KNOWLEDGE, ATTITUDE AND PRACTICE OF ANTENATAL EXERCISE AMONG PREGNANT WOMEN IN HOSPITAL UNIVERSITI SAINS MALAYSIA

BY

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Dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Health Sciences (Nursing)

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DECLARATION

I certify that this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

CERTIFICATE

This is to certify that the dissertation entitled "Knowledge, Attitude and Practice of Antenatal Exercise among Pregnant Women in Hospital Universiti Sains Malaysia" is the bonafide record of research work done by Chua Yi Ling, Matric Number: 108639 during the period of September 2013 to June 2014 under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Nursing). Research work and collection of data belong to Universiti Sains Malaysia.

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LIST OF ABBREVIATIONS

ACOG	-	American College of Obstetricians and Gynecologists
PAL	-	Physical Activity Level
CDC	-	Centers for Disease Control and Prevention
GDM	-	Gestational diabetes mellitus
Hospital USM	-	Hospital Universiti Sains Malaysia
HREC	-	Human Research and Ethic Committee
LTPA	-	Leisure time physical activity
PFME	-	Pelvic floor muscle exercise
SPSS	-	Statistical Package Social Science
USM	-	Universiti Sains Malaysia

ABSTRACT

KNOWLEDGE, ATTITUDE AND PRACTICE OF ANTENATAL EXERCISE AMONG PREGNANT WOMEN IN HOSPITAL UNIVERSITI SAINS MALAYSIA

Background: Exercise has been demonstrated to be beneficial for the mother and the unborn child, and programs of antenatal exercise for pregnant women have been recommended. There are few references on this subject in the literature. The aim of this study was to investigate the knowledge, attitude and practice of antenatal exercise among pregnant women in Hospital Universiti Sains Malaysia (Hospital USM).

Methods: A cross-sectional, descriptive study was conducted in 128 pregnant women of 18 to 45 years of age receiving antenatal care at Hospital Universiti Sains Malaysia were surveyed using a structured self-administered questionnaire. The simple random sampling technique was used to select the sample for the study. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics were used to summarize socio-demographic and characteristics of the pregnant women. The Pearson's chi-Square test was used to evaluate the association between the study variables: socio-demographic data (age, education level, number of pregnancy and income) with the knowledge, attitude, and practice of antenatal execise of pregnant women. A p-value of equal or less than 0.05 was considered significant.

Results: There was 56.3% (72) of study population had inadequate knowledge of antenatal exercise and 65.6% (84) participants had adequate attitude. Then, there was 53.9% (69) of participants had adequate practice while the remaining 46.1% (59) participants had inadequate practice. Educational level was found to be associated with the knowledge level of participants, with p-value 0.020. The two main sources of information regarding antenatal exercise are magazines (60.6%) and doctors (58.7%). There was 92.7% (114) participants claimed that antenatal exercise is necessary and important because it makes childbirth easier. Lack of information regarding antenatal exercise was the principal reason given by 29 (56.9%) participants for not exercising during pregnancy.

Conclusion: This study reflected that there was a lack of knowledge in most of the pregnant women population. In comparison with the knowledge, attitude of pregnant

women was higher regarding antenatal exercise. Besides that, These results suggest that the pregnant women's knowledge concerning the antenatal exercise during pregnancy was inadequate and their attitude was favorable; there was nearly half of pregnant women not practiced antenatal exercises during pregnancy. Therefore, awareness regarding the benefit of antenatal exercise and related programme on exercise would be useful for pregnant women to practice antenatal exercise.

Keywords: Antenatal Exercise, Attitude, Barriers, Knowledge, Practice, Reasons, Sources of Information

ABSTRAK

KAJIAN PENYELIDIKAN MENGENAI PENGETAHUAN, SIKAP DAN AMALAN SENAMAN ANTENATAL DALAM KALANGAN WANITA HAMIL DI HOSPITAL UNIVERSITI SAINS MALAYSIA

Latar Belakang: Senaman telah dibuktikan memberi manfaat kepada ibu dan anak dalam kandungan, dan program-program senaman antenatal untuk wanita hamil telah disyorkan. Terdapat kurang rujukan yang mengenai perkara ini dalam karya sastera. Kajian ini bertujuan untuk menilai pengetahuan, sikap dan amalan senaman antenatal dalam kalangan wanita hamil di Hospital Universiti Sains Malaysia (Hospital USM)

Kaedah: Kajian keratin rentas dan deskriptif telah dijalankan kepada 128 wanita hamil yang berumur 18 hingga 45 tahun yang sedang menerima rawatan antenatal di Hospital Universiti Sains Malaysia dengan meminta peserta menjawab soal selidik. Teknik persampelan rawak mudah telah digunakan untuk memilih sampel untuk kajian ini. Pakej Statistik untuk Sains Sosial (SPSS) telah digunakan untuk menganalisis data dalam kajian ini. Statistik deskriptif digunakan untuk meringkaskan sisio-demografi dan ciri-ciri wanita hamil. Ujian 'Pearson's chi-Square' telah digunakan untuk menilai hubungan antara pembolehubah kajian: sosio-demografi (umur, tahap pendidikan , bilangan kehamilan dan pendapatan bulanan) dengan pengetahuan, sikap dan amalan senaman antenatal dalam kalangan wanita hamil. Nilai-p yang sama atau kurang daripada 0.05 dianggap sebagai ketara.

Keputusan: Terdapat 56.3 % (72) daripada populasi kajian mempunyai pengetahuan yang tidak mencukupi mengenai senaman antenatal dan 65.6% (84) peserta mempunyai sikap yang mencukupi. Seterusnys, terdapat 53.9% (69) peserta mempunyai amalan yang mencukupi manakala 46.1% (59) peserta menpunyai amalan yang tidak mencukupi. Pembolehubah demografi seperti tahap pendidikan telah didapati berkaitan dengan tahap pengetahuan peserta, dengan nilai-p 0.020. Terdapat dua sumber utama maklumat mengenai senaman antenatal iaitu majalah (60.6%) dan doktor (58.7%). Terdapat 92.7% (114) peserta mendakwa melakukan senaman antenatal adalah penting dan diperlukan untuk memudahkan proses kelahiran. Kekurangan maklumat mengenai

senaman antenatal adalah sebab utama yang diberikan oleh 29 (56.9%) peserta untuk tidak bersenam semasa hamil.

Kesimpulan: Kajian ini menggambarkan bahawa kebanyakan populasi wanita hamil mempunyai kekurangan pengetahuan. Berbanding dengan pengetahuan, sikap wanita hamil adalah lebih tinggi mengenai senaman antenatal. Selain itu, keputusan ini menunjukkan bahawa pengetahuan wanita hamil tentang senaman antenatal semasa mengandung tidak mencukupi, dan sikap mereka adalah baik; hampir separuh daripada wanita hamil tidak mengamal senaman antenatal semasa mengandung. Oleh sebab itu, meningkatkan kesedaran dan pengetahuan mengenai manfaat senaman antenatal dan program yang berkaitan dengan senaman akan membantu wanita hamil untuk mengamalkan senaman antenatal.

Kata kunci: Senaman Antenatal, Sikap, Halangan, Pengetahuan, Amalan, Sebab, Sumber Maklumat

CHAPTER 1 INTRODUCTION

The introduction of this research thesis is followed by a presentation of background of the study, problem statement, research objectives, research questions, hypotheses, definition of operational terms used in the study and the significance of the study. The research study also comprised of literature review of concepts and issues pertaining to knowledge, attitudes and practices of antenatal exercise during pregnancy, the methodology of the study, data collection, ethical considerations and data analysis.

1.1 Background of the Study

Women's health is important because women play a very important role in the care and nurturing of future generation. Apart from this, women are also the primary care giver and the first teacher of their children. Women's health is the basis of gaining better health of family and nation (Sharma, 2007). Hence, women's health should be promoted by well-organized health care program to maintain maternal physical, mental and social well-being (Sharma, 2007). Hence, antenatal exercise plays a very significant role to maintain the maternal health in terms of mental, physical and social during pregnancy.

Pregnancy is recognized as a unique time for behavior modification and is no longer considered a condition of confinement (Artal & Toole, 2003). It is currently recognized that habits adopted during pregnancy could affect a woman's health for the rest of their life (Artal & Toole, 2003). Pregnancy is a critical time for both mother and developing fetus, events that occur during pregnancy can have a permanent effect on the health of the offspring (Carter, 2013). Pregnancy is the time that women should change their lifestyle to a healthier one. Pregnant women should have a regular exercise and good nutrition during pregnancy in order to gain a better life.

In 2002, American College of Obstetricians and Gynecologists (ACOG) published "Exercise during Pregnancy and the Postpartum Period: ACOG Committee Opinion 267" (Scott, 2006). In this paper, the ACOG committees have recommended that pregnant women should be encouraged to engage in regular, moderate intensity

physical activity in the absence of contraindications, to derive health benefits during their pregnancy as they did prior to their pregnancy (American College of Obstetricians and Gynecologists, 2002). According to Abedzadeh, Taebi and Saberi (2011), regular exercise are recommended during childbearing years to reduce blood glucose concentration of diabetic mothers, pelvic and back pain, anxiety and depression, constipation and leg cramps. According to Sharma (2007), antenatal exercise enhances the woman to adapt to pregnancy changes. In addition, exercise shows the link between exercise (Sharma, 2007) and getting stamina during pregnancy, and benefits for the brain of newborns.

Ribeiro and Milanez (2011) shows that, even if pregnant women have adequate knowledge concerning the practice of exercise during pregnancy and their attitude towards exercising is positive, however few of them was actually practicing it. Obtaining enough knowledge related to antenatal exercise is significant. In between, pregnant women should also have a good attitude regarding antenatal exercises and should practice it during pregnancy. In pregnancy, exercise helps builds muscles and ensuring that the body is fit enough to carry a healthy baby to term.

1.2 Problem Statement

From the time the women are pregnant, it seems everything and everyone is focused on the baby instead of pregnant women. In our conscious mind, women undergo physical and physiological changes to cope with pregnancy. The woman's body shape will change, the center of gravity will be altered and the mobility and balance will be affected (Berman, Snyder, Kozier & Erb, 2008). In addition, pregnancy will also influence the emotions, career, and sexual life of pregnant women as well (Berman et al., 2008).

Maternal health is very important, because women are the primary caregivers, first educators, and nurtures of the next generation (Sharma, 2007). Pregnancy and childbirth are the special moments in the women's life and their family. Exercise has important health benefits for all women and is well recognized in bettering the life of most pregnant women all around the world. However, there are less people practicing it during pregnancy. In Malaysia, more women were categorized as having sedentary

Physical Activity Level (PAL) compared to their male counterparts (Pok, Safiah, Tahir, et al., 2010). It can be concluded that Malaysian adults are generally sedentary. The antenatal exercise is an exercise that should be practiced by pregnant women; the importance of antenatal exercise should be further promoted in order to improve their knowledge, attitude and practice regarding antenatal exercise during pregnancy.

In Malaysia, a cross sectional study of "knowledge, attitude and practice towards pelvic floor muscle exercise (PFME) among antenatal women in HUSM, Kelantan" shows that the proportion of antenatal women with good knowledge, attitude and practice score were about 51.8%, 96.4% and 10.7% respectively (Rosediani, Nik Rosmawati, Juliawati & Norwati, 2012). Despite of good attitude, the overall knowledge and practice on PFME were still poor among pregnant women (Rosediani et al., 2012). Thus, it can be said that the practice of exercise among the pregnant women is relatively low in Kelantan.

On the other hand, less practicing of antenatal exercise is not only in Kelantan, Malaysia, but also occurs in other country. According to Ribeiro and Milanez (2011), the prevalence of physical activity is low among Brazilian pregnant women (12, 9 %). The knowledge, attitude of pregnant women is favorable, but few are actually practicing antenatal exercise (Ribeiro & Milanez, 2011). Although physical activity is not threatening for pregnant women and it is recommended by current guidelines; the attitude of the population does not seem to change. Despite most research indicates the importance and benefits of antenatal exercise during pregnancy; and the programs of antenatal exercise for pregnant mother is recommended; however, there are few studies investigating knowledge, attitudes, and practices about antenatal exercises among pregnant women (Ribeiro & Milanez, 2011).

Moreover, pregnant women often report a lack of knowledge regarding to the safety of exercise during pregnancy (Doran & O' Brien, 2007). When pregnant women received information related to exercise during pregnancy, it will help pregnant women to be more confident to engage in antenatal exercise (Doran & O' Brien, 2007). In contrast, if pregnant women do not get enough information regarding antenatal exercise, their knowledge about antenatal exercise would be inadequate. Exercise is noted to provide long-term general health benefits unrelated to pregnancy. These include

prevention of conditions such as heart disease, high blood pressure, diabetes, osteoporosis, anxiety and depression; including prevention of dyspnea. Apart from this benefit, exercise can help the women to ease many pregnancy related complications.

Despite knowledge regarding antenatal exercise is an important component affecting the attitude of pregnant women, whether to practice the antenatal exercise or not, the majority of pregnant women do not meet physical activity guidelines (Evenson, Savitz & Huston, 2004). According to Ribeiro and Milanez (2011), the barrier of not practicing antenatal exercise was fatigue, lack of time, uncomfortable, lack of information, and afraid the antenatal exercise will be harmful.

In this research study, the appropriate theory used was conceptual framework: The Theory of Planned Behavior. In this study, the Theory of planned behavior explains, pregnant women's behaviors that are under voluntary control (Ajzen, 1991). A major assumption underlying the theory is that pregnant women are usually rational and will make predictable decisions in well-defined circumstances (Ajzen, 1991). When the women have the antenatal exercise intention, the pregnant women most probably will practice the antenatal exercise.

1.3 Research Objectives

In conducting a research plan, the most important step is to write the research objectives. According to Polit and Beck (2010), formulating aims and objectives of a research study helps shape and guide the researcher's work after a study topic is decided that should be closely related to the statement of the problem and summarize what the researchers hope to achieve by the research study.

1.3.1 General Objective

The aim of this study was to investigate the knowledge, attitudes and practice of antenatal exercise among pregnant women in Hospital Universiti Sains Malaysia (Hospital USM).

1.3.2 Specific Objective

a. To identify the sources of information regarding antenatal exercise.
b. To identify the reason of why antenatal exercise during pregnancy is necessary to pregnant women in Hospital USM.
c. To identify the barrier to practice antenatal exercise of pregnant women in Hospital Universiti Sains Malaysia.
d. To determine the knowledge, attitude and practice level regarding antenatal exercises among the pregnant women in Hospital Universiti Sains Malaysia (Hospital USM)?
e. To determine the association between selected demographic data (age, number of pregnancy, educational level and monthly income) and knowledge, attitude and practice towards antenatal exercise among pregnant women in Hospital USM.

1.4 Research Questions

a. What are the sources of information regarding antenatal exercise?
b. Why pregnant women think that antenatal exercise is necessary?
c. Why some pregnant women do not practice antenatal exercise during pregnancy?
d. What is the knowledge, attitude and practice level regarding antenatal exercises among the pregnant women in Hospital Universiti Sains Malaysia (Hospital USM)?
e. Is there any association between the knowledge, attitude and practice of pregnant women in Hospital USM and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income)?

1.5 Research Hypotheses

Hypothesis 1: H_O - There is no significant association between knowledge and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

H_A - There is a significant association between knowledge and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

Hypothesis 2: H_O - There is no significant association between attitude and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

H_A - There is a significant association between attitude and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

Hypothesis 3: Ho - There is no significant association between practice of pregnant women in Hospital USM and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

H_A - There is a significant association between practice of pregnant women in Hospital USM and selected socio-demographic variables (age, number of pregnancy, educational level and monthly income).

1.6 Definitions of Operational Term

Knowledge - Knowledge defined as the level or degree of information acquired in a particular field (Ndikom & Onibokun, 2007). Knowledge in this study refers to the level of understanding regarding antenatal exercise of pregnant women. Knowledge is important, because it is the basis on which positive changes in behavior occur because it brings awareness, which in turn leads to action (Ndikom & Onibokun, 2007).

Attitude - Attitude is defined as a predisposition to respond to a certain object in a positive or in a negative way (Pietro & Rosetta, 2009). It refers to tendency, mental view, and disposition towards antenatal exercises by pregnant women. When women pose a positive attitude toward antenatal exercise, they probably would practice it during pregnancy.

Practice - Practice refers to direct goal oriented actions. The practice of antenatal exercise is an action that is taken by the pregnant women in gaining the benefits of antenatal exercise (Ndikom & Onibokun, 2007).

Antenatal exercise - Exercise during pregnancy is also called as antenatal exercise (DePietro, 2013). The antenatal exercise in this study includes water aerobics, walking, swimming, stationary cycling, yoga, Pilates and so on.

Pregnant women - In this study, pregnant women refer to mothers who are gravid and attending care in Hospital Universiti Sains Malaysia.

1.7 Significance of the Study

Promoting antenatal exercise need to remain a crucial objective among health promoters, which includes, doctor, nurses, and health care professionals (Gaston & Cramp, 2011). Positive physical and mental health outcomes associated with participating in regular exercise is known to benefit the mother and the newborn child (Gaston & Cramp, 2011). Despite the importance of exercise attribute to well-being and health, engaging in regular exercise is a complex and challenging behavior, and being pregnant presents further posed challenges to an already difficult behavior (Gaston & Cramp, 2011).

Knowledge towards physical exercise during pregnancy plays an important role. If women have enough knowledge about the risk, benefits and effects on their body and baby, they may have a positive attitude towards antenatal exercise. Hence, pregnant women will be more confident in practicing antenatal exercise (Doran & O' Brien, 2007). Thus, it is important to assess pregnant women's knowledge regarding antenatal exercise. By assessing their knowledge, attitude, and practice of antenatal exercise, it would help to improve the quality and quantity of information about antenatal exercise. Besides that, it also helps in correcting the wrong perception of antenatal exercise on pregnant women and fetuses.

During the practical experience in antenatal clinics, there is least attention laid on antenatal exercises. Thus, it seems the present health education failing to correct the women's inaccurate perceptions of the risks related to antenatal exercise during pregnancy (Clarke, Gross & Psychol, 2004). Hence, it is significant to study the knowledge, attitude and practice of antenatal exercise among pregnant women, so that health promoters can offer educational tools that may be employed to initiate behavioral change (Ribeiro & Milanez, 2011).

Because of the dearth of study found in the literature examining the knowledge, attitude and practice of women regarding antenatal exercise and the reason why the majority women do not exercise (Ribeiro & Milanez, 2011), leads to the researcher's interest to undertake this research study about the knowledge, attitude, and practice of

antenatal exercise among pregnant women in Hospital Universiti Sains Malaysia (Hospital USM).

1.8 Outline of the Thesis

This thesis contains six chapters. Chapter 1 detailed the introduction of the research, the problem statement, general objectives and specific objectives, research questions, research hypotheses, definition of operational terms and significance of the study.

Chapter 2 explored the knowledge and practice of antenatal exercise; safety of antenatal exercise; benefits of exercise in pregnancy and labor outcome, and attitude and belief related to antenatal exercise. It concluded with a presentation of the conceptual framework guiding this study.

Chapter 3 described the methodology, which includes research design, the study population and setting, study sampling method, sample size determination, instrument, data collection, ethical consideration and data analysis.

Chapter 4 presented the results from the study and data analyses which included the demographic characteristics, the source of information regarding antenatal exercise, reason of why antenatal exercise is necessary, barrier to the practice of antenatal exercise, mean knowledge and attitude score of antenatal exercise, knowledge, attitude and practice level about antenatal exercise, and association between socio-demographic data (age, number of pregnancy, highest education attained, and income) with the knowledge, attitude and practice of antenatal exercise.

Chapter 5 included the summary of the study findings and population of the study. Besides that, the results gained from the study were discussed, which included population of the study, the source of information regarding antenatal exercise, reason why antenatal exercise is necessary, barrier to the practice of antenatal exercise, knowledge, attitude and practice of antenatal exercise of antenatal exercise, and the association between knowledge, attitude and practice and socio-demographic data.

In chapter 6, a conclusion of this study was formed. Besides that, this chapter included the strength and limitation of this study, and makes recommendations for nursing practice, nursing education and future nursing research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction to the Chapter

Literature on this topic is to allow the researcher to become familiar with the current knowledge on the topic before undertaking this research. In addition, the review of the literatures provides an account of what has been published on a topic by accredited researchers making a case for further investigation and research (Taylor, 2013). It also highlights gaps in knowledge and asking questions that need to be answered (Taylor, 2013). Hence, the purpose of this literature review is to provide insight into the details of antenatal exercise. Apart from that, this literature review is to explore the research literature on the knowledge, attitudes and practice on antenatal exercise of pregnant women.

The sections of this literature review presented under the following headings: knowledge and practice of antenatal exercise; safety of antenatal exercise; benefits of exercise in pregnancy and labor outcome, and attitude and belief related to antenatal exercise. This chapter also consists of Rosenstock and Becker's Health Belief Model (HBM), which was used to describe the knowledge, attitude and practice of antenatal exercise among pregnant women.

2.2 Knowledge and Practice Related to Antenatal Exercise during Pregnancy

From previous study investigating on a descriptive study regarding the knowledge, attitude and practice of women in Campinas, São Paulo, Brazil with respect to physical exercise in pregnancy reported that almost two-third of the women were sufficiently informed about practice of physical exercise during pregnancy and the vast majority was in favor of it (Ribeiro & Milanez, 2011). However, only about 20% of the women in this sample exercise adequately during pregnancy (Ribeiro & Milanez, 2011). In the above study, a significant association was found between an adequate knowledge of physical exercise during pregnancy and educational level and between the adequate practice of physical exercise during pregnancy and having had fewer pregnancies (Ribeiro & Milanez, 2011).

On the other hand, a study of knowledge and performance of pregnant women referring to Shabihkhani hospital on exercise during pregnancy and postpartum periods shows that high percentages of women have poor knowledge about antenatal exercise and the performance of antenatal exercise is insufficient (Abedzadeh et al., 2011). Education about the importance of exercise and the role of women during pregnancy is very significant. Thus, awareness is necessary to increase the pregnant women's understanding of the benefits of antenatal exercise and improve their attitude by providing health education via pamphlets and offering them regular training antenatal exercise (Abedzadeh et al., 2011).

Knowledge of antenatal exercise is also important for pregnant women with diabetes. According to Ceysens, Rouiller and Boulvain (2006), diabetes in pregnancy may result in unfavorable maternal and neonatal outcomes. Besides that, adherence of exercise among pregnant women with diabetes may overcome a peripheral resistance to insulin, thus it will help to prevent gestational diabetes mellitus (GDM) or controlling hyperglycemia in women with GDM (Sheri, Ronald, & Bo, et al., 2010). Thus, the importance of antenatal exercise should be widely spread to pregnant women who, having GDM by advertisement, health post, antenatal follow up and so on.

A study done by Mudd, Nechuta, Pivarnik, Paneth, and Alliance (2009) shows that nulliparity was associated with feeling unsafe or unsure about vigorous intensity exercise. These results may indicate a lack of communication about physical activity guidelines and/or the benefits of physical activity during pregnancy to certain subgroups of women (Mudd et al., 2009). To increase the percentage of pregnant women engaging in the recommended antenatal exercise, it is important that health care providers provide up to date information and knowledge about antenatal exercise during prenatal care (Mudd et al., 2009).

Apart from that, a research shows that pregnant women had adequate knowledge of the American College of Obstetricians and Gynecologists (ACOG) guidelines for exercise during pregnancy, but most of them failed to exercise according to recommendations (Jones, Housman & McAleese, 2010). It is known that research supports the idea that knowledge influence behavior (Jones et al., 2010). It is mean that

when women have adequate and enough knowledge regarding to antenatal exercise, their attitude and behavior will be favorable. Pregnancy education is a first step to healthful pregnancy behaviors during pregnancy and it needs to be expanded and improved (Jones et al., 2010). The pregnancy education may include the importance of adherence to exercise among pregnant women, the importance of exercise following the ACOG guideline and so on.

2.3 Safety of Antenatal Exercise during Pregnancy

There are no data to support the restriction of pregnant women participating in the activities that use large muscle groups in a continuous rhythmic manner, although some activities carry more risk than others (Artal & Toole, 2003). According to Centers for Disease Control and Prevention (CDC) guidelines for physical activity in adults, it stated that, pregnant women should perform exercises at least 30 minutes of moderate physical activity on most, if not all, days of the week (Paisley, Joy & Price, 2003) Besides that, CDC guideline also recommend sedentary women to perform low impact exercise at least 3 times per week with minimum 30 minutes each time (Paisley et al., 2003).

The activities that need to be avoided during pregnancy are scuba diving and exertion in the supine position (Artal & Toole, 2003). During scuba diving, it will increase the risk of decompression sickness of the fetus because fetal pulmonary circulation unable to filter bubble formation (Camporesi, 1996). However, swimming was considered suitable for pregnant women as it hasn't been associated with adverse effects and has the advantage of creating a buoyant condition that is well tolerated (Artal & Toole, 2003).

Apart from that, depending on maternal fitness and altitude adaptation, exertions at altitude are available for activities up to 2500m (6000 feet) (Artal & Toole, 2003; Scott, 2006). If pregnant women perform exercise at altitude, they should aware of signs of altitude sickness, and they should stop exercising, descend from altitude, and seek for medical attention Besides that, the exercise that involved high altitude activities, with risk of fall and activities with risk of abdominal trauma need to be avoided during pregnancy (Scott, 2006).

The activities that increase risk of fall, such as skiing, or those that may result in excessive joint stress, such as jogging and tennis, should include cautionary advice for most pregnant women (Artal & Toole, 2003). Then, walking, stretching, most yoga, and other low-impact activities are safe for women who never exercised before (Rebeiro & Milanez, 2011; Scott, 2006). Pregnant women should gradually build up their regime to ensure there is no negative impact from increased activity level (Scott, 2006). Moreover, maximal weight lifting elevates blood pressure and should be avoided during pregnancy, although moderate intensity lifting can be performed safely (Scott, 2006). On the other hand, any high-risk or contact/collision sports can result in abdominal trauma and subsequent fetal injury (Scott, 2006).

Leisure time physical activity (LTPA) does not seem to have a negative impact on the rate of preterm delivery or on birth weight (Hegaard, Pedersen, Nielsen & Damm, 2007). Thus, it seems relevant that health authorities recommended 30 minutes of daily physical activity for healthy pregnant women (Hegaard et al., 2007). LTPA before and/or during pregnancy has a protective effect on the development of Gestational Diabetes Mellitus (GDM) and pre-eclampsia (Hegaard et al., 2007). Besides that, exercise during pregnancy may actually decrease risk and improve maternal well-being instead of bringing harm.

However, a new finding suggested that exercise during pregnancy lowers the heart rate of the fetus, and this effect persists for a month after the baby is born (May, Glaros, Yeh, Clapp & Gustafson, 2010; Rettner, 2011). A deceleration of the fetal heart rate usually indicates that the fetus is under some sort of stress, which may be a good healthy sign if it is corresponding with movement or uterine contraction (Rettner, 2011). So, exercise usually can help to improve the cardiovascular health of the fetus (Rettner, 2011).

Besides that, previously sedentary women with singleton gestation can safely engage in moderate, supervised exercise programs until the end of gestation as this would not affect gestation age (Barakat, Stirling & Lucia, 2008). Based on previous and present findings, exercise mode could include both aerobic and very light weight training/toning-orientated type of activities (Barakat et al., 2008). Exercise can be safe

and enjoyable for pregnant women. It can increase maternal well-being and self-esteem (Scott, 2006). For most women, the benefits far outweigh any theoretic risks, and the risks are small when proper guidelines and precautions are followed (Scott, 2006).

In additional, a researcher reported that the question as to how safe maternal exercise is for mother and fetus has become more important (Koshino, 2003). The effects of pregnancy on maternal Cardio-respiratory system include an increase in oxygen consumption, cardiac output, heart rate, stroke volume, and plasma volume (Koshino, 2003). The increase in oxygen reserve seen in early pregnancy is reduced later, suggesting that maternal exercise may present a greater physiological stress in the third trimester (Koshino, 2003). The type, intensity, frequency, and duration of the exercise seem to be important determinants of its beneficial effects (Koshino, 2003). In addition, depending on the individual's needs and the physiologic changes associated with pregnancy, women may have to modify their specific exercise regimes (Koshino, 2003). The physiological adaptations to exercise during pregnancy appear to protect the fetus from potential harm and risks.

According to Niedziocha (2011), lying on back for an extended period of time after the first trimester is not recommended. When pregnant women lie on their back, the weight of the fetus can compress the blood vessels that run behind the growing uterus (Niedziocha, 2011). On the other hand, the cardiovascular change associated with body posture is an important consideration for pregnant women both at rest and exercise (Artal & Toole, 2003). After the first trimester, the supine position results in relative obstruction of venous return and therefore decreased cardiac output (Artal & Toole, 2003). Thus, it can be said that the pregnant women should not exercise while lying down on their back after the first trimester. Besides that, women should be told that a small minority of pregnant women feel faint when lying flat (Farine & Seaward, 2007). If pregnant women feel faint, they should change their position to a comfortable position that is likely to be a left lateral decubitus position or variant thereof (Farine & Seaward, 2007).

Kalisiak and Spitznagle (2009) shows that, exercising at a moderate intensity for 60 minutes a day, five times per week or greater seems to be beneficial for the mother and does not appear to cause harm to the fetus or child. Therefore, after consulting the

physician about any possible adverse effect of exercising, healthy women are encouraged to continue exercising during their pregnancy (Kalisiak, & Spitznagle, 2009). Most of the exercises are safe to perform during pregnancy, as pregnant women perform it with caution and do not overdo it, and it would be safe and no harm.

In addition, consideration should be given to the type, intensity, duration and frequency of exercise sessions to careful balance between the potential benefits and potential harmful effects (Artal & Toole, 2003). Thus, additional attention should be given to progression in intensity over time. Moreover, control of exercise intensity within the precise limit is often desirable at the beginning of an exercise program; the most easily quantified activities are walking or stationary cycling by cycling machine (Artal & Toole, 2003). Stationary cycling is better than outdoor bicycle cycling because it is a low impact exercise, and has a low risk of falls.

Apart from the safety of exercise, it is also essential to know the contraindication during antenatal exercise. Women is absolute contraindicated with antenatal exercise, if the women with hemodynamically significant heart disease, restrictive lung disease, incompetent cervix or cervical cerclage, multiple gestation with risk for preterm labor, persistent second or third trimester bleeding, placenta previa after 26 weeks of gestation, premature labor during the current pregnancy, rupture of membranes and pregnancy-induced hypertension (ACOG, 2002). It is dangerous for women at risk for preterm labor, women with bleeding after the first four months of pregnancy, or women with unstable heart or lung disease exercise during pregnancy (Scott, 2006).

Despite the benefit of exercise on new mother and baby, there are some relative contraindications to exercise during pregnancy. The women with a history of sedentary lifestyle, intrauterine growth retardation, poorly controlled hypertension, poorly controlled seizure disorder, poorly controlled insulin-dependent diabetes, severe anemia, chronic bronchitis, maternal cardiac arrhythmia, poorly controlled thyroid disease, extremely overweight (morbid obesity), extremely underweight, orthopedic limitations, heavy smoker are contraindicated to exercise (ACOG, 2002). These women should do their exercise with extra caution. They must listen to their body's ability and the advice of their clinician.

If a woman develops any of the following problems: vaginal bleeding, difficulty breathing before or during exercise, dizziness, headache, chest pain or swelling, uterine contractions, decreased fetal movement, or leakage of clear fluid from vagina, exercise should be terminated (Scott, 2006). These can be the sign of dangerous medical condition during pregnancy.

2.4 Outcomes and Benefits of Antenatal Exercises for Mothers

According to the American College of Obstetricians and Gynecologists (ACOG), exercising 30 minutes each day at a moderate pace can result in numerous health benefits for pregnant women, including the prevention or treatment of gestational diabetes, increased stamina, improved sleep, and reduction of pregnancy symptoms such as backache, constipation, bloating, and edema. Exercise may also improve coping skills during labor and help women return to their previous fitness level more quickly after giving birth (American College of Obstetricians and Gynecologists, 2008).

A study indicated that the increased level of endorphins in the blood after exercise results in less pain during the delivery process (Abedzadeh, Saberi & Sadat, 2005; Howells, 2002). Besides that, many studies of pregnant women who exercise regularly, these women experience a shorter active labor and less Caesarean section (Lewis, Avery, Jennings, et al., 2008). However, some study reported that exercise can cause side effect, for example: increased maternal body temperature and possible damage to the fetus, decrease of fetal growth caused by reduction of placenta perfusion, and less access to glucose due to maternal blood glucose reduction (Abedzadeh et al., 2005; Clapp, Kim, Burciu, et al., 2002).

There are many types of exercise which is beneficial to the pregnant women. Among these exercise programs should consist of a warm up, cool down and Kegel exercises. Kegel exercises are contractions of the pelvic floor using the muscles that stop the flow of urine (Jeffrey & Nordahl, 2002). There are some recommended modes of exercise, for example: aquatic exercise, pregnancy designed yoga or Pilates, walking, and other mixed cardiovascular activities. Pilates is a low impact muscle contraction exercise, it trains the core muscle of the body and improve spinal alignment (Jago,

Jonker, Missaghian & Baranowski, 2006). Pilates help to reduce low back pain and disability of women (Rydeardm, Leger & Smith, 2006).

Aquatic exercises are beneficial because the buoyancy of water decreases the weight and stress on the joints, encouraging freedom of movement (Henley & Wollam, 2009). Walking provides a total body workout, has minimal impact on joints and muscles, and is a great way to begin an exercise program (ACOG, 2008). Brisk walking helps to increase the blood circulation of pregnant women, and it able to redistribute the retained fluid. Other mixed cardiovascular activities such as low-impact aerobics are also beneficial (Jeffrey & Nordahl, 2002).

The long-term effects exercise during pregnancy can have on offspring health (Carter, 2013). Women may be encouraged to start an exercise regime before and during their pregnancy if they are aware of the lifelong benefits it can have for their children (Carter, 2013). Besides that, none of the studies reported any adverse effects of exercising during pregnancy in healthy women (Kalisiak, & Spitznagle, 2009). On the contrary, despite varied exercise type, frequency, duration, and intensity; exercise during pregnancy appears to have many positive benefits (Kalisiak, & Spitznagle, 2009).

Besides that, a study that evaluated factors associated with women's perceptions of the safety of physical activity in pregnancy found that women perceive antenatal exercise as beneficial (Ribeiro & Milanez, 2011). This is because pregnant women believe exercise helps to control blood glucose levels, minimizes weight gain, improve energy efficiency and mood, makes childbirth easier and contributes towards fetal health (Duncombe, Wertheim, Skouteris, Paxton & Kelly, 2009). Thus, antenatal exercise can help improving the mother's and baby's health and help pregnant women to be more energetic. Moreover, Wolfe and Davies (2003) also reported that the benefit of antenatal exercise included maintenance of prenatal aerobic and musculoskeletal fitness levels, prevention of excessive maternal weight gain, facilitation of labor, control gestational glucose and improve psychological adjustment to change of pregnancy.

According to Artal & Toole (2003), the mean birth weight is substantially lower when women exercised at or above 50% of preconception levels compared with non-

exercisers. However, another study found that it is no difference between birth weight of offspring of vigorous exercisers and those of sedentary women (Artal & Toole, 2003). In addition, another study found that exercise can increase birth weight (Artal & Toole, 2003). It can be concluded that birth weight is not affected by exercise in women who have an adequate energy intake

Aerobic exercise is beneficial to pregnant women and fetuses (Kalisiak, & Spitznagle, 2009). Aerobic exercise improves maternal fitness level, self-image, placental growth rate, and placenta volume and decreases incidence of low back pain during pregnancy (Kalisiak, & Spitznagle, 2009). In additional, exercise in healthy women during pregnancy may improve neurodevelopmental scores of the child up to 5 years old (Kalisiak, & Spitznagle, 2009).

Moreover, antenatal exercise helps to increase blood circulation of pregnant women. If the blood circulation is poor, it may lead to varicose veins, vulva veins and cramps. (BabyCentre Medical Advisory Board, 2013) Antenatal exercise is the way to prevent varicose veins that usually found in pregnant women (BabyCentre Medical Advisory Board, 2013). So, pregnant women is not advisable to sit or stand for long periods of time, move around at least every 30 minutes or take some gentle exercise can help to prevent varicose veins (BabyCentre Medical Advisory Board, 2013).

A prospective randomized study investigated the effect of exercise during pregnancy on the intensity of low back pain and kinematics of the spine (Garshasbi & Zadeh, 2005). Women participated in this exercise program for three times a week during the second half of pregnancy for 12 weeks, lordosis and flexibility of the spine were measured by flexible ruler and side bending test (Garshasbi & Zadeh, 2005). The result of this study shows that low back pain intensity was increased in the control group, whereas exercise group showed significant reduction in the intensity of low back pain after exercise. Flexibility of spine decreased more in the exercise group (Garshasbi & Zadeh, 2005). Thus, pregnant women should be encouraged to exercise to reduce low back pain and lordosis.

Apart from that, antenatal gymnastics is a form of non-pharmacological childbirth preparation methods (Lawani, Alihonou, Akplogan, et al., 2003). It helps

maintain rachidian statics and to relieve painful syndromes (joints, lumbar pains) during pregnancy (Lawani et al., 2003). It also helps correct gravida problem s (leg cramps, backache, weight increase) (Lawani et al., 2003). In a study, the researcher divided 50 sedentary women into two groups of 25 experimental and 25 controls. The results show a lower number of caesareans and a significant lower number of untorn perineas in the experimental group (Lawani et al., 2003). Apgar scores are also statistically higher in the children of trained women (Lawani et al., 2003). Muscular force improvement, psychological control, and good body form, can be noticed in training mothers (Lawani et al., 2003). Therefore, antenatal gymnastics is a good exercise that can be performed by pregnant women to avoid complication in childbirth. However, the Guideline of the American College of Obstetricians and Gynecologists doesn't recommend doing gymnastics during pregnancy, because it increased risk of falling (Artal & Toole, 2003).

A single-blind randomized controlled trial study on 301 healthy nulliparous women were randomly allocated to a training (n=148) or a control group (n=153) in Trondheim University Hospital (Morkved, Bo, Schei, & Salvesen, 2003). The training group attended a 12-week intensive pelvic floor muscle training program during pregnancy, supervised by physiotherapists (Morkved et al., 2003). The pelvic floor muscle strength was significantly higher in the training group at 36 weeks' pregnancy (p= 0.008) and 3 months after delivery (p= 0.048) (Morkved et al., 2003). Thus, intensive pelvic floor muscle training during pregnancy prevents urinary incontinence during pregnancy and after delivery.

2.5 Attitudes and Beliefs Related To Antenatal Exercises in Pregnancy

A study was conducted on "Belief about exercise and physical activity among pregnant women". The study shows that, 1306 pregnant women were asked about belief regarding physical activity and exercise at 27-30 weeks' gestation (Evenson & Bradley, 2010). The result showed that 78% of women agreed that women can continue their regular exercise during pregnancy (Evenson & Bradley, 2010). Evenson & Bradley (2010) stated that most (89%) agreed that regular exercise was better than irregular exercise during pregnancy. While almost 98% women agreed with the benefits of light activity, less agreed that there were benefits with moderate (73%) or vigorous exercise (13%). The study concluded that differences in belief were most notable by educational

level, race/ethnicity, and whether they participated in regular exercise during pregnancy (Evenson & Bradley, 2010).

Clarke et al. (2004) reported that, in another study, 57 nulliparous participated in a study, 14 of the 36 (39%) women who reported participating in some form of weekly exercise before pregnancy did not report pursuing any similar activities during pregnancy (Clarke et al., 2004). Rest and relaxation were perceived as more important than regular exercise or the maintenance of an active lifestyle during pregnancy (Clarke et al., 2004). Fifty-five (96%) respondents indicated that they had received advice about physical activity at least once during pregnancy (Clarke et al., 2004). Even where accurate health education had been received, it had often failed in term of translating this knowledge into useful and consistent advice for the women concerned (Clarke et al., 2004).

From previous study "Knowledge, attitude and practice of women in Campinas, São Paulo, Brazil with respect to physical exercise in pregnancy: a descriptive study" , the author stated that although women are aware of the benefits of physical exercise during pregnancy, they do not behave in accordance with this knowledge, compliance with exercising being low (Ribeiro & Milanez, 2011). Besides that, as shown in this study, other than tiredness and discomfort, the main reason given by women for not exercising was lack of time (Ribeiro & Milanez, 2011). Many women does not motivate to exercise despite being aware of the possible benefits that physical exercise could offer to their health and the health of their baby (Ribeiro & Milanez, 2011).

A study was to examine the exercise beliefs and behaviors of postpartum women who had gestational diabetes mellitus (GDM) during a recent pregnancy (Downs & Ulbrecht, 2006). To increase exercise behavior and reduce risk of type 2 diabetes in women with GDM, researcher and health care professionals are encouraged to use women's exercise beliefs (Downs & Ulbrecht, 2006). They found that the strongest perceived advantage of exercise during pregnancy was controlling blood glucose (Downs & Ulbrecht, 2006). In the above study, we can see that the belief play an important role in encouraging the pregnant women to exercise.

Moreover, a retrospective study of 74 postpartum women was conducted to examine women's behavioral, normative, and control beliefs about exercising during pregnancy and postpartum and to determine their most salient beliefs (Downs & Hausenblas, 2004). In addition, women's pre-pregnancy, pregnancy, and postpartum exercise behavior was examined (Downs & Hausenblas, 2004). The result shows that the most common exercise belief during pregnancy was that exercise improves mood and physical limitations (e.g., nausea) obstructed exercise participation. Besides that, the result shows that woman's husband/partner and family members most strongly influenced their pregnancy and postpartum exercise behavior (Downs & Hausenblas, 2004). Thus, women's exercise belief can influence their exercise, attitude and behavior, when they have the belief of antenatal exercise brings advantages, they most probably will practice the antenatal exercise.

2.6 Conceptual Framework

Conceptualizing is the process of forming ideas, designs and plans. A conceptual framework acts as a guided research concept for a research study. The framework help to deal with the concepts assembled together by virtue of relevance to the research problems, which provides a certain frame of reference for clinical practice, research, and education. The focus of the framework is to make scientific finding meaningful and generalized. In addition, it provides direction for relevant questions to practical problems (Polit & Beck 2012).

The conceptual framework for this study is based on Ajzen and Fishbein's theories of reasoned action and planned behavior. This theory explains that people are usually rational and will make predictable decisions in well-defined circumstances. The model suggests that intention to act is the most immediate determinant of behavior, and behavioral intention will influence behavior.

Figure 2.1 shows how behavioral intentions are thought to be influenced by attitudes towards behaviors and subjective norms. The attitude in this study refers to pregnant women's attitude towards the antenatal exercise. Attitude is determined by behavioral beliefs and evaluation of behavioral outcomes. In this case, the attitude is

determined by the belief of desired outcomes of antenatal exercise will occur if practicing antenatal exercise, and the desired outcomes will be beneficial to the health of mothers and babies.

Subjective norms in this case relate to pregnant women's beliefs about how significant others view the behavior. The normative belief, which means what other people think the pregnant women should do. This includes advice from magazines, television, nurses, family, doctor, internet, friends, and exposure to books or any other sources. Subjective norm includes the motivation to comply, which means how willing the pregnant women are to comply with these beliefs. Ajzen and Fishbein take this analysis further by indicating subjective norms are most affected by significant others. These significant others include a person's valued peer, favorite celebrities who act as role models. When pregnant women know the benefits of antenatal exercise of the significant others, they will have the motivation to comply the antenatal exercise.

Ajzen and others have developed this theory further and added perceived behavioral control as a third influence on behavioral intentions. This recognizes that a person's intentions will become significantly greater if they feel they have greater personal control over a behavior, which a concept closely allied to self-efficacy and that this is also mediated by their perceived power in relation to a given situation. This means when the pregnant women perceived they have ability to perform the antenatal exercise, they would practice it during pregnancy. There are many factors beyond the immediate control of individuals which will shape their ability to behave in the desired way. As a result, Ajzen proposed changing the name from the theory of reasoned action to theory of planned behavior. Thus, this model helps to understand the factors influencing pregnant women's knowledge, attitude and practice on antenatal exercise (Figure 2.2).

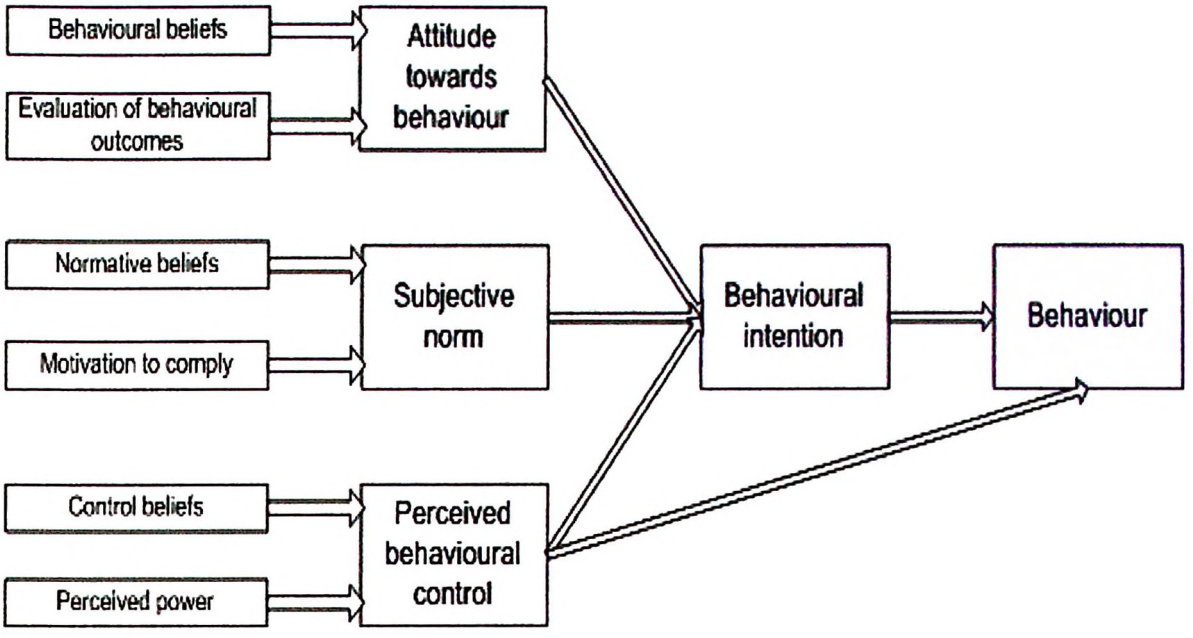

Figure 2.1 Ajzen and Fishbein's theory of reasoned action and planned behavior
[Source: Adapted from Ajzen, I., 2012]