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UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
DOCTOR OF PHILOSOPHY IN NURSING

FACTORS AND HEALTH PROMOTING BEHAVIORS THAT INFLUENCE
MATERNAL AND INFANT OUTCOMES IN OLDER PREGNANT THAI WOMEN

By

Supawadee Thaewpia, MSN, RN

A dissertation presented to the
FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE
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In partial fulfillment of the
requirements for the degree
DOCTOR OF PHILISOPHY IN NURSING

April, 2012

Dissertation Committee

Lois Chandler Howland, DrPH, MSN, RN. Chairperson

Mary Jo Clark, PhD, RN

Kathy Shadle James, DNSc, APRN

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Abstract

This dissertation summarizes research conducted in partial fulfillment of the program requirements for the Doctor of Philosophy in Nursing degree from the Hahn school of Nursing and Health Sciences, University of San Diego. The results of the dissertation research are organized as three discrete papers.

Article one is entitled; “Reliability and Validity of Thai Translations of Instruments Measuring Psychosocial Factors and Health Promoting Behaviors among Older Pregnant Thai Women.” This article describes the dissertation research study in which the selected instruments were piloted at an antenatal clinic in Thailand. The article determines the instruments’ ability to examine perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors in older pregnant Thai women. Article two is entitled; “Perinatal Complications in Older Pregnant Thai Women: What We Know.” This literature-review provides an overview of how previous research has described pregnant Thai women aged 35 years or older and the factors related to maternal and infant outcomes. Article three is entitled; “Factors and Health Promoting Behaviors that Influence Maternal and Infant Birth Outcomes in Older Pregnant Thai Women.” This article describes the relationship between selected factors and health promoting behaviors that influence maternal and infant outcomes. The article also advocates nursing care for older pregnant women that can prevent risk factors and promote health behaviors in order to achieve healthy pregnancy in older women.

Dedication

This dissertation is dedicated to my mother, Palapa Thaewpia, who sacrificed her retirement time to take care my daughter, Pachayapa Thaewpia. The little child seems to be growing into a wonderful human being, in spite of the fact that her mother was less available than she should have been during the first two years of her life.

I would also like to dedicate this dissertation to my father, the late Prasit Thaewpia, the first person who taught me English for my second language. Therefore, I have a chance to study abroad. Additionally, this dissertation is dedicated to my younger sister, Wisansanee Thaewpia, and my husband, Pisanu Tonpo. They allowed me to achieve my goal without worries about leaving my family behind in Thailand.

Acknowledgement

I would like to deeply thank the Royal Thai Government for giving me the scholarship to obtain my doctoral degree in the United States. Without the sponsorship from them, this study would not be possible.

I would like to give special acknowledgement to Dr. Lois Chandler Howland who is interested in my research study and served as my research chairperson. Dr. Howland always gave me encouragement, research guidance, flexibility, and caring support. I would also like to acknowledge Dr. Mary Jo Clark and Dr. Kathy Shadle James for their thoroughness and promptness in reviewing my works in progress. Without their on-going feedback, it would have been impossible to complete my dissertation.

I also recognize Dr. Patricia Roth, my academic advisor who gave me an overseas interview before she accepted a Thai student into the doctoral program. I am also grateful to the faculty and staff of the Hahn School of Nursing and Health Science at the University of San Diego for supporting me in my academic and personal dimensions. As I am an international student, I also would like to thank all of my PhD classmates who never made me feel like the outsider from the group.

I am grateful for the experts, Dr. Jiraporn Worawong, Dr. Promjit Hornboonherm, and Dr. Gusumalee Chaimung, who validated the instruments. I appreciate Dr. Pilanut Phusawisot for translating the instruments.

I am thankful for all of my colleagues at Simahasarakham Nursing College who worked harder to cover my workload in my absence. Without their support, I would not have had the opportunity to pursue doctoral training.

Finally, I especially thank all the participants for their willingness to participate in my study. Furthermore, I appreciate the full support from those directors of the hospitals and research assistants of the antenatal care clinics, including Khon Kaen hospital, Health Promotion Hospital Region 6, Kalasin hospital, and Mahasarakham hospital. Without their advocacy, my study would have not been completed.

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Introduction

Maternal and child health care in Thailand has been increasingly interested in older pregnant women. The proportion of women aged 35 years or older in prenatal medical and obstetrical services has increased significantly over the past 10 years. This change has important consequences for women planning a pregnancy, their partners and families, their future children, and the health care providers who work with pregnant women.

Most of older pregnant women expect to have a healthy pregnancy and healthy baby. However, there are some concerns that may increase the risks regarding their age. Many of these risks can be successfully managed through prenatal care. Therefore, knowing factors that influence maternal and infant outcomes can minimize health risks and maximize healthy pregnancy.

These three articles provide relevant information about the results of a dissertation conducted among older pregnant Thai women. They are intended for application by maternal and child nurses, nurse researchers, and nursing faculty members.

Chapter 1

Introduction

Statement of the Problem

In 1958, the older primigravida was defined by the International Federation of Obstetricians and Gynecologists as a woman who delivers her first child at the age of 35 years or older (Tuck, Yudkin, & Turnbull, 1988). Since then, there has been growing interest in older primigravidas. In January 2000, the United States Department of Health and Human Services (USDHHS, 2000) released “The Healthy People 2010: National Health Promotion and Disease Prevention Objectives.” Maternal, infant, and child health is one of the 28 focus areas, the goal of which is to improve the health and well-being of women, infants, children, and families. The increasing age of pregnancy causes an increase in the rates of maternal and infant complications. Therefore, objective to reduce maternal illness and death, and reduce birth defects in mothers aged 35 years and older are the progress toward targets (USDHHS, 2000).

Hoffman et al. (2007) stated that maternal age is a risk factor for infant death in the United States. Mortality rates are highest among infants born to mothers aged 40 years and older. Pregnant women greater than 35 years of age have elevated risks of

complications for both themselves and their infants; they confront both physiological and psychological problems such as gestational diabetes mellitus, preterm delivery, and stress.

In the developing country of Thailand the Ministry of Public Health has been concerned about maternal, infant, and child health. Health promotion activities were initiated to promote pregnancy health behavior about 50 years ago. While maternal and infant mortality rates have dropped steadily, many health problems in pregnant women and infants still remain, especially in older primigravidas. Between 1996 and 2006, the proportion of first births in Thai to women over 35 years of age increased two-fold from 1.0% to 1.9%, and the number steadily increases (National Statistical Office, 2006). Incidence rates for medical complications during pregnancy and poor infant outcomes, such as pregnancy induce hypertension (PIH), antepartum hemorrhage (APH), and low birth weight, have also significantly increased. Furthermore, more than 50% of older primiparous and multiparous pregnant Thai women give birth by caesarean section (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007).

Postponing pregnancy allows Thai women to advance their careers. Employment characteristics can cause stress and anxiety that may place older pregnant women at risk for inappropriate health promoting behaviors, such as drinking caffeine and alcoholic beverages, smoking, and sleeping less (Patanavanichnun, 2000). Moreover, many aspects of a typical Thai lifestyle may increase risks during pregnancy for older pregnant women. These may include an inadequate diet (low protein, high starch, and fewer supplements), motorcycle use, and lack of a social network. These risky health behaviors among older

pregnant women have been shown to be related to poorer pregnancy outcomes in research done in western societies (CDC, 2009; Chiodo et al., 2010; Thompson, 2010). Many developed countries are very concerned about pregnancy at the age of 35 years or over.

Much research has been conducted on older pregnant women to identify and solve the problems in this group (Montan, 2007; Nelson, 2004; Schardt, 2005). In Thailand, limited research has focused on pregnancy outcomes in older primigravidas. In addition, there is limited information about health promoting behaviors and their impact on pregnancy among older pregnant women. Contemporary inquiry addressing the history of older pregnant Thai women's nursing care has been limited. It is important to identify ways to optimize health promoting behaviors in this at-risk population. Thus, addressing health risks in older pregnant Thai women, regardless of their parity is important to reduce poor maternal and infant health outcomes.

There is little knowledge of the factors that are associated with poor infant outcomes in older pregnant Thai women. Many factors may complicate pregnancy in this population. Although the exact mechanisms underlying the risks for adverse birth outcomes among older mothers remain poorly understood, health promoting behaviors (HPB) or life styles during pregnancy may be associated with better maternal and infant outcomes. Therefore, an understanding of the role of factors and HPB associated with maternal and infant outcomes is needed to develop research-based nursing interventions for this population. In this study, the relationship between a selected group of factors identified in the Health Promotion Model (Pender, Murdaugh, & Parsons, 2006), which

include personal factors (education, income, parity, marital status, smoking, and alcohol consumption), perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors will be examined in relation to maternal and infant birth outcomes.

Background and Significance

Pregnant women who are 35 years of age and older have been categorized as a high-risk group by obstetricians and gynecologists. The focus of maternal, infant, and child health services in Thailand has increasingly been on the care of this risk group. However, the morbidity and mortality rate, particularly among older pregnant women, remains high (National Statistical Office, 2006).

Prevalence of childbearing at an older age. Recently, societal change has influenced individuals to marry later in life resulting in a rapid increase in the number of women becoming pregnant after 35 years of age. This phenomenon has been increasing steadily in many countries around the world, including the United States, Australia, Canada, Taiwan, and Thailand (Benzies et al., 2006; Carolan, 2004; Reddy, Ko, & Willinger, 2006; Yang, McAlpine, & Chen, 2006). In the United States, the number of older primigravidas increased 36% between 1991 and 2001 (Bainbridge, 2007). In 2002, Dick (as cited in Robb, Alder, & Prescott, 2005) reported that one out of four pregnant women in the United Kingdom were between 35-39 years of age. In Thailand, the percentage of women aged 35-49 years with a child younger than 1 year of age was 13.69% of all married women between 15 and 49 years of age (National Statistical Office, 2006). Tabcharoen, Pinjaroen, Suwanrath, and Krisanapan (2009) reported that

the number of mothers who deliver at the age of 40 or older at Prince of Songkla University Hospital, Thailand has increased to three times the base rate. Moreover, Suwannachat and Ualalitchoo Wong (2007) stated that 9% of all pregnant women in Kalasin Hospital, Thailand experienced pregnancy at an older age. The Annual Report of Pregnancy from the Obstetrics and Gynecology Department of Mahasarakham Hospital, Thailand (2009) showed that the percentage of older pregnant women had increased rapidly from 8.85% to 15.95% between 2006 and 2008. Similarly, the percentage of older pregnant women at Khon Kaen Hospital increased from 15.03% to 21.75% from 2006 to 2009 (Department of Obstetrics and Gynecology, 2009).

Prevalence of risk behaviors. Among ever-married pregnant Thai women aged 35 years or older, 7.66% received no prenatal care, and 4.03% gave birth at home with a trained midwife (National Statistical Office, 2006). Seventy six percent reported drinking alcohol during pregnancy (National Statistical Office, 2001).

Obstetrical and neonatal risks. Older pregnant women experience greater physical and psychological complications perinatally. This is especially true for first-time pregnant women. Pre-eclampsia is more common in older primiparas (Bainbridge, 2007; Muhieddine et al., 2002), and gestational diabetes mellitus (GDM) has been associated with increasing maternal age (Joseph et al., 2005; Montan, 2007). Increased obstetrical risks in older pregnant women include antepartum hemorrhage, miscarriage, caesarean sections, vaginal operative deliveries, and the need for induction and augmentation of labor (Joseph et al., 2005; Muhieddine et al., 2002). Furthermore, women who become pregnant at age 35 or older not only have many obstetric complications, such as

miscarriage, APH, and premature contraction, but they also have high rates of amniocentesis and assisted delivery, which increase health care unit costs (Caughey, Washington, & Kuppermann, 2008; Chou et al., 2009). In Thailand, older pregnant women have significantly increased risks for GDM, chronic hypertension, malpresentation, PIH, placenta previa, multiple pregnancies, preterm labor, fetal distress, postpartum hemorrhage, and endometritis (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009).

In addition, studies have examined the relationship between maternal age and the risk of fetal complications. Research by Miller (2005) and Hoffman et al. (2007) revealed that having children in later life can result in many fetal and neonatal problems, including fetal death, preterm delivery, low birth weight, intrauterine growth retardation, and newborn complications. These and other studies found that older mothers had significantly higher risks of infant complications (Delbaere et al., 2007; Hoffman et al., 2007; Reddy et al., 2006).

In Thailand, the percentage of infants born at low birth weight among mothers aged 35 years and older has remained between 11.82% and 11.85% from 2003 to 2005 when compared with adult pregnancy (National Statistical Office, 2006). Older pregnant Thai women had more adverse fetal outcomes including low birth weight, low Apgar scores, and congenital anomalies than their younger counterparts (Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009).

Psychological risks. Older pregnant women also have higher risk for poor psychological outcomes, such as stress, anxiety, and depression (Robb et al., 2005). This

is especially true of women who have had a bad obstetric history (Schardt, 2005). Some research suggests that mothers aged 35 years and older may be more likely to believe that their babies might be harmed during labor because of their older age (Yang et al., 2006). Mothers may also be embarrassed regarding late pregnancy, and concerned about the safety of pregnancy and childbirth. Additional issues associated with later pregnancy include possible struggles with infertility, prior perinatal loss, and high-risk pregnancies and can result in greater psychological distress related to feelings of disappointment, guilt, anger, jealousy, and doubt as to one's own abilities (Carolan, 2004; Robb et al., 2005; Schardt, 2005).

In contrast, other research findings suggest that pregnant women over 35 years of age experience good psychological adjustment. They indicated that older mothers have less stress and more perceived support than younger mothers (Poikkeus et al., 2006). In addition, there is evidence that older mothers are ready and plan intensely for their pregnancies (Byrom, 2004; Nelson, 2004). It is important to understand these factors that explain the variation in health outcomes in this population.

Despite an increased interest in problems of older pregnancy it is surprising that in Thailand little research has been conducted to identify factors which can be used to promote health behaviors associated with good maternal and infant outcomes in this group. A limited number of studies have been conducted regarding infant outcomes and factors that cause complications in older pregnancy (Silalai, 2005; Suwannachat & Ualalitchowong, 2007; Tabcharoen et al., 2009).

In the western world, critical factors that associate HPB and maternal and infant outcomes have been found to include knowledge about the benefits and barriers of HPB, and the level of self-efficacy of pregnant women. Moreover, most of the quantitative studies examined the relationships between demographic or sociological factors and infant outcomes in older mothers. (Nelson, 2003, 2004; Poikkeus et al., 2006; Salihu, Shumpert, Slay, Kirby, & Alexander, 2003; Viau, Padula, & Eddy, 2002). The question arises, are these also critical factors in the patterns of HPB and maternal and infant outcomes in older pregnant Thai women?

Theoretical Framework

Pender's Health Promotion Model (HPM) has been used as a framework for many studies designed to test its predictive capabilities for overall health-promoting lifestyles, specific health promoting behaviors, and health promoting behavioral outcomes (Pender et al., 2006). Since health promotion is an important component of maternal and child nursing, Pender's Health Promotion Model (Pender et al., 2006) was chosen as the theoretical framework for this study.

The HPM is composed of three major components derived from the social learning theory of Bandura (1997). These components include individual characteristics and experiences, behavior-specific cognitions and affects, and behavior outcomes. These three major components of the HPM are factors that affect or influence an individual's health promoting behaviors. The interrelationships between the factors and their influence on the outcome of the health behavior allow researchers to explain, predict, and alter health promoting behaviors (Pender et al., 2006).

Individual characteristics and experiences. According to Pender et al. (2006), each person has unique characteristics and experiences that affect subsequent actions. They are influenced directly by behavior-specific cognitions and affects. These characteristics and experiences include prior related behaviors and personal factors.

Prior related behavior. The best predictor of behavior is the frequency of the same or similar behavior in the past. This has been retained in the HPM as “prior related behavior.” Prior related behavior has both direct and indirect effects on the likelihood of engaging in health promoting behaviors. The direct effect of the past behavior on current behavior may be due to habit formation. The indirect effect can influence health promoting behaviors through perceptions of self-efficacy, benefits, barriers, and activity-related affect.

According to Pender et al. (2006), indirect health promoting behaviors influence maternal and infant outcomes by frequent participation in the same behavior or in a similar one in the past. In this study, the older pregnant Thai women, either primiparous or multiparous (who experienced abortion in previous pregnancy), who have never been pregnant will not have prior experience of health promoting behaviors during pregnancy. Therefore, this variable is not relevant to include in this study.

Maternal personal factors. Maternal personal factors are categorized as biologic, psychological and sociocultural characteristics. Personal biological factors include variables such as age, body mass index, and pubertal status. Psychological factors include self-esteem, self-motivation, and perceived health status. Sociocultural factors include variables such as race, education, and socioeconomic status.

Pender suggested that factors included in any research study should be limited to the few that are theoretically relevant to explain or predict a given target behavior. Thus, maternal personal factors that will be included in this study are education, income, parity, and marital status. These factors have been shown to be relevant predictors of maternal and infant outcomes in the literature.

Behavior-specific cognitions and affects. Behavior-specific cognitions and affects are considered to be a critical core for nursing intervention. These variables are also considered to be the major motivational predictors of health promoting behaviors. Six components of behavior-specific cognitions and affects have been identified and are discussed as follows.

Perceived benefits of action. Individuals tend to choose to invest time and resources in activities that have a high likelihood of increasing their experiences of positive outcomes (Pender et al., 2006). In addition, beliefs in benefits or positive outcome expectations have been shown to be an important condition for engaging in a specific health behavior. In many studies, perceived benefits of action were found to be a significant predictor of individuals' participation in health promoting behaviors (Alexcy & Martin, 2007; Lambert et al., 2005; Pichayapinyo, 2005). Therefore, this variable will be included in this study.

Perceived barriers to action. Perceived barriers to action affect health promoting behaviors directly by impeding action, and indirectly through decreasing commitment to a plan of action. Barriers may be imagined or real and may consist of perceptions concerning the unavailability, inconvenience, expense, difficulty, or time-consuming

nature of a particular action (Pender et al., 2006). Lack of personal effort, lack of social support, inadequate finances, and fear have been found in the literature as barriers to practicing health promoting behaviors (Lambert et al., 2005). Therefore, these variables may also be the barriers to health promoting behaviors for older pregnant Thai women.

Perceived self-efficacy. In the HPM, perceived self-efficacy motivates health promoting behaviors directly by efficacy expectations and indirectly by affecting perceived barriers and determining the level of commitment or persistence in pursuing a plan of action (Pender et al., 2006). Self-efficacy is a central concept in social learning theory and can be defined as the belief that one can successfully execute the behavior required to produce a particular outcome (Bandura, 1995, as cited in Smith & Liehr, 2003). A person with high self-efficacy is more likely to initiate and maintain a specific behavior, such as eating healthy food, than a person with low self-efficacy. Self-efficacy has been shown to be a significant predictor of health promoting behaviors in many studies (Peyman et al., 2007). Therefore, the degree of perceived self-efficacy will be included as a determinant of health promoting behaviors among older pregnant Thai women.

Activity-related affect. Activity-related affect is a subjective feeling state that occurs prior to, during, and following a behavior. These affective responses may be positive (e.g., enjoyment, satisfaction) or negative (e.g., anxiety, boredom). Behaviors associated with positive affect are likely to be repeated, while those associated with negative affect are likely to be avoided (Pender et al., 2006). In the HPM, activity-related affect is proposed to influence health behavior directly as well as indirectly through self-

efficacy and commitment to a plan of action. In this study, the women who have never been pregnant before will have no experience of practicing health promoting behaviors during pregnancy. Thus, it is unlikely that this variable is a factor that influences those samples with no health promoting behaviors to have good baby outcomes. Therefore, this variable will not be included in this study.

Interpersonal influences. Interpersonal influences are cognitions concerning the behaviors, beliefs, or attitudes of others. They include norm-expectations of significant others, social support (e.g., instrumental and emotional encouragement), and modeling-vicarious learning through observing others engaged in a particular behavior (Pender et al., 2006). The primary sources of this factor are families, peers, and health care providers that can increase or decrease commitment to and engagement in health promoting behaviors. In the HPM, persons are more likely to commit to and engage in health promoting behaviors when significant others model the behavior, expect the behavior to occur, and provide assistance and support to enable the behavior. Interpersonal influences, defined as social support, have been shown to affect individuals' predisposition to engage in health promoting behaviors in a number of studies (Chen, Kuo, Chou, & Chen, 2007; Downs & Hausenblas, 2007). Therefore, this variable will be included in this study.

Situational influences. Personal perceptions and cognitions of situation or context can facilitate or impede characteristics, and aesthetic features of the environment (Pender et al., 2006). Individuals may want to promote health, but environmental limitations may obstruct healthful options. In this study, all pregnant women are older

and Thai, thus they have the same situation during their pregnancies. The environment, culture, and options available for promoting health behaviors for the women are mostly the same for all samples, therefore, this variable will not be included in this study.

Commitment to a plan of action. Commitment to a plan of action implies a commitment to carry out a specific action at a specific time and place and identification of specific strategies for carrying out and reinforcing the behavior (Pender et al., 2006). In this study, commitment to a plan of action refers to the commitment to engage in good health behaviors during pregnancy that result in the good baby outcomes.

Immediate competing demands and preferences. These factors refer to alternative behaviors that intrude into the consciousness as possible courses of action immediately before the intended occurrence of a planned health promoting behavior. Competing demands are defined as alternative behaviors over which individuals have a low level of control, such as work or family care responsibilities. Competing preferences are defined as alternative behaviors with strong reinforcing personalities over which individuals have a high level of control. Competing preferences are the different hierarchy of control that derails a plan for positive health action. Strong commitment to a plan of action may sustain dedication to complete a behavior in light of competing demands or preferences (Pender et al., 2006).

Health promoting behavior. Health promoting behavior is the end point of action outcome in the HPM. The health promoting behaviors of interest in this study are the utilization of positive health actions during pregnancy that may result in positive maternal and infant outcomes in older pregnant Thai women. The relationships between

selected factors and health promoting behaviors that influence maternal and infant outcomes in older pregnant Thai women will be explored. The relationship among the proposed variables is shown in Figure 1.

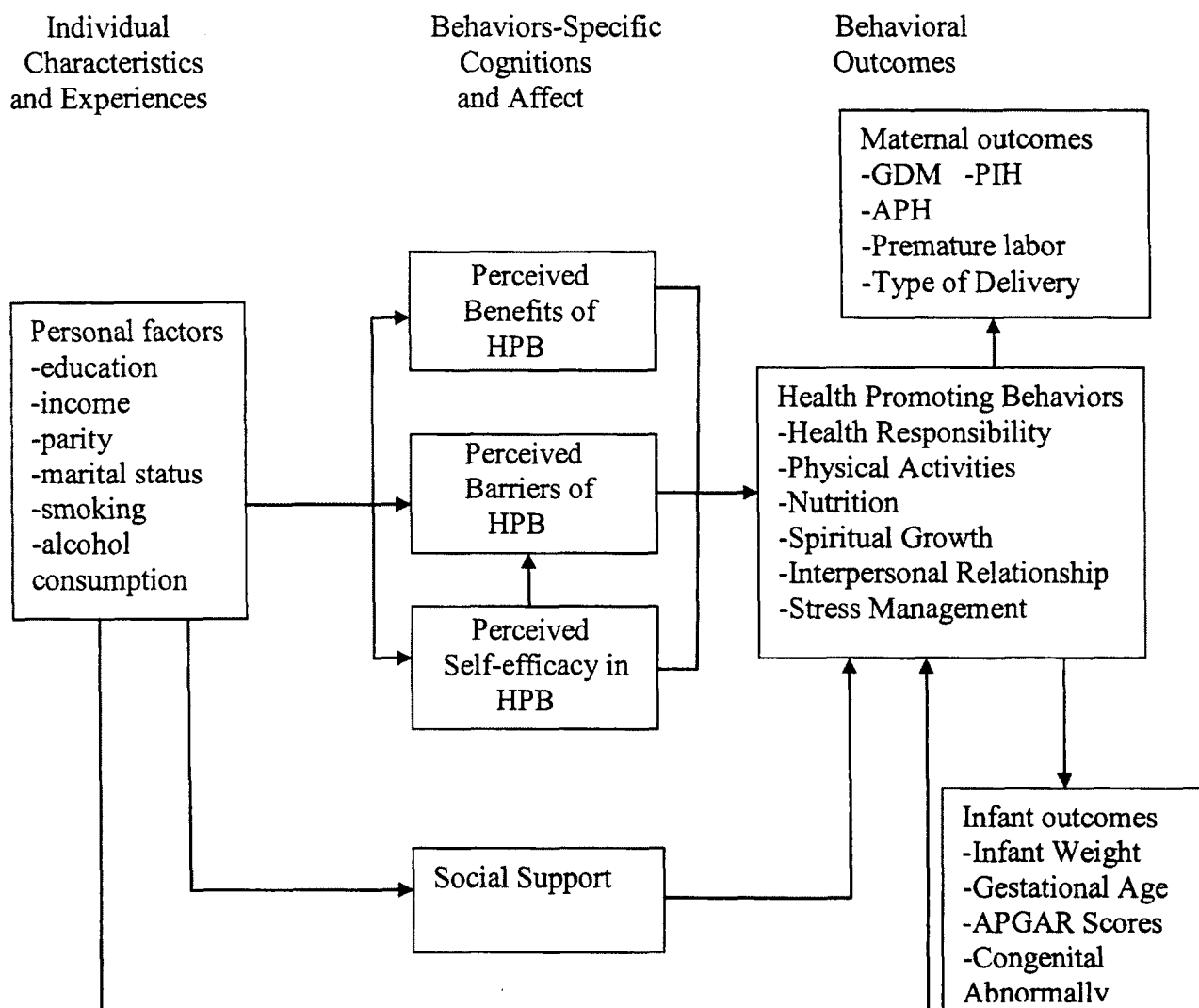
Purpose of the Study

The purpose of this prospective correlational descriptive study was to determine maternal factors which may influence HPB and resulting maternal and infant outcomes among older pregnant Thai women. In this study, relationships among a selected group of factors identified in Pender, Murdaugh and Parsons's (2006) Health Promotion Model, including personal factors (education, income, parity, marital status, smoking, and alcohol consumption), perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors and maternal and infant outcomes in older pregnant Thai women, were examined.

Research Question

The research question guiding this study were as follows:

1. What are the relationships between maternal factors (personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and social support) and overall level of health promoting behaviors in older pregnant Thai women?
2. What is the relationship between overall level of health promoting behaviors and maternal outcomes in older pregnant Thai women?
3. What is the relationship between overall level of health promoting behaviors and infant outcomes in older pregnant Thai women?



*Figure 2. Model of factors and health promoting behaviors that influence maternal and infant birth outcomes in older pregnant Thai women. Adapted from "Health Promotion Model (revised)," by N. J. Pender, C. L., Murdaugh, and M. A. Parsons, 2006, *Health Promotion in Nursing Practice*. Upper Saddle River, NJ: Pearson Education*

This study was used descriptive statistics, inferential, and multivariate statistics to analyze the data. The results of the study provide a resource for health policy makers in

designing special care services appropriate to the needs and concerns of older mothers.

Moreover, results of the study can be used to develop nursing health education and counseling interventions to decrease negative maternal and infant outcomes in this population.

Chapter 2

Literature Review

This chapter summarizes literature relevant to the topic of this dissertation. It is organized into four sections: (a) health promoting behaviors of older pregnant women, (b) factors influencing health promoting behaviors in older pregnant women, (c) maternal and infant outcomes in older pregnant women, and (d) maternal personal characteristics.

Health Promoting Behaviors of Older Pregnant Women

Health promoting behaviors of older pregnant women are important because pregnancy at the age of 35 years or older may result in many complications. However, few studies were found that focus on older pregnant women. Most studies on health promoting behaviors focused on healthy pregnant women, other high-risk pregnancies, or healthy adults.

Although older mothers are expected to be well informed and have greater knowledge about pregnancy than younger women, delayed pregnancy may be harmful for the women or fetus, especially when associated with inappropriate behaviors. These include insufficient rest, vigorous work, anxiety, and stress. Serious complications, which may occur during pregnancy, delivery, and the postpartum period, include pregnancy-

induced hypertension, abruptio placenta, and fetal abnormalities (Miller, 2005). In 2002, Viau et al., explored the specific health concerns and health promotion behaviors of childbearing women 35 years of age or older. The participants were interviewed in their third trimester of pregnancy. The results showed that almost of the older pregnant women reported engaging in multiple health promoting behaviors focusing on daily nutritional intake, life style activities, and rest patterns. They increased daily water intake, decreased caffeine consumption, and eliminated alcohol and smoking. More than a half of the participants altered their daily activities by altering work schedules, responsibilities, and travel.

Health promoting behaviors are necessary for older pregnant women to perform in their daily lives in order to maintain their own and fetal health. Health promoting behaviors can reduce problems of infant health, control and prevent complications, and decrease maternal and infant mortality. In addition, health promoting behaviors are the targets of the Tenth National Socio-Economic Development Plan (2007-2011) of Thailand (WHO, 2010). With increasing attention to lifestyle behaviors, the focus in health care is being directed toward the promotion of health and away from treatment of disease. With this emphasis, health professionals are concerned about how much of this attention is actually affecting health behaviors.

The concept of health promoting behaviors involves a positive action life-style directed toward sustaining or increasing the individual's level of well-being, self-actualization, and personal fulfillment (Pender et al., 2006). Thus, older pregnant women need to establish healthy behaviors in order to be healthy mothers. Healthful physical and

psychological conditions during pregnancy can allow them to achieve good health as well as normal fetal development.

To promote health behaviors in older pregnant women, pregnant women seem to be increasing their attention to exercise, stress modification, and nutrition awareness. However, information is limited as to the effectiveness of interventions directed at the promotion of health. While research on positive health behaviors during pregnancy is limited, the importance of health promotion during the prenatal period is receiving increased attention.

According to the Pender's revised Health Promotion Model (1996), the major components of a healthy lifestyle will be developed in six dimensions including health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth, and stress management. Older pregnant women should incorporate these components into their health promoting behaviors.

Health responsibility. Older pregnant women should have activities for self-care management as well as concern about their body's changes during pregnancy. In addition, they must seek information or knowledge and prenatal care to promote their own and their babies' health. Zephyrin and D'Alton (2007) suggested that women can maintain a healthy pregnancy after 35 years of age by keeping themselves healthy; stopping smoking, drinking alcohol, or taking illegal drugs; getting preconception care; having a reproductive health plan; and seeing a health care provider regarding fertility concerns. However, there are no reports for older pregnant Thai women regarding these health responsibilities. Among ever-married pregnant Thai women aged 35 years or older, 7.66% received no prenatal care, and 4.03% gave birth at home with the uncertified

midwife (National Statistical Office, 2006). These indicate that older pregnant Thai women have poor health responsibility that may result in negative maternal and infant outcomes.

Physical activity. Suitable exercise for pregnant women involves doing daily activity or walking in green areas everyday for at least 30 minutes. They also encourage certain postures to avoid back pain and muscle strain. Appropriate exercise can improve cardiovascular function, reduce common discomforts of pregnancy, and help pregnant women tolerate the process of labor with less alteration in fetal cord blood (Towle & Adams, 2008). Aggressive or vigorous exercise should be avoided; it could cause premature labor, especially in the third trimester. A study by Hopkins, Baldi, Cutfield, McCowan, and Hofman (2010) revealed that mothers who did regular aerobic exercise during pregnancy kept their babies' birth weight within a healthy range. In addition, Downs & Hausenblas (2007) stated that women exercising during their third trimester had significantly lower postpartum BMIs and significantly heavier and longer babies than women not exercising during their third trimester.

Nutrition. Adequate nutrition during pregnancy is essential for pregnant women. Fetal development requires many nutrients to foster fetal growth. The mother's weight should increase by 10-12.5 kilograms or not more than 25% of her weight before pregnancy. Normal physiological events cumulatively account about for 9 kilograms, including the fetus, amniotic fluid, uterine hypertrophy, increase in maternal blood volume, breast enlargement, and maternal extracellular and extravascular fluid (Mc Kinney, James, Murray, & Ashwill, 2005). Babies born to mothers with inadequate weight gain are more likely to be premature and small for gestational age (SGA).

Heather (2010) revealed that poor maternal nutrition increases the risk of the fetus for future diseases. In contrast, women with excessive weight gain during pregnancy are at increased risk for developing type II diabetes later in life (Shah & Ohlsson, 2009; Vause, Martz, Richard, & Gramlich 2006). The National Statistical Office of Thailand (2001) reported that 76% of older pregnant Thai women drink alcohol during pregnancy. Therefore, older pregnant women need to have adequate quality and quantity nutrition.

Interpersonal relationships. Close relationships with different people, for example, husbands, relatives, neighbors, and friends, will provide support in various ways. Older pregnant women come in contact with these people that can support them while going through difficulties, stress, and problems occurring during pregnancy. People in social networks may also help pregnant women practice their health promoting behaviors. Therefore, pregnant women would feel warm, secure and have persistent emotion. In addition, having a relationship with someone who had delivered an infant before may help in exchanging ideas, experiences, and problems faced during pregnancy. Carolan (2004) reported that primiparous women over the age of 35 often have limited family social support.

Spiritual growth. Spiritual growth is the ability of pregnant women to develop their spiritual nature to its greatest potential. These attributes include the ability to discover and articulate a basic purpose in their lives, the ability to learn how to experience love, joy, peace, and fulfillment, and the ability to help themselves and others to achieve their greatest potential (Pender, 1996). Attainable goals are being proud to be a mother, being optimistic, looking at the situation in a realistic manner, accepting changes, and preparing to face potential problems. If pregnant women can achieve their

life goals, they will realize their spiritual reality and know themselves better. The greater the sense of self-efficacy the higher the number of reported health promoting behaviors.

Stress management. Older pregnant women may be stressed for personal reasons or at work. They should have some activities that reduce physiological and psychological stress. Pender (1996) suggested managing daily stress by reducing the frequency of situations that lead to stress by changing the environment or one's lifestyle. Moreover, increasing resistance to stress by doing exercise, increasing self-esteem, talking to close friends, traveling, or taking time to relax are recommended. Mc Kinney et al. (2005) suggested that a high level of stress during pregnancy was associated with low birth weight and perinatal death. Research by Nkansah-Amankra, Luchok, Hussey, Watkins, and Xiaofeng (2010) indicated that maternal stress was significantly associated with increased risk of low birth weight and preterm delivery. Moreover, Weck, Paulose, and Flaws (2008) suggested that chronic stress affects pregnancy outcomes, possibly resulting in spontaneous abortion, preterm birth, alterations in fetal development, and long term health consequences for offspring.

Factors Influencing Health Promoting Behaviors in Older Pregnant Women

According to Pender (1996) the six components of a healthy lifestyle can enhance maternal and infant health if older pregnant women engage in health promoting behaviors. Since numerous factors exist, those factors that will be included in this study are perceived benefits of action, perceived barriers to action, perceived self-efficacy, social support, health promoting behaviors, and some personal characteristics that are theoretically relevant to the explanation and prediction of pregnancy outcomes.

Perceived benefits of health promoting behaviors in older pregnant women.

Pregnant women tend to engage in health promoting behaviors if they anticipate benefits from those behaviors (Pender, 1996). There was limited information in the literature regarding older pregnant women's perceived benefits of health promoting behaviors. However, some researchers have found that perceived benefits are significant predictors of health promoting behaviors in pregnant women. Research by Caughey, Washington, and Kuppermann (2008) found that women aged 35 years old or older had a higher perceived risk of Down syndrome than younger women, but had a lower perceived risk of a procedure-related miscarriage. Therefore, older women perceived prenatal testing at their high-risk age as beneficial.

In a study of factors that influenced prenatal care utilization among Thai women by Cananub (2004), perceived benefits were significantly related to greater frequency of prenatal care visits. Pichayapinyo (2005) reported that the perceived benefits of prenatal care predicted first time Thai mothers' use of prenatal care. The greater the perceived benefits of prenatal care, the greater the number of antenatal care clinic visits. Clearly, perceived benefits of behaviors encourage positive health behavior activities. Therefore, perceived benefits and their relationship to health promoting behaviors during pregnancy that influence maternal and infant outcomes will be examined.

Perceived barriers to health promoting behaviors in older pregnant women.

People sometimes experience barriers to engaging in health promoting behaviors. Barriers affecting personal health behavior may be imagined or real and may consist of perceptions concerning the unavailability, inconvenience, expense, difficulty, or time consuming nature of a particular action (Pender, 1996). Several studies examined the

relationship between perceived barriers and health promoting behaviors in pregnant women and new mothers. The results showed that perceived barriers to action had negative relationships with health behavior. As barriers increased, the extent of health behavior decreased (Cananub, 2004). Moreover, Arethiweth (2003) and Lambert et al. (2005) found that perceived barriers had a significant negative correlation with health promoting behaviors in postpartum women.

A study by Beckmann, Buford, and Witt (2000) reported that the two major barriers to seeking prenatal care in pregnant women who come to antenatal care clinic after the 20th week of gestation were long waiting time at the time of appointments and the cost of getting care. In addition, the results showed a significant relationship between perceived barriers and the age of the women. Married women aged 15 to 19 years and those over 30 years old were more likely to be concerned about cost and believe the wait at the antenatal care clinic appointment was too long. It was claimed that perceived barriers are parallel to perceived benefits of action and exert a direct influence on predisposition to engage in health promoting behaviors. In this study, perceived benefits and their relationship to health promoting behaviors during pregnancy that influence maternal and infant outcomes among older pregnant Thai women will be examined.

Perceived self-efficacy in older pregnant women. Most studies on self-efficacy focused on healthy or high-risk pregnancy and the intention to participate in health promoting behaviors. However, few studies were found to focus on older pregnant women.

A person's action is based on self-efficacy. If people believe that they have self-efficacy, they will show capability, tolerance, and accomplishment behaviors. Therefore,

people who have high self-efficacy will seek information to prevent or stop risk behaviors and seek care during the onset of symptoms more often than those with low self-efficacy (Stretcher, Devellis, Becker, & Rosenstock, 1986).

A study of factors that influence prenatal care utilization among Thai women by Cananub (2004) indicated that pregnant women with higher self-efficacy scores had more prenatal visits. Moreover, studies have examined the relationships between self-efficacy and health promoting behaviors in Thai women. For example, Patanavanichnun (2000) found that pregnant industrial workers were more likely to engage in health promoting behaviors if they had higher perceived self-efficacy for health promoting behaviors. Stepwise multiple regression revealed that perceived self-efficacy accounted for 29.6% of the variance in health promoting behaviors. Similar research designed to describe the relationships between perceived self-efficacy and exercise and exercise behaviors in Thai pregnant women by Klankhajhon (2008) indicated that pregnant women had moderate exercise behaviors. The pregnant women with higher self-efficacy scores exhibited more exercise behaviors.

Wirifai (2004) studied the effects of structured information on perceived self-efficacy, outcome expectation of health behaviors, and pregnancy outcomes in pregnant women with premature labor pain. Pregnant women in the experimental group had a significantly higher mean score for perceived self-efficacy and outcome expectation of health behaviors than the control group. These results implied that pregnant women with premature labor pain with higher self-efficacy scores had outcomes of pregnancy in terms of gestational age at delivery more term than those who did not. Those findings found that self-efficacy was the most useful for health promotion. Therefore, general self-

efficacy and its relationship to health promoting behaviors during pregnancy that influence maternal and maternal and infant outcomes among older pregnant Thai women will be examined in this study.

Social support in older pregnant women. Most studies of social support focused on healthy non-pregnant and pregnant women or high-risk pregnant women. Limited studies were found to focus on older pregnant women.

In the health promotion theoretical framework, social support is suggested as a resource variable affecting pregnancy outcomes. Social support was included among interpersonal influences proposed in the health promotion model as behavior-specific cognitions which directly influence health promoting behaviors (Pender et al., 2006). In a study aimed at identifying relationships among social support, maternal personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and prenatal care utilization, Cananub (2004) collected postpartum data from 110 Thai women. The results indicated that women who had more social support tended to have more frequent prenatal care visits. Similarly, Pitchayapinyo (2005) examined the relationship of perceived benefits, perceived barriers, social support, and sense of mastery to adequacy of prenatal care for first time Thai mothers. The findings indicated that perceived benefits of prenatal care and social support were predictors of adequate prenatal care, while perceived barriers and sense of mastery were not. Schardt (2005) noted that older pregnant women's psychological needs are often underestimated. They also worry required extra support and supervision during pregnancy. Carolan (2004) reported on findings from a longitudinal qualitative study that older pregnant women may experience situations of

limited family or social support, geographical distance from family, and few links to the community.

Although social support is primarily defined by its more positive dimension, recent research has noted the negative aspect of this construct. Support can be viewed as negative if it undermines self-esteem, causes strain within the social network, and does not allow for equal and reciprocal relationships. The Tilden Interpersonal Relationship Inventory (IPRI) was developed to examine the possible negative aspects of social support (Tilden, Nelson, & May, 1990). Perceived social support may be more strongly associated with health behaviors and health outcomes because it more directly measures the support offered to a person. Most of the studies on social support have found a relationship with psychological factors such as anxiety, stress, self-esteem, and adjustment. Research that has examined social support as a predictor variable for particular outcomes, for instance health behaviors, pregnancy complications, and infant outcomes has demonstrated equivocal results. More research is needed to determine whether perceived social support is predictive of particular health/well-being outcomes. Therefore, in this study, perceived social support and its relationship to health promotion activities during pregnancy that influence maternal and infant outcomes among older pregnant Thai women will be examined.

Maternal and Infant Outcomes in Older Pregnant Women

At any point during pregnancy, older pregnant women have the potential to become unhealthy, resulting in a negative birth outcome. In this study, infant outcomes will be measured by four variables. All of them are physiological indicators. They

include infant birth weight, gestational age, APGAR scores at birth, and congenital abnormality.

Infant birth weight. In a normal birth outcome following 37 to 40 weeks of gestation, the newborn infant is of normal weight (2,500 grams) and without any birth defects (National Governors Association, 2004). Several maternal behaviors and characteristics have been associated with low birth weight babies, particularly the age of the mother at pregnancy. Many studies found that women 35 years or over have a higher risk of low birth weight than younger women.

Delbaere et al. (2007) compared perinatal data for primiparous women aged 35 years or older ($n=2,970$) to data of primiparous women 25 to 29 years old ($n=23,921$). They found that older maternal age correlated with low birth weight (birth weight < 2,500 gram). Research by Tough et al. (2002) found that low birth weight deliveries also increased by 10.9% ($p < 0.025$) for women 35 years of age and older. Moreover, a study to compare the maternal and perinatal outcomes of nulliparous women 35 years of age and older ($n = 143$) at the time of delivery with nulliparous women 25 to 29 years old ($n = 148$) was conducted by Ziadeh (2002). The results showed that women delivering their first child at 35 years or older were at an increased risk of low birth weight.

In Thailand, Tabcharoen et al. (2009) studied pregnancy outcomes in pregnant women at age 40 or older. The multivariate logistic regression analysis confirmed that older maternal age was an independent risk factor for low birth weight. A similar study by Suwannachat and Ualalitchoowong (2007) reported that pregnancy at and older age was associated with adverse neonatal outcomes, such as low birth weight, preterm delivery, and Apgar scores less than 7 at 1 minute after birth.

Gestational age. The normal gestational age of full term pregnancy is 38 to 40 weeks (National Governors Association, 2004). Several maternal behaviors and characteristics have been associated with preterm birth, particularly the age of mother at pregnancy. Many studies found that women 35 years or older have a higher risk of preterm birth than younger women. Delpisheh, Brabin, Attia, and Brabin (2008) examined the correlation of maternal age as an independent factor for adverse birth outcomes in the United Kingdom population from Liverpool. They analyzed hospital based data from 9,506 delivery records from 1998 to 2003 at the Liverpool Women's Hospital to assess pregnancy outcomes in older women of reproductive age. The results showed that mean gestational age was shorter with advanced age (39.0 weeks) compared with young adults aged 26 to 30 years (39.8 weeks). Primiparous women over 40 years old were also at higher risk for delivering a very preterm baby (8.9% v.s. 4.4%, $p = 0.001$) than multiparous mothers of the same age.

Likewise, Delbaere et al. (2007) compared perinatal data for primiparous women aged 35 years or older ($n=2,970$) to those aged 25 to 29 years old ($n=23,921$). Univariate analysis was used to assess the effect of maternal age on pregnancy outcomes. They found that older maternal age correlated with very preterm birth (gestational age < 32 weeks), low birth weight (birth weight < 2,500 gram) and perinatal death. Furthermore, a study by Tough et al. (2002) found that the preterm delivery rate (< 37 weeks) for women 35 years of age and older was increased 13.6% ($p < 0.010$). Moreover, a study to compare the maternal and perinatal outcomes of nulliparous women 35 years of age and older ($n = 143$) at the time of delivery with nulliparous women 25 to 29 years old ($n = 148$) was conducted by Ziadeh (2002). The results showed that women delivering their first child at

35 years of age or older were at an increased risk of adverse neonatal outcomes, such as lower gestational age, low birth weight, preterm delivery, small for gestational age, fetal distress, and neonatal intensive care unit admissions than younger women. In Thailand, similar studies designed to examine infant outcomes in older pregnant women revealed that women 35 years or older have a higher risk of preterm delivery (Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009).

APGAR scores at birth. APGAR scores provide a quick and reliable means of assessing a neonate's physiological response to the birth process and its vital function in the first few minutes of extrauterine life. It includes the following components: heart rate, respiration, reflex responses, muscle tone, and skin color and is considered the best indicator of neonatal health. APGAR scores for a normal full-term baby 1 minute and 5 minutes after birth are expected to be 8 and 9, respectively. A score of 7 or less represents an impairment of the cardiopulmonary adaptation process and can be associated with long-term complications (Towle & Adams, 2008). As the APGAR scoring system is both easy and well integrated into Thailand's health care system, the researcher will examine the possible links between health promoting behaviors and the 5-minutes APGAR scores (the most reliable index of the neonate's future health status) in babies who are born to older pregnant Thai women.

The research literature linked several factors to low APGAR scores, especially women who get pregnant at age 35 or older. Tabcharoen et al. (2009) examined pregnancy outcomes in pregnant women aged 40 or older. They found that older pregnant Thai women had increased rates of low 1- and 5-minute APGAR scores. Research by Suwannachat and Ualalitchoowong (2007) reported that pregnant Thai women aged 35 or

older had an increased rate of APGAR scores lower than 7 at 1 minute after birth. In contrast, Weerasekera and Udugama (2003) conducted a study designed to determine obstetric and neonatal outcomes in women who become pregnant at or after 40 years of age compared to pregnancies below the age of 40. The results revealed no significant difference in the 5-minute APGAR scores between the two groups.

Congenital abnormality. The risk of conceiving a child with congenital abnormality increases with age, especially over age 35. Major congenital abnormalities can be structural or chromosomal abnormalities. Common examples are Down syndrome, trisomy 18, or trisomy 13 (Towle & Adams, 2008). These agree with many studies which revealed that congenital abnormality occur at significantly more frequent level in older pregnant women (Hoffman et al., 2007; Miller, 2005; Tabacharoen et al., 2009).

Maternal complications. Older pregnant women have an increased incidence of medical and obstetrical complications during pregnancy. The two most common complications in older pregnant women are diabetes and hypertension (two disorders that increase with age). Not only are women over 35 more likely to have these conditions before they become pregnant, they are more likely to develop them during pregnancy. Moreover, women with glucose intolerance (a precondition for diabetes) have a high comparative risk of gestational diabetes melitus, and those with high blood pressure are at increased risk for preeclampsia and kidney failure during pregnancy (Muhieddine, 2002; Montan, 2007).

Women over 35 are also at increased risk of antepartum hemorrhage especially abruptio placenta, a condition in which the placenta detaches prematurely from the uterine wall, believed to be related to the aging of uterine blood vessels, and placenta

previa, in which the placenta completely or partially covers the cervix. Uterine fibroids, which are more prevalent in older women, increase the risk of preterm contractions, degeneration of the placenta, and abnormal presentation of the fetus, a common cause of cesarean delivery (Joseph et al., 2005; Muhieddine et al., 2002). The results from several studies designed to study pregnancy outcomes in older pregnant women supported the occurrence of these complications. Advanced maternal age was associated with GDM, pregnancy induced hypertension, antepartum hemorrhage, and preterm delivery (Joseph et al., 2005; Montan, 2007; Muhieddine et al., 2002; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). Moreover, older pregnant women may confront intrapartum complications of malpresentation, fetopelvic disproportion, abnormal labour, increased use of oxytocin in labour, caesarean section, instrumental delivery, sphincter rupture, and postpartum hemorrhage (Montan, 2007). In this study, only medical and obstetrical complications during pregnancy in older pregnant Thai women will be examined.

Maternal Personal Factors

In addition to the perceived benefits and barriers of health promotion, self-efficacy, and social support, Pender (2006) noted various factors that affect health promoting behaviors. Personal characteristics are considered to be important variables that affect health promoting behaviors among older pregnant women. Personal characteristics to be included in this study are education, family income, parity, marital status, smoking, and alcohol consumption.

Education. Education is an element that influences decision making, understanding of information, and planning for health promoting behaviors. Highly

educated people tend to seek the benefits of activities that will facilitate their health promoting behaviors and experience for self-care (Pender, 1996). Most studies on education focused on healthy pregnant women and healthy adults. Studies focusing on the relationship between education and maternal and infant outcomes among older pregnant Thai women were limited.

In a study of the mother's perceptions of internal control, health promotion behaviors during pregnancy, and infant health outcomes, Sierra (1995) reported that education was found to be a significant explanatory variable for self-care during pregnancy. Women who had a high level of education also had good self-care behaviors. In addition, Coyle (2009) examined the relationship between sociodemographic factors, concerns, social support, and health-related quality of life of 238 mothers. The results showed that education was the sole sociodemographic predictor of health-related quality of life.

Family income. Family income or economic status influences basic self-care abilities. A person with a firm financial background will be able to seek the benefits of health care, get good food and high quality service, and also find the right products and equipment for health promotion. A person with less income will have limits in finding things to improve health. This agrees with the findings of a study by Walker, Cooney, and Riggs (1999) that lower family income was related to poorer health behaviors in the first trimester of pregnancy. Moreover, Coyle's (2009) study suggested that income can predict health-related quality of life.

Parity. A woman who has had several pregnancies may understand the importance of performing health promoting behaviors. She may have better control over

her temper and be able to solve her problems better than those who have never been pregnant. If the pregnancy has any abnormal conditions, the woman will take extra care of her health. Studies focused on the relationship between parity and maternal and infant outcomes among older pregnant Thai women were limited. Most studies on parity focused on healthy pregnant women.

Tabcharoen et al. (2009) suggested that 79% of older pregnant Thai women were multiparous. However, the study did not examine the relationship between parity and pregnancy outcomes. In a study designed to explore the relationship between mothers' perceptions of internal control over their children's health, self-care behaviors during pregnancy related to their own and their unborn child's health promotion, and the child's eventual health and development, Sierra (1995) found that parity was significantly related to self-care practice during pregnancy.

Marital status. Marital status is a source of benefits, set role, opinion, judgment, problem solving, social support, relation activity, and self-care. It also indicates status and family system. The spouse can help the pregnant woman conserve energy, increase motivation, and encourage the need to develop health knowledge to increase health promoting behaviors. This agrees with Pichayapinyo (2005) who found that the marital status of Thai mothers was significantly related to the adequacy of prenatal care. Likewise, Sierra (1995) studied 166 low income mothers and their month-old babies in urban communities. The results showed that marital status was a significant explanatory variable for self-care during pregnancy.

Smoking. Smoking during pregnancy increases poor pregnancy outcomes, such as low birth weight, preterm birth, and spontaneous abortion (Mc Kinney et al., 2005).

This agrees with the findings of a study by Fertig (2010) that smoking was related to the risk of a low birth weight in pregnant women. Moreover, Keegan, Parva, Finnegan, Gerson, and Belden (2010) study suggested that smoking in pregnant women can predict adverse infant outcomes. In Thailand, smoking habits in older pregnancy have not been addressed.

Alcohol consumption. The use of any alcohol in pregnancy causes a fetus at risk for fetal alcohol syndrome. Children with fetal alcohol syndrome may have difficulties with learning, memory, and communication (Mc Kinney et al., 2005). Women aged 35 or older in Canada reported a higher rate of alcohol consumption during pregnancy compared to other women (Health Canada, 2003). During 2001 to 2005, the highest percentage of pregnant women reporting any alcohol use was aged 35 to 44 years (CDC, 2007). In Thailand, seventy percent of older pregnant women reported alcoholic drinking during pregnancy (National Statistic Office, 2001). These consistent with Chiodo et al. (2010) who found that alcohol consumption during pregnancy were significantly related to maternal age. Children born from older alcohol-using women have more deleterious effects of prenatal alcohol exposure on other neurobehavioral outcomes.

Thus, education, income, parity, marital status, smoking, and alcohol consumption have relationships with health- promoting behaviors. Therefore, in this study these maternal personal factors and their relationship to health promotion by older Thai women during pregnancy will be examined.

Many studies related to health promoting behaviors in pregnancy have been documented in the literature. The results revealed that adverse maternal and infant outcomes are associated with perceived psychosocial factors and health promoting

behaviors. These studies recommend that to improve maternal and infant outcomes, women should have good health promoting behaviors. However, the review of this literature indicated that limited studies regarding the association between factors and health promoting behaviors that influence maternal and infant outcomes in older pregnant Thai women have been conducted. Therefore, studies related to health promoting behaviors in this group are needed.

Chapter 3

Methodology

This chapter addresses the methodology to be used in the study. The study purpose, research questions, specific aims and hypotheses, research design, and procedures for data collection and analysis are addressed.

Purpose of the Study

The purpose of this prospective correlational study was to describe the relationship between personal factors (education, income, parity, marital status, smoking, and alcohol consumption), perceived benefits, perceived barriers, perceived self-efficacy, social support, health promoting behaviors and maternal and infant outcomes in older pregnant Thai women. The relationship of each variable to selected maternal and infant outcomes will be examined, as will the relative contribution of variables to outcomes.

Research Question

The research questions guiding this study are as follows:

1. What are the relationships between maternal factors (personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and social support) and overall level of health promoting behaviors in older pregnant Thai women?

2. What is the relationship between overall level of health promoting behaviors and maternal outcomes in older pregnant Thai women?

3. What is the relationship between overall level of health promoting behaviors and infant outcomes in older pregnant Thai women?

Specific Aims and Hypotheses

This study was designed to address three specific aims, each of which involves testing of a number of hypotheses. The aims and hypotheses are presented below.

Specific Aim 1. Examine the relationships between personal factors (education, income, parity, marital status, smoking, and alcohol consumption), perceived benefits, perceived barriers, perceived self-efficacy, and social support on health promoting behaviors in older pregnant Thai women.

H1: Older pregnant women with higher education levels will exhibit more health promoting behaviors than those with lower levels of education.

H2: Women with higher income will exhibit more health promoting behaviors.

H3: Multiparous women will exhibit worse health promoting behaviors.

H4: Women with couple marital status will exhibit healthier health promoting behaviors.

H5: Women who smoke during pregnancy will exhibit fewer health promoting behaviors.

H6: Women who drink during pregnancy will exhibit fewer health promoting behaviors

H7: Women with higher perceived benefits to health promoting behaviors will exhibit more health promoting behaviors.

H8: Women with higher perceived barriers to health promoting behaviors will exhibit fewer health promoting behaviors.

H9: Women with higher perceived self-efficacy will exhibit more health promoting behaviors.

H10: Women with higher perceived social support will exhibit more health promoting behaviors.

Specific Aim 2. Examine the relationship between health promoting behaviors and maternal outcomes (GDM, PIH, APH, premature labor, and type of delivery) in older pregnant Thai women.

H11: Women with higher health promoting behaviors scores will have healthier maternal outcomes.

Specific Aim 3. Examine the relationship between health promoting behaviors and infant outcomes (birth weight, gestational age, APGAR, and congenital abnormality) in older pregnant Thai women.

H12: Women with higher health promoting behaviors scores will have healthier infant outcomes.

Research Design

A prospective correlational design was used to study the relationship between selected factors and maternal and infant outcomes in older pregnant Thai women. The independent variables in this study were personal factors (education, income, parity, marital status, smoking, and alcoholic consumption), perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors. The dependent variables were maternal and infant outcomes (maternal complications, birth

weight, gestational age, and APGAR). The participants' medical record was used to determine the maternal complications, birth weight, gestational age, and APGAR.

Procedures

Setting. The study was conducted at four public hospitals in a metropolitan area in the north-eastern part of Thailand. These included Khon Kaen Central Hospital, Health Promotion Hospital Region 8 (Khon Kaen province), Mahasarakham Hospital (Mahasarakham province), and Kalasin Hospital (Kalasin province). These hospitals are managed by the Thai government. An antenatal clinic was provided at each of the hospitals. Approximately 20 to 30 older pregnant women were seen per month in the antenatal clinic at each hospital.

Sample and sampling. The population in this study was older pregnant women who received care at the antenatal clinic at Khon Kaen Central Hospital, Health Promotion Hospital Region 8, Kalasin Hospital, or Mahasarakham Hospital. The following criteria were used to select the study sample: Thai pregnant women who (a) were at least 35 years old, (b) had a gestational age between 25 and 36 weeks, (c) were able to read and understand the Thai language, and (d) had no psychiatric diagnoses.

To give the researcher a short time period for looking at maternal and infant outcomes, the third trimester of pregnancy was selected. Moreover, pregnant women usually adapt their health behaviors and change perception of health in this period of pregnancy. Furthermore, pregnancy complications especially GDM and PIH occur at the midpoint of pregnancy (Pillitteri, 2003).

A purposive convenience sampling method was used in this study. The advantages of this sampling technique were that it yields a selection of typical cases and

was convenient and not expensive (Polit & Beck, 2008). In contrast, purposive sampling is rarely representative of the target population. However, it was used in this study because the researcher was interested in understanding the experiences of special segments of the population rather than the typical experiences of the entire population.

The sample size consisted of 130 older pregnant Thai women, as determined using Cohen's power analysis (1987, as cited in Munro, 2005). Eleven independent variables (education, income, parity, marital status, smoking, alcoholic consumption, perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors) were included to calculate sample size. The level of statistical significance was set at an alpha equal to .05, a power of .80, and a medium effect size (.13).

The following steps were taken to recruit participants for the study:

1. An introduction letter was obtained from the dissertation advisor and sent to the directors of the hospitals asking for permission to collect data.
2. The researcher introduced herself to the head nurse and nursing staff at antenatal clinics in each facility, explained the research procedure, and asked for cooperation in data collection.
3. The researcher recruited participants who meet the criteria and were interested in participating in the study from antenatal clinics at the participating hospitals. Participants were recruited by using informational flyers. Flyers were posted in a variety of public places at the antenatal care clinic. If interested, participants telephoned the researcher to make arrangements to meet with them in a private room adjacent to the

antenatal care clinic during next clinic visit, or they could walk in to talk with the researcher or research assistant.

4. The researcher described the study and read the informed consent to the selected participants.

5. After the participants agreed to participate in the study, the researcher asked the participants to sign the consent form and complete the five questionnaires.

6. The researcher followed up on the maternal and infant outcomes by looking at medical records. The protected information included: mother and infant name, address, phone number, medical record number, and information from mother and infant chart.

7. A register nurse working at an antenatal care clinic in each hospital functioned as a research assistant in this study.

Data collection procedures. Self-administered questionnaires were used to gather the data at antenatal clinics in Khon Kaen Central Hospital, Health Promotion Hospital Region 6, Mahasarakam Hospital, and Kalasin Hospital. In the first and second weeks of the month, the researcher collected data at Khon Kaen Central Hospital and Health Promotion Hospital Region 6. In the third and fourth weeks of the month, the researcher collected data at Mahasarakam Hospital, and Kalasin Hospitals respectively. When the researcher was unavailable at the other hospitals, a research assistant collected data. The day after the participant gave birth, the researcher obtained data on the maternal and infant outcomes based on the participants' hospital record, which included maternal complications, infant birth weight, gestational age, and 5-minute APGAR scores. The researcher was also contacted participants by telephone to ask about maternal and infant outcomes.

Definition of Variables

The operational definitions for the variables in this study were as followed.

Perceived benefits. Perceived benefits were defined as the beliefs, thoughts, and feelings of the older pregnant Thai women regarding health promoting behaviors. The score obtained on the 12-item Benefits Scale, a subscale of the benefits to undertaking health preventing and health promoting behaviors that reduce risk factors for negative pregnancy outcomes (Murdaugh & Hinshaw, 1986), was used to measure this variable.

Perceived barriers. Perceived barriers were defined as the beliefs, thoughts, and feelings of the older pregnant Thai women regarding things, events, and activities that inhibit the performance of health promoting behaviors during pregnancy such as money, facilitators, and misconceptions. The 12-item Barriers Scale (Murdaugh & Hinshaw, 1986) was used to measure this variable.

Perceived self-efficacy. Perceived self-efficacy was operationally defined as the score obtained on the 10-item General Self-Efficacy Scale (Schwarzer & Jerusalem, 2008).

Social support. Social support was defined as the score obtained on the 13-item Tilden Interpersonal Relationship Inventory questionnaire (IPRI) (Tilden et al., 1990).

Health promoting behaviors. Health-promoting behaviors were defined as the actions of the older pregnant Thai women in daily activities to improve their physiological, psychological, emotional, and social health status. It was measured using the Health Promotion Lifestyle Profile II Scale (Walker, Schrist, & Pender, 1995).

Maternal and infant outcomes. Maternal outcomes referred to medical complications during pregnancy, which included GDM, PIH, APH, premature labor,

other medical and obstetric complications during pregnancy, and peripartum period complications.

Infant outcomes referred to the weight of baby at birth, APGAR scores at five minutes after birth, gestational age at birth and congenital abnormality. Gestational age was calculated from the first day of the pregnant women's last menstrual period to the date of delivery.

Personal characteristics. Personal Characteristics were defined as characteristics of older pregnant Thai women that affect health promoting behaviors as follows:

1. **Education:** The number of years that a pregnant woman took to achieve her highest level of education.
2. **Income:** The average monthly household income of the pregnant woman.
3. **Parity:** The number of times the woman had been pregnant prior to the current pregnancy, excluding miscarriages.
4. **Marital Status:** The marital status of the pregnant woman as single, married, separated, divorced, or widowed.
5. **Smoking:** Cigarette smoking during pregnancy.
6. **Alcoholic consumption:** Use of alcoholic beverages during pregnancy.

Instrumentation

For the purpose of this study, the researcher used five instruments for data collection.

The personal characteristics questionnaire was used to collect demographic information including education, income, parity, marital status, smoking, alcoholic consumption (Appendix E).

Perceived benefits and perceived barriers of health promoting behaviors

were measured using the Murdaugh and Hinshaw's Barriers and Benefits Scale (1986). The original scale contained 10 items each using a 6-point response format. After many pilot studies, the perceived benefits and perceived barriers scale has been further refined to a 24-item instrument. Alpha coefficients estimating internal consistency reliability ranged from .72 to .79. Content validity was established by cardiovascular clinical experts. Construct validity was estimated with exploratory factor analysis that revealed several content clusters that can measure the constructs of interest.

The latest version contains 12 items related to perceived benefits and 12 items addressing perceived barriers. This instrument was adapted by the researcher based on Murdaugh and Hinshaw's Preventive Behavior Model (Appendix F). The questionnaire is designed to measure older pregnant Thai women's perceived benefits and barriers related to undertaking illness preventing and health promoting behaviors that modify risk factors contributing to negative pregnancy outcomes. Suitable adaptations were made to appropriately address Thai women's behaviors. The question that asked about smoking, for example, was changed to address sexual intercourse during pregnancy because of limited smoking prevalence among Thai women.

The English versions of the instruments were translated to Thai. The Thai translated versions of the instruments were adapted for use with older pregnant Thai women and were translated back to English. These 24 items are rated on 4-point Likert-type scale ranging from 1 to 4 (1 = strong disagreement, 2 = disagreement, 3 = agreement, 4 = strong agreement). Separate scores are calculated for perceived benefits and perceived barriers. The total possible score for each set of questions ranges from 12

to 48. The actual score of 36 or higher indicates high levels of perceived benefits of and barriers to health promoting behaviors, and the score of 31 or lower indicates low levels of perceived benefits of and barriers to health promoting behaviors. In this study, internal consistency reliability for the perceived benefits and perceived barriers sub-scales were supported by Cronbach's alpha coefficients of .739 ($M = 3.543$, $SD = .346$) and .890 ($M = 3.078$, $SD = .587$), respectively.

Perceived self-efficacy was measured by the use of the Schwarzer and Jerusalem (2008) General Self-Efficacy Scale (see Appendix G). This scale has been used in numerous studies in samples from 27 nations. These studies showed Cronbach's alphas ranging from .76 to .90. The total score is used to assess the subject's perceived level of self-efficacy. These 10 items are rated on 4-point Likert-type scale ranging from 1 to 4 (1 = not at all true, 2 = hardly true, 3 = moderately true, 4 = exactly true). The total possible score ranges from 10 to 40. The actual score of 30 or higher indicates a high level of perceived self-efficacy, and the score of 26 or lower indicates a low level of perceived self-efficacy. In this study, internal consistency reliability for the perceived self-efficacy scale was supported by a Cronbach's alpha coefficient of .878 ($M = 3.046$, $SD = .449$).

Social support was measured using the Tilden Interpersonal Relationship Inventory questionnaire (IPRI), developed by Tilden, Nelson, and May (1990). The instrument was developed in 1983 and has been used in a wide variety of samples including pregnant women. The original IPRI consisted of 39 items divided into three subscales addressing social support, reciprocity, and conflict. The initial testing of Cronbach's alpha coefficient was .91 for social support, .84 for reciprocity, and .81 for conflict. This 39-item tool is rated on a 5-point Likert-type scale. Respondents are asked

to indicate the degree of agreement with items ranging from 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). In this study, only the 13 items of interpersonal social support subscale were used to measure interpersonal relationships.

The total possible score ranges from 13 to 65. The actual score of 49 or higher indicates a high level of perceived social support, and the score of 42 or lower indicates a low level of perceived social support (Appendix H). In this study, internal consistency reliability for the social support subscale was supported by a Cronbach's alpha coefficient of .842 ($M = 3.899$, $SD = .495$).

Health promoting behaviors were measured by the use of the Health Promotion Lifestyle Profile II scale (HPLP II) created by Walker, Sechrist, and Pender (1995). The original HPLP was derived from the Lifestyle and Health Habits Assessment developed by Pender (1982). After many pilot studies, the HPLP contained 48 items and became available in 1987 (Pender, 1987). This scale has been refined and used in diverse populations and across cultures. The latest version is HPLP II, a 52-item instrument, which has six dimensions to measure a health-promoting lifestyle. The six subscales address health responsibility, physical activities, nutrition, spiritual growth, interpersonal relationships, and stress management. The total HPLP II Cronbach's alpha score is .94.

This instrument was adapted by the researcher based on Pender's Health Promotion Model to measure health promoting behaviors in older pregnant Thai women (Appendix I). Suitable adaptations were made for the older pregnant Thai women. For example, one item addressed asking the doctor or the nurse about prenatal testing for women 35 years of age and older, and another asked about advice from a doctor or nurse

for self-care when pregnant at an older age. In addition, some items were adapted to be appropriated for Thai culture, such as eating habits and exercising activity.

A 4-point Likert-type scale is used to respond to the items (1 = never do these behaviors, 2 = sometimes do these behaviors, 3 = often do these behaviors, 4 = always do these behaviors). The total possible score ranges from 52 to 208. The actual score of 156 or higher indicates good health promoting behavior, and the score of 133 or lower indicates poor health promoting behavior. In this study, internal consistency reliability for the health promoting behaviors scale was supported by a Cronbach's alpha coefficient of .9317 ($M = 3.124$, $SD = .410$).

Maternal and infant outcomes were obtained from medical records. These include maternal complications, infant birth weight, gestational age, and 5-minute APGAR scores.

Maternal complications that were measured included GDM, PIH, APH, premature labor, other medical and obstetric complications during pregnancy, and peripartum period complications.

Infant birth weight was obtained from the infant's medical record. The normal Thai infant birth weight is 3,000 grams. The infant who has birth weight less than 2,500 grams is categorized as low birth weight (Ministry of Public Health, 2007).

Gestational age was determined based on the infant's medical record. The full term gestational age at birth for Thai pregnant women is 38-40 weeks. Preterm delivery occurs at a gestational age ≤ 37 weeks (Littleton & Engebretson, 2005).

The 5-minute APGAR score was gathered from the infant's medical record. A score of 7 to 10 is considered normal, while a score of 4 to 7 requires some resuscitative

measures, and a baby with an apgar of 3 and below requires immediate resuscitation (Littleton & Engebretson, 2005).

Congenital Abnormality was gathered from the infant's medical record. All defects that present at birth, such as Down's syndrome, heart defect, and cleft lip and cleft palate were included (Littleton & Engebretson, 2005).

Previous Study to Translate and Validate English Version Instruments to Thai

From March 8 to April 30, 2010 a study was conducted by the researcher in Thailand to test the reliability and validity of study instruments. The instruments were translated from English to Thai. The translation followed the guidelines proposed by Kim, Schewertz-Bancott, Holter, and Lorensen (1995). This guideline consists of three phases: translation, back translation, and a consensual phase. All of the instruments had been previously translated into Thai and used to collect data in different populations in Thailand. The Thai translated versions of the instruments were adapted for use with older pregnant Thai women and were translated back to English by an experienced translator proficient in both Thai and English who had never seen the English versions of the instruments. Finally, the English versions derived from back translation of the Thai version were compared to the original English versions of the instruments. This consensual phase was completed by two Thai nurse educators who are proficient in both English and Thai.

Content validity was assessed by three faculty members from nursing colleges in north eastern Thailand. All are experts in maternal and child nursing and health promotion. They concluded that the instruments were appropriate and relevant for older pregnant women. Minor editing to enhance comprehension and developmental

appropriateness to Thai culture was conducted, including kinds of food, types of physical activity, and activities for leisure time. The instruments were pilot tested with 35 older pregnant women who received care at the antenatal care clinic of Khon Kaen Central Hospital, Khon Kaen province, Thailand. The Cronbach's alpha coefficient was used to assess internal consistency reliability of the instruments. The alphas for the instruments ranged from .721 to .932.

Statistical Analysis

Descriptive statistics were used to describe sample characteristics. Pearson product-moment correlations were used to determine association among continuous variables; Spearman Rho correlation coefficient analysis was used to compare ranked variables and continuous variables. Point-biserial correlation coefficient was used to compare discrete dichotomous variables and continuous variables (Field, 2005).

Point-biserial correlation coefficient was used to examine the relationship between health promoting behaviors and maternal and infant outcomes. Point-biserial correlation was further used to explore the relationships between marital status and smoking and health promoting behaviors. Pearson product-moment correlations were conducted to examine the relationship between each of two personal factors (income and parity), perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors. Spearman Rho correlation coefficient analysis was used to describe the relationships of education level and alcohol consumption with health promoting behaviors. Subsequently, stepwise multiple regression analysis was conducted to evaluate how well the personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and social support predicted health promoting behaviors.

Human Subjects Protection

The proposal was reviewed by the Institutional Review Board of the University of San Diego. The researcher developed an informed consent form for the participants to sign before they engaged in the research (Appendix F). Furthermore, the researcher explained the purpose of the study, estimated time commitment, minimal risks, and benefits to the participants.

Written informed consent was obtained prior to study participation. The participants were informed in writing in the consent form and verbally that their participation in the study was voluntary and they had the right to: (a) not answer a question, (b) terminate the interview, or (c) withdraw from the study at any time in the process. Participants were assured that their participation or nonparticipation or their refusal to answer questions would have no effect on services they receive from health care providers.

The participants participated in a 60-minute data collection session consisting of administration of the study instruments by the researcher. Privacy was maintained in a room located near the antenatal care clinic. After obtaining written informed consent, the participants completed the study instruments. Following data collection, participants were thanked for their participation. The participants incurred no expenses during the study other than approximately 60 minutes of time. Permission to use the facilities had been obtained from the directors of the hospitals.

If fatigue occurred, (or for any other reason), the participants might terminate participation at any time to rest or re-schedule it, or might choose to not continue in the study. Furthermore, If the participants experienced negative emotions such as anxiety or

sadness, the telephone number for the 24-hour Thailand Department of Mental Health Direct Hotline Number: 1667 was provided on the consent form for further emotional support if needed.

In order to obtain data regarding the outcome of the pregnancy, the researcher recorded the medical record number of each participant. Three months after the initial data collection session (following the date of delivery of the infant), the researcher submitted the list of participants' medical record numbers to Khon Kaen Hospital, Health Promotion Hospital Region 6, Kalasin Hospital, and Mahasarakham Hospital Medical Records Department and requested the following data: the weight of baby at birth, APGAR scores at five minutes after birth, the infants gestational age, congenital abnormality, and any medical or obstetric complications for each participant. Immediately upon receipt of this data, the medical record number was destroyed.

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**Reliability and Validity of Thai Translations of Instruments Measuring
Psychosocial Factors and Health Promoting Behaviors among Older Pregnant Thai
Women.**

Abstract

Background: Psychosocial factor and health promoting behavior scales are widely used for measuring behavior-specific cognitions and affect that predict behavioral outcomes in health promotion. However, limited data exist for their reliability in older pregnant Thai women. **Purpose:** To examine the reliability and validity of previously developed measures of perceived benefits, perceived barriers, self-efficacy, social support, and health promoting behaviors among older pregnant Thai women. **Methods:** Content validity of all scales was determined by a group of experts. The instruments were translated from English to Thai and back translated. They were tried out with 35 older pregnant Thai women. Cronbach's alphas were used to establish internal consistency reliability. **Results:** The Cronbach's alpha reliability coefficient for the scales ranged from 0.721 to 0.932. Content validity was deemed appropriate and relevant for older

pregnant women. Conclusion: The results indicate that the questionnaires exhibited good reliability in these samples, and their use by nurses to assess psychosocial factors and health promoting behaviors among older pregnant Thai women is warranted.

Keywords. Health Promotion; Older Pregnant Women; Translations; Instruments; Reliability and Validity.

Introduction

In the last decade, the focus of maternal, infant, and child health services in Thailand has increasingly been on the care of high-risk pregnancies, particularly in older pregnant women (women who get pregnant at 35 years of age or older). Innovations in prevention and treatment have focused on preventable causes of maternal and neonatal morbidity and mortality; however, the morbidity and mortality rate, particularly among older pregnant women, remains high (National Statistical Office, 2006). Between 2000 and 2003, the proportion of maternal death in older pregnant Thai women increased from 33.4% to 37.3%, and the number steadily remains (Health Information Unit, 2004). Complications during labor and delivery were the most frequent causes of older Thai maternal mortality rate (Office of the Permanent Secretary for Public Health, 2006).

Pregnant women who are 35 years of age and older have been categorized as a high-risk group by obstetricians and gynecologists. Mothers in this age group confront both physiological and psychological problems, such as gestational diabetes mellitus, preterm labor, and stress (Miller, 2005; Montan, 2007; Schardt, 2005). Postponing pregnancy allows Thai women to advance their careers. Employment characteristics can cause stress and anxiety that may place older pregnant women at risk for inappropriate health related behaviors, such as drinking caffeine and alcohol, smoking, and sleeping less (Patanavanichnun, 2000). Moreover, many aspects of a typical Thai lifestyle may increase risk during pregnancy for older women. These may include unhealthy diet, motorcycle use, and lack of a social network.

These risky behaviors among older pregnant women have been shown to be related to poorer pregnancy outcomes in research done in western societies. For example,

Viau, Padula, & Eddy (2002) explored specific health concerns and health promotion behaviors related to childbearing in women 35 years of age or older. They found that older mothers engaged in multiple health promotion behaviors focusing on daily nutritional intake, lifestyle activities, and rest patterns. They also reported particular decisions to eliminate harmful substances or to alter exercise, employment, or daily activities to accommodate physical changes during pregnancy. There is limited information, however, about health promoting behaviors and their impact on pregnancy among older pregnant women in Thailand. Contemporary inquiry addressing older pregnant Thai women's nursing care has been limited. Previous research on maternal care has emphasized normal pregnancy and care of other high-risk pregnant women, particularly from the point of view of physicians and treatment, rather than nursing care (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007). It is important to identify ways to optimize health promoting behaviors in this at-risk population. Doing so requires use of valid and reliable research tools.

This study examined the reliability and validity of previously developed measures of health promoting behaviors, perceived benefits, perceived barriers, perceived self-efficacy, and social support for use among older pregnant Thai women. The knowledge from this study is a prerequisite to implementing interventions to improve health promoting behaviors and pregnancy outcomes in this population.

Procedures for Item Development and Description of the Instruments

Questionnaires indicating personal characteristics, perceived benefits and perceived barriers to health promoting behaviors, perceived self-efficacy, social support, and health promoting behaviors were used to gather the data. The instruments in this

study were translated from English to Thai. The translation followed the guidelines proposed by Kim, Schewertz-Bancott, Holter, and Lorensen (1995). This guideline consists of three phases: translation and back translation and a consensual phase. All of the instruments had been previously translated into Thai and used to collect data in different populations in Thailand. The Thai translated versions of the instruments were adapted for use with older pregnant Thai women and were translated back to English by an experienced translator proficient in both Thai and English, who had never seen the English versions of the instruments. Finally, the English versions derived from back translation of the Thai versions were compared to the original English versions of the instruments. This consensual phase was completed by two Thai nurse educators who are proficient in both English and Thai.

Description, Administration and Scoring of the Instruments

Instruments translated for use with older pregnant Thai women included perceived benefits of and perceived barriers to health promoting behaviors, perceived self-efficacy, social support, and health promoting behavior questionnaires. Each tool is discussed briefly below.

Perceived benefits of and perceived barriers to health promoting behaviors were measured using the Murdaugh and Hinshaw barrier and benefit scale (1986). The original scale contained 10 items related to barriers and 10 items related to benefits and used a 6-point response format. After many pilot studies, the perceived benefits and perceived barriers scale has been further refined to a 24-item instrument. Alpha coefficients estimating internal consistency ranged from .72 to .79. Content validity was established by cardiovascular clinical experts. Construct validity was estimated with exploratory

factor analysis that revealed several content clusters that measure the constructs of interest.

The latest version of the tool contains 12 items related to perceived benefits and 12 items addressing perceived barriers. This instrument was adapted by the researcher based on Murdaugh and Hinshaw's preventive behavior model. The questionnaire is designed to measure older Thai pregnant women's perceived barriers and benefits to undertaking illness preventing and health promoting behaviors to modify risk factors contributing to negative pregnancy outcomes. Adaptations were made to appropriately address Thai women's behaviors. For example, the question that asked about smoking was changed to address sexual intercourse during pregnancy because of the limited prevalence of smoking among Thai women.

The English version was translated into Thai. The Thai translated version of the instrument was adapted for use with older pregnant Thai women and was translated back to English. These 24 items are rated on 4-point Likert-type scale ranging from 1 to 4 (1 = strong disagreement, 2 = disagreement, 3 = agreement, 4 = strong agreement). Separate scores are calculated for perceived benefits and perceived barriers. The total possible score for each set of questions ranges from 12 to 48. Higher scores indicate higher levels of perceived benefits and barriers to health promoting behavior.

Perceived self-efficacy was measured using the Schwarzer and Jerusalem General Self-Efficacy Scale (1992). This scale has been used in numerous studies in samples from 27 nations. These studies showed Cronbach's alphas ranging from .76 to .90. The total score is used to assess the subject's perceived level of self-efficacy. The 10 items are rated on 4-point Likert-type scale ranging from 1 to 4 (1 = not at all true, 2 = hardly true,

3 = moderately true, 4 = exactly true). The total possible score ranges from 10 to 40. A higher score indicates a higher level of perceived self-efficacy, and a lower score indicates a lower level of perceived self-efficacy.

Social support was measured using the Tilden Interpersonal Relationship Inventory questionnaire (IPRI) which was developed by Tilden, Nelson, and May (1990). The instrument was developed in 1983 and has been used in a wide variety of samples including pregnant women. This questionnaire consists of 39 items divided into three subscales addressing social support, reciprocity, and conflict. The initial testing of Cronbach's coefficient alpha reliability was .91 for social support, .84 for reciprocity, and .81 for conflict. This 39-item tool, rated on a 5-point Likert-type scale, uses two different anchor styles: agree to disagree (items 1-22), and often to never (items 23-39), to measure interpersonal relationships. Respondents were asked to indicate the degree of agreement with items 1 to 22 ranging from 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). In contrast, items 23-39 are rated on 5-point Likert type scale ranging from 1 to 5 (1 - never happens, 2 - almost never happens, 3 - sometimes happens, 4 - happens fairly often, 5 - happens very often). The total possible score ranges from 39 to 195. A higher score indicates a higher level of perceived social support, and a lower score indicates a lower level of perceived social support.

Health promoting behaviors were measured using the Health Promotion Lifestyle Profile II scale (HPLP II) created by Walker, Sechrist, and Pender (1995). The original HPLP was derived from the Lifestyle and Health Habits Assessment developed by Pender (1982). After many pilot studies, the HPLP included 48 items (Pender, 1987). This scale has been refined and used in diverse populations and across cultures. The latest

version is HPLP II, a 52-item instrument, which has six dimensions to measure a health-promoting lifestyle. The six subscales address health responsibility, physical activities, nutrition, spiritual growth, interpersonal relationships, and stress management. The total HPLP II Cronbach alpha score is .94.

This instrument was adapted by the researcher based on Pender's Health Promotion Model to measure health promoting behaviors in older pregnant Thai women. Suitable adaptations were made for older pregnant Thai women. For example, one item addressed asking the doctor or the nurse about prenatal testing for women 35 years of age and older, and another asked about advice from a doctor or nurse for self-care when pregnant at an older age. In addition, some items were adapted to be appropriate for Thai culture, such as eating habits and exercise activity.

A 4-point Likert-type scale was used for item response (1 = never do these behaviors, 2 = sometimes do these behaviors, 3 = often do these behaviors, 4 = always do these behaviors). The total possible score ranges from 52 to 208. A higher score indicates good health promoting behavior, and a lower score indicates poor health promoting behavior.

Methods

Sample. A purposive sample consisted of 35 older pregnant women who received care at the antenatal care clinic of Khon Kaen Central Hospital, Khon Kaen province, Thailand from March 8 to April 30, 2010. The criteria used to select the study sample were Thai pregnant women who (a) were at least 35 years old, (b) were between 16 and 24 weeks gestation, (c) were either primiparous or multiparous, (d) could read and understand Thai, and (e) had no psychiatric diagnosis. Most pregnant women come to

visit the antenatal care clinic in their second trimester of pregnancy (Department of Obstetrics and Gynecology, 2009). To give the researcher a short time period for looking at maternal and infant outcomes, the second and third trimester of pregnancy were selected. Pregnant women usually adapt their health behaviors and change perception of health in this period of pregnancy. Furthermore, pregnancy complications, especially, GDM and PIH occur at the midpoint of pregnancy (Pillitteri, 2003). The number of first time older pregnant women is fewer than multiparous pregnant women (Tabcharoen, Pinjaroen, Suwanrath, & Krisanapan, 2009); therefore, both primiparous and multiparous women were recruited to achieve a reasonable sample size.

Procedure. The Institutional Review Board of the University of San Diego approved the procedures for protecting study participants. The director of the hospital provided written permission to collect data. At the initiation of outpatient antenatal care services, all participants provided written informed consents to receive care, answer the questionnaires, and allow data from their clinical records to be used anonymously for research and reporting purposes. The participants completed the tools while waiting for antenatal care.

Validity and reliability assessment. Content validity was assessed by three faculty members from nursing colleges in north eastern Thailand. All are experts in maternal and child nursing and health promotion. They concluded that the instruments were appropriate and relevant for older pregnant women. Minor editing to enhance comprehension and developmental appropriateness to Thai culture was conducted and related to culturally appropriate foods, types of physical activity, and leisure time

activities. The Cronbach's alpha coefficient was used to assess internal consistency reliability of the instruments.

Analysis

The data were analyzed using descriptive statistics. The Statistical Package for the Social Science/Personal Computer (SPSS/PC) was used to analyze the data. Personal characteristics were examined in terms of frequency and percentage.

Results

Data from two participants were excluded because of incomplete data on the social support and health promoting behavior scales. After exclusions, data from 33 older pregnant Thai women were analyzed. Characteristics of the overall study population are presented in Table 1. Most of the older pregnant women had an elementary school education and low income and were more often multiparous and married. Medical and obstetrical complications included gestational diabetes mellitus and premature contractions. The results of reliability testing of the questionnaires are described below.

Internal consistency reliability for the perceived benefits and perceived barriers scales was supported by Cronbach's alpha coefficients of .739 ($M = 3.543$, $SD = .346$) and .890 ($M = 3.078$, $SD = .587$), respectively. The perceived self-efficacy questionnaire obtained a Cronbach's alpha coefficient of .878 ($M = 3.046$, $SD = .449$). Internal consistency reliability for social support was supported by a Cronbach's alpha coefficient of .721 ($M = 3.775$, $SD = .461$). Moreover, internal consistency reliability was high for the health promoting behaviors questionnaire. The alpha reliability coefficient for the total scale was .9317 ($M = 3.124$, $SD = .410$).

Discussion

The present study is different from previous reports as the researcher studied only older pregnant Thai women who received antenatal care services who had other children. The data are consistent with other studies for reliability of measures of perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors. In a study that described the relationship between psychosocial factors and prenatal care utilization among Thai women, Cananub (2004) reported the Cronbach's alpha coefficient for reliability of the instruments as follows: perceived benefits - .77, perceived barriers - .92, and self-efficacy - .86. In 1993, the social support questionnaire was used to measure factors affecting pregnancy and birth outcomes among low-risk and high-risk pregnant women. The internal consistency reliability was high for two short-form subscales, support (Cronbach's $\alpha = .92$) and conflict (Cronbach's $\alpha = .91$). These study results and others have shown the reliability of health promoting behavior scales. For instance, Hatmaker (1993) developed the Health Promoting Lifestyle Profile scale to measure health promotion during pregnancy in high-risk and low-risk pregnant women. The total instrument was determined to have high internal consistency reliability (alpha = .92).

The findings from this investigation show that each questionnaire demonstrated high internal reliability (Cronbach's $\alpha = .74$ to .93) for use among older Thai pregnant women. The value of alpha depends on the number of items. All the questionnaires have more than 12 items, therefore alpha levels are acceptable at .7 to .84 (Field, 2005).

Many obstacles were noted during data collection. Because of the participants' older age, some of them exhibited far-sightedness and felt exhausted reading and

answering long questionnaires. One of the participants agreed to answer the questionnaires but forgot to bring her glasses. Another participant needed to take the questionnaires home and promised to bring them back for the next appointment. Thus, researchers should prepare envelopes with stamps for this kind of situation or use larger type fonts for questionnaires.

In addition, some of the participants could not distinguish between complications and minor discomforts during pregnancy. They reported their minor discomforts, such as morning sickness, leg cramps, and low back pain, as complications. Furthermore, although the researcher stressed that all information would be confidential some of the participants did not provide information about their personal income; they just reported their income as “enough or not enough”.

An important finding is that more than half of the negatively worded questions in the questionnaires were answered in the middle of the rating scale. For this reason, the value of alpha may not be accurate. Another important consideration in data collection was the source of medical record information. Utilizing medical records to obtain information for research purposes is not always feasible; thus the participant is relied upon as a source of information. The researcher plans to ask the participants directly by phone about their pregnancy outcomes (baby’s weight, gestational age at birth). Moreover, timing of data collection must be considered. In this study, data were obtained from older pregnant Thai women between 16 and 24 weeks gestation. Expansion of gestational age to between 16 and 36 weeks must be considered to reduce the time in collecting data.

In conclusion, the Thai translations of all of the questionnaires exhibited good reliability. They may be utilized with a high level of confidence for collecting data and research purposes, but some modification in questionnaire format and data collection processes may be warranted in their use with older pregnant women.

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Perinatal Complications in Older Pregnant Thai Women: What We Know

Abstract

This article is a review of the literature regarding the prevalence of perinatal complications and factors that influence maternal and infant outcomes in older pregnant Thai women. Older pregnant women are those who get pregnant at the age 35 or above. The prevalence of pregnancy among Thai women 35 years of age or over may be as high as 15%, with 30 to 40% of these women experiencing complications, such as gestational diabetes mellitus, pregnancy induced hypertension, preterm labor, multiple pregnancies, and postpartum hemorrhage. Infant complications can include low birth weight, low APGAR scores, and congenital anomalies. It is important to understand the risk factors that may be associated with adverse maternal and infant outcomes in this population. The purpose of this review is to identify factors related to increased perinatal risk among older pregnant Thai women.

Keywords: Perinatal Care; Pregnancy Complications; Prevalence; Review.

Introduction

Concern about the rising prevalence of maternal and infant complications in older pregnant women around the world is growing (Kenyon, 2010; Tabcharoen, Pinjaroen, Suwanrath, & Krisanapan, 2009). The major physiological health problems in older mothers have been gestational diabetes mellitus and pregnancy induced-hypertension (Bainbridge, 2007; Montan, 2007). The most common complications in infants have been low birth weight and preterm birth (Delbaere et al., 2007; Hoffman et al., 2007).

According to the World Health Organization (WHO), the average age at pregnancy worldwide is between 20 and 30 years of age (WHO, 2010). Pregnant women who are 35 years of age and older have been categorized as a high-risk group by obstetricians and gynecologists (Edmonds, 2008). A WHO goal is to decrease infant, perinatal, and maternal mortality rates around the world by 2020 (WHO, 2010). Given the increasing age of pregnancy and greater risk of complications, much work will be needed to achieve this goal.

In the developing country of Thailand, the Ministry of Public Health has been concerned about improving maternal, infant, and child health outcomes. Health promotion activities were initiated to promote improved pregnancy health-related behaviors 50 years ago. While maternal and infant mortality rates have dropped steadily, many health problems among pregnant women and infants remain, especially in older primigravidas. Between 1996 and 2006, the proportion of first births in Thai women over 35 years of age increased almost two-fold from 1.0% to 1.9%, and the proportion continues to increase (National Statistical Office, 2006).

Many research studies have been conducted on older pregnant women to identify and solve the problems of this group. This article is a review of the literature regarding the prevalence of perinatal complications and factors that influence maternal and infant outcomes in older pregnant Thai women. The purpose of this review is to examine the prevalence of perinatal complications in older pregnant Thai women and to assess the factors that influence perinatal outcomes.

Prevalence of Older Childbearing in Thailand

Recent societal change has influenced individuals to marry later in life, resulting in a rapid increase in the number of women becoming pregnant after age 35. This phenomenon has been increasing steadily in many countries including the United States (Reddy, Ko, & Willinger, 2006), Australia (Carolan, 2004), Canada (Benzies et al., 2006), Taiwan (Yang, Peden-Mc Alpine, & Chen, 2007), and Thailand (Tabcharoen et al., 2009). In the United States, the number of older primigravidas increased 36% between 1991 and 2001 (Bainbridge, 2007). In 2002, Dick (as cited in Robb, Alder, & Prescott, 2005) reported that one out of four pregnant women in the United Kingdom was between 35 and 39 years of age.

In Thailand, 13.69% of married women with a child younger than one year of age were 35 to 49 years old (National Statistical Office, 2006). Tabcharoen et al. (2009) reported that the number of mothers who deliver at the age 40 or older at Prince of Songkla University Hospital, Thailand has increased to three times the base rate. Moreover, Suwannachat and Ualalitchoowong (2007) stated that 9% of all pregnant women in Kalasin Hospital, Thailand experienced pregnancy at an older age. The Annual

Report of Pregnancy from the Obstetrics and Gynecology Department of Khon Kaen Hospital, Thailand (2009) showed that the percentage of older pregnant women had increased rapidly from 15.03% in 2006 to 21.75% in 2009.

Perinatal Complications in Older Pregnant Thai Women

Older pregnant women are confronted by both physiological and psychological problems. Many complications that occur in older pregnant women or their infants result in long-term consequences, increasing both individual and societal burden.

Maternal complications. Older pregnant women experience greater physical and psychological complications perinatally. This is especially true for first-time pregnant women. Pre-eclampsia is more common in older primiparas (Bainbridge, 2007; Seoud et al., 2002), and gestational diabetes mellitus (GDM) has been associated with increasing maternal age (Joseph et al., 2005; Montan, 2007). Additional increased obstetrical risks in older pregnant women include antepartum hemorrhage, miscarriage, caesarean section, vaginal operative deliveries, and the need for induction and augmentation of labor (Joseph et al., 2005; Seoud et al., 2002). In particular, the number of inappropriate caesarean sections in Thailand remains high. The study by Yusamran, Srisuphan, Parisunyakul, & Sripichyakan (2004) revealed that pregnant women age 30 to 45 perceived high benefits of caesarean section but used inappropriate rationale to make decisions about giving birth by caesarean section. Older pregnant women were more likely to believe that their age makes their health and their babies particularly vulnerable during labor. In addition, working women considered that a cesarean would result in less time lost from their jobs than a vaginal birth. Furthermore, pregnancy at the age of 35 or

older not only has many obstetric complications, such as miscarriage, antepartum hemorrhage, and premature contraction, but also increases the use of amniocentesis and assisted delivery, which increase health care unit costs (Caughey, Washington, & Kuppermann, 2008; Chou et al., 2009).

In Thailand, older pregnant women have significantly increased risks for gestational diabetes mellitus, chronic hypertension, malpresentation, pregnancy induced hypertension, placenta previa, multiple pregnancies, preterm labor, fetal distress, postpartum hemorrhage, and endometritis (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). Furthermore, a study by Luealon and Phupong (2010) found that older maternal age was one of the risk factors significantly associated with increased risk of pre-eclampsia. They also indicated that older mothers who had a history of pre-eclampsia in previous pregnancies and older mothers who had history of chronic hypertension were at risk of pre-eclampsia.

Older pregnant women also have higher risk for poor psychological outcomes, such as stress, anxiety, and depression (Robb et al., 2005). This is especially true of women who have had a bad obstetric history including experiences such as infertility, prior perinatal loss, and high-risk pregnancies (Schardt, 2005). Poor obstetric history can result in greater psychological distress related to feelings of disappointment, guilt, anger, jealousy, and doubt as to one's own abilities, including becoming a mother, potentially increasing conflict in the couple's relationship and influencing the practice of healthy behaviors (Carolan, 2004; Robb et al., 2005; Schardt, 2005). Some research suggests that mothers aged 35 years or older may be more likely to fear that their babies will be

harmful during labor because of their older age (Carolan, Davey, Biro, & Kealy, 2011; Yang et al., 2007). Mothers may also be embarrassed regarding late pregnancy, and concerned about the safety of pregnancy and childbirth.

Infant complications.

Many studies have examined the relationship between maternal age and the risk of fetal complications. Research by Miller (2005) and Hoffman et al. (2007) revealed that having children in later life can result in many fetal and neonatal problems, including fetal death, preterm delivery, low birth weight, intrauterine growth retardation and newborn complications. These and other studies found that older mothers had significantly higher risks of infant complications (Delbaere et al., 2007; Hoffman et al., 2007; Reddy et al., 2006). Moreover, Lisonkova, Janssen, Sheps, Lee, and Dahlgren (2010) reported that older women were at elevated risk of stillbirth, preterm birth, and NICU admission regardless of parity. Specifically, the congenital anomaly of Down syndrome is becoming increasingly common in women who get pregnant at age 35 or older (Ohman, Saltvedt, Waldenstrom, Grunewald, & Olin, 2006).

In Thailand, infants born at low birth weights among mothers age 35 years or older has remained about 12% higher than mothers aged 20 to 34 years (National Statistical Office, 2006). Older pregnant Thai women had more adverse fetal outcomes, including low birth weight, low Apgar scores, and congenital anomalies, than their younger counterparts, while younger pregnancy was associated with anemia, preterm delivery, low birth weight, and high rate of NICU admission (Shrim et al., 2011; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009).

Risk Factors for Pregnancy Outcomes in Older Pregnant Thai Women

Despite an increased interest in problems of older pregnancy it is surprising that in Thailand little research has been conducted to identify factors which can be associated with good maternal and infant outcomes in this group. A limited number of studies have been conducted regarding infant outcomes and factors that cause complications in older pregnancy (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). A number of factors have been identified as influencing maternal and infant outcomes; however, use of health promotion practices in pregnancy is one of the most significant influencing factors. The three major categories of factors related to health promotion in pregnancy are addressed below.

Personal perceptions. Personal perceptions of any situation facilitate behavior. According to Pender, Murdaugh, and Parsons (2006), the major component in health-specific cognitions and affects have been identified and discussed; especially, perceived benefits and barriers to action, and perceived self-efficacy. There are many studies that support the importance of perceived benefits, perceived barriers, and perceived self-efficacy in influencing health behaviors that affect health outcomes. For example, research by Caughey et al. (2008) found that women aged 35 years old or older had a higher perceived risk of Down syndrome than younger women, but had a lower perceived risk of a procedure-related miscarriage. Therefore, older women perceived prenatal testing at their high-risk age as beneficial. In contrast, Research by Prusanusak et al.

(2009) revealed that women younger than 35 years of age had more positive attitudes towards Down syndrome screening than older women.

In 2004, Yusamran et al. examined the relationships and predictive power of personal factors, perceptions of cesarean section, decision-making style, and decision-making regarding cesarean section in pregnant Thai women. They found that the number of inappropriate caesarean sections in Thailand remains high. Pregnant women age 30 to 45 years who had no medical indications for cesarean section perceived high benefits of cesarean section but used inappropriate rationale to make decisions to select operative as the method of delivery.

Furthermore, a study by Beckmann, Buford, and Witt (2000) reported a significant relationship between perceived barriers to health-promoting behavior, such as obtaining prenatal care, and the women's age. Married women aged 15 to 19 years and those over 30 years old were more likely than older adolescents and women in their 20s to be concerned about high cost of getting prenatal care and long waits in the antenatal care clinic.

Perceived barriers are parallel to perceived benefits of action and exert a direct influence on predisposition to engage in health promoting behaviors. Most studies on self-efficacy focused on healthy or high-risk pregnancy and the intention to participate in health promoting behaviors. However, few studies were found to focus on older pregnant women. A study of factors that influence prenatal care utilization among Thai women by Cananub (2004) indicated that pregnant women with higher self-efficacy scores had more prenatal visits. Similar research designed to describe the relationships between perception

of self-efficacy and exercise behaviors in Thai pregnant women by Klankhajhon (2008) indicated that pregnant women had moderate exercise behaviors. Those findings stated that low perceived benefits of action, high perceived barriers to action, and low self-efficacy were risk factors for poor health behaviors that influence adverse pregnancy outcomes.

Health behaviors during pregnancy. Although older mothers are expected to be well informed and have greater knowledge about pregnancy than younger women, delayed pregnancy may be harmful for the women or fetus, especially when associated with inappropriate behaviors. Many studies suggest that older and younger women differ in terms of their willingness to engage in healthful behaviors during pregnancy. For example, the National Statistical Office (2001) reported that of married pregnant Thai women aged 15 to 49 who consumed alcohol during pregnancy, 69% are 35 years old or older, while 31% are younger than 35 years. This shows that older pregnant Thai women are more than twice as likely as younger women to consume alcohol during pregnancy. Although the Ministry of Public Health in Thailand has initiated efforts to decrease the proportion of married pregnant Thai women aged 15 to 49 who receive no prenatal care, 7.66% are 35 years old or older, while 92.34% are younger than 35 years old (National Statistical Office, 2006). In addition, Suwannachat and Ualalitchoowong (2007) reported that, among pregnant women who received no prenatal care, the percentage of older pregnant women is nearly twice higher than the younger group. Furthermore, among married pregnant Thai women aged 15 to 49 who give birth at home with a trained midwife, 43.65% are 35 years old or older, which is slightly lower than the 56.35% who

are younger than 35 years old. The place of delivery and the personnel assisting during delivery are variables related to maternal and infant outcomes. Giving birth at a hospital with professional health care providers reduces risks of poor maternal and infant outcomes. Regardless of age, all pregnant women should give birth at the hospital with health care providers.

Personal characteristics.

Education. Education is an element that influences decision making, understanding of information, and planning for health promoting behaviors. More highly educated people generally engage in more health promoting behaviors and self-care than those with less education (Pender et al., 2006). In developed countries, older mothers tend to be well-educated and involved in highly paid employment (Carolan, 2004). In contrast, more than half of older pregnant Thai women had elementary education levels and were agriculturists (Kuasit & Singhala, 2007; Suwannachart & Ualalitchoowong, 2007).

Most studies on education levels focused on healthy pregnant women and healthy adults. Studies focusing on relationships between education and maternal and infant outcomes among older pregnant Thai women were limited. In 2002, Wiriyawattana found that education was a significant positive predictor of health promoting behaviors in pregnant thalassemia carriers. In addition, Thitasan (2002) reported that education level could predict health promoting behavior in pregnant women with anemia. Education has been shown to have a significant positive correlation with health promoting behaviors such as eating nutritious food and avoiding wearing tight clothing and high-heel shoes in

women pregnant at an older age (Loke & Poon, 2011; Williams et al., 2003).

Furthermore, Coyle (2009) examined the relationship between sociodemographic factors, concerns, social support, and health-related quality of life of among 238 mothers. The results showed that education was the sole sociodemographic predictor of health-related quality of life. Mothers with low education were more likely to report lower levels of health-related quality of life.

Family income. Family income/economic status is an important predictor of self-care. Affluent pregnant women are more likely to take care of themselves than middle and working-poor or unemployed women (Mc Kinney, James, Murray, & Ashwill, 2005). Financial security is an advantage of many older mothers; however, it is different for older pregnant Thai women.

In 2007, Kuasit and Singhala found that the majority of older pregnant Thai women had low incomes. They also reported that family income was significantly positively related to self-care behaviors. Older mothers who have high family incomes were more likely to seek prenatal care earlier than low income mothers. A study by Grace, Williams, Stewart, and Franche (2006), revealed that family income was significantly positively correlated with health promoting behaviors, particularly physical activity in women healthcare workers. Similarly, Jamrit (2009) examined relationships between personal factors and health promoting behaviors of pregnant women with anemia. The results indicated that higher income was significantly correlated with better health promoting behaviors.

Marital status. Marital status is a source of benefits, set roles, opinions, judgments, problem solving, social support, relation activity, and self-care. It also indicates status and family interactions that exist between members of families. Spouses can help the pregnant women conserve energy and increase motivation. They can also encourage pregnant women to develop health promoting behaviors (Pender et al., 2006).

Couples who delay childbearing usually make deliberate and thoughtful decisions to have a baby. Compared with younger women, married pregnant women over age 35 tend to be more emotionally stable and more likely to obtain early prenatal care and demonstrate healthful behaviors during their pregnancy (Towle & Adams, 2008). The literature is consistent with the findings of a study in Thailand. Suwannachart and Ualalitchoowong (2007) revealed that older pregnant Thai women tend to be married and obtain prenatal care four times or over; pregnant women need to visit the doctor at least once in each trimester of their pregnancy until 4 visits are completed. However, limited research has focused on the relationship between marital status and health promoting behaviors in this population. In 2005, Pichayapinyo found that the marital status of first-time Thai mothers was significantly positively related to adequacy of prenatal care. Married mothers were more likely to attend prenatal care visits than single mothers. Similarly, Bloch et al. (2010) reported that unmarried pregnant women were more likely to have poor health behaviors and increased risks of infant low birth weight than married pregnant women.

Parity. Personal experiences and prior behaviors influenced current performance of health promoting behaviors (Pender et al, 2006). A woman who has had several

pregnancies may understand the importance of health promoting behaviors. If the pregnancy has any abnormal conditions, the woman will take extra care of her health. However, many research studies concluded that multiparous women aged 40 or older seemed to have a higher perinatal complication rate than younger women (Joseph et al., 2005; Kenyon, 2010). McKinney et al. (2005) stated that multiparous women frequently do not have as much time to care for themselves as they did during their first pregnancies.

Studies focused on the relationship between parity and maternal and infant outcomes among older pregnant Thai women were limited. Most studies on parity focused on healthy pregnant women.

Tabcharoen et al. (2009) reported that 79% of older pregnant Thai women were multiparous. However, the study did not examine the relationship between parity and pregnancy outcomes. In 2010, Luealon and Phupong examined the risks factors of pre-eclampsia in Thai women. The results indicated that age of 35 years or older, nulliparity, and multifetal pregnancy increase the risk of preeclampsia when compared with mothers aged less than 20 years. Furthermore, Phung et al. (2003) studied the risk factors for low birth weight in pregnant women and revealed that higher parity was associated with higher birth weight. Pregnant multiparous women were more likely to give birth to normal birth weight babies than primigavidas.

Clinical Implications

Women over age 35 are more likely to believe their pregnancy and their baby's life could be at risk. Therefore, nurses should assess the perception of risk in these mothers. Because the incidence of congenital abnormality is increased in older pregnant

women, nurses must inform them of the chance of having a baby with genetic disorders (Ohman et al., 2006). They should provide preconceptual counseling and offer the option of prenatal first or second trimester screening tests.

Many pregnancy complications are associated with increasing maternal age (Bainbridge, 2007; Montan, 2007). Nurses must regularly assess older mothers to identify risks in their medical histories at the initial visit and during subsequent prenatal visits. All of these women are more likely to develop medical conditions with age. The risk for pre-existing medical conditions, such as diabetes mellitus and hypertension, is a concern.

Many complications, especially gestational diabetes mellitus and pregnancy-induced hypertension, occur at the midpoint of pregnancy (Seoud et al., 2002; Joseph et al., 2005). Nurses should be particularly concerned about the results of tests for urine albumin and sugar and blood pressure in older pregnant women. Furthermore, providing education regarding early signs and symptoms of gestational diabetes mellitus and pregnancy-induced hypertension can help older mothers recognize complications early in pregnancy.

Another consideration in caring for older pregnant women involves complications in the third trimester of pregnancy. Antepartum hemorrhage, premature contraction, preeclampsia, and fetal distress are common risks factors for perinatal mortality (Hoffman et al., 2007; Lisonkova et al, 2010; Tabcharoen et al., 2009). Nurses should concentrate on detecting premature contractions, fetal heart rate abnormalities, and signs of preeclampsia early on, as well as teaching older pregnant women about their risks and how to minimize them.

Moreover, nurses should prepare older pregnant women for unexpected experiences such as caesarean sections and vaginal operative deliveries (Joseph et al., 2005; Seoud et al., 2002). In addition, older pregnant women confront many psychological problems with these treatments (Carolan, 2004; Robb et al., 2005; Schardt, 2005). Nurses can assess their anxiety or stress and support them by allowing their relatives or the spouse to stay beside them to make them feel more comfortable. In addition, nurses can explain preoperative procedures and their purposes to reduce the mothers' fear of the unknown and increase their sense of confidence about their infant's birth (McKinney et al., 2005).

The number of inappropriate cesarean sections in Thailand remains high (Yusamran et al., 2004). Nurses should inform older pregnant women about the indications for doing cesarean sections and encourage them to give birth by spontaneous delivery if they do not have complications during their pregnancy. Nurses can also educate them about the advantages of normal labor and the disadvantages of cesarean section.

Some older pregnant Thai women, especially those in rural areas, exhibit poor health behaviors; therefore, community outreach is highly recommended for this population (National Statistical Office, 2001). Community health nurses need to motivate pregnant women to eliminate alcohol consumption during pregnancy. Nurses may create leaflets or brochures as well as provide health education to explain the negative effects of alcohol consumption on the infants. Community health nurses can also promote the benefits of prenatal care and giving birth at hospitals or primary care units to decrease the

percentage of no prenatal care and home births among older pregnant women (National Statistical Office, 2006).

Nurses should also acknowledge and work to ameliorate financial problems of older pregnant women that can be barriers to receiving prenatal care or other health care services. Furthermore, nurses should provide information about health care facilities provided by the government that help older pregnant Thai women to access health care providers easily. These include the universal coverage and public health protection schemes which provide personal prevention services and health promotion services targeting the whole Thai population (Sakunphanit, 2006).

Conclusion

The trend of pregnancy after age 35 has become well established in Thailand, presenting unique challenges for health service providers who work with pregnant women. With an understanding of the trend toward increased maternal age comes a duty to support older pregnant women in achieving healthy pregnancies. Health promotion and prevention strategies can reduce the risks of adverse outcomes and have a positive impact on women and their babies, potentially reducing health care costs. Therefore, nurses must be encouraged to consider changes that they can make in their practices and programs to better support and care for older pregnant women. More research is needed on the most effective approaches to caring for this vulnerable population.

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Factors and Health Promoting Behaviors that Influence Maternal and Infant Birth Outcomes in Older Pregnant Thai Women

Abstract

Societal change in Thailand has influenced individuals to marry later in life resulting in a rapid increase in the number of women becoming pregnant at older ages. Women becoming pregnant beyond age 35 years are at greater risk for poor pregnancy outcomes. However, limited data exists for factors that are associated with poor maternal and infant outcomes in older pregnant Thai women. The purpose of this prospective correlational study was to describe the relationship of selected factors to perinatal outcomes in older Thai women.

The sample was 142 pregnant women attending antenatal clinics in 4 public hospitals in northeastern Thailand, aged 35 years or older. Measurement instruments included the Personal Characteristics Questionnaire, Perceived Benefits and Perceived Barriers of Health Promoting Behaviors Scale, General Self-Efficacy Scale, Interpersonal Relationship Inventory questionnaire, and Health Promotion Lifestyle Profile II scale. Maternal and infants outcomes were obtained from medical records.

Gestational diabetes mellitus, premature labor, breech presentation, pregnancy-induced hypertension, premature rupture of membrane, and antepartum hemorrhage were the most frequently reported for maternal outcomes. The majority of infant complications were fetal distress, preterm baby, low birth weight, and mild meconium stain. Health promoting behaviors were significantly associated with education, perceived benefits, perceived self-efficacy, and social support.

Stepwise multiple regression analysis revealed the presence of perceived self-efficacy, perceived benefits, and social support together explained 49.3% of the variance in health promoting behaviors. A significant negative correlation was found between health promoting behavior scores and antepartum hemorrhage. No significant correlation was found between health promoting behaviors scores and infant outcomes. Interventions to enhance self-efficacy and social support combined with education about the benefits of health promoting behaviors may improve pregnancy outcomes in this at-risk population.

Key words: Advanced Maternal Age; Health Promotion; High Risk Pregnancy; Perinatal Care; Pregnancy Outcomes.

Introduction

Pregnant women who are 35 years of age and older have been categorized as a high-risk group by obstetricians and gynecologists (Edmonds, 2008). The focus of maternal, infant, and child health services in Thailand has increasingly been on the care of this at-risk group. However, morbidity and mortality, particularly among older pregnant women, remain high (National Statistical Office, 2006). Although the Ministry of Public Health in Thailand has initiated efforts to decrease the maternal death rate, 35.9% of pregnant women are 35 years old or older, while 10.1% are teenage pregnancies (Bureau of Health Policy and Strategy, 2008). Among married women 15 to 49 years of age in Thailand, 13.69% were over age 35 (National Statistical Office, 2006).

Tabcharoen, Pinjaroen, Suwanrath, and Krisanapan (2009) reported that the number of mothers who deliver at the age 40 or older at Prince of Songkla University Hospital, Thailand has increased to three times the base rate. Moreover, Suwannachat and Ualalitchoowong (2007) stated that 9% of all pregnant women in Kalasin Hospital, Thailand experienced pregnancy at an older age. The Annual Report of Pregnancy from the Department of Obstetrics and Gynecology of Mahasarakham Hospital, Thailand (2009) showed that the percentage of older pregnant women had increased rapidly from 8.85% in 2006 to 15.95% in 2008. Similarly, the percentage of older pregnant women at Khon Kaen Hospital increased from 15.03% to 21.75% from 2006 to 2009 (Department of Obstetrics and Gynecology, 2009).

Several studies link increasing maternal age with higher rates of maternal and infant complications (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). Poor health behaviors during pregnancy can further increase risks of

maternal and infant complications. The National Statistical Office (2001) reports that among married pregnant Thai women aged 15 to 49 years who consumed alcohol during pregnancy, 69% were 35 years old or older, while 31% are younger than 35 years old. Suwannachat and Ualalitchoowong (2007) reported that older pregnant women were nearly twice as likely not to receive prenatal care as younger women. While identified as a “high risk” group, little research has examined factors which promote health behaviors associated with good maternal and infant outcomes in older pregnant Thai women.

Review of the Literature

Older pregnant women experience more frequent physical and psychological complications of pregnancy than younger women. This is especially true for first-time pregnant women. Pre-eclampsia is more common in older primiparas (Bainbridge, 2007; Seoud et al., 2002), and gestational diabetes mellitus (GDM) has been associated with increasing maternal age (Joseph et al., 2005; Montan, 2007). Increased obstetrical risks in older pregnant women include antepartum hemorrhage, miscarriage, caesarean sections, vaginal operative deliveries, and the need for induction and augmentation of labor (Joseph et al., 2005; Seoud et al., 2002). Furthermore, women who are pregnant at the age 35 or older not only have many obstetric complications, such as miscarriage, antepartum hemorrhage, and premature contraction, but also experience frequent amniocentesis and assisted delivery, increasing health care costs (Caughey, Washington, & Kuppermann, 2008; Chou et al., 2009).

In Thailand, older pregnant women have significantly increased risks for gestational diabetes mellitus, chronic hypertension, malpresentation, pregnancy induced hypertension, placenta previa, multiple pregnancies, preterm labor, fetal distress,

postpartum hemorrhage, and endometritis than younger women (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). Luealon and Phupong (2010) found that women 35 years of age or older, particularly those with a history of prior pre-eclampsia or chronic hypertension, had a significantly increased risk of pre-eclampsia.

Older pregnant women also have a higher risk for poor psychological outcomes, such as stress, anxiety, and depression (Robb, Alder, & Prescott, 2005). This is especially true of women who have a higher risk obstetrical history such as infertility, prior perinatal loss, and high-risk pregnancies (Schardt, 2005). Older pregnant women may have greater psychological distress related to feelings of disappointment, guilt, anger, jealousy, and doubt as to their own abilities, including becoming a mother, conflict in the couple's relationship, and practicing healthy behaviors (Carolan, 2004; Robb et al., 2005; Schardt, 2005). Some research suggests that mothers aged 35 years and older may be more likely to believe that their babies might be harmed during labor because of their older age (Carolan, Davey, Biro, & Kealy, 2011; Yang, Peden-McAlpine, & Chen, 2007).

Research conducted with other populations reported links between older maternal age and the risk of fetal complications (Delbaere et al., 2007; Hoffman et al., 2007; Reddy et al., 2006). Studies by Miller (2005) and Hoffman et al. (2007) revealed that having children in later life can result in fetal and neonatal problems, including fetal death, preterm delivery, low birth weight, intrauterine growth retardation, and newborn complications. Moreover, Lisonkova, Janssen, Sheps, Lee, and Dahlgren (2010) reported that older women were at elevated risk of stillbirth, preterm birth, and NICU admission regardless of parity. Genetic abnormalities such as Down syndrome are more common in

women who get pregnant at the age of 35 or older (Ohman, Saltvedt, Waldenstrom, Grunewald, & Olin, 2006).

In Thailand, infants born at low birth weights among mothers age 35 years or older have remained about 12% higher than women younger than 35 years old (National Statistical Office, 2006). Older pregnant Thai women had more adverse fetal outcomes including low birth weight, low Apgar scores, and congenital anomalies than their younger counterparts (Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009).

Health promoting behaviors are important factors influencing pregnancy outcomes (Pender, Murdaugh, & Parsons, 2006). In the Western world, important factors associated with health promoting behaviors and subsequent maternal and infant outcomes have been found to include knowledge about perceived benefits of and barriers to health promoting behaviors and the level of self-efficacy of pregnant women. (Linsonkova et al., 2010 ; Neggers, Goldenberg, Cliver, & Hauth, 2006; Thompson, 2006). The question arises, are these also critical factors in the patterns of health promoting behaviors and maternal and infant outcomes in older pregnant Thai women? The purpose of this study was to determine maternal factors that may influence health promoting behaviors and resulting maternal and infant outcomes among older pregnant Thai women.

Method

Design. A prospective correlational design was used to study the relationship between selected factors and maternal and infant outcomes in older pregnant Thai women. A selected group of factors identified in Pender, Murdaugh and Parsons's (2006) Health Promotion Model (HPM) were examined. The independent variables in this study were personal factors (education, income, parity, marital status, smoking, and alcohol

consumption), perceived benefits of health promoting behaviors, perceived barriers to health promoting behaviors, perceived self-efficacy, social support, and health promoting behaviors. The dependent variables were maternal and infant outcomes (maternal complications, birth weight, gestational age, 5-minute APGAR scores, and congenital abnormality).

Sample. A sample size of 121 participants was calculated using Cohen's power analysis (1987, as cited in Munro, 2005). Eleven independent variables (education, income, parity, marital status, smoking, alcohol consumption, perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors) were included to determine sample size. The level of statistical significance was set at an alpha equal to .05, a power of .80, and a medium effect size (.13).

Recruitment. Using purposive sampling, participants were recruited from antenatal care clinics at four public hospitals in northeastern Thailand. The following inclusion criteria were used to select the study sample: Thai pregnant women who (a) were at least 35 years old, (b) had a gestational age between 25 and 36 weeks, (c) were able to read and understand the Thai language, and (d) had no psychiatric diagnoses. Data were collected over seven months. Originally, 155 women were enrolled in the study. Thirteen participants were excluded because of they gave birth elsewhere. This study was approved by the Institutional Review Board of the University of San Diego, and letters of support were obtained from the participating public hospital directors.

Measures.

The personal characteristics questionnaire was used to collect demographic information including education, income, parity, marital status, smoking, and alcoholic

consumption during pregnancy. Information from the participants' medical records was used to determine maternal complications, infant birth weight, gestational age, 5-minute APGAR scores, and congenital abnormality.

Perceived benefits of and perceived barriers to health promoting behaviors were measured using the Barrier and Benefit Scale (Murdaugh & Hinshaw, 1986). This instrument was adapted by the researcher based on Murdaugh and Hinshaw's preventive behavior model. The instrument has 24 items rated on a 4-point Likert-type scale ranging from 1 to 4 (1 = strong disagreement to 4 = strong agreement). Twelve items relate to perceived benefits and 12 to perceived barriers to health promoting behaviors. Separate subscale scores are calculated for perceived benefits and perceived barriers. The total possible score for each subscale ranges from 12 to 48. Higher scores indicate higher levels of perceived benefits and barriers to health promoting behavior. Internal consistency reliabilities for the perceived benefits and perceived barriers scales in a pilot study were .739 and .890 respectively.

Perceived self-efficacy was measured using the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1992). The total score is used to assess the subject's perceived level of self-efficacy. The 10 items are rated on 4-point Likert-type scale ranging from 1 to 4 (1 = not at all true to 4 = exactly true). The total possible score ranges from 10 to 40. Higher scores indicate greater perceived self-efficacy. The perceived self-efficacy questionnaire had a Cronbach's alpha coefficient of .878 in the pilot study.

Social support was measured using the interpersonal social support subscale of the Interpersonal Relationship Inventory questionnaire (IPRI) developed by Tilden, Nelson, and May (1990). The original IPRI consists of 39 items divided into three

subscales, addressing social support, reciprocity, and conflict. The social support subscale had 13 items with a 5-point Likert-type scale. Respondents were asked to indicate the degree of agreement with items ranging from 1 to 5 (1 = strongly disagree to 5 = strongly agree). The total possible score ranged from 13 to 65. A higher score indicates a higher level of perceived social support. In this study, internal consistency reliability for the social support subscale was .842.

Health promoting behaviors were measured using the Health Promotion Lifestyle Profile II scale (HPLP II) created by Walker, Sechrist, and Pender (1995). The original HPLP was derived from the Lifestyle and Health Habits Assessment developed by Pender (1982). This 52-item instrument was adapted by the researcher based on Pender's Health Promotion Model to measure health promoting behaviors in older pregnant Thai women. A 4-point Likert-type scale is used to respond to the items (1 = never do these behaviors to 4 = always do these behaviors). The total possible score ranges from 52 to 208; higher scores indicate better health promoting behaviors. Internal consistency reliability for health promoting behaviors scale in the pilot study was .932.

Each of the questionnaires was translated from English to Thai and the Thai translated versions were adapted for use with older pregnant Thai women. The questionnaires were translated back to English by an experienced translator proficient in both Thai and English, who had never seen the English versions of the instruments. Finally, the English versions derived from back translation of the Thai versions were compared to the original English versions of the instruments. This consensual phase was completed by two Thai nurse educators who are proficient in both English and Thai.

Procedure. After signing an IRB-approved consent form, participants completed the five questionnaires. Each participant received a baby gift set after finishing the questionnaires. Data from the participant's medical records was collected at this visit. The day after the participants gave birth, the researcher obtained data on maternal and infant outcomes from the participants' hospital record. Data collected included maternal complications, infant birth weight, gestational age, 5-minute APGAR scores, and congenital abnormality.

Data analysis. Descriptive statistics were used to describe sample characteristics. Pearson product-moment correlations were used to compare continuous variables; Spearman Rho correlation coefficient analysis was used to compare ranked variables and continuous variables. Point-biserial correlation coefficient was used to compare discrete dichotomous variables and continuous variables (Field, 2005).

Point-biserial correlation coefficient was used to examine the relationship between health promoting behaviors and maternal and infant outcomes. Point-biserial correlation was further used to explore the relationship between marital status and smoking and health promoting behaviors. Pearson product-moment correlations were calculated to examine the relationship between each of two personal factors (income and parity), perceived benefits, perceived barriers, perceived self-efficacy, social support, and health promoting behaviors. The Spearman Rho correlation coefficient analysis was used to describe the relationships of education level and alcohol consumption with health promoting behaviors. Subsequently, stepwise multiple regression analysis was conducted to evaluate how well the personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and social support predicted health promoting behaviors.

Results

The majority of the sample reported an elementary school education, and had a medium income level. Most participants were married, multiparous, non-smoking, and did not consume alcohol during pregnancy. The most frequent type of delivery was vaginal (see Table 1).

Gestational diabetes mellitus was the most frequent complication during pregnancy, and cephalopelvic disproportion was the most frequent birth complication. Postpartum hemorrhage was the most frequent postpartum complication (see Table 2). Approximately 6% of infants experienced fetal distress and/or prematurity. Additionally, about 5% of infants experienced low birth weight or mild meconium stain indicating some fetal distress (see Table 3).

The participants had very high scores for perceived benefits of health promoting behaviors. The perceived levels of social support and health promoting behaviors were also high among study participants. However, the findings indicated a moderate level of perceived self-efficacy and suggested the participants perceived several barriers to health promoting behaviors (see Table 4).

Education level, perceived benefits, self-efficacy, and social support were all significantly related to health promoting behavior scores (see Table 5). Stepwise multiple regression analysis estimated how well the personal factors, perceived benefits, perceived barriers, perceived self-efficacy, and social support predicted health promoting behaviors. Regression results indicated that three predictors (perceived self-efficacy, perceived benefits, and social support) were significantly related to health promoting behaviors ($p < .001$). These three variables can explain 49.3% of the variance in health promoting

behaviors. A summary of coefficients for the final regression model is presented in Table 6. These findings suggest that older pregnant women who had higher self-efficacy scores, perceived more benefits of health promoting behaviors, and had higher social support tended to have higher health promoting behavior scores.

Relationships between health promoting behaviors and maternal outcomes were evaluated. A significant negative correlation was found between health promoting behavior scores and antepartum hemorrhage ($r = -.185, p < .05$). Women with higher health promoting behavior scores may have lower risk for antepartum hemorrhage. No significant correlation was found between health promoting behavior scores and infant outcomes.

Discussion

In this study we found that education level, perceived benefits, perceived self-efficacy, and social support were significantly related to health promoting behaviors among older pregnant Thai women. The findings related to education level are consistent with previous studies indicating that pregnant women with higher education levels were more likely to engage in health promoting behaviors (Coyle, 2009; Loke & Poon, 2011; Thitasan, 2002; Williams et al., 2003; Wiriyawattana, 2002). Education can influence decision-making, understanding of information, and planning for healthier behaviors. Highly educated people tend to seek things that facilitate better health behaviors (Pender, 1996). Higher education levels may help women better understand the advice given by health care providers and perhaps improve their level of health promoting behaviors. Furthermore, having better education also offers more opportunities to access sources of knowledge that would support health promoting behaviors. However, the findings in this study are inconsistent with those of Patanavanichnun (2000) who found no relationship

between health promoting behaviors and the education level among pregnant industrial workers, perhaps because of lack of educational variability in that population.

Our study showed a significant relationship of perceived benefits of health promoting behaviors to actual behaviors supporting the tenets of Pender's Health Promotion Model (HPM) (2006) states that the perceived benefits of actions have an influence on action for health promoting behaviors. Perceived benefits of behaviors are based on personal or vicarious experience of outcomes from prior experiences or observational learning from others engaging in the behaviors. Pregnant women who believe in the benefits of healthier behaviors may invest more time and resources in activities to increase chances of healthier pregnancies. This finding is consistent with research by Panyapisit (2002) who found perceived benefits to be a predictor of health promoting behaviors in mothers experiencing preterm delivery. Other studies have demonstrated links between perceived benefits and better health promoting behaviors among pregnant thalassemia carriers (Wiriyawattana, 2002), and greater frequency of prenatal care visits among pregnant women (Barge, 2008; Cananub, 2004; Pichayapinyo, 2005). Furthermore, the present results also support Cioffi et al.'s (2011) qualitative study which suggested that perceived benefits of physical activity in pregnancy influenced pregnant women to engage in physical activity.

Similarly, women in our study who reported higher perceived self-efficacy were significantly more likely to report more health promoting behaviors. This finding is consistent with the HPM which states that perceived self-efficacy influences action by affecting perceived barriers and level of commitment or persistence in pursuing a plan of action. People with high perceived self-efficacy have confidence in their ability to

perform particular behaviors (Bandura, 1997). Therefore, people who have high self-efficacy are likely to seek information to prevent risk or change risk behaviors and seek care during the onset of symptoms more often than those with low self-efficacy (Korpershoek, Bijl, & Hafsteinsdottir, 2011). In study of first time pregnant women age 35 years or older, a high level of self-efficacy helped older pregnant women persist in the high-risk pregnancy and experience positive outcomes (Enter, 1993). In another study conducted by Patanavanichnun (2000), pregnant industrial workers were found to be more likely to engage in health promoting behaviors if they had higher perceived self-efficacy for health promoting behaviors. Self-efficacy has also been found to positively correlate with increased exercise behaviors during pregnancy (Gaston and Prapavessis, 2009; Klankhajhon, 2008) and greater frequency of prenatal visits (Barge, 2008; Cananub, 2004).

In our study, social support was significantly correlated with health promoting behaviors suggesting social support fosters health promoting behaviors. In the HPM (Pender et al., 2006), social support is an important interpersonal process that affects a persons' willingness to engage in health promoting behaviors. Jamrit (2009) found that social support was significantly correlated with health promoting behaviors in pregnant women with anemia, and Chrzan (2008) also demonstrated a strong relationship between social support and higher intake of nutrients important in pregnancy. Social support has also been positively linked with health promoting behaviors in pregnancy in studies by Ruppel (2001) and Wiriyawattana (2002). Antepartum hemorrhage had a significant inverse relationship with health promoting behaviors suggesting that women with higher health promoting behaviors may have a lower risk of antepartum hemorrhage though it

must be recognized that very few women experienced antepartum hemorrhage in this study.

Finally, we did not find that reported health promoting behaviors significantly correlated with any infant outcomes. These results are similar to those of Neggers et al. (2006) who concluded that health practice scores were not associated with any of the pregnancy outcomes in African-American pregnant women. Work by Thompson (2006) suggested that social support and marital status were more likely to influence infant birth outcomes.

Our study found that three out of four participating women had complications during pregnancy or during the perinatal period. Moreover, a quarter of the sample had adverse infant outcomes, such as Down's syndrome. These findings are similar to those reported in the literature (Silalai, 2005; Suwannachat & Ualalitchoowong, 2007; Tabcharoen et al., 2009). Additionally, we found that women in our sample had some poor health promoting behaviors, including less physical activity and poorer levels of stress management during pregnancy, which have also been reported in the literature (Patanavanichnun, 2000; Arethiwetch, 2003).

Strengths and Limitations

In this study we were able to recruit a sample of participants that exceeded the original estimate needed to address our study questions. However, this was a purposive sample of older pregnant Thai women who attended specific public hospital clinics. It is possible that women attending these clinics may not be generally representative of older Thai women who become pregnant. Recruiting more diverse samples in other geographic areas of Thailand, especially rural areas and private hospitals, may validate and enhance

the generalizability of findings. Not all women who attended these clinics participated in the study. It is possible that women who volunteered to be in the study might have different responses to the study questions and different perinatal outcomes from women who declined participation. Moreover, the measurement of behaviors and attitudes relied on self-report, therefore recall or other bias may affect the reliability of reported health behaviors among the participants.

Implications of the Study

This study describes the relationship of health promoting behaviors and maternal and infant outcomes among older pregnant Thai women. These women have distinct concerns, opportunities and health risks during the prenatal period, labor, and delivery. A woman's health promoting behaviors may have a significant impact on her pregnancy outcome. By routinely assessing factors such as health promoting behaviors, self-efficacy, and social support reported by older women during pregnancy, nurses will be better able to identify those at greater risk for poor pregnancy outcomes. Further, this approach to early identification of factors related to health promoting behaviors can offer a unique opportunity for nurses to provide effective teaching and counseling to assist pregnant women to engage in more optimal health behaviors. Women who experience pregnancy at an older age should be made aware of the benefits of preconception care and early prenatal care to ensure that they have the option of first trimester screening, and early intervention for possible health concerns.

Nurses caring for pregnant women can encourage health promoting behaviors by developing and providing education programs about the benefits of health promoting behaviors during pregnancy, particularly for older pregnant women. Developing

programs that provide ways to manage stress such as relaxation techniques, meditation, and physical activity may improve pregnancy outcomes in this high-risk pregnancy population. Understanding and identifying barriers such as education levels and financial problems that may interfere with health promoting behaviors is important in providing optimal nursing care. Early identification of women who lack social support or who have lower self-efficacy can allow the nurse to intervene to decrease risk for poor pregnancy outcomes.

Future policies need to better address supportive services to encourage health promoting behaviors by older pregnant women in order to achieve the healthiest pregnancy possible. Providing early access to prenatal counseling and screening as well as encouraging on-going prenatal care can help ensure better pregnancy outcomes.

This study identified several factors associated with health promoting behaviors. Future research on factors related to health promoting behaviors may increase our understanding about more effective strategies to promote optimal health behaviors during pregnancy in this unique population. Furthermore, research is needed to explore the types of nursing care and health services that may be most effective in promoting healthy behaviors during pregnancy.

Conclusion

The trend of pregnancy after age 35 has become well established in Thailand, presenting unique challenges for health service providers who work with pregnant women. With an understanding of the trend toward increased average maternal age comes a duty to develop strategies to support older pregnant women in having healthy pregnancies. Health promotion and prevention strategies can reduce risks and have a

positive impact on women and their babies, potentially reducing health care costs.

Therefore, nurses must be encouraged to consider changes that they can make in their practices and programs to better support and care for older pregnant women. More research is needed on the most effective approaches to caring for this vulnerable population.

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Table 1. Frequency Distribution for Demographic Data (N=142)

Demographic	Frequency	Percent
Education		
Elementary education	74	52.1
High school or vocational education	34	23.9
Certificate of higher education	6	4.2
Bachelor's degree or higher	28	19.7
Family monthly income		
Low ($\leq 5,000$ Baht)	47	33.1
Medium (5,001-15,000 Baht)	60	42.3
High ($\geq 15,001$ Baht)	35	24.6
Parity		
Primiparous	22	15.5
Multiparous	120	84.5
Marital status		
Married	136	97.2
Unmarried	4	2.8
Smoking during pregnancy		
Smoking	2	1.4
Non smoking	138	97.9
Alcoholic consumption during pregnancy		
No drinking	134	97.8
Drinking	3	2.2

Table 1. Continued

Demographic	Frequency	Percent
Type of Delivery		
Vaginal	74	52.5
Caesarean section or other	67	47.5

Table 2. Frequency Distribution for Maternal Outcomes Data (N=142)

Variable	Yes		No	
	N	%	N	%
Complications During Pregnancy				
Gestational diabetes mellitus	24	16.9	118	83.1
Premature labor	10	7.0	132	93.0
Breech presentation	9	6.3	133	93.7
Pregnancy-induced hypertension	8	5.6	134	94.4
Premature rupture of membrane	6	4.2	136	95.8
Ante-partum hemorrhage	5	3.5	137	96.5
Complications During Delivery				
Cephalopelvic disproportion	18	12.7	124	87.3
Poor maternal effort	5	3.5	137	96.5
Postpartum Complications				
Postpartum hemorrhage	8	5.6	134	94.4

Table 3. Frequency Distribution for Infant Outcomes Data (N=143)

Variable	Yes		No	
	N	%	N	%
Fetal distress	9	6.3	133	93.7
Preterm baby	8	5.6	134	94.4
Infant low birth weight	7	4.9	136	95.1
Mild meconium stain	7	4.9	136	95.1

Table 4. Descriptive Statistics for the Perceived Benefits, Perceived Barriers, Perceived Self-efficacy, Social Support, and Health Promoting Behaviors Scores (N=142)

Variable	Mean (S.D.)
	Range
Perceived benefits	41.85 (4.29) (28-48)
Perceived barriers	39.26 (5.07) (20-47)
Perceived self-efficacy	29.11 (5.87) (13-40)
Social support	50.68 (8.53) (16-65)
Health promoting behaviors	157.08 (21.43) (98-204)

Table 5. Correlations among Selected Factors and Health Promoting Behaviors

Variables	Health Promoting Behaviors
1.Education	.190*
2.Income	.141
3.Parity	.102
4.Marital Status	.041
5.Smoking	.026
6.Drinking	.107
7.Perceived Benefits	.375**
8.Perceived Barriers	.161
9.Self-Efficacy	.613**
10.Social Support	.534**

Table 6. Summary of Stepwise Regression Model

Variable	<i>B</i>	β	<i>t</i>	<i>p</i>
Perceived Self-efficacy	.296	.429	4.98	.000
Perceived Benefits	.252	.220	3.10	.002
Social support	.141	-.232	2.74	.007

Summary

The trend of increased average maternal age is expected to continue. Concerns relating to the unique needs of older pregnant women have implications for nurses. Encouraging factors including perceived benefits, perceived self-efficacy, social support that associated with health promoting behaviors can prevent poor maternal and infant outcomes. Nurse can play the roles to take care of older pregnant women based on these research findings. Other factors in the component of individual characteristics and experiences such as sociocultural, psychological, and biological factors should be included in future studies to search for major motivation in order to increase the level of health promoting behaviors that influence maternal and infant outcomes. Comparisons between older pregnant women living in urban and rural areas should be provided to indicate other factors influencing health promoting behaviors that effect pregnancy outcomes. Moreover, a qualitative study of health promoting behaviors should be made to explore other factors influencing maternal and infant outcomes in this vulnerable group.

Appendix A

Request for Permission to Conduct Research

November 10, 2010

Director
NAME Hospital
NAME Road, Amphur Muang
NAME Province, THAILAND
NUMBER Area Code

Dear Director,

This letter is seeking permission for Miss Supawadee Thaewpia to conduct a doctoral research in a group of older pregnant women receiving that prenatal care at the Hospital. Miss Supawadee is a professional nurse and a Ph.D. student in the Hahn School of Nursing and Health Science, University of San Diego, California. I currently serve as Chairperson on Ms. Thaewpia's dissertation committee.

The focus of her doctoral research is to identify social factors and health promoting behaviors that influence maternal and infant outcomes in older pregnant Thai women. The results of the study have relevance for nursing practice to improve maternal and infant health outcomes for pregnant women who are older than 35 years by identifying way they can improve health behaviors during pregnancy.

In order for her to conduct her research, she needs your permission to contact older pregnant women being served by the antenatal care clinic at Hospital from December 15, 2010 to May16, 2011. Her plan is to recruit 35 pregnant women who are age 35 years or older with pregnancies between 25 to 36 weeks gestation to answer five questionnaires. In order to obtain data regarding the outcomes of pregnancy, Miss Supawadee also needs your permission to look at maternal and infant medical records for this following birth to obtain the following information: infant birth weight, gestational age, 5-minute APGAR scores scores, reported congenital amomalies, type of delivery, and maternal complications.

We would very much appreciate receiving your permission for Miss Supawadee to conduct this study which is essential to her doctoral research. Please do not hesitate to contact me if you have any questions about this request. Thank you for your consideration of this request.

Very Sincerely,

Lois C. Howland, DrPH, APRN. Chairperson
Associate Professor

Hahn School of Nursing and Health Science
University of San Diego
5998 Alcala Park
San Diego, California 92110
lhowland@sandiego.edu
(619)260-7672

Appendix B

Letters of Support from Hospitals

December 2, 2010

Director
NAME Hospital
NAME Road, Amphur Muang
NAME Province, THAILAND
NUMBER Area Code

Professor Dr.Loie C. Howland
Hahn School of Nursing and Health Science
University of San Diego
5998 Alcala Park, San Diego, CA, USA 92110

Dear Dr.Howland,

Miss Supawadee Thaewpia has requested permission to collect research data from the older pregnant Thai women at an Ante Natal Care clinic, __Hospital Name__ for her study, Factors and Health Promoting Behaviors that Influence Maternal and Infant Outcomes in Older Pregnant Thai Women. I have been informed of the purposes of the study and the nature of the research procedures.

As a director of __Hospital Name__, I am authorized to grant permission to have the researcher recruit research participants from our hospital. Once Miss Supawadee has obtained Institutional Research Board approval from her university, she is welcome to conduct her study at this hospital. I will encourage my staffs to provide an essential assistant for the study.

Miss Supawadee will contact the head nurse of an Ante Natal Care clinic to recruit the participants by approaching them as they waiting to see the doctors or the nurses. She is also permitted to collect research data during the office hours. In addition, Miss Supawadee can look at the maternal and infant medical condition chart after the participants give birth.

If you require additional acknowledgement of my support for this study, please feel free to contact my office.

Very Sincerely,

....., MD.
Director of __Hospital Name__

Appendix C

Consent Form for the Participants

Factors and Health Promoting Behaviors that Influence Maternal and Infant Outcomes in
Older Pregnant Thai Women

Introduction

Supawadee Thaewpia is a doctoral student in nursing at the Hahn School of Nursing and Health Science at the University of San Diego. You are invited to participate in a dissertation study she is conducting for the purpose of exploring what it's like to be a Thai woman having a baby when she is age 35 or over, including what are some ways to promote health for a healthier pregnancy outcome.

Procedures

The research project will involve one meeting that will take about 60 minutes. Supawadee will ask you to fill out 5 questionnaires that will ask you information about how you are feeling emotionally right now, and what you think about your health promoting behaviors. A typical question on these questionnaires is, "Do you think wearing flat shoes with good support can relieve back pain"? You will also be asked general questions about yourself such as your education, income, pregnancy data, and marital status. Supawadee will ask you to give her your medical record number, so that after your baby is born, she can request this information about your baby from the hospital records department: your baby's birth weight, APGAR score (how healthy your baby is at birth), and at what week of pregnancy the birth took place. As soon as Supawadee receives this information, she will immediately destroy your medical record

number. No one else besides Supawadee and the hospital records department will ever see your medical record number.

Risks

There may be a risk that you will feel tired or fatigued while filling out the questionnaires. You can stop at any time to rest, decide not to fill out all the forms, or withdraw from the study anytime.

Sometimes when people are asked to think about their feelings, they feel sad or anxious. If you would like to talk to someone about your feelings at any time, you can call toll-free within Thailand 24 hours a day: **Department of Mental Health Direct Hotline**
Number: 1667

Benefits

The benefit to participating will be in knowing that you helped nurses and healthcare providers know more about how to help women who become pregnant in their mid-30's or older.

Participant Costs and Payment

The only cost to you is 60 minutes of your time.

Confidentiality

Any information provided and/or identifying records will remain confidential and safeguarded in a locked file in Supawadee Thaewpia's home for a minimum of five years. All data collected from you will be coded with a number and not your name. The

results of the research project may be made public and information quoted in professional journals or meetings, but information from this study will only be reported as a group, and not individually.

Voluntary Participation and Withdrawal

Participation in the research project is entirely voluntary and you can refuse to answer any question and/or quit at any time. Should you choose to quit, no one will be upset with you. Deciding not to participate or answer some of the questions will have no effect on your health care or any other services you might receive from doctors, nurses, or social services.

More Information

If you have any additional questions about this research project, please contact Supawadee Thaewpia at (043) 393-816 or at sthaewpia@hotmail.com. You may also contact Dr. Lois C. Howland, the professor who is supervising Supawadee's research, at the University of San Diego School of Nursing: (619) 260-7672 or lhowland@sandiego.edu for additional information.

I have read and understand this form, and consent to the research it describes to me. I have received a copy of this consent form for my records.

Signature of Participant

Date

Name of Participant (Printed)

Signature of Investigator

Date

Appendix E

The Personal Characteristics Questionnaire

HN.....

No.....

Direction: Please fill in the blank or put a \checkmark mark in front of the relevant answer for each item.

1. Your highest level of educational completed

- ☐ 1. Elementary school
- ☐ 2. High school or vocational education
- ☐ 3. Certificate of higher education
- ☐ 4. A bachelor's degree
- ☐ 5. A master's degree
- ☐ 6. A doctoral degree

2. Your family income (Bath per month).....Bath

3. Your pregnancy data

- 3.1 Number of pregnancies.....
- 3.2 Gestational age at the present time.....weeks
- 3.3 Number of abortions () none ().....
- 3.4 Expected date of giving birth.....

4. Your marital status

- ☐ 1. Single
- ☐ 2. Married
- ☐ 3. Widowed
- ☐ 4. Separated

☐ 5. Divorced

5. Do you currently smoke? ☐ yes ☐ no

6. How many alcoholic beverages do you drink? (please check box that is correct for you)

☐ a. I do not drink any alcoholic beverages

☐ b. Less than 1 alcoholic beverage each week

☐ c. 1-2 alcoholic beverages each week

☐ d. 3-6 alcoholic beverages each week

☐ e. 1 alcoholic beverage each day

☐ f. More than 1 alcoholic beverage each day

Appendix F

Perceived Benefits of Health Promoting Behaviors in Older Pregnant Thai Women Questionnaire

Directions

The following questions ask about your beliefs about the benefits of certain health promoting behaviors. Please indicate how strongly you agree or disagree with each statement. There is no right or wrong answer because the statements measure your own beliefs. The criteria are as follows:

“Strongly agree” means that the statement closely matches your real beliefs.

“Agree” means that the statement is rather compatible with your belief.

“Disagree” means that the statement responds to your belief to a less extent.

“Strongly disagree” means that the statement does not match your beliefs at all.

Example

Item	Strongly agree	Agree	Disagree	Strongly disagree
1. Wearing flat shoes with good support can relieve back pain	√			

Meaning: You believe completely that wearing flat shoes with good support can relieve back pain.

Items	Strongly agree	Agree	Disagree	Strongly disagree
1. Doing moderate exercise for at least 20-30 minutes every day during pregnancy can help the baby tolerate labor contractions.				
.....				
.....				
.....				
.....				
12. Keeping my heart cheerful can help my baby develop its emotional intelligence.				

Appendix F (cont.)

Perceived Barriers to Health Promoting Behaviors in Older Pregnant Thai Women Questionnaires

Directions

The following questions ask about your beliefs about barriers to health promoting behaviors. Please indicate how strongly you agree or disagree with each statement. There is no right or wrong answer because the statements measure your own beliefs. The criteria are as follows:

“Strongly agree” means that the statement closely matches your real beliefs.

“Agree” means that the statement is matches your belief some of the time.

“Disagree” means that the statement responds to your belief only occasionally.

“Strongly disagree” means that the statement does not match your beliefs at all.

Example

Item	Strongly agree	Agree	Disagree	Strongly disagree
1. I feel shy about wearing maternity cloth.				√

Meaning: The statement “I feel shy about wearing maternity cloth” does not match your beliefs at all.

Items	Strongly agree	Agree	Disagree	Strongly disagree
1. Family can get in the way to make me have healthy pregnancy.				
.....				
.....				
.....				
.....				
.....				
12. I do not get enough sleep because of stress.				

Appendix G

Self-Efficacy Questionnaires

Directions

This questionnaire contains statements about your ability to accomplish things for yourself. Please respond to each item as accurately as possible. Indicate your belief in your own abilities to do each action by marking \checkmark in the blank space. The criteria are as follow:

“Exactly true” means the statement is definitely true about you.

“Moderate true” means the statement is sometimes true about you.

“Hardly true” means the statement is not usually true about you.

“Not at all true” means the statement is never true about you at all.

Example

Item	Exactly true	Moderate true	Hardly true	Not at all true
1. I can go to see the doctor follow the prenatal care follow-up appointments.	\checkmark			

Meaning: You really belief that you can see the doctor follow the prenatal care follow-up appointments.

Items	Exactly true	Moderate true	Hardly true	Not at all true
1. I can manage to solve difficult problems if I try hard enough.				
.....				
.....				
.....				
.....				
10. I can manage everything in my life.				

Appendix H

Social Support Questionnaire

Directions

This questionnaire contains statement that describes close personal relationships.

Please respond to each item that best fits your situation and mark √ in the blank space.

The criteria are as follows:

“Strongly agree” Means the statement matches your real feelings completely.

“Agree” Means the statement is matches your feelings some of the time.

“Neutral” Means the statement is neither true nor untrue about you.

“Disagree” Means the statement is only occasionally true about you.

“Strongly disagree” Means the statement is not true for you at all.

Example

Item	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. My family supports me.					√

Meaning: You feel that your family does not support you at all.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. Someone makes me feel confident.					
.....					
.....					
.....					
.....					
.....					
11. I have the opportunity to consult with people close to me about things.					
Items	Very often	Fairly often	Sometimes	Almost never	Never
.....					
13. Some people count on me.					

Appendix I

Health Promoting Behaviors of Older Pregnant Thai Women Questionnaire

Directions

This questionnaire contains statement about your present way of life or personal habits during pregnancy. Please respond to each item as accurately as possible. Indicate the frequency with which you engage in each behavior by marking √ in the blank space.

The criteria are as follows:

“Routinely” Means you perform this action regularly or every day.

“Often” Means you perform this action more than 3 days per week.

“Sometime” Means you perform this action at least 3 days per week, but not every day.

“Never” Means you never perform this action.

Example

Item	Routinely	Often	Sometime	Never
1. Having dinner.	√			

Meaning: You have dinner regularly or every day.

Items	Routinely	Often	Sometime	Never
1. I discuss problems and concerns about being pregnant at an older age with the doctor or the nurse.				
.....				
.....				
.....				
.....				
52. I am interested in new experiences and challenges				