2001: 121-124), but Panyapisit (2002) found that age had no correlation with health- promoting behavior during pregnancy of women who had premature labor ($p < .05$) (Panyapisit, 2002: 95-97).

2. Income:It points out the socioeconomic status and opportunity to seek for anything that is beneficial for pregnant women. Pregnant women with high income obtain higher health-promoting behavior than that others do (Kannika Kantharaksa, B.E. 1984: 125) because they are able to afford for facilities and accessories offering more convenience to proper health promotion services.

Income had correlation with ongoing behavior for maintaining health status ($p < .05$) (Swangtook, 1996: 75-82), and income is related to health- promoting behavior of teenagers ($p < .05$) (Nirattaradorn, 1996: 86-88).

3. Educational level: It is another significant factor for health-promoting behavior because education offers intelligence, reason and cause, good decision making, being able to make decision on proper health promotion (Swangtook, 1996: 30). Additionally, education motivates self-research with good supportive resources of health-promoting behavior that causes pregnant women with higher education obtain better health promotion behavior than pregnant women with lower education (Kannika Kantharaksa, B.E. 1984: 123)

A previous study found that educational level is correlated with self-care behavior of pregnant adolescence ($p< .05$) (Reudee Pungbangkadee, B.E. 1997: 85-87). In additional, educational level expressed correlation with health-promoting behavior of Thalassemia pregnant women (Pornpimol Viriyawattana, B.E. 2002: 83-104).

4. Number of pregnancy: Pregnant women who had experienced about pregnancy are able to perceive alterations during pregnancy, outcomes and understand problems and solutions better than women who have not been pregnant before (Boonsom, 1997: 25) that might reduce intention to engage in health-promoting behavior (Kannika Kantharaksa, B.E. 1984: 129).

5. Gestational age: It has an indirect effect on health-promoting behavior but it associates with psychosocial alteration of pregnant women and mission of role adjustment to become mother. In the 1st trimester, pregnant women are concerned with themselves and their pregnancy. In the 2nd trimester, they pay more attention to their fetuses. In the 3rd trimester, they think about maternal role and anxiety of labor (Rawan Somboon & Teamsorn Thongsawad, B.E. 2002: 29-57; Pillitteri, 2003: 206-225; Murray, McKinney and Gorrie, 2002: 120-152).

Perceived Benefits of Exercise

Perceived benefits of exercise is defined as anticipated benefits of action, being mental representations of the positive or reinforcing consequence of an exercise behavior. Perceived benefits of doing any activity are proposed as a directly motivating behavior as well as indirectly motivating behavior through determining the extent of commitment to a plan of engaging in the behavior from which the anticipated benefit will result. Benefits from performance of the behavior may be intrinsic or extrinsic. Intrinsic benefits include increased alertness and decreased feeling of fatigue. Extrinsic benefits include rewards or money (Pender, 2002: 69-70).

According to Sechrist, Walker, and Pender (1987: 357-365), perceived benefits of exercise can be devided into four main categories: Life enhancement/improvement psychological outlook, Physical performance, Social interaction, and Health promotion and illness prevention.

Life enhancement/improvement psychological outlook is defined as a pleasurable feeling (Gillett, 1988: 27), improved appearance and body image. (Ferguson, 1989: 14; Myers & Roth, 1997: 281 as cited in Jones & Nies, 1996: 152), and a sense of wellbeing (Myers & Roth, 1997: 281). Those who participated in regular exercise over a long period time (Muhlenkamp & Sayles, 1986: 335) cited a sense of well-being as the most important benefit. Moreover, physical activity also improved mental health, reduced symptoms of anxiety and increased feeling wellbeing. (Jones, et al., 1998: 75).

Physical performance is defined as increased energy (Gillett, 1988: 27; Myers & Roth, 1997: 280), decreased joint stiffness, increased endurance (Jones & Nies, 1996: 152), and improved physical condition (McAuley & Jacobson, 1991 cited by Jones & Nies, 1996: 152).

Social interaction is defined as a benefit of exercises to meet new people and contact friends or other persons (Jones & Nies, 1996: 152). Gillett (1988: 29) found that the benefit of social support was given as a reason for continuing exercise. Women who exercised were more likely than non-exercisers to visit friends and family (Sampselle, et al., 1999: 47).

Health promotion and illness prevention is defined as a benefit of exercises to prevent illness or improve health. Gillett (1988: 28) stated that exercise participants wanted to improve their current health status. Ferguson and colleagues (1989: 113) indicated that "people will live longer if they exercise". Moreover, exercise reduced the risk of pregnancy induced hypertension (Artal, Toole & White, 2003: 6-12; Franklin, 2000: 230-234). Therefore, promotion of physical activity could have tremendous effects on prolonged women lives (Jones, et al., 1998: 76).

Benefits of Exercise for Pregnant Women

Benefits of exercise in pregnant women and fetuses are summarized as follows:

1. Efficiency of energy control: Regular exercise assists to efficiently control energy use and body temperature. Aerobic exercise increases or maintains physical strength and good figure (Kramer, 2003: 279).

2. Improve blood circulation: By stimulating blood circulation and digestive tract, and preventing constipation, hemorrhoid, varicose veins, cramp and swelling ankles that are discomforts frequently found in pregnant women (Wirun Laopattarakaseam, B.E. 1994: 252-256; Akekachai Piensriwatchara, B.E. 2002: 56-57).

3. Preventing diabetes in pregnant women: Insulin resistance increased from placenta during the pregnancy that may cause diabetes affecting to have giant baby resulting in difficult delivery and cesarean section. The exercise would help reducing insulin resistance (Lopez-Luna, Iglesias, Munoz & Herrera, 1998: 1510-1514) and preventing diabetes during pregnancy (Akekachai Piensriwatchara, B.E. 2002: 56-57; Wang & Michiganuni, 1998; Franklin, 2000: 230-234; Artal, Toole & White, 2003: 6-12).

4. Emotional status: Exercise decreased stress, emotional reluctance and depression in pregnant women who had to adjust her previous role to be mother role and also hormonal changes. Exercise would help better mood (Da Costa, Rippen, Dritsa & Ring, 2003: 111-119; Symons & Hausenblas, 2004: 138-144).

5. Preventing low back pain: Low back pain is a discomfort that is frequently found in pregnant women. Exercise increased muscular strength of hamstrings, legs and abdomen. It could reduce back pain, wrest pain, hip pain and leg pain ($p < .05$) (Areerat Suputthithada, et al., B.E. 2002: 59-72; Pennida Chaisayan, B.E. 2000: 61-63, 81-82).

6. Sleep:Exercise promoted better sleep but exercise 3 hours before sleeping would increase body alert and reduce difficult sleeping (Chowtippawan Pankaew, B.E. 2000: 68-75).

7. Childbirth preparation: Exercise may reduce the duration of labor pain, phenomenon of labor acceleration and rate of cesarean section. Regular exercise in the 2nd and 3rd trimesters decrease the risk of cesarean section (Bungum, Peaslee, Jackson & Perez, 2000: 258-264), especially in the primigravida. Chaisayan (2000: 71) found that exercise could shorter the 2nd stage of labor in the experimental group was shorter than which intervention they received ($p < .05$). Pregnant women who normally worked by standing or walking a lot had correlation with normal labor in the primigravida (Prapaiwan Danpradit, B.E. 2002: 231-239).

Benefits of Exercise for Fetuses

1. Fetal growth:Pregnant women had no prohibit to exercise. They should exercise at least 30 minute, 3 times a week. There was no evidence of the association of premature babies and fetal death (Schramm, Stockbauer & Hoffman, 1996: 461-462; Zeanah & Schlosser, 2004). Baby birth weights were normal. Weight of placenta from pregnant women with regular exercise was heavier than others with no exercise (Areerat Suputthithada, et al., B.E. 2002: 59-72). Exercise during pregnancy promoted fetal growth (Clapp, Little & Widness, 2003: 1021-1025; Dye, Fernandez, Rains & Fershteyn, 2003: 415-422; Perkins, Pivarnik, Stein & Juanita, 2004).

2. Fetal stress: There was no evidence of fetal distress during mothers exercised (Areerat Suputthithada, et al., B.E. 2002: 59-72). Babies from pregnant women with exercise had better Apgar score, less meconium in amniotic fluid, less

opportunity for CPR and less treatment in ICU than babies from pregnant women without exercise (Akekachai Piensriwatchara, B.E. 2002: 57).

3. Fetal development: There was no evidence of benefits of exercise for fetal development in human, but study on the outcome of exercise of pregnant mice, babies from pregnant mice with exercise showed better learning than babies from mice without exercise ($p < .05$) (Panaree Panpiensilp, B.E. 2003: 120-121).

Perceived benefits of action had positively correlated with health-promoting behavior in first-time pregnant women ($p < .001$) (Yupin Pienmongkol, B.E. 1994: 74-75) and adolescence pregnant women ($p < .001$) (Nirattaradorn, 1996: 84), pregnant workers who were working in manufactory ($p < .001$) (Darinee Suwaphabh, B.E. 1999: 124-129), pregnant women ($p < .01$) (Wilawan Thanomroob, B.E. 2000: 66-67), diabetic pregnant women ($p < .001$) (Tanaporn Wongchan, B.E. 2001: 126-127) and pregnant workers in garment factory ($p < .01$) (Wassana Sarakarn, B.E. 2001: 63-64). In addition, the positive correlation between perceived benefits of action and health-promoting behavior was stated in women with premature labor ($p< .001$) (Panyapisit, 2002: 92-93), and Thalassemia-carrier pregnant women ($p < .001$) (Pornpimol Viriyawattana, B.E. 2002: 98).

Perceived Barriers to Exercise

Perceived barriers is related to exercise behaviors, barriers may be imagined or real. They consist of perceptions or expectations concerning the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular exercise. Barriers are often viewed as the blocks, handles, personal costs of undertaking a given behavior. Perceived barriers to action affect health-promoting behavior directly by serving as blocks to action as well as indirectly through decreasing commitment to a plan of action (Pender, 2000: 70).

According to Sechrist, Walker, and Pender (1987: 357-365), perceived barriers to exercise can be divided into four main categories: time expenditure, exercise milieu factor, lack of family or social support, and physical exertion.

Time expenditure is defined as time constraints due to work or other activities. Generally, women had multiple roles such as employment, parenthood or family responsibilities that affected to exercise activity (Desmond, et. al., 1990: 220; Nies, et al., 1998: 268). Lack of time to exercise is the principal and most prevalent reason given for an inactive lifestyle (Teeintong, 2002: 36). Seven hundred and fifty pregnant women aged 35 years old and over believed time was a barrier of exercise (Jaffee, et al., 1999: 215-218).

Exercise milieu factors are defined as far exercising locations, embarrassment to exercise, high exercising costs, inconvenient schedules of facilities, funny appearance in exercise suits, and few numbers of exercising places (Sechrist, Walker, & Pender, 1987: 360). Marcus and Forsyth (1998: 104-110) reported that exercising location nearby the house, safety, convenience and less service fees would motivate more exercise in women.

Lack of family or social support is defined as lack of motivation or lack of encouragement from the spouse and family. Several studies reported a strong relationship between lack of spouse and family support and continuance of exercise by women (Albrecht & Nelson, 1993: 47; Dishman, et al., 985: 163; Lutter, et al., 1998: 87; Sechrist, Walker, & Pender, 1987: 360).

Physical exertion is defined as the exercise referring to tiredness, fatigue and hard work. The study indicated that lack of exercise most consistently was related to low energy levels and illness (Yoshida, et. al., 1988: 107; Verhoef & Love, 1993: 15-29). Other studies reported that exercise caused illness, tiredness and muscle pain (Myers & Roth, 1997: 277-283). Pregnant workers in industrial manufactories had no knowledge of proper exercise during their pregnancy (Darinee Suwaphabh, B.E. 1999: 127).

Perceived barriers to action had negative correlation with health-promoting behavior of pregnant adolescence ($p < .001$) (Nirattaradorn, 1996: 85), pregnant workers who were working in manufactory ($p < .001$) (Suwapabh, 1999: 124-129), pregnant women ($p < .001$) (Thanomroob, 2000: 68-69), pregnant workers in industrial clothes garment factory ($p < .01$) (Sarakarn, 2001: 65), women with premature labor ($p< .001$) (Panyapisit, 2002: 93-94), and Thalassemia-carrier pregnant women ($p < .001$) (Viriyawattana, 2002: 102).

Perceived Self-Efficacy of Exercise

Self-efficacy is a central concept of Bandura's social cognitive theories combining features of social leaning theories and cognitive behavior theories (Bandura, 1977, 1986), which implicate self-efficacy, the belief in one's ability to perform a certain task, as a pivotal construct in understanding and modifying human behavior.

Perceived self-efficacy of action is a judgment of one's abilities to accomplish a certain level of performance. Perceptions of skill and competence in a particular domain motivate individuals to engage in those behaviors that they excel in. Felling efficacious and skilled in one's performance is likely to encourage one to engage in the target behavior more frequently than is felling inept and unskilled (Pender, 2002: 70).

Bandura believes that perceived self-efficacy or realizing self-confidence influences the activity of the individual. Even though individual with same ability may have different behaviors if they have different perceived self-efficacy. Same individual may have different perceived self-efficacy for different situations and thus, different behaviors (Patanavanichnun, 2000: 41-48). The self confidence indicates how much an individual may try to achieve. If a person is confidence about doing a job, he will not fear before doing, will try harder and not give up or get excited easily. When a person tries to do a job in a confusing situation and achieves outcome as expected, they will be motivated and their self-efficacy will strengthen. But if the person gives up or fails in the job they will begin to avoid this activity.

The idea of perceived self-efficacy has been widely used in supporting health-promoting behaviors. This has influenced on choice of the behavior creating an environment to facilitate the behavior and creates endeavor to succeed in the performance.

Perceived self-efficacy of exercise had positive correlation with health-promoting behavior in patients with chronic lung disease (Chanchanakit, 1998: 93). A significant positive correlation was noted between perceived self-efficacy and self-care behavior (e.g. avoiding consumption of alcohol, giving up smoking, doing exercise, avoid high carbohydrate and cholesterol intake) in myocardial infarction

patients (Charoenwongwiwat, 1995: 22-43), in diabetes mellitus patients (Kingery & Glasgow, 1989: 14-18) in elderly (Homnan, 1996). The majority of studies were in patients with chronic illness and the elderly. A part of all research associated with health status showed their healthy behavior can lead to improvement and rehabilitation by healthy behavior.

Previous studies was found self-efficacy was significantly correlated with health promoting lifestyles in adolescent students for 441 cases in Chiang Mai province ($p < .001$) (Kwanngen, 1994: 72), 150 elderly persons who were the members of The Elderly Association of Nakhonsawan Province and lived in Amphur Mung ($p < .001$) and Perceived self-efficacy, perceived health status, year of education, and income could predict health-promoting behavior of elderly persons who were the members of The Elderly Association of Nakhonsawan Province and lived in Amphur Mung as 33.5% ($p < .001$) (Wandee Yamchanchai, B.E. 1995: 35-37), adolescent coronary heart disease risk behaviors in high school and vocational students in Bangkok Metropolis ($p < .01$) (Teewaree, 2000: 73). Perceived self-efficacy was significantly correlated with health-promoting behavior among pregnant industrial workers ($p < .001$) (Patanavanichnun, 2000:94-95). In additional, perceived self-efficacy had the highest direct effect on exercise behavior in coronary artery disease patients after revascularization ($p < .001$) (Ngaosomskul, 2000: 69-70).

Previous studies found that perceived self-efficacy, year of education, and income were predictors of health-promoting behavior and account for 33.5% of the variance of health-promoting behaviors in elderly persons who were the members of The Elderly Association of Nakhonsawan Province and lived in Amphur Mung ($p < .001$) (Wandee Yamchanchai, B.E. 1995: 35-37), Perceived benefits, perceived barriers of action and income can explain health-promoting behavior of pregnant adolescence as 34.4% ($p < .001$) (Nirattaradorn, 1996: 92). Perceived benefits and perceived barriers of action can explain health promoting behavior of pregnant workers who work in the industrial manufactories as 35.26% ($p < .001$) (Darinee Suwaphabh, B.E. 1999: 129). Age, perceived benefits and perceived barriers of action can explain health-promoting behavior of pregnant women as 22.0% ($p < 0.01$) (Wilawan Thanomroob, B.E. 2000: 75). Perceived benefits can explain health promoting behavior of diabetic pregnant women as 32.90% ($p < .01$) (Tanaporn

Wongchan, B.E. 2001: 117). Perceived benefits of action, educational level and perceived barriers of action account for 31.4% of variance of health-promoting behavior of Thalassemia-carrier pregnant women ($p < .01$) (Pornpimol Viriyawattana, B.E. 2002: 98). Perceived benefits and perceived barriers of action can describe health-promoting behavior during the pregnancy of women with premature labor as 50.0% ($p < .005$) (Panyapisit, 2002: 92).

Review of literature indicate that the study of exercise behaviors of pregnant women is still minimal, particularly merge other health-promoting behavior such as nutrition, health responsibility etc. The researcher would like to study relationships between personal factors: age, income, education level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of pregnant women and predictability of these variables for exercise behaviors of pregnant women.

CHAPTER III
MATERIAL AND METHOD

This descriptive correlational research was designed to examine the relationships among personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of the pregnant women. The predictability of study variables for exercise behaviors of pregnant women also was explored.

Population and Sample

The sample of this study was the pregnant women who sought antenatal care at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan, Thailand from February 2006 to May 2006. Purposive sampling were used by the following inclusion criteria:

1. The pregnant women had no complication during pregnancy.
2. The pregnant women were able to speak, listen, read and write Thai language.
3. The pregnant women received general knowledge about antenatal exercise from staff nurses in 2nd ANC.

Sample Size

The sample size was computed by using the formula of Kerlinger and Pedhazur (Worapongsathorn, 1989: 60). The formula was:

$$n = 30k$$

n = estimated sample size

k = number of independent variables

In this study, the independent variables were age, income, educational level, number of pregnancy, gestational age, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy of exercise.

$$n = 30k$$
$$= 30 \times 8$$
$$= 240$$

Then, the sample size in this study was 240 cases.

Setting

This study was conducted at the Department of Antenatal Care Health Promotion Hospital Region 8, Nakhonsawan, Thailand. The Antenatal Clinic offers antenatal care for pregnant women on Monday to Friday. The office hour is from 08.00 am. – 04.00 pm. The pregnant women receive general knowledge about exercise for pregnant women by staff nurses at least one time. Data collection was performed at the Department of Antenatal Care, before the pregnant women received investigation and treatment from the health care team.

Instrumentation

The instrument used in this study was a self-reported questionnaire which consisted of five parts as follows:

Part 1 The Personal Characteristics Form

The Personal Characteristics Form was developed by the researcher to collect data regarded to the personal factors: age, family income, educational level, number of pregnancy, and gestational age. (Appendix C)

Part 2 Exercise Behavior Questionnaire

The Exercise Behavior Questionnaire was developed by Teeintong (2002: 46), based on Pender's Health Promotion Model. The researcher, modified the Exercise Behavior Questionnaire of Teeintong (2002: 46) based on literature review about exercise behavior and health-promoting behavior in pregnant women. The exercise behavior questionnaire was composed of 2 sub-scales, including 7 items of leisure-time exercise, 5 items of lifestyle exercise; The total number of items is 12 items, and 1 item of open-ended question about other leisure-time exercise and lifestyle exercise, as follow:

- Leisure-time exercise (7 items) 1, 2, 3, 4, 5, 6, 7
- Lifestyle exercise (5 items) 8, 9, 10, 11,12

Each item was rated on a 4 point Likert scale, which 1 = never, 2 = sometimes, 3 = often, and 4 = routinely. The possible range of the total score was 12-48. The higher score indicated the high exercise behavior the pregnant women had. (Appendix D)

The criteria of this score were as follows:

> 80% mean high exercise behaviors

60%-80% mean moderate exercise behaviors

< 60% mean low exercise behaviors

Validity

Teeintong (2002: 47) evaluated the content validity of the instrument by a panel of 7 experts, medical lecturers and nursing lecturers. The Content Validity Index (CVI) obtained was .90. In this study content validity was examined by a panel of 5 obstetric nursing instructors. After the questionnaire was examined by the experts, the researcher improved it according to the experts' recommendations. The Content Validity Index (CVI) obtained was .91.

Reliability

Teeintong (2002: 47) tested the reliability of the Exercise Behavior Questionnaire with 30 postpartum women. The Cronbach's alpha coefficient obtained was .82. When using in 200 postpartum women, the Cronbach's alpha coefficient obtained was .80. In this study, the reliability of the instrument was tested among 30 subjects who were similar to the sample. The Cronbach's alpha coefficient obtained was .80. For the sample of 240 subjects, the Cronbach's alpha coefficient obtained was .80.

Part 3 Perceived Benefits of/Barriers to Exercise Scale (EBBS)

In this study, the researcher used the Exercise Benefits/Barriers Scale (EBBS) of Sechrist, Walker and Pender (1985) which modified by Teeintong (2002).

The original EBBS consisted of 2 subscales: exercise benefits subscale and exercise barriers subscale. There are 29 items including in exercise benefits subscale and 14 items in the barriers subscale.

Teeintong (2002) modified the original EBBS and discarded 1 item of the exercise benefits subscale. In her study, Teeintong (2002) doubled the exercise benefits subscale: 28 items for leisure-time exercise and 28 items for lifestyle exercise.

In this study the researcher discarded 2 items of leisure-time exercise and 2 items of lifestyle exercise that modified by Teeintong (2002). Therefore, there are 26

items in leisure-time exercise and 26 items in lifestyle exercise in this study. Of the 26 items in leisure-time exercise and lifestyle exercise, there are 4 categories of benefits of exercise: life enhancement/improved psychological outlook, physical performance, social interaction and health promotion and illness prevention, as follows:

	Leisure-time item	Lifestyle item
• Life enhancement/improved psychological outlook (13 items)	1,2,3,5,10,13,14,16, 18,19,20,21,22	27,28,29,31,36,39,40, 42,44,45,46,47,48
• Physical performance (8 items)	4,8,9,11,12,24,25,26	30,34,35,37,38,50,51,52
• Social interaction (3 items)	6,17,23	32,43,49
• Health promotion and illness prevention (2 items)	7,15	33,41

Each items of benefits of exercise in a 5 point Likert scale, range from 1 = not agree at all to 5 = truly agree (Appendix E).

The criteria of this score were as follows:

> 80%	mean perceived benefits of exercise in a high level
60%-80%	mean perceived benefits of exercise in a moderate level
<60%	mean perceived benefits of exercise in a low level

For the barriers of exercise subscale, Teeintong (2002) modified from the original EBBS and added 14 items in the barriers to exercise subscale. There are 17 items in leisure-time exercise and 11 items lifestyle exercise in Teeintong's study.

In this study, the researcher used the 28 items of barriers to exercise subscale that modified by Teeintong (2002). There are 4 categories of barriers to exercise: exercise milieu factor, time expenditure, physical exertion and lack of family or social support, as follows:

	Leisure-time item	Lifestyle item
• Exercise milieu factor	(6 item) 8,11,12,13,15,16	(2 item) 25,28
• Time expenditure	(4 item) 1,5,14,17	(2 item) 18,22
• Physical exertion	(5 item) 2,3,7,9,10	(5 item) 19,20,24,26,27

- Lack of family or social support (2 item) 4,6 (2 item) 21,23

Each items of barriers of exercise in a 5 point Likert scale, range from 1 = not agree at all to 5 = truly agree (Appendix F).

The criteria of this score were as follows:

>80% mean perceived barriers to exercise in a high level

60%-80% mean perceived barriers to exercise in a moderate level

<60% mean perceived barriers to exercise in a low level

Validity

The EBBS used in this study was reviewed by a panel of 5 experts in maternity nursing for content validity. The Content Validity Index (CVI) for benefits of exercise subscale obtained was .92 and for barriers to exercise was .93.

Reliability

The reliability of the EBBS used in this study was examined by trying out in 30 pregnant women that used characteristics similar to the study sample. Cronbach's alpha coefficient obtained for benefits of exercise subscale was .96 and for barriers to exercise was .94.

Part 4 Perceived Self-Efficacy of Exercise Questionnaire

The Perceived Self-Efficacy of Exercise Questionnaire measured perceived self-efficacy of exercise in pregnant women. The Perceived Self-Efficacy of Exercise Questionnaire was developed by Garcia, et al. (1995) for the adolescents, based on Pender's Health Promotion Model. In this study, the researcher modified by changing some word in items to make it more appropriate for pregnant women. The Perceived Self-Efficacy of Exercise Questionnaire was composed of 2 sub-scales, including 8 items of perceived self-efficacy of leisure-time exercise and 8 items of perceived self-

efficacy lifestyle exercise; the total items in the instrument consisted of 16 items (Appendix G), as follows:

- Leisure-time exercise (8 items) 1,2,3,4,5,6,7,8
- Lifestyle exercise (8 items) 9,1011,12,13,14,15,16

Each item was rated on a five point Likert scale, which 1 = not at all true, 2 = not very true, 3 = in-between, 4 = sort of true, and 5 = very true. The possible range of the total score is 16-80 (Appendix F). The higher the score indicated that the pregnant women perceived more self-efficacy of exercise.

The criteria of this score were as follows:

>80%	mean perceived self-efficacy of exercise in a high level
60%-80%	mean perceived self-efficacy of exercise in a moderate level
<60%	mean perceived self-efficacy of exercise in a low level

Validity

In this study content validity was examined by a panel of 5 obstetric nursing instructors. After the questionnaire was examined by experts, the researcher improved it according to the experts' recommendations. The Content Validity Index (CVI) obtained was .89.

Reliability

Garcia, et al (1995) tested with the Perceived Self-Efficacy of Exercise Questionnaire with 286 female adolescents. The Cronbach's alpha coefficient obtained was .77. In this study, the reliability of the instrument was tested among 30 subjects who were similar to the sample. The Cronbach's alpha coefficient obtained was .80. For the sample of 240 subjects, the Cronbach's alpha coefficient obtained was .89.

Protection of Human Rights

This study was permitted by the Faculty of Graduate Studies, Mahidol University, administrators of Health Promotion Hospital Region 8, Nakhonsawan, Thailand, and The Committee on Human Rights Related to Researches Involving Human Subjects. Potential participation were informed about the purpose of the study and their right to decline participation or to withdraw from the study at any time. There were no risks of participation in this study. The only known inconvenience was the time (45-60 minutes) spent to completed the questionnaires. There was no cost, nor was there any payment, to participate in the study (Appendix B).

Data Collection

Data were collected by the researcher at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan, Thailand. The following procedures were performed to collect the data:

1. Request permission from the Faculty of Graduate Studies, Mahidol University and the Committee on Human Rights Related to Researches Involving Human Subjects for collecting data and refer to administrators of Health Promotion Hospital Area 8, Nakhonsawan, Thailand for collecting data on February 2006 to May 2006 on Monday to Friday from 08.00 am. - 04.00 pm.

2. The researcher introduced herself to the head nurse and explained the objectives, procedures of the study and prepared place for the sample.

3. The researcher studies history of pregnant women and selected the sample, and collected data less than 15 cases/day. While the sample were waiting for the doctor, the researcher introduced herself to them for cooperation based on human's rights, and assured that they were not disturbed or postponed the que. If the subjects agreed to participate in the study the consent form was signed (Appendix A).

4. The researcher explained the questionnaire and how to check it. Total time spent filling out the questionnaires was about 45-60 minutes, if the sample use more than 60 minutes, the researcher had to ask some problem about questionnaire. After the

sample finished the questionnaires, the researcher checked for completeness of the questionnaires. If some items were not completed, the studies sample asked for further completion according to their willingness. The researcher thank them for their cooperation.

5. All data were statistical analyzed.

Data Analysis

All data were analyzed using the computer program. The level of significance was set at .05.

1. Percentage, range, mean, and standard deviation were used to describe the personal factors: age, income, educational level, number of pregnancy, and gestational age.

2. Range, mean, and standard deviation were used to describe perceived benefits of exercise, perceived barriers to exercise, perceived self-efficacy of exercise and exercise behaviors.

3. The normality of the variables in this study was tested by Kolmogorov-sminov.

4. Pearson's Product-Moment correlation coefficient was computed to find the relationships among personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of pregnant women.

5. Multiple regression with the Enter method was performed to find out the predictability of study variables for exercise behaviors of the pregnant women.

CHAPTER IV
RESULTS

The objectives of this study were to describe the relationships among personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise; and exercise behaviors of pregnant women. The predictors of exercise behaviors of pregnant women were also explored. In this chapter, results of data analysis will be presented as follows:

1. Characteristics of the sample
2. Perceived benefits of exercise of pregnant women
3. Perceived barriers to exercise of pregnant women
4. Perceived self-efficacy of exercise of pregnant women
5. Exercise behaviors of pregnant women
6. Result of hypothesis testing

Characteristics of the Sample: Age, Income, Educational Level, Number of Pregnancy, and Gestational Age

The total sample of this study were 240 pregnant women who came to antenatal clinic at Health Promotion Hospital Region 8, Nakhonsawan at the time of study. The sample has age between 15 to 40 years. The mean and standard deviation of age were 25.78 and 6.07 years. Most of their ages ranged between 20 to 35 years (72.5%). The sample has family monthly income between 3,500 to 45,000 Baht. The mean and standard deviation of income were 10,909.17 and 7632.67 Baht. Their income mostly ranged from 5,001 to 10,000 Baht per month (52.08%). Most of the sample finished primary school (44.59%), and 28.33% of them completed secondary school. The highest years of education completed were between 2 to 18 years, with the mean and standard deviation of 8.91 and 3.8 years, respectively. The sample had pregnancy number between 1 to 4. Almost half of them were primigravida (43.75%). The sample had gestational age between 5 to 37 weeks. The mean and standard deviation of gestational age 20.47 and 11.1 weeks. Most of them were gestational age between 0 to 14 weeks (41.67%) and 15 to 28 weeks (33.33%). The personal characteristics of the sample are summarized in Table 1.

Table 1 Characteristics of the Sample Classified by Age, Income, Educational Level, Number of Pregnancy and Gestational Age (N = 240)

Characteristics	Range	Mean	S.D.	KS test	Number	Percentage
Age (Years)	15-40	25.78	6.07	.07		
< 20					38	15.83
20-35					174	72.50
> 35					28	11.67
Income (Baht/month)	3,500-45,000	10,909.17	7632.37	.00		
< 5,000					23	9.58
5,001-10,000					125	52.08
> 10,001					92	38.34
Educational level	2-18	8.91	3.80	.00		
Primary school					107	44.59
Secondary school					68	28.33
High school					20	8.33
Diploma					41	17.08
≥ Bachelor degree					4	1.67
Number of pregnancy	1-4	1.86	0.91	.00		
1					105	43.75
2					76	31.66
3					46	19.17
≥ 4					13	5.42
Gestational age (weeks)	5-37	20.47	11.10	.06		
First trimester					100	41.67
Second trimester					80	33.33
Third trimester					60	25.00

Note: KS test = Kolmogorov-Smirnov test

Perceived Benefits of Exercise

The perceived benefits of exercise scores of the sample ranged from 121 to 257 out of 260 with a mean of 190.33 (S.D. = 29.74). It was shown that the perceived benefits of exercise of the sample was at a moderate level. Considering to each subscale, the sample perceived more benefits of leisure-time exercise than lifestyle exercise. The highest to the lowest categories of perceived benefits of exercise was physical performance, life enhancement/improved psychological outlook, health promotion and illness prevention, and social interaction.

Perceived Barriers to Exercise

The perceived barriers to exercise scores of the sample ranged from 28 to 101 out of 140 with a mean of 48.87 (S.D. = 16.09). It was shown that the perceived barriers to exercise of the sample was at a low level. Considering to each subscale, the sample perceived more barriers to leisure-time exercise than lifestyle exercise. The highest to the lowest categories of perceived barriers to exercise was time expenditure, physical exertion, exercise milieu factor, and lack of family or social support.

Perceived Self-Efficacy of Exercise

The perceived self-efficacy of exercise scores of the sample ranged from 16 to 77 out of 140 with a mean of 46.45 (S.D. = 10.27). It was shown that the perceived self-efficacy of exercise of the sample was at a low level. Considering to each subscale, the sample perceived more self-efficacy of leisure-time exercise than lifestyle exercise.

The perceived benefits of, perceived barriers to, and perceived self-efficacy of exercise of the sample are summarized in Table 2.

Table 2 Scores of Perceived Benefits, Perceived Barriers, and Perceived Self-Efficacy of Exercise of Pregnant Women (N = 240)

Variables	Possible range	Actual range	Mean	Standard Deviation	KS test	Level
• Perceived benefits of exercise	52-260	121-257	190.33	29.74	.31	Moderate
Overall exercise						
- Leisure-time exercise	26-130	63-127	96.68	14.96		Moderate
- Lifestyle exercise	26-130	49-130	93.65	16.08		Moderate
• Perceived barriers to exercise	23-140	28-101	48.87	16.09	.13	Low
Overall exercise						
- Leisure-time exercise	17-85	17-61	29.97	10.02		Low
- Lifestyle exercise	11-55	11-41	18.90	7.17		Low
• Perceived self-efficacy of exercise	16-80	16-77	46.45	10.27	.09	Low
Overall exercise						
- Leisure-time exercise	8-40	8-39	23.55	5.57		Low
- Lifestyle exercise	8-40	8-38	22.90	6.14		Low

Note: KS test = Kolmogorov-Smirnov test

Exercise Behaviors

The exercise behaviors scores of the sample ranged from 12 to 42 out of 48 with a mean of 30.54 (S.D. = 5.62). It was shown that the exercise behaviors of the sample was at a moderate level. Considering to each subscale, the leisure-time exercise behavior scores of the sample ranged from 7 to 24 out of 28 with a mean of 14.54 (S.D. = 4.16). It was shown that the leisure-time exercise behavior of the sample was at a low level. The lifestyle exercise behavior scores of the sample ranged from 5 to 20 out of 20 with a mean of 15.99 (S.D. = 2.63). It was shown that the lifestyle exercise behavior of the sample was at a moderate level. That indicated the sample had more lifestyle exercise than leisure-time exercise behavior. The exercise behaviors of the sample are summarized in Table 3.

Table 3 Scores of Exercise Behaviors of the Pregnant Women (N = 240)

Exercise behaviors	Possible range	Actual range	Mean	Standard Deviation	KS test	Level
Overall exercise	12-48	12-42	30.54	5.62	.09	Moderate
- Leisure-time exercise	7-28	7-24	14.54	4.16		Low
- Lifestyle exercise	5-20	5-20	15.99	2.63		Moderate

Note: KS test = Kolmogorov-Smirnov test

Result of Hypotheses Testing

Hypothesis 1 Personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise are correlated with exercise behaviors of pregnant women.

Pearson's product moment correlation analysis was used to identify the relationships among personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise and exercise behaviors of pregnant women. Prior to analysis, the principle assumptions were tested. The Kolmogorov-Smirnov test from Table 1, Table 2, and Table 3 revealed that age, gestational age, perceived benefits of exercise, perceived barriers to exercise, perceived self-efficacy of exercise, and exercise behaviors had a normal distribution, while income, educational level, and number of pregnancy, were not normally distributed. Using Pearson's product moment correlation, it was found that age ($r = .18$, $p < .01$), educational level ($r = .17$, $p < .01$), and gestational age ($r = .31$, $p < .001$) were positively correlated with the exercise behaviors of pregnant women. It means that pregnant women who had higher age, educational level, and gestational age would have higher exercise behaviors. For the variables that were not normally distributed (income, educational level, and number of pregnancy), Spearman's Rho was used to explore their relationships with exercise behaviors of pregnant women. The result was similar to the analysis using Pearson's product moment correlation in that only education was positively with exercise behaviors ($r_s = 15$, $p < .05$). However, Income, pregnancy number, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy in exercise were not statistically correlated with the exercise behaviors of pregnant women. This hypothesis was partially supported, as shown in Table 4.

Table 4 Correlation Matrix of the Study Variables using Pearson's Correlation Coefficients (N = 240)

Variables	1	2	3	4	5	6	7	8	9
1. Age	1.00								
2. Income	.01	1.00							
3. Educational level	.04	.40	1.00						
4. Number of pregnancy	.54	.01	-.46	1.00					
5. Gestational age	.09	-.03	-.15	-.03	1.00				
6. Perceived benefits of exercise	.16	-.11	.08	.11	-.06	1.00			
7. Perceived barriers to exercise	.01	-.01	.018	-.01	-.15	.01	1.00		
8. Perceived self-efficacy of exercise	-.05	-.05	-.04	-.16	-.01	-.14	-.01	1.00	
9. Exercise behaviors	.18**	-.07	.17**	.07	.31***	-.07	-.05	-.05	1.00

*P < .05, **P < .01, ***P < .001

Hypothesis 2 Personal factors: age, income, educational level, number of pregnancy, and gestational age; perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy of exercise can jointly predict the exercise behaviors of pregnant women.

Multiple regression analysis was used to identify predictors of exercise behaviors of the pregnant women. Prior to analysis, the principle assumptions were tested. The histograms and p-p plot showed the normal curve of the residual of exercise behaviors of pregnant women (Appendix K). In order to test autocorrelation, Dubin-Watson test was performed. This regression model revealed Dubin-Watson test statistics of 2.02, indicating no autocorrelation. According to Wanichbuncha (2000), Dubin-Watson value ranging from 1.5-2.5 indicates no autocorrelation. To test multicollinearity among independent variables, it was shown that tolerance values were close to one. Stevens (1996) suggested that if the VIF exceeds 10, it should be a concern (Appendix L). Therefore, multicollinearity was not a problem in this multiple regression analysis.

The analysis of Enter multiple regression as shown in Table 5 indicated that All variables including age, income, educational level, number of pregnancy, gestational age, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy of exercise could jointly explain 16.5% of variance in exercise behaviors of pregnant women (Overall $F_{(8,231)} = 5.711$, $P < .001$). In this analysis, educational level was the strongest predictor followed by the number of pregnancy, income, gestational age and perceived benefits of exercise respectively. This mean that if educational level of the pregnant women increase 1 unit, exercise behaviors of pregnant women will increase .35 units ($\beta = .35$, $p < .001$); number of pregnancy increase 1 unit, exercise behaviors of the pregnant women will increase .24 units ($\beta = .24$, $p < .05$); income increase 1 unit, exercise behaviors of the pregnant women will decrease .23 units ($\beta = -.23$, $p < .01$); gestational age of pregnant women increase 1 unit, exercise behaviors of the pregnant women will increase .21 units ($\beta = .21$, $p < .01$) and perceived benefits of exercise of pregnant women increase 1 unit, exercise behaviors of the pregnant women will be down .16 units ($\beta = -.16$, $p < .05$) . The predictive equations were as follows:

Table 5 Enter Multiple Regression Analysis of Exercise Behaviors of Pregnant Women (N= 240)

Variables	b	β	t
1. Age	.04	.04	.50
2. Educational level	.51	.35	3.96***
3. Income	.00	-.23	-3.28**
4. Number of pregnancy	1.45	.24	2.54*
5. Gestational age	.16	.21	3.35**
6. Perceived benefits of exercise	-.03	-.16	-2.55*
7. Perceived barriers to exercise	-.01	-.03	-.44
8. Perceived self-efficacy of exercise	-.02	-.03	-.52

Constant = 28.11, $\mathbf{R^2}$ = .165, $\mathbf{R^2}$ **adj**. = .136,
SEE = 3.42, **Overall F** $_{(8,231)}$ = 5.711, P < .001

*P < .05, **P < .01, ***P < .001

Unstandardized score equations to predict exercise behaviors of pregnant women

Predicted exercise behaviors = .51 (Educational level) + 1.45 (number of Pregnancy) - .00 (Income) + .16 (Gestational age) - .03 (Perceived benefit of exercise) + .04 (Age) - .02 (Perceived self-efficacy of exercise) - .01 (Perceived barrier to exercise)

Standardized score equations to predict exercise behaviors of pregnant women

Z Predicted exercise behaviors = .35 Z(Educational level) + .24 Z(number of Pregnancy) - .23 Z(Income) + .21 Z(Gestational age) - .16 Z(Perceived benefit of exercise) + .04 Z(Age) - .03 Z(Perceived self-efficacy of exercise) - .03 Z(Perceived barrier to exercise)

CHAPTER V
DISCUSSION

This descriptive correlational research was conducted to explore the factors related to the exercise behavior of pregnant women and to determine whether exercise behaviors could be predicted by selected factors, including personal factors, perceived benefits, perceived barriers and perceived self-efficacy of exercise behaviors in pregnant women. The researcher has discussed the objectives and hypothesis, as follows:

Sample's Characteristics

The sample in this study comprised 237 pregnant women who sought antenatal care at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan. The subjects were 15-40 years of age with an average of 25.78 years old. The majority of the subjects in the sample were of reproductive age, 20-35 years old (The National Institute of Child and Family Development, B.E. 2005: 18-19). They are mature both physically and psychologically.

The bodies of the pregnant women who had become pregnant before the age of 20 years were not fully developed which put them at risk for difficult and premature deliveries. In terms of psychological factors, the women in this age group continued to have mood swings that left them unprepared for performing maternal roles. The pregnant women with aged over 35 years tended to encounter problems with their pregnancies or pregnancy complications such as gestational diabetes, pregnancy-induced hypertension, difficult labor, premature birth and vaginal bleeding, etc. With regard to psychological factors, these women were also susceptible to mood swings which made them unready to accept maternal roles

(National Institute for Child and Family Development, Mahidol University, B.E. 2005: 18-19). Thus, these women might pay more attention to their health, be highly attentive and have motivation to practice good healthcare behavior. This finding concurred with the study of Kannika Kantharaksa (1984) and Angkhana Nuonyong (1992) which stated that pregnant women with higher ages paid more attention to their health, possibly due to their increased chance for danger or anomalies during pregnancy.

The monthly incomes of the sample were 3,500-45,000 Baht with an average of 10,909.17 Baht. Most of the sample (52.08%) had monthly incomes ranging between 5,001-10,000 Baht. Furthermore, it has been shown that the average income of Thai people is 12,150 Baht (National Statistics Office, B.E. 2000: 1). Therefore, the average income of the sample is slightly lower than the national average. The interviews revealed that most of the subjects in the sample had sufficient income to accommodate higher expenses caused by pregnancy. The great difference in the levels of income among the samples may be due to the fact that pregnant women who receive treatment at this hospital live both within and outside the municipality. From the observations and interviews, it was revealed that the pregnant women who lived out of the municipality were farmers and government officers who preferred to attend a highly competent hospital. The hospital that provided the setting for this study particularly specializes in pregnancy, labor, postpartum and neonatal services. It has obstetricians and staff who are experts in obstetrics and gynecology. The pregnant women who come here have to have sufficient income to cover service fees of at least 100 Baht per checkup. Most pregnant women from within the municipality are vendors and general laborers who have to work every day. They do not have particular days off, and they will miss their pay when they do not work. Consequently, they choose a hospital close to their homes so that coming to the hospital will not affect their jobs, incomes and expenses (Caldwell, et al., 1970: 587).

In terms of educational level, 44.59 % of the sample finished elementary school, which is the national compulsory level (Education Bill, B.E. 2002). Wassana Sarakarn's study showed that 60% of her samples who had graduated at the elementary school level were able to make good decisions to a certain degree (Wassana Sarakarn, B.E. 2001: 49), being able to decide or choose to improve their

health in doing concrete things rather than abstract ones. They also had opportunity to get information about exercising from different media, such as pamphlets, VCDs and TV shows. However, their opportunity to research and self-educate was not as great as that of the women who had graduated at a higher level than elementary school (Reudee Pungbangkadee, B.E. 1997: 84-86) and were able to use the internet and read books about pregnancy.

Forty-three point seventy-five percent of the sample subjects were primigravida. Since they had never experienced pregnancy before, they had better self-caring behaviors and attitudes towards pregnancy than women who had been pregnant before because they were attentive and interested in pregnancy (Kannika Kantharaksa, B.E. 1984: 129). On the other hand, the pregnant women who had previously given birth were able to maintain better control of their emotions and situations (Bash, 1981: 176-177).

Forty-one point sixty-seven percent of the samples were in their first trimester (1-14 weeks). Pregnant women in their first trimester are marked by uncertainty, ambivalence and focus on self as they may feel that it is not the right time for them to be pregnant. They need time to adapt to pregnancy. Among pregnant women in first trimester, exercise is not well practice because some physical change such as nausea, vomiting, fatigue etc. make them not ready to exercise. The physical changes occurring in the first trimester of pregnancy result in discomfort and a need to rest (Murray, McKinney & Gorrie, 2002: 120-152; Pillitteri, 2003: 206-225; Rawan Somboon & Teamsorn Thongsawad, B.E. 2002: 29-57).

Exercise Behaviors of Pregnant Women

The sample's exercise behaviors was at the moderate level with scores ranging from 12-42, with an average of 30.54. Most of the sample subjects were aged 20-35 years, making the group of working age. Thus, working may have left the women with little or no time for exercise behaviors due to their fatigue from various tasks. This finding concurred with the studies of Mayuree Nirattaradorn (1996), Sumitta Swangtook (1996), Darinee Suwaphabh (1999) and Wassana Sarakarn

(2001), which found that working outside the home reduced exercise behaviors in combination with the fact that the sample group had an average monthly income that was lower than the average monthly income for Thai citizens, which might also have resulted in reducing exercise behaviors. The level of education for the greater part of the sample group met the minimum educational requirements set forth by the government. Therefore, low levels of education may have caused the women to possess little knowledge and understanding about exercise as compared to women with higher levels of education who were able to better perceive and understand what needed to be learned and better comprehend the reasons for getting exercise. These findings corresponded to the findings of the studies of Reudee Pungbangkadee (1998) and Wassana Sarakarn (2001) which found that low levels of education might prevent self-learning from being as broad as that of women with higher levels of education and higher numbers of pregnancies. The greater part of the sample group were primigravida who were attentive and interested in their pregnancies because they had never previously experienced pregnancy. Therefore, the women may practice better self-care behavior that includes exercise than women in subsequent pregnancies. For the most part, the gestational age of the sample group was at the first trimester wherein the women continued to experience discomforts due to hormonal changes e.g. nausea, vomiting, dizziness, fatigue and exhaustion including psychological factors wherein the women had feelings of uncertainty and hesitance which might have caused them to practice little exercise, possibly because they were afraid of doing anything to endanger their pregnancies. These findings concurred with the study of Unjit Boonsom (1997) which found that 15.9% of pregnant women did not exercise because they were afraid of doing something that would endanger their unborn fetus. Furthermore, from the rate of 10-15% of spontaneous abortions, the majority occurred during 4-20 weeks of pregnancy wherein pregnant women had less physical activity than they did before their pregnancies (Melanie O'Connor, 2004). The sample group perceived the benefits of exercise to a moderate degree, possibly due to their perceptions of the benefits of exercise for pregnant women and their unborn babies during one of their antenatal visits in the exercise manual for pregnant women. Perceptions of the obstacles to exercising during pregnancy were at a low level, possibly due to current support for exercise from hospitals and other media.

However, sample group perceived their self-efficacy of exercise at low level, possibly because of existing perceptions regarding the benefits of exercise, but with a lack of correct understanding about exercise for pregnant women. Therefore, their success at deciding to exercise during pregnancy was low, or they assessed their exercise behavior in terms of former exercise experience. The leisure-time exercise scores were low at 7-24 with an average of 14.54, whereas the lifestyle exercise scores were at a moderate level, ranging from 5-20 and with an average of 15.99, possibly due to the fact that they are women and women have lower rates of exercise behaviors than men (Hellman, 1994; Felton, 1997: 361-367; Jacobson & Jeanette, 1999).

The sample did more lifestyle exercise than leisure-time exercise. Considering each of the topics, the top three highest scores were “I do light housework, such as dusting, cooking, and putting things away”, “I exercise for 15-20 minutes each time” and “I always move my body instead of being in one position for a long time”. The three lowest scores are “I exercise three days a week”, “I exercise with moderate force” and “I walk to get my food instead of having other people bring it to me”.

After looking at the topics with the highest and lowest scores, it can be assumed that lifestyle exercise is easy to perform in daily life without the use of skills or tools, thus making it convenient to allocate time for exercise. On the other hand, leisure-time exercise requires skills and tools and specifically allocated time (Kayroj, 1999: 39-43). When exercise positions were compared 13 different positions became apparent with both sitting and lying down positions, which might have prompted physical activity on the part of the pregnant women who were experiencing physical changes which could have resulted in nausea, vomiting, dizziness, enlarged abdomens, slower physical movement than before pregnancy. Thus, certain positions e.g. Lying-down Position 2 and Crawling Position 3 in Step 2 and positions for exercising the hip muscles might have caused the pregnant women to experience more dizziness, while some of the positions for pregnant women who were more than 6 months pregnant should not be performed because they could result in faintness or actual fainting, which may have reduced the exercise behaviors of the sample group. The sample group’s exercise behaviors was mostly fast walking. This corresponded to

the study that found that 42.36% of pregnant women at Chulalongkorn Hospital did their exercise by taking a walk in the afternoon, although they exercised less often than three times a week (Clarke & Gross, 2004; Piravej & Saksirinukul, 2001: 276-282). The sample stated that walking was easy and convenient to do because it consumed little time, making it suitable for their jobs. Furthermore, most of the samples were also married and marriage is a main obstacle for exercise behaviors (Woodward, et al., 1989 cited in Evan & Nies, 1997) because women have to be responsible for both housework and office work (Verhoef & Love, 1992 cited in Evan & Nies, 1997). Particularly, working in an office (Swangtook, 1996: 73) causes fatigue (Darinee Suwaphabh, B.E. 1999: 124-125; Wassana Sarakarn, B.E. 2001: 59) and less time or no time to exercise (Boonsom, 1997: 49-50; Nirattaradorn, 1996: 80; Reudee Pungbangkadee, B.E. 1997: 75). Furthermore, pregnant women do not realize the importance and necessity of doing exercise (Rapeeporn Prakorbsap, B.E. 1998: 78). The interviews with the sample revealed that 70% of the sample in this study had less energy to do activities when they were pregnant than when they were not pregnant. This agrees with a study that found women to have less physical activities during pregnancy than during the pre-pregnancy period (Melanie O'Connor, 2004) which was caused by changes in their expanding bodies, sickness, fatigue, unstable emotions, little tolerance to hot weather, pain in the back and hips and various personal beliefs.

Most pregnant women (80%) do activities which do not require too much physical strength (Nirattaradorn, 1996: 66) because they believe that if they do not do anything at all, laboring will be very difficult or the fetus may become too large. Moreover they avoid activities that require a great deal of physical strength as they are afraid that these activities may harm the fetus. In studying the health-promoting behavior of pregnant women, it was found that 15.9% of pregnant women did not exercise at all while some of them feared that exercising might endanger the fetus (Boonsom, 1997: 49-50).

Perceived Benefits of Exercise

The sample's perceived benefits of exercise scores ranged from 121-257, with an average of 190.33. It may be that they learned about the benefits of exercise for pregnant women and babies at least once during their checkups at the hospital in which they received manuals for doing exercise during pregnancy and postpartum. The manuals focused on increasing physical functions in the different parts of the body like muscles, arms, legs, the cardiovascular system. Consideration of each individual part found that Part 1, leisure-time exercise was at a moderate level with scores ranging from 63-124 points for an average of 96.68 points. Part 2, lifestyle exercise was at a moderate level with scores ranging from 49 to 130 points and an average of 93.65 points, from which it can be seen that the pregnant women perceived leisure-time exercise as being more beneficial than lifestyle exercise.

The instructional content focused on various increased physical functions such as the leg and arm muscles and the cardiovascular system by considering the use of the 4 steps for exercise in 13 positions wherein step 1 is for warming the body up. Step 2 consists of exercise to increase the muscular strength of the arm and hip muscles. Step 3 consists of exercise aimed at strengthening the abdominal and pelvic muscles. And, step 4 is for relaxing the body, or cooling down. In addition, walking, swimming, aerobics and stationery bicycling are aimed at strengthening the cardiovascular system, which concurred with the findings of the study. The highest to the lowest categories of perceived benefits of leisure-time exercise were in the following order: physical performance (77.05%); life enhancement/improved psychological outlook (74.54%); health promotion and illness prevention (73.5%); and social interaction (67.13%). The same order goes for lifestyle exercise: physical performance (74.3%): life enhancement/improved psychological outlook (72.42%); health promotion and illness prevention (69.5%) and social interaction (66.13%). The pregnant women realized the physical benefits of exercise from health' education, different media and public policies that promoted exercise for good health (The Ninth National Health Development Plan Steering Committee, 2001: 49-55). These benefits should also be concrete. The top three highest items of perceived benefits of exercise were "Exercising improves the functioning of my cardiovascular system",

"Exercise improves my psychological health" and "Exercise increases my muscle strength". The three lowest items of perceived benefits of exercise were "Exercising increases my acceptance by others", "I enjoy exercising" and "Exercise improves overall body functioning for me, and performing daily living activities is a good way for me to meet new people".

Perhaps due to the pregnant women viewed the benefits of exercise in terms of physical function as a result of having received healthcare education during pregnancy by means of various media such as radio, television and policies that emphasize exercise for good health National Health Development Planning Board, Vol. 9, 2001: 49-55). Regular walking and exercising helps blood circulation and generates feelings of refreshment and strength, which eases the labor preceding childbirth (Darinee Suwaphabh, B.E. 1999: 109). Therefore, benefits in physical functions received the highest scores. On the other hand, social relations are not the results of doing exercise because provincial society relies on tight relations with other people who usually help. Meeting new friends or being accepted in a society does not depend on exercise. Therefore, the benefits of exercise in creating social relations scored the lowest.

Perceived Barriers to Exercise

The sample scored the perceived barriers to exercise at a low level ranging from 28 to 101 with an average of 48.87. For the most part, the sample group received knowledge about exercise for pregnant women in their antenatal visits to the hospital wherein they were informed of beneficial resources in exercising, both at the hospital, at home and at work wherein suitable exercise methods for pregnant women were introduced, pamphlets were handed out and individuals who wanted to watch the VCD could contact staff, which might have made the sample group's overall perceived obstacles to exercise lower. When considered in terms of individual parts, it was found that Part 1, leisure-time exercise, was at a low level with scores ranging from 17 to 61 points with an average of 29.97 points while Part 2, lifestyle exercise, was rated at a low level with scores from 11-41 and an average of 18.9 points. It was

found that the pregnant women perceived more barriers of leisure-time exercise than lifestyle exercise. As they said that leisure-time exercise was a behavior that required skills, tools and time allotment (Kayroj, 1999: 39-43). The sample also did more lifestyle exercise than leisure-time exercise. The perceived barriers to leisure-time exercise were scored from highest to lowest as follows: time expenditure, physical exertion, exercise milieu factor, and lack of family or social support. The perceived barriers of lifestyle exercise were physical exertion, exercise milieu factor, time expenditure, and lack of family or social support. Time expenditure was the highest because leisure-time exercise was a behavior that required time. Also, most of samples were vendors and general laborers who had to work every day wherein lack of time to exercise was the principal and most prevalent reason given for an inactive lifestyle (Johnson, et al., 1990 cited by Verhoef & Love, 1994: 298). Similarly, in the study of Jafee, et al. (1999), it was found that seven hundred and fifty pregnant women aged 35 years old and over believed time was a barrier of exercise (Jaffee, et al., 1999: 215-218). Lack of family or social support was the lowest because public policies and media nowadays encourage people to exercise at least three times a week or do physical activities for good health. It is also generally believed that exercise and physical activities, not just sitting and standing, will make the baby weak, big and difficult to deliver or the mother unable to give birth naturally. The top three highest items of perceived barriers to exercise were “I am fatigued by exercise”, “Exercise takes too much time from my family responsibilities” and “Exercise tires me”. The three lowest items of perceived barriers to exercise are “My family members do not encourage me to exercise”, “Exercise is hard work for me” and “I might not exercise because feel dissatisfied with body image”.

The top three highest items of perceived barriers to exercise were fatigue, boredom and household responsibilities. This is because most of the sample in this study were married. Marriage is an important barrier for exercise behavior (Woodward, et al., 1989 cited in Evan & Nies, 1997). One of the three lowest scores was about family support. This was the case because most of the sample lived in extended families and lived in rural areas where they could get help from, talk to or consult with members of their families easily. Moreover, the media have been

promoting exercising as a good way to stay healthy. Furthermore, the pregnant women's husbands and relatives were educated about what to do during pregnancy.

The sample also believed that they had to perform activities because it would be difficult for them to deliver babies or their babies would be too big if they did not have any physical activities. Dissatisfaction with body image was scored as the second lowest because most of the sample had voluntarily become pregnant. Therefore, they did not have to hide their pregnancies and a wider variety of maternity wear is available today, thus making it easy to find something to suit their bodies. Exercise being hard work was scored as the second-lowest because the women had been advised not to over-exercise and they knew there were many ways to exercise. Therefore, they did not think exercise was hard work.

Perceived Self-Efficacy of Exercise

The subjects of the study perceived self-efficacy of exercise at a low level, scoring 16-77 with an average of 46.45. The members of the sample group assessed their self-efficacy in practicing exercise behavior at a low level wherein decisions depended upon 4 key principles: evaluating behavior at which the women had succeeded by self-imposed standards and from the feedback of others; experiences gained by observing the activities of others; from the invitation of other people and from physical condition. These 4 key principles of the sample group remain insufficient for convincing the pregnant women to decide that they would be able to exercise during pregnancy, possibly due to the fact that the majority of the samples were primigravida who had never had previous experience with exercise during pregnancy, from the changing physical condition of pregnancy such as nausea, vomiting, dizziness, fatigue, expanding abdomens or invitations from other family members, friends, insufficient health care information from nurse while some of the women may have never seen other women exercising during pregnancy because do not have live model for practicing exercise, which, therefore, may have caused the perceived self-efficacy scores to be low. It was found that the pregnant women perceived more self-efficacy in terms of leisure-time exercise than lifestyle exercise

because they knew they could exercise rather than simple performing daily activities, they learned about how they could exercise, what they could do and should not do along with other prohibitions. They also tried to exercise at least three times a week (Suwaphabh, 1999: 107). The top three highest scores were “I could perform daily activities during pregnancy, even if I had to do them alone”, “I could exercise even if I was feeling lazy” and “I could exercise even if I had to do it by myself”. The three lowest scores were “I could exercise even if I was not very good at it”, “I could exercise even if I was not in the mood” and “I could exercise even if I was sore from exercising the day before”.

The top three highest scores indicated that the pregnant women perceived self-efficacy of exercise. They felt they could exercise even if they were alone because they wanted to follow the exercise recommendations and different exercise positions that could be done without help. Generally speaking, women who get married, or live separately from their parents, have to do daily activities such as cleaning and cooking by themselves anyway. They may also feel that exercise can be done if they want to do it, even when they feel lazy. The three lowest scored topics show that they perceived self-efficacy of exercise at a low level i.e. they could exercise during pregnancy, even if they did not like to exercise, were not in the mood, or were bored. These perceptions could have resulted from improper physical conditions, such as low back pain, soreness and discomfort, all of which led to lower perceived self-efficacy of exercise. In addition, negative emotions such as stress, fear and dissatisfaction, could lower recognition of their own capability. Thus, they may have avoided performing intended behaviors (Bandura, 1997: 20).

Hypothesis 1 Personal Factors: Age, Income, Educational Level, Number of Pregnancy, and Gestational Age; Perceived Benefits of Exercise; Perceived Barriers to Exercise; Perceived Self-Efficacy of Exercise are Correlated with Exercise Behaviors of Pregnant Women.

Data analysis by Pearson Product-Moment correlation found that age ($r = .18$, $p < .01$), educational level ($r = .17$, $p < .01$), and gestational age ($r = .31$, $p < .001$) were positively and statistically correlated with the exercise behavior of pregnant women.

Age was positively correlated with exercise behaviors in these pregnant women. The older the pregnant women were, the more exercise behaviors they reported. This may be because the sample's age was between 25-30 years, which is the reproductive age at which they are physically, emotionally, socially and economically ready to have babies. Thus, they are able to adjust themselves to physical and psychological changes as they realized the importance of good health better than pregnant women at a younger age (Kannika Kantharaksa, B.E. 1984: 119). Women at this age also have more access to health services. They are more attentive and motivated to improve their health because pregnancy at an old age has a higher risk of irregularities (Angkhana Nuonyong, B.E. 1992: 97-98). They also at a higher risk of having complications during labor (The National Institution of Child and Family Development, Mahidol University, B.E. 2005: 18-19). Older pregnant women are at greater risk for pregnancy-related dangers or anomalies, thus they are more attentive and motivated toward personal health care behaviors (Wilai Rattanapong, B.E.2001) which might also have caused the older subjects in the sample group to practice more exercise behaviors. At the same time, pregnant women who are younger than 20 years of age are physically immature, so they are at risk for complicated labor and premature birth while remaining emotionally unstable and unready for motherhood.

The correlation between education level and exercise behaviors was found. The higher the education levels of the women in this study, the more exercise behaviors they had. This is because education at a higher level helped the pregnant women to constantly learn and gain knowledge. They also had better chances of

obtaining information from different types of media such as books and the internet. Their ability to learn and understand was also high. Finally, these women know how to receive medical treatment better than women of lower education (Ruth, 1973: 136-156). Most of the samples had elementary school educations. This enabled them to be logical and make good decisions on a certain level, as they were able to decide or choose to do good things for their health in a more concrete way than abstract. They also have access to information about exercise through different types of media, such as pamphlets, VCDs, and TV shows. However, their chance to research and self-educate on this topic were not as high as that of pregnant women with education levels that were higher than the elementary level, who could research by using the internet and reading books about pregnancy (Reudee Pungbangkadee, B.E. 1997: 84-86).

The correlation between gestational age and exercise behavior has also been found. This means the higher gestational age, the more exercise behavior the women had. This can be explained by the fact that most of the women in the study were in their first trimester (1-14 weeks) and remained uncertain and hesitant about the timing of their pregnancies. They also felt they had more responsibilities as their lives changed, all of which caused emotional conflicts, even though their pregnancies may have been planned. In addition, physical changes during the first trimester caused discomfort and required rest which could have prevented the women from exercising. Finally, these women did not exercise much because it was also emphasized in their exercise class that doing exercise during the first trimester may lead to miscarriage. In the second trimester (15-28 weeks), the women started to pay more attention to the fetus and choose to do things that were beneficial to the baby. They also cared for their image more because their bodies go through obvious changes at this stage e.g. expanding abdominal wall, inability to move as quickly as before fetal movement, all of which could encourage them to exercise more. In the last trimester (29-40 weeks), however, they think more of their roles as mothers and require more help from others as they become concerned about labor. In addition, physical changes, large abdominal wall and back pain (Pillitteri, 2003: 206-225; Murray, McKinney & Gorrie, 2002: 120-152; Rawan Somboon & Teamsorn Thongsawad B.E., 2002: 29-

57) may encourage them to exercise more since they realize the benefits of doing so for a short term (Pender, 2002).

Income ($r = -.07$, $p>.05$), number of pregnancy ($r = .07$, $p>.05$), perceived benefits of exercise ($r = -.07$, $p>.05$), perceived barriers to exercise ($r = -.05$, $p>.05$), and perceived self-efficacy of exercise ($r = -.05$, $p>.05$), were not significantly correlated to the exercise behaviors of the pregnant women.

Income was not statistically related to exercise behaviors. The monthly incomes of the sample group were between 5,001-10,000 baht. Since income usually signifies socioeconomic status, higher income means higher capability to search for beneficial conveniences and access better health services (Kannika Kantharaksa, B.E. 1984: 125). However, all of these women had learned about the benefits of exercise during pregnancy and received informational pamphlets during their checkup at least once. Furthermore, exercise for pregnant women consists of easy positions or daily life activities which they can do by themselves without tools. Therefore, women with low and high incomes did not have different exercise behaviors.

Number of pregnancy was not statistically related to exercise behaviors. This can be explained in the following ways. First of all, most of these women were pregnant for the first time and they were recommended to exercise during their checkup in the same way as first-time pregnant women. Also, women who are pregnant for the first time usually do not know about the physical and psychological changes during pregnancy or the consequences of pregnancy (Boonsom, 1997: 25). Therefore, they are more interested in their changes and more willing to look for information and suggestions from different sources. Nonetheless, women who have previously given birth are able to control their emotions and situations better (Bash, 1981: 176-177), so their exercise behavior may not be different.

Perceived benefits of exercise was not statistically related to exercise behaviors. Results of this study are not consistent with most previous studies found that perceived benefits of action had positively related to health-promoting behavior (Darinee Suwaphabh, B.E. 1999: 124-129; Nirattaradorn, 1996: 84; Tanaporn Wongchan, B.E. 2001: 126-127; Wassana Sarakarn, B.E. 2001: 63-64; Wilawan Thanomroob, B.E. 2000: 66-67; Yupin Pienmongkol, B.E. 1994: 74-75). This may be due to the fact that the sample was informed about the benefits of exercise during

pregnancy at least once during their second or third checkup at the hospital depending on their preference. Therefore, they all had the same knowledge, but exercise behaviors also relied upon internal recognition, such as raising awareness of behavior and external motivations like rewards and praises.

Perceived barriers to exercise was not statistically related to exercise behaviors. Results of this study are not consistent with most previous studies found that perceived barriers to action had negative correlations with the health-promoting behavior (Darinee Suwaphabh, B.E. 1999: 124-129; Nirattharadorn, 1996: 85; Panyapisit, 2002: 93-94; Pornpimol Viriyawattana, B.E. 2002: 102; Wassana Sarakarn, B.E. 2001: 65; Wilawan Thanomroob, B.E. 2000: 68-69). This may be because the sample perceived barriers to exercise did occur, but did not have effects on their exercise behaviors. The main barriers were time and physical readiness. Since exercise requires time, and the pregnant women were usually responsible for both their occupations and families, they may have then been too tired, sore or bored to exercise. However, environment and family support prevented them from exercising very little because public policies and media all promote exercise.

The correlation between perceived self-efficacy of exercise and exercise behaviors was not significantly statistical correlated. However, perceived self-efficacy of exercise had positive correlation with health-promoting behavior in previous studies (Homnan, K., 1996; Kingery & Glasgow, 1989: 14-18; Chanchanakit, 1998: 93; Charoenwongwiwat, 1995: 22-43). This could explain that the women believe and fear to their fetus and their own situations. Or have insufficient health information about exercise, or the women may have never seen other women exercising during pregnancy.

Hypothesis 2 Personal Factors: Age, Income, Educational Level, Number of Pregnancy, and Gestational Age; Perceived Benefits of Exercise; Perceived Barriers to Exercise; Perceived Self-Efficacy of Exercise Can Jointly Predict the Exercise Behaviors of Pregnant Women.

The analysis of Enter multiple regression as shown in Table 7 indicates that all variables including age, income, educational level, number of pregnancy, gestational age, perceived benefits of exercise, perceived barriers to exercise, perceived self-efficacy of exercise could explain 16.5% of variance in exercise behaviors of pregnant women (Overall $F_{(8,231)} = 5.711$, $P < .001$). In this analysis, educational level was the strongest predictor followed by number of pregnancy, income, gestational age and perceived benefits of exercise respectively ($\beta = .35$, $p < .001$, $\beta = .24$, $p < .05$, $\beta = -.23$, $p < .01$, $\beta = .21$, $p < .01$ and $\beta = -.16$, $p < .05$).

Educational level represented another variable that could explain the exercise behavior of pregnant women with statistical significance, possibly because advanced levels of education allow pregnant women to gain knowledge and better understanding about self-care aimed at good health and resulting in capability to seek additional health information when visiting the antenatal clinic. Most of the subjects in the sample group of the present study were sixth grade graduates who could understand tangible knowledge better than abstract alternatives (Wassana Sarakarn, B.E. 2001: 49) i.e. they understand from what they see rather than from complex knowledge. Furthermore, they are capable of making decisions or selecting health promotion behavior that includes exercise. The sample group had opportunities to obtain knowledge regarding exercise from various media handed out by hospitals e.g. brochures, VCD's, and television news. However, the sample group with higher educations had greater opportunity to seek knowledge (Reudee Pungbangkadee, B.E. 1997: 84-86) or self research of health promotional behavior such as that found on the internet, or in mother and child magazines.

Number of pregnancy showed the women's experience regarding pregnancy and childbirth. Most sample in this research were pregnant with their first child wherein 43.75% of them had no experience regarding pregnancy and were completely unaware of the physical and mental changes occurring during pregnancy,

or of the effects of pregnancy and pregnancy behaviors (Boonsom, 1997:25). Therefore, these pregnant women practiced fewer health promotion behavior than the women with pregnancy experience because previously pregnant women have been through the experiences, perceive the outcomes of pregnancy, possess knowledge and understanding about suitable practice for themselves during pregnancy. Furthermore, women in subsequent pregnancies are better able to control their emotions and circumstances (Bash, 1981: 176-177) while also being able to pick up additional knowledge from antenatal care which might give them better understanding about self-care, especially regarding exercise for pregnant women after having perceived the physical and mental changes of pregnancy in addition to the pregnancy outcomes associated with practice of exercise behaviors in previous pregnancies which, therefore, lead them to increased practice of exercise behaviors during new pregnancies.

Income is capable of predicting exercise behaviors in women in a negative way i.e. pregnant women who have higher incomes practice little exercise behaviors while pregnant women with low incomes exercise a lot, which may be a result of the fact that income is an indicator of economical status for everyone. The fact that pregnant women have high incomes, but little exercise behaviors, is related to their professions and daily routines. Upon consideration of individual scores for the sample group, it was found that most of the pregnant women with high incomes had careers related to the agricultural field and where government officers, respectively, which are professions that require long periods of sitting and working during the day with little physical activity. The exercise behaviors scores in the category of “Lifestyle Exercises”, therefore, was at a lower level than the pregnant women who were merchant or otherwise employed, which are professions that require a great deal of daily activity and mobility where the women had to walk back and forth to sell things and had to exert strength in their employment e.g. plantation workers and laborers, etc. Most of the pregnant women worked outside the home and didn’t have much time. They were tired from and their leisure time for exercise required skills, equipment and time. As a part of this study, the pregnant women who participated received equal knowledge about exercise during pregnancy with the documents, brochures and VCD’s handed out, which were also the same. Upon consideration of

overall exercise behavior in terms of leisure-time exercise, both the subjects with high and low incomes were no different.

It could explain that the greater part of the sample group for this study were pregnant women in their first trimesters (1-14 weeks). The pregnant women during early pregnancy usually need time to adjust themselves to be mothers. That is, pregnant women in the first trimester are marked by uncertainty, ambivalence and focus only on themselves without thinking about babies. The exercise restrictions during the first trimester may hinder exercise behaviors or prohibit mothers from exercising altogether. In the second trimester, pregnant women learn to accept the fetus. Since the fetus starts to move at this stage of pregnancy, the mother will focus her attention on her unborn child and try to do good things for it. Thus, exercise behaviors improves in order to ensure the baby's good health. The third trimester is close to labor. The mother are more clumsy and has more physical discomforts such as low back pain and joint pain (Tohkani, 2002: 47), and become more worried about labor and delivery. Hence, their exercise behaviors increases in order to to help facilitate labor and relieve discomforts.

Perceived benefits of exercise can predict exercise behaviors negatively i.e. pregnant women with high perceived benefits had low exercise behaviors and women with low perceived benefits had high levels of exercise behaviors. The sample group in this study received knowledge regarding exercise for pregnant women the 2nd time they came for antenatal care which had benefits regarding exercise for pregnant women and their babies. Therefore, the sample group had high perceived benefits, but low levels of exercise behavior, perhaps because they perceived the benefits associated with receiving knowledge from antenatal care and information from various media regarding exercise to promote health. However, most of the subjects in the sample group never actually exercised during pregnancy and, therefore, might not yet realize the benefits and persistence associated with exercise behavior. In consideration of the sample group's individual demographic data, it is found that the sample group had higher perceived benefits of leisure-time exercise than lifestyle exercise, but actually practiced more lifestyle exercise than leisure-time exercise. Furthermore, for those with high perceived benefits of exercise, these women had high incomes and bachelor's degrees. Therefore, they had understanding regarding the

benefits of exercise during pregnancy. In contrast, it was found that the members of the sample group who had occupations which did not involve physical activity and had low levels of lifestyle exercise. Therefore, the scores for perceived benefits of exercise had negative prediction ability.

Regarding the results of non-significant predictors of exercise behaviors of the sample in this study (perceived barriers to action and perceived self-efficacy of action), they are inconsistent with most studies about these variables and with empirical support in Pender's Health Promotion Model (Pender, 2002: 69-70). It could be possible that in this study, almost half of the sample had gestational age in the first trimester; therefore, they had distressing symptoms such as nausea, vomiting, fatigue, and dizziness. These symptoms might affect their low self-efficacy of exercise.

In addition, regarding the non-significant relationship between perceived barrier to exercise and exercise behaviors of the sample, it might be due to the measurement issue. It is possible that many of the items in the Perceived Barrier to Exercise Scale were not sensitive to the topics that the sample prioritized. They tended to prioritize on physical exertion and time expenditure rather than exercise milieu factors and social support for exercise; for example, the sample ranked the first three items regarding: 1) fatigue from exercise; 2) conflict between time expenditure and family responsibilities; and 3) tiredness from exercise, while they ranked the lowest items about family support or body image. Thus, the scale might not capture the main reasons of not performing exercise of the sample.

In addition, the sample might not have seen role models for exercising in pregnant women. Pregnant women the community of the research setting seldom perform exercise, especially leisure-time exercise. Thus, they perceived that they had little capacity for exercise as well. When considered in terms of health education intervention provided by nurses in service that it is descriptive and demonstrative, but without follow-up on the exercise behaviors of the pregnant women as to whether they were about to apply the practice in their daily routines or not, the pregnant women might never have tried. Thus, they perceived that they had low efficacy to exercise and, therefore, did not associate themselves with exercise behaviors.

According to Pender's' Health Promotion Model on individual capability to initiate health-promoting behavior (Pender, 2002: 8-9), health is individual capability that is both innate and grows at a later time. This ability is a behavior that has obvious aims and is complete with physical, psychological emotional, spiritual and environpsychological health factors (Pender, 2002: 16-20). Health-promoting behavior consists of various activities that elevate health and good living leading to life-time fulfillments (Pender, 2002: 61). In this study, the activities in focus are exercise behaviors among pregnant women. The variables that can predict exercise behaviors are parts of the three major concepts. The first construct is individual characteristics and experience. They are age, educational level, income, number of pregnancy and gestational age. The second construct is behavior-specific cognition and affect: perceived benefits of, perceived barriers to and perceived self-efficacy of exercise. The third construct is behavioral outcome, or the exercise behaviors of pregnant women. The variables could explain the exercise behavior at only 16.5%. This could be due to the fact that individual traits that create health-promoting behavior have many factors (Pender, 2002: 61) which were not included in this study. These factors are prior related behavior, activity-related effect, interpersonal influences, situational influences, commitment to a plan of exercise behaviors and immediate competing demands and preferences. For that reason, this study partially supports Pender' Health Promotion Model.

CHAPTER VI
CONCLUSION

This study was a descriptive research aimed at exploring personal factors (age, income, educational level, pregnancy number, and gestational age); perceived benefits of exercise; perceived barriers to exercise; perceived self-efficacy at exercise; exercise behaviors of pregnant women; and the predictability of exercise behaviors by those variables guided by Pender's Health Promotion Model (1996).

The sample comprised 240 pregnant women who received antenatal care at the Department of Antenatal Care, Health Promotion Hospital Region 8, Nakhonsawan, Thailand. The samples had no complications during pregnancy, were able to speak, listen, read, and write in the Thai language, and were willing to participate in the study. Data was collected from February 2006 to May 2006, by using a self-reported questionnaires consisting of the Personal Characteristics Form, the Exercise Behavior Questionnaire, the Perceived Benefits of/Barriers to Exercise Scale, and the Perceived Self-Efficacy of Exercise Questionnaire. The data obtained was then analyzed using a computer program.

The findings of this study were as follows:

1. The sample ages ranged from 15-40 years old with an average of 25.78 years. Incomes ranged from 3,500-45,000 baht/month with an average of 10,909.17 baht/month. Most of the sample had finished primary school, and the number of pregnancies ranged from 1-4 with 43.75% of sample being primigravida. The sample gestational ages ranged from 5-37 weeks with an average of 20.47 weeks and 41.67% of sample were in the first trimester of pregnancy.

2. The sample practiced moderate exercise behaviors wherein they had more lifestyle exercise than leisure-time exercise. The sample had moderate perceived benefits of exercise, low perceived barriers to exercise, and low perceived self-efficacy regarding both leisure-time exercise and lifestyle exercise. Moreover, the

sample perceived more benefits of, barriers to, and self-efficacy at leisure-time exercise than lifestyle exercise.

3. There were statistically positive correlations between age ($r = .18$, $p < .01$), educational level ($r = .17$, $p < .01$), and gestational age ($r = .31$, $p < .001$) with the exercise behavior of the pregnant women. There were, however, no statistically positive correlations between income ($r = -.07$, $p>.05$), number of pregnancies ($r = .07$, $p>.05$), perceived benefits of exercise ($r = -.07$, $p>.05$), perceived barriers to exercise ($r = -.05$, $p>.05$), and perceived self-efficacy at exercise ($r = -.05$, $p>.05$), with the exercise behavior of the pregnant women. This indicated that pregnant women who had higher ages, educational levels and gestational ages would have high levels of exercise behavior.

4. All variables, including age, income, educational level, number of pregnancies, gestational age, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy at exercise, were able to jointly explain the exercise behaviors of the pregnant women with 16.5% variance in the exercise behaviors of the pregnant women (Overall $F_{(8,231)} = 5.711$, $P < .001$).

Limitations of the Study

1. The data was collected only at the Department of Antenatal Care in Health Promotion Hospital Region 8 of the Nakhonsawan Province in Thailand, so the findings cannot not be generally applied to the target population.

2. The sample subjects' attention was disturbed by uncontrollable factors. The place where the survey was conducted was not private. Although it was set in a corner, the samples continued to be distracted by other factors such as noise.

Recommendations and Implication of the Study

This research revealed that age, income, educational level, number of pregnancies, gestational age, perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy at exercise combined to explain 16.5% of the variance in the exercise behaviors of the pregnant women. Therefore, in promoting exercise behaviors in pregnant women, the recommendations are as follows:

Nursing practice

1. Nurses should assess pregnant women's physical and psychological readiness to exercise, taking factors such as morning sickness, fatigue, attention to promoting the health of both mother and fetus into consideration before encouraging exercise behavior. After the first trimester, at which time it is expected that the pregnant women will have recovered from morning sickness symptoms, the exercise program should be implemented. the knowledge should be

2. For pregnant woman, particularly those who have sedentary lifestyles, nurses should develop an exercise program that is easy to understand and feasible for performing in daily living.

3. Nurses should discover interventions to enhance exercise self-efficacy in pregnant women.

4. Nurses who provide care for pregnant women should assess perceived benefits of exercise, perceived barriers to exercise, and perceived self-efficacy at exercise as well as the factors related to the pregnant women's adjustment to the interventions that are appropriate for them.

Nursing education

The importance of exercise for pregnant women should be emphasized in nursing curriculums and in service education for staff nurses.

Nursing research

1. This study provides basic information for further studies. An experimental/quasi-experimental study of an intervention program using the predictors in this study may be examined to assure whether the program is appropriate for the sample.

2. Since the predictors in this study jointly explained the modest variance in the exercise of pregnant women, further research may re-test these predictors in other samples because this study may be context-specific. In addition, further study should explore other variables which were not included in this study.

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APPENDIX

APPENDIX A

List of Expert

รายนามผู้ทรงคุณวุฒิตรวจสอบความถูกต้องในเนื้อหาของแบบสอบถามในการวิจัยนี้

1. **รศ. ดร. ยุวดี วัฒนานนท์**
   คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

2. **ผศ. ดร. นิตยา สินสุกใส**
   คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

3. **ผศ.ดร. จรัสศรี ธีระกุลชัย**
   ภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

4. **อ. ดร. สตรีรัตน์ ธาดากานต์**
   ภาควิชาพยาบาลศาสตร์ คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

5. **นางกนกวรรณ เวสสธาดา**
   พยาบาลชำนาญการ แผนกฝากครรภ์ คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี

APPENDIX B

ใบยินยอมและการพิทักษ์สิทธิ์ของผู้เข้าร่วมวิจัย

ดิฉัน นางสาวศิริกนก กลั่นขจร นักศึกษาหลักสูตรปริญญาโท สาขาวิชาการพยาบาลมารดาและทารกแรกเกิด คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กำลังทำวิจัยเรื่อง การศึกษาปัจจัยส่วนบุคคล การรับรู้ประโยชน์ การรับรู้อุปสรรค การรับรู้สมรรถนะแห่งตน และพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์ เพื่อนำมาใช้เป็นแนวทางในการส่งเสริมพฤติกรรมการออกกำลังกายในหญิงตั้งครรภ์ได้อย่างเหมาะสม

ด้วยเหตุผลดังกล่าวท่านจึงเป็นบุคคลที่สำคัญอย่างยิ่ง เพราะท่านเป็นตัวแทนของหญิงตั้งครรภ์ที่มีข้อมูลเกี่ยวกับพฤติกรรมการออกกำลังกายในระยะตั้งครรภ์ และข้อมูลที่ท่านได้ให้จะเป็นประโยชน์ต่อการศึกษาครั้งนี้ ดังนั้น ดิฉันจึงใคร่ขอความร่วมมือจากท่านในการตอบแบบสอบถาม ซึ่งประกอบด้วย 5 ส่วน ได้แก่ ข้อมูลส่วนบุคคล พฤติกรรมการออกกำลังกาย การรับรู้ประโยชน์ของการออกกำลังกาย การรับรู้อุปสรรคของการออกกำลังกาย และการรับรู้สมรรถนะแห่งตนของการออกกำลังกาย โดยใช้เวลาตอบทั้งหมดประมาณ 45-60 นาที ไม่มีคำตอบใดถูกหรือผิด และไม่มีผลกระทบใดๆ ต่อท่าน ข้อมูลที่ได้รับจะถูกเก็บไว้เป็นความลับ โดยไม่มีการเปิดเผยชื่อให้ผู้อื่นทราบ ผู้วิจัยจะนำข้อมูลไปวิเคราะห์เป็นภาพรวมเพื่อใช้ประโยชน์ในการวิจัย การบริหารงานการศึกษา และการพยาบาลเท่านั้น

การตัดสินใจเข้าร่วมการวิจัยครั้งนี้จะเป็นไปตามความสมัครใจของท่าน และไม่ว่าท่านจะเข้าร่วมการวิจัยหรือไม่ก็ตาม จะไม่มีผลกระทบใดๆ ทั้งต่อตัวท่านและบุคคลที่เกี่ยวข้อง และแม้ว่าท่านจะยินยอมเข้าร่วมการวิจัยแล้ว ท่านมีสิทธิ์ที่จะยกเลิกการเข้าร่วมการวิจัยได้ตลอดเวลาตามที่ท่านต้องการ โดยไม่มีข้อแม้ใดๆ

ดิฉันขอขอบพระคุณท่านที่ได้เสียสละเวลาให้ความร่วมมือในการตอบแบบสอบถามครั้งนี้

ศิริกนก กลั่นขจร

ผู้วิจัย

สำหรับผู้เข้าร่วมวิจัย

ข้าพเจ้าได้อ่านหรือได้รับคำชี้แจงตามรายละเอียดดังกล่าวข้างต้นอย่างครบถ้วน มีความเข้าใจเป็นอย่างดี และยินดีเข้าร่วมในการวิจัยครั้งนี้

…….

(……..)

..…/..……../…….

No. MU 2006-015

Documentary Proof of Ethical Clearance
The Committee on Human Rights Related to
Human Experimentation
Mahidol University, Bangkok

Title of Project: The Study of Personal Factors, Perceived Benefits of, Perceived to, Preferences of Exercise and Exercise Behavior of Pregnant Women
(Thesis for Master Degree)

Principle Investigator: Miss Sirikanok Klankhajhon

Name of Institution: Faculty of Medicine Ramathibodi Hospital

Approved by the Committee on Human Rights Related to Human Experimentation

Signature of Chairman: .....
(Professor Dr.Srisin Khusmith)

Signature of Head of the Institute: .....
(Professor Dr.Pornchai Matangkasombut)

Date of Approval: 31 JAN 2006

Date of Expiration: 30 JAN 2007

คำชี้แจง

แบบสอบถามสำหรับหญิงตั้งครรภ์ประกอบด้วย 5 ส่วนดังนี้

1. ข้อมูลส่วนบุคคล
2. พฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์
3. การรับรู้ประโยชน์ของการออกกำลังกายของหญิงตั้งครรภ์
4. การรับรู้อุปสรรคของการออกกำลังกายของหญิงตั้งครรภ์
5. การรับรู้สมรรถนะแห่งตนของการออกกำลังกายของหญิงตั้งครรภ์

โดยใช้เวลาตอบทั้งหมดประมาณ 45-60 นาที ไม่มีคำตอบใดถูกหรือผิด หากมีข้อสงสัยท่านสามารถสอบถามหรือติดต่อผู้วิจัย โทร. 09-5633784

คำอธิบายเบื้องต้น

การออกกำลังกาย (leisure-time exercise) หมายถึง การออกกำลังกายที่มีรูปแบบชัดเจน (formal exercise) และการเล่นกีฬาชนิดต่างๆ (sport exercise) เช่น การบริหารร่างกาย เดินออกกำลังกาย วิ่งเหยาะๆ เต้นแอโรบิค โยคะ ไทเก๊ก ปั่นจักรยาน และอื่นๆ

การออกแรงทำกิจกรรมต่างๆ (lifestyle exercise) หมายถึง การทำกิจกรรมการเคลื่อนไหวร่างกายในชีวิตประจำวัน (physical activity in daily life) เช่น การทำความสะอาดบ้าน การเตรียมอาหาร การเลี้ยงดูบุตร การเดินไปทำธุระ และอื่นๆ

APPENDIX C

แบบสอบถามข้อมูลส่วนบุคคล

1. อายุ ……ปี
2. ระดับการศึกษา……..จำนวนปีที่ศึกษา ……ปี
3. อาชีพ……..
4. รายได้ครอบครัว……บาท/เดือน
5. การตั้งครรภ์นี้เป็นครรภ์ที่……
6. อายุครรภ์ปัจจุบัน …….. สัปดาห์

APPENDIX D

แบบสอบถามพฤติกรรมการออกกำลังกายของหญิงตั้งครรภ์

โปรดทำเครื่องหมาย / ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด และกรุณาตอบให้ครบทุกข้อ โดยมีเกณฑ์การเลือกคำตอบดังนี้

ไม่เคยเลย หมายถึง ท่านไม่เคยทำ

บางครั้ง หมายถึง ท่านทำเป็นบางครั้ง หรือนานๆ ครั้ง หรือน้อยกว่า 3 ครั้ง/สัปดาห์

บ่อยครั้ง หมายถึง ท่านทำเป็นส่วนมาก หรือ 3 ครั้ง/สัปดาห์ขึ้นไปแต่ไม่ได้ทำทุกวัน

เป็นประจำ หมายถึง ท่านทำเป็นประจำทุกครั้ง หรือทุกวัน

พฤติกรรมการออกกำลังกาย	ไม่เคยเลย	บางครั้ง	บ่อยครั้ง	เป็นประจำ
1. ฉันออกกำลังกายครั้งละ 15-20 นาที				
2. ฉันออกกำลังกายสัปดาห์ละ 3 วัน				
3. เมื่อออกกำลังกายด้วยความแรงระดับปานกลาง				
4. ก่อนออกกำลังกายฉันอบอุ่นร่างกาย				
5. ฉันอบอุ่นร่างกายนานอย่างน้อย 5 นาที				
6. หลังออกกำลังกายฉันผ่อนคลายร่างกาย				
7. ฉันผ่อนคลายร่างกายนานอย่างน้อย 5 นาที				
8. ฉันเดินไปตักอาหารมารับประทานด้วยตนเอง แทนที่จะให้ผู้อื่นยกอาหารมาให้รับประทาน				
9. ฉันทำงานบ้านเบาๆ เช่น ปัดฝุ่น จัดของเล็กๆ น้อยๆ ในบ้าน เตรียมอาหาร เป็นต้น				
10. ฉันเคลื่อนไหวร่างกายอยู่เสมอแทนการอยู่นิ่งในท่าเดียวนานๆ				
11. ฉันงดทำงานหนัก เช่น งานที่ต้องยืนนานๆ ยกของหนัก เป็นต้น				
12. ฉันใช้เวลาในการออกแรงทำกิจกรรมต่างๆ ไม่น้อยกว่าครึ่งชั่วโมงต่อวัน				

ถ้าท่านมีการออกกำลังกายรูปแบบอื่นๆ หรือ**การออกแรงทำกิจกรรมต่างๆ** นอกเหนือจากนี้ โปรดระบุ……..

…….....

APPENDIX E

แบบสอบถามการรับรู้ประโยชน์ของการออกกำลังกายของหญิงตั้งครรภ์

โปรดทำเครื่องหมาย / ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด และกรุณาตอบให้ครบทุกข้อ โดยมีเกณฑ์การเลือกคำตอบดังนี้

ไม่จริงเลย หมายถึง ท่านมีความคิดเห็นไม่ตรงกับข้อความนั้นเลย
ไม่จริงเป็นส่วนใหญ่ หมายถึง ท่านมีความคิดเห็นส่วนมากไม่ตรงกับข้อความนั้น
จริงบ้างไม่จริงบ้าง หมายถึง ท่านมีความคิดเห็นตรงบ้างไม่ตรงบ้างกับข้อความนั้น
ส่วนมากจริง หมายถึง ท่านมีความคิดเห็นส่วนมากตรงกับข้อความนั้น
จริงมาก หมายถึง ท่านมีความคิดเห็นตรงกับข้อความนั้นทั้งหมด

เหตุผลที่ทำให้ฉันออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
1. ฉันสนุกกับการออกกำลังกาย					
2. การออกกำลังกายทำให้ความวิตกกังวลและความเครียดของฉันลดลง					
3. การออกกำลังกายช่วยให้สุขภาพจิตดีขึ้น					
4. การออกกำลังกายช่วยให้กล้ามเนื้อของฉันแข็งแรงขึ้น					
5. การออกกำลังกายทำให้ฉันรู้สึกผ่อนคลาย					
6. การออกกำลังกายทำให้ฉันมีสัมพันธภาพกับเพื่อนและบุคคลที่ฉันชอบ					
7. การออกกำลังกายช่วยป้องกันโรคความดันโลหิตสูงให้กับฉัน					
8. การออกกำลังกายทำให้กล้ามเนื้อของฉันมีความยืดหยุ่นเพิ่มขึ้น					
9. การออกกำลังกายช่วยให้หัวใจและหลอดเลือดทำงานได้ดีขึ้น					
10. การออกกำลังกายทำให้ฉันรู้สึกดี (มีความผาสุกในชีวิตเพิ่มขึ้น)					
11. การออกกำลังกายทำให้ฉันแข็งแรงขึ้น					

เหตุผลที่ทำให้ฉันออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
12. การออกกำลังกายทำให้ฉันเคลื่อนไหวคล่องตัวขึ้น					
13. การออกกำลังกายทำให้อารมณ์ดีขึ้น					
14. การออกกำลังกายช่วยให้ฉันนอนหลับสนิทตลอดคืน					
15. ฉันจะมีชีวิตยืนยาวถ้าฉันออกกำลังกาย					
16. การออกกำลังกายช่วยลดความเมื่อยล้าของฉัน					
17. การออกกำลังกายทำให้ฉันมีโอกาสได้รู้จักกับเพื่อนใหม่					
18. การออกกำลังกายทำให้ฉันรู้สึกว่าตนเอง (อัตมโนทัศน์) ดีขึ้น					
19. การออกกำลังกายทำให้กระปี้กระเปร่า					
20. การออกกำลังกายทำให้ฉันรู้สึกไม่เบื่อหน่าย					
21. การออกกำลังกายทำให้ฉันทำงานได้ดีขึ้น					
22. การออกกำลังกายทำให้ฉันรู้สึกเพลิดเพลิน					
23. การออกกำลังกายทำให้ฉันได้รับการยอมรับจากคนอื่นๆ เพิ่มขึ้น					
24. การออกกำลังกายทำให้ร่างกายของฉันทำหน้าที่ได้ดีขึ้น					
25. การออกกำลังกายทำให้ฉันมีสมรรถนะทางกายสูงขึ้น					
26. การออกกำลังกายทำให้รูปร่างของฉันดูดี					
27. ฉันสนุกกับ**การออกแรงทำกิจกรรมต่างๆ**					
28. **การออกแรงทำกิจกรรมต่างๆ** ทำให้ความวิตกกังวลและความเครียดของฉันลดลง					
29. **การออกแรงทำกิจกรรมต่างๆ** ช่วยให้สุขภาพจิตดีขึ้น					
30. **การออกแรงทำกิจกรรมต่างๆ** ช่วยให้กล้ามเนื้อของฉันแข็งแรงขึ้น					

เหตุผลที่ทำให้ฉันออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
31**. การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกผ่อนคลาย					
32. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันมีสัมพันธภาพกับเพื่อนและบุคคลที่ฉันชอบ					
33. **การออกแรงทำกิจกรรมต่างๆ**ช่วยป้องกันโรคความดันโลหิตสูงให้กับฉัน					
34. **การออกแรงทำกิจกรรมต่างๆ**ทำให้กล้ามเนื้อของฉันมีความยืดหยุ่นเพิ่มขึ้น					
35.. **การออกแรงทำกิจกรรมต่างๆ**ช่วยให้หัวใจและหลอดเลือดทำงานได้ดีขึ้น					
36. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกดี (มีความผาสุกในชีวิตเพิ่มขึ้น)					
37. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันแข็งแรงขึ้น					
38. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันเคลื่อนไหวคล่องตัวขึ้น					
39. **การออกแรงทำกิจกรรมต่างๆ**ทำให้อารมณ์ดีขึ้น					
40. **การออกแรงทำกิจกรรมต่างๆ**ช่วยให้ฉันนอนหลับสนิทตลอดคืน					
41. ฉันจะมีชีวิตยืนยาวถ้าฉัน**การออกแรงทำกิจกรรมต่างๆ**					
42. **การออกแรงทำกิจกรรมต่างๆ**ช่วยลดความเมื่อยล้าของฉัน					
43. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันมีโอกาสได้รู้จักกับเพื่อนใหม่					
44. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกว่าตนเอง (อัตมโนทัศน์) ดีขึ้น					
45. **การออกแรงทำกิจกรรมต่างๆ**ทำให้กระปี้กระเปร่า					
46. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกไม่เบื่อหน่าย					

เหตุผลที่ทำให้ฉันออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
47. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันทำงานได้ดีขึ้น					
48. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกเพลิดเพลิน					
49. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันได้รับการยอมรับจากคนอื่นๆ เพิ่มขึ้น					
50. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ร่างกายของฉันทำหน้าที่ได้ดีขึ้น					
51. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันมีสมรรถนะทางกายสูงขึ้น					
52. **การออกแรงทำกิจกรรมต่างๆ**ทำให้รูปร่างของฉันดูดี					

APPENDIX F

แบบสอบถามการรับรู้อุปสรรคของการออกกำลังกายของหญิงตั้งครรภ์

โปรดทำเครื่องหมาย / ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด และกรุณาตอบให้ครบทุกข้อ โดยมีเกณฑ์การเลือกคำตอบดังนี้

ไม่จริงเลย หมายถึง ท่านมีความคิดเห็นไม่ตรงกับข้อความนั้นเลย

ไม่จริงเป็นส่วนใหญ่ หมายถึง ท่านมีความคิดเห็นส่วนมากไม่ตรงกับข้อความนั้น

จริงบ้างไม่จริงบ้าง หมายถึง ท่านมีความคิดเห็นตรงบ้างไม่ตรงบ้างกับข้อความนั้น

ส่วนมากจริง หมายถึง ท่านมีความคิดเห็นส่วนมากตรงกับข้อความนั้น

จริงมาก หมายถึง ท่านมีความคิดเห็นตรงกับข้อความนั้นทั้งหมด

สิ่งที่ขัดขวางทำให้ฉันไม่สามารถออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ ได้	ไม่จริงเลย	ไม่จริงเป็นส่วนใหญ่	จริงบ้างไม่จริงบ้าง	ส่วนมากจริง	จริงมาก
1. การออกกำลังกายทำให้ต้องเสียเวลามาก					
2. การออกกำลังกายทำให้ฉันรู้สึกเบื่อหน่าย					
3. การออกกำลังกายทำให้ฉันรู้สึกอ่อนเพลีย					
4. เพื่อนของฉันไม่สนับสนุนให้ฉันออกกำลังกาย					
5. การออกกำลังกายทำให้ไม่มีเวลาในการสังสรรค์/มีสัมพันธภาพกับสมาชิกในครอบครัว					
6. สมาชิกในครอบครัวไม่สนับสนุนให้ฉันออกกำลังกาย					
7. การออกกำลังกายเป็นงานหนักสำหรับฉัน					
8. ฉันไม่ออกกำลังกายเพราะอายในท่าทางของตนเอง					
9. ฉันไม่ออกกำลังกายเพราะสุขภาพไม่ดี					
10. ฉันกลัวว่าจะได้รับอันตรายจากการออกกำลังกาย					
11. สถานที่สำหรับออกกำลังกายอยู่ไกลเกินไปสำหรับฉัน					

สิ่งที่ขัดขวางทำให้ฉันไม่สามารถออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ ได้	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
12. สถานที่ออกกำลังกายคับแคบ หรือไม่เพียงพอ					
13. เวลาที่จัดไว้ของสถานที่ออกกำลังกายต่างๆ ไม่สะดวกสำหรับฉัน					
14. ฉันมีภาระงานในบ้านที่ต้องรับผิดชอบมากจนไม่สามารถออกกำลังกายได้					
15. การออกกำลังกายทำให้ต้องสิ้นเปลืองค่าใช้จ่าย					
16. ฉันคิดว่าการใส่เสื้อผ้าสำหรับออกกำลังกายนั้นไม่เหมาะสมกับตัวเอง					
17. ฉันไม่สามารถออกกำลังกายได้เพราะต้องดูแลบุตร					
18. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ต้องเสียเวลามาก					
19. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกเบื่อหน่าย					
20. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ฉันรู้สึกอ่อนเพลีย					
21. เพื่อนของฉันไม่สนับสนุนให้ฉัน**ออกแรงทำกิจกรรมต่างๆ**					
22. **การออกแรงทำกิจกรรมต่างๆ**ทำให้ไม่มีเวลาในการสังสรรค์/มีสัมพันธภาพกับสมาชิกในครอบครัว					
23. สมาชิกในครอบครัวไม่สนับสนุนให้ฉัน**ออกแรงทำกิจกรรมต่างๆ**					
24. **การออกแรงทำกิจกรรมต่างๆ**เป็นงานหนักสำหรับฉัน					
25. ฉันไม่**ออกแรงทำกิจกรรมต่างๆ**เพราะอายในท่าทางของตนเอง					
26. ฉันไม่**ออกแรงทำกิจกรรมต่างๆ**เพราะสุขภาพไม่ดี					

สิ่งที่ขัดขวางทำให้ฉันไม่สามารถออกกำลังกายหรือออกแรงทำกิจกรรมต่างๆ ได้	**ไม่จริงเลย**	**ไม่จริงเป็นส่วนใหญ่**	**จริงบ้างไม่จริงบ้าง**	**ส่วนมากจริง**	**จริงมาก**
27. ฉันกลัวว่าจะได้รับอันตรายจาก**การออกแรงทำกิจกรรมต่างๆ**					
28. ฉันไม่**ออกแรงทำกิจกรรมต่างๆ** หากสถานที่ที่ทำกิจกรรมอยู่ไกลบ้าน					

APPENDIX G

แบบสอบถามการรับรู้สมรรถนะแห่งตนของการออกกำลังกายของหญิงตั้งครรภ์

โปรดทำเครื่องหมาย / ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด และกรุณาตอบให้ครบทุกข้อ โดยมีเกณฑ์การเลือกคำตอบดังนี้

ไม่จริงเลย หมายถึง ท่านมีความคิดเห็นไม่ตรงกับข้อความนั้นเลย

ไม่จริงเป็นส่วนใหญ่ หมายถึง ท่านมีความคิดเห็นส่วนมากไม่ตรงกับข้อความนั้น

จริงบ้างไม่จริงบ้าง หมายถึง ท่านมีความคิดเห็นตรงบ้างและไม่ตรงบ้างกับข้อความนั้น

ส่วนมากจริง หมายถึง ท่านมีความคิดเห็นส่วนมากตรงกับข้อความนั้น

จริงมาก หมายถึง ท่านมีความคิดเห็นตรงกับข้อความนั้นทั้งหมด

ข้อความ	ไม่จริงเลย	ไม่จริงเป็นส่วนใหญ่	จริงบ้างไม่จริงบ้าง	ส่วนมากจริง	จริงมาก
1.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้จะรู้สึกเหน็ดเหนื่อย					
2.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้ว่าฉันมีกิจกรรมอื่นที่อยากจะทำ					
3.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้จะต้องทำตามลำพัง					
4.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้จะเป็นวันที่มีแต่อุปสรรค					
5.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้จะรู้สึกเกียจคร้าน					
6.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้ว่าจะรู้สึกไม่ชอบทำ					
7.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้ว่าจะรู้สึกระบม ปวดเมื่อยกับการออกกำลังกายเมื่อวานนี้					
8.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้แม้ว่าไม่มีอารมณ์ที่อยากจะทำ					
9.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ** ขณะตั้งครรภ์ได้ถึงแม้จะรู้สึกเหน็ดเหนื่อย					

ข้อความ	ไม่จริงเลย	ไม่จริงเป็นส่วนใหญ่	จริงบ้างไม่จริงบ้าง	ส่วนมากจริง	จริงมาก
7.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้ถึงแม้ว่าจะรู้สึกระบม ปวดเมื่อยกับการออกกำลังกายเมื่อวานนี้					
8.ฉันสามารถออกกำลังกายขณะตั้งครรภ์ได้แม้ว่าไม่มีอารมณ์ที่อยากจะทำ					
9.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้จะรู้สึกเหน็ดเหนื่อย					
10.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้ว่าฉันมีกิจกรรมอื่นที่อยากจะทำ					
11.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้จะต้องทำตามลำพัง					
12.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้จะเป็นวันที่มีแต่อุปสรรค					
13.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้จะรู้สึกเกียจคร้าน					
14.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้ว่าจะรู้สึกไม่ชอบทำ					
15.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้ถึงแม้ว่าจะรู้สึกระบม ปวดเมื่อยกับการออกกำลังกายเมื่อวานนี้					
16.ฉันสามารถ**ออกแรงทำกิจกรรมต่างๆ**ขณะตั้งครรภ์ได้แม้ว่าไม่มีอารมณ์ที่อยากจะทำ					

APPENDIX H

Perceived Benefits of Exercise: Range, Mean, and Standard Deviation (N = 240)

Perceived benefits of exercise	Possible range	Actual range	Mean	Standard Deviation
Overall exercise	121-257	121-257	190.33	29.74
• Leisure-time exercise	63-127	63-127	96.68	14.96
- Life enhancement/ improved psychological outlook	31-62	31-62	48.45	7.47
- Physical performance	15-40	15-40	30.82	4.76
- Social interaction	3-15	3-15	10.07	2.74
- Health promotion and illness prevention	2-10	2-10	7.35	1.85
• Lifestyle exercise	49-130	49-130	93.65	16.08
- Life enhancement/ improved psychological outlook	26-65	26-65	47.07	7.99
- Physical performance	14-40	14-40	29.72	5.36
- Social interaction	5-15	5-15	9.92	2.44
- Health promotion and illness prevention	2-10	2-10	6.95	1.70

APPENDIX I

Perceived Barriers to Exercise: Range, Mean, and Standard Deviation (N = 240)

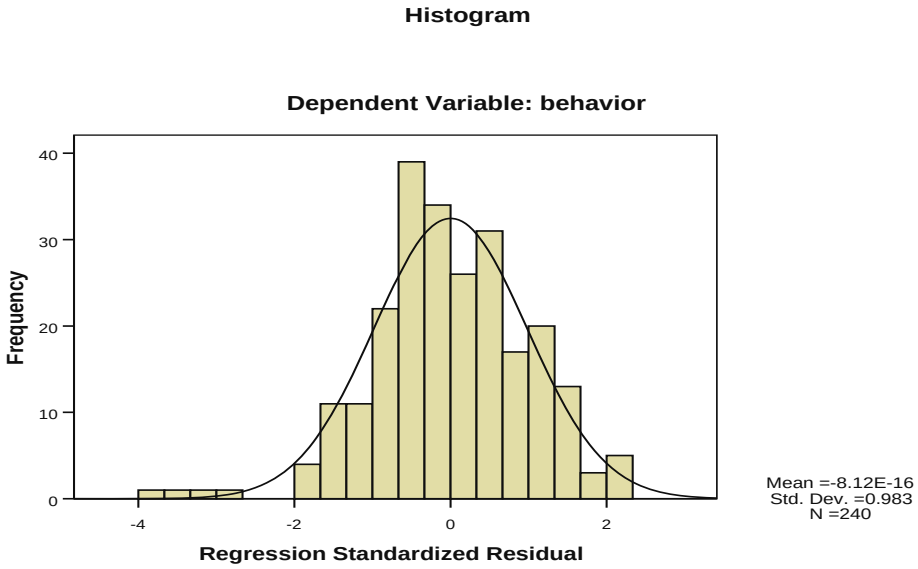
Perceived barriers to exercise	Possible range	Actual range	Mean	Standard Deviation
Overall exercise	28-101	28-101	48.87	16.09
• Leisure-time exercise	17-61	17-61	29.97	10.02
- Exercise milieu factor	6-22	6-22	10.29	3.76
- Time expenditure	4-17	4-17	7.65	3.11
- Physical exertion	5-19	5-19	9.09	3.30
- Lack of family or social support	2-8	2-8	2.93	1.59
• Lifestyle exercise	11-41	11-41	18.90	7.17
- Exercise milieu factor	2-9	2-9	3.49	1.65
- Time expenditure	2-8	2-8	3.21	1.69
- Physical exertion	5-18	5-18	8.99	3.78
- Lack of family or social support	2-8	2-8	3.20	1.50

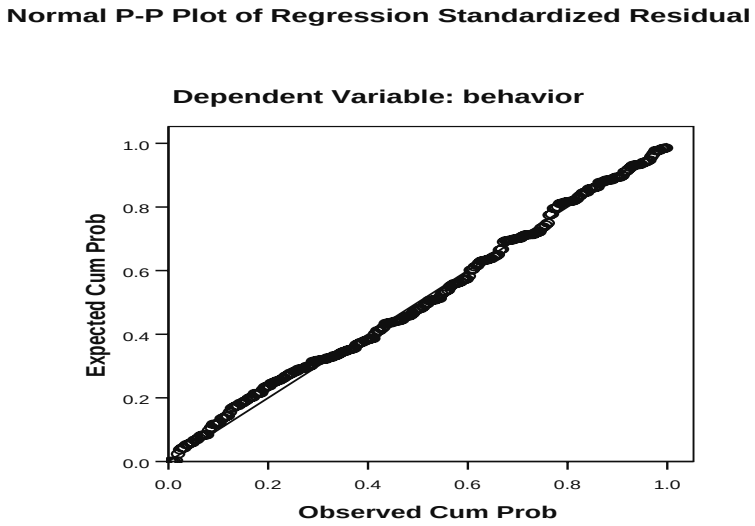
APPENDIX J

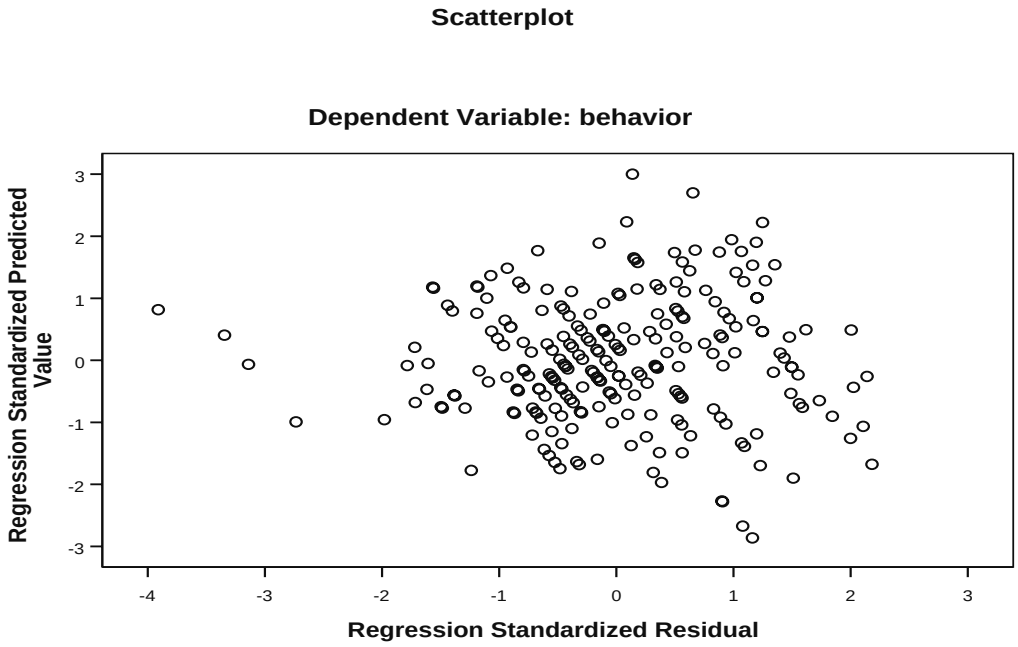
Perceived Self-Efficacy of Exercise: Range, Mean, and Standard Deviation (N = 240)

Perceived self-efficacy of exercise	Possible range	Actual range	Mean	Standard Deviation
Overall exercise	16-80	16-77	46.45	10.27
• Leisure-time exercise	8-40	8-39	23.55	5.57
• Lifestyle exercise	8-40	8-38	22.90	6.14

APPENDIX K


Histogram
Dependent Variable: behavior
Frequency
Regression Standardized Residual
Mean =-8.12E-16
Std. Dev. =0.983
N =240


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: behavior
Expected Cum Prob
Observed Cum Prob


Scatterplot
Dependent Variable: behavior
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-4
-3
-2
-1
0
1
2
3

APPENDIX L

Test Multicollinearity among Independent Variables

Variables	Collinearity statistics	
	Tolerance	VIF
1. Age	.5613	1.776
2. Educational level	.465	2.149
3. Income	.719	1.390
4. Number of pregnancy	.416	2.406
5. Gestational age	.903	1.107
6. Perceived benefits of exercise	.931	1.074
7. Perceived barriers to exercise	.963	1.039
8. Perceived self-efficacy of exercise	.954	1.048

BIOGRAPHY

NAME	Miss Sirikanok Klankhajhon
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