

## **Relationships among Health Promoting Behaviors and Maternal and Infant Birth Outcomes in Older Pregnant Thais**

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**Abstract:** Given that approximately 36% of all Thai births are by women 35 years of age and older, advanced maternal aged women experience poor perinatal outcomes, and limited data exists regarding factors associated with negative maternal and infant outcomes among older pregnant Thais, this prospective correlational research sought to describe the relationships among health promoting behaviors, and maternal and infant outcomes in older pregnant Thais. The sample consisted of 142 pregnant Thais who were 35 years of age or older and receiving antenatal care in one of four public hospitals in northeastern Thailand. Data were collected via a Personal Characteristics Questionnaire, the Health Promotion Lifestyle Profile II Scale, and each subject's medical record.

The results revealed that gestational diabetes mellitus, premature labor, breech presentation, pregnancy-induced hypertension, premature rupture of membrane, and antepartum hemorrhage were the most frequently reported maternal outcomes. The infants' complications included fetal distress, preterm delivery, and low birth weight. Although the subjects reported a high level of health promoting behavior, a significant negative correlation was found between their health promoting behavior scores and antepartum hemorrhage. On the other hand, no significant relationships were found among the mothers' health promoting behaviors and the infants' outcomes. Thus, interventions that enhance health promoting behaviors may help to prevent some of the poor maternal outcomes that can occur in this at-risk population.

*Pacific Rim Int J Nurs Res 2013 ; 17(1) 28-38*

**Keywords:** Advanced maternal age; Health promotion; High risk pregnancy; Maternal outcomes; Pregnancy outcomes

### **Introduction**

Global concern about the prevalence of maternal and infant complications among older women is on the increase.<sup>1, 2</sup> Older pregnant women often experience gestational diabetes mellitus and pregnancy induced-hypertension,<sup>3, 4</sup> while their newborns most commonly experience pre-term birth and low birth weight.<sup>5, 6</sup> According to the World Health Organization (WHO), the average age at pregnancy, worldwide, is 20 to 30 years of age.<sup>7</sup> In response to the fact that

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women who become pregnant after age 35 have been categorized as members of a high-risk group<sup>8</sup> the WHO has set a goal to decrease infant, perinatal, and maternal mortality rates, worldwide, by 2020.<sup>7</sup> However, given the increasing age of women becoming pregnant and the greater risk of complications, much work needs to be done to meet this goal.

Fifty years ago the Thailand Ministry of Public Health recognized the need to improve maternal, infant, and child health outcomes and, thus, initiated health promotion activities to promote improved health-related pregnancy behaviors. Although the maternal and infant mortality rates have steadily decreased, health problems continue to exist among pregnant women, especially among older primigravidas and their infants. Between 1996 and 2006, the proportion of first births to Thais over 35 years of age increased almost two-fold (1.0% to 1.9%) and continues to increase.<sup>9</sup> Thus, in an attempt to identify and solve the problems that exist within this group, numerous studies have been undertaken regarding pregnancies among older Thais.<sup>2, 10-12</sup> However, examination of health promoting behaviors, among older pregnant Thais, with respect to maternal and birth outcomes has been limited.

## **Review of Literature**

Societal changes, globally, have led individuals to marry later in life, resulting in an increase in the number of pregnancies to women 35 years of age and older. This phenomenon has been noted especially in the United States of America (USA), Australia, Canada, Taiwan, and Thailand.<sup>2, 13-16</sup> In the USA, the number of older primigravidas increased 36% between 1991 and 2001,<sup>3</sup> while one in four pregnancies in the United Kingdom (UK) occurred in women 35 to 39 years of age.<sup>17</sup>

In Thailand, 13.69% of the married women who had a child one year of age or less were noted to be 35 to 49 years of age.<sup>9</sup> In addition, the number

of deliveries at the Prince of Songkla University Hospital in Hat Yai, Thailand, among women 40 years of age or older increased 30% between 1997 and 2006.<sup>2</sup> Moreover, 9% of pregnant Thais, at Kalasin Hospital, Thailand, experienced their pregnancy at an older age (i.e. 35 years and older) between 2006 and 2007,<sup>12</sup> and the percentage of older pregnant women (i.e., 35 to 42 years), at the Khon Kaen Hospital, Thailand, increased from 15.03% (2006) to 21.75% (2009).<sup>18</sup>

Older pregnant women, especially those with first-time pregnancies, are known to be confronted by both physiological and psychological perinatal complications, with many of the complications resulting in long-term consequences that affect both the individual and society at-large. For example, pre-eclampsia has been found to be more common in older primiparas<sup>3</sup> and gestational diabetes mellitus (GDM) has been found to be associated with increased maternal age.<sup>4, 19</sup> In addition, older pregnant women's increased obstetrical risks include, but are not limited to: antepartum hemorrhage; miscarriage; and, the need for a caesarean section (C-section), vaginal operative delivery, and induction and augmentation of labor.<sup>19</sup>

In Thailand, the number of unnecessary C-sections remains high (42.85%), due to pregnant Thais, 30 to 45 years of age, believing their age makes them and their babies particularly vulnerable during labor, and/or that a C-section results in experiencing less lost work time from one's job than does a vaginal birth.<sup>10</sup> In addition, older pregnant Thais have been found to 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.<sup>2, 11, 12</sup> Furthermore, older mothers, who have a history of pre-eclampsia and/or chronic hypertension in previous pregnancies, have been found to be at risk of pre-eclampsia.<sup>20</sup>

Prior studies have revealed that having children in later life can result in the occurrence of fetal and neonatal problems, including: fetal death; preterm delivery; low birth weight; intrauterine growth retardation; Down syndrome; and newborn complications.<sup>5-6,13,21,22</sup> Moreover, older women have been found to be at greater risk for having a stillbirth or preterm birth, and for their infants to require admission to a neonatal intensive care unit.<sup>23</sup>

In Thailand, the birth rate of low birth weight infants to mothers 35 years of age and older is about 12% higher than among mothers 20 to 34 years of age.<sup>9</sup> In addition, infants of older pregnant Thais have been found to experience more adverse fetal outcomes (i.e., low birth weight, low Apgar scores, and congenital anomalies) compared to infants of younger Thai mothers.<sup>2,13,24</sup>

Although older mothers often are expected to be well informed and have greater knowledge about pregnancy than younger mothers, having a delayed pregnancy may be harmful for the woman or her fetus, especially when associated with inappropriate behaviors.<sup>25</sup> A number of studies have suggested that women differ in terms of their willingness to engage in healthful behaviors during their pregnancies. For example, 69% of married pregnant Thais, who admitted to consuming alcohol during pregnancy, were 35 years of age or older, while only 31% of married pregnant Thais, who admitted to consuming alcohol during pregnancy, were less than 35 years of age.<sup>26</sup>

Although the Thailand Ministry of Public Health has initiated efforts to decrease the number of married pregnant Thais who do not receive prenatal care, 7.66% of them are 35 years of age or older.<sup>9,12</sup> Furthermore, 43.65% of married pregnant Thais, 35 years of age and older, reportedly gave birth at home, with the assistance of a trained midwife.<sup>9</sup> In light of the fact that 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 in attendance, reduces the risks of poor maternal and infant outcomes.<sup>8</sup>

Despite an increased interest in problems related to older women giving birth, a limited amount of research, throughout Thailand, has been conducted to identify factors associated with good maternal and infant outcomes among this group.<sup>2,11,12</sup> In addition, limited information is available, throughout Thailand, regarding health promoting behaviors and their impact on pregnancies among older women. Previous research on maternal care has emphasized normal pregnancies and the care of other groups of women with high-risk pregnancies, from the point of view of physicians and treatments, rather than in regards to nursing care.<sup>11,12</sup> However, it is important to identify ways to optimize health promoting behaviors among the at-risk (i.e., 35 years of age and older) female pregnant population. While a number of factors have been identified as influencing maternal and infant outcomes, the presence of health promotion practices in pregnancy has been recognized as one of the most significant factors.<sup>27</sup> Thus, the purposes of this study were to: describe the relationships among health promoting behaviors, and maternal and infant birth outcomes; and, identify health promoting behaviors that predict maternal and infant birth outcomes.

## **Method**

**Design:** A prospective correlational design was used to study the relationships among health promoting behaviors and maternal and infant birth outcomes in older pregnant Thais. The health promoting behaviors identified in the Health Promotion Model were examined. 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.<sup>27</sup> 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.<sup>25</sup> The independent variables were health promoting behaviors. The dependent variables were maternal outcomes (gestational diabetes mellitus, pregnancy induced hypertension, antepartum hemorrhage, preterm labor, and type of delivery) and infant birth outcomes (birth weight, gestational age, 5-minute APGAR scores, and congenital anomalies).

**Ethical considerations:** Approval to conduct the study was obtained from the Institutional Review Board of the primary investigator's (PI) academic institution, as well as from the Directors of the four hospitals used as study sites. All potential subjects were informed about: the purpose of the study; what being in the study would entail; anonymity and confidentiality issues; and, the right to withdraw from the study at any time without repercussions. Women agreeing to take part in the study were asked to sign a consent form.

**Sample:** A sample size of 121 subjects was determined via Cohen's power analysis.<sup>28</sup> The level of statistical significance was set at an alpha of 0.05, a power of .80, and a medium effect size (0.13). One hundred fifty-eight potential subjects were purposively recruited from the antenatal clinics of four public hospitals in northeastern Thailand. The hospitals were selected because of the large number of pregnant women they served each year. Of these 158 women, two refused to take part in the study

because of lack of time and one did not have her glasses with her so she was unable to read the questionnaires, leaving 155 potential subjects. Thirteen of the 155 recruited subjects were excluded from the study because they did not deliver at one of the four selected hospitals, leaving a total of 142 subjects participating in the study.

The study's inclusion criteria consisted of being a pregnant Thai who: was at least 35 years of age; had a gestational age of 25 to 36 weeks; was able to read and understand Thai; and, did not have a psychiatric diagnosis, as reflected in the medical record. The majority of the sample had: an elementary school education (n = 74; 52.5%); a monthly income of 5,001-15,000 Baht [30 baht = 1 USD] (n = 60; 42.3%); and, a vaginal delivery (n = 74; 52.5%). Most of them were: married (n = 136; 97.2%); multiparous (n = 120; 84.5%); non-smokers (n = 138; 97.9%); and alcohol consumption free during pregnancy (n = 134; 97.8%).

As shown in **Table I**, the subjects' most frequent complication, during their pregnancy, was gestational diabetes mellitus, while cephalopelvic disproportion was their most frequent birth complication and postpartum hemorrhage was their most frequent postpartum complication. In addition, approximately 6% of subjects' infants experienced fetal distress and/or prematurity, while about 5% of their infants experienced low birth weight or mild meconium stain, which indicated some fetal distress (see **Table 2**).

**Table 1** Frequency Distribution for Maternal Outcomes (n=142)

Variables	Yes		No	
	n	%	n	%
<b>Complications During Pregnancy</b>				
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
<b>Complications During Delivery</b>				
Cephalopelvic disproportion	18	12.7	124	87.3
Poor maternal effort	5	3.5	137	96.5
<b>Postpartum Complications</b>				
Postpartum hemorrhage	8	5.6	134	94.4

**Table 2** Frequency Distribution for Infant Outcomes (n=142)

Variables	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

**Instruments:** Data were collected via use of two instruments, including a researcher developed Personal Characteristics Questionnaire (PCQ) and Modified Health Promotion Lifestyle Profile II (MHPLP II). The PCQ was used to collect demographic information regarding each subject’s level of education; monthly income; parity; marital status; smoking history; and alcohol consumption during pregnancy. Information from each subject’s medical records was obtained regarding her and her infant’s: maternal complications; birth weight; gestational age; 5-minute APGAR scores; and congenital anomalies. It took about one minute to complete the PCQ

Each subject’s health promoting behaviors were measured via the 52-item MHPLP II, which was adapted, by the PI, from the Health Promotion Lifestyle Profile II Scale (HPLP II),<sup>29</sup> based on Pender’s Health Promotion Model,<sup>27</sup> to measure the health promoting behaviors of older pregnant Thais. Items on the MHPLP II included: asking the doctor or nurse about preventing complications during pregnancy for women 35 years of age and older; and, discussing with the doctor or nurse the possibility of delivering a baby with problems because of being pregnant at an older age. Three items (i.e., those asking about eating habits and exercise activities)

were adapted so as to be appropriate for use in the Thai culture.

An example of an item on the MHPLP II was: “I report unusual signs or symptoms to the doctor or nurse whenever I notice them.” The items had possible responses that ranged from 1 = “never do this behavior” to 4 = “always do this behavior.” A total score, which could range from 52 to 208, was calculated by summing response values across items, with higher scores indicating better health promoting behaviors. The internal consistency reliability for the MPHLP was found to be 0.932. It took about 10 to 15 minutes to complete the MHPLP II.

The HPLP II questionnaire was translated from English to Thai and then the Thai translated version of the HPLP II was modified for use, as the MHPLP II, with the older pregnant Thais in this study. The Thai version of the HPLP II was translated back to English by an experienced translator proficient in Thai and English, who had not seen the English version of the HPLP II. Then the English version, derived from back translation of the Thai version of the HPLP II, was compared to the original English version of the HPLP II, by two Thai nursing educators proficient in English and Thai.

**Procedure:** Following approval to conduct the study, potential subjects, who met the inclusion criteria, were identified and recruited by the respective antenatal clinic nurses on a day each pregnant woman received care in the clinic. After informing each potential subject about the study, the nurses gave each interested woman the primary investigator’s (PI) contact information, in the event she had questions or concerns about being in the study. Once a subject consented to take part in the study and signed a consent form, she was given, by the antenatal clinic nurses, the PCQ and MHPLP II to personally complete, while sitting in a private area of her respective

antenatal clinic. In addition, the day after each woman gave birth, the PI collected information regarding the maternal and infant outcomes (maternal complications, infant birth weight, gestational age, 5-minute APGAR scores, and congenital abnormality) from each subject’s hospital record. As a token of appreciation for her involvement in the study, each subject was given a baby gift set after completing the questionnaires.

**Data analysis:** Descriptive statistics were used to describe the sample characteristics. Pearson product-moment correlations were used to compare the continuous variables, while point-biserial correlation coefficient was used to compare the discrete dichotomous variables and continuous variables.<sup>30</sup> In addition, regression analyses were planned to determine the extent of the contribution of health promoting behaviors to variance in maternal and infant outcomes variables. However, since the health promoting behaviors variable was significantly related to only one of five dependent variables of maternal outcomes, no regression analyses were conducted.

## Results

As shown in **Table 3**, the subjects had relatively high health promoting behaviors scores (range = 98 to 201; mean = 157). However, the findings indicated they had a moderate level of stress management and less than optimal physical activity. In addition, as shown in **Table 4**, a significant negative correlation was found between their health promoting behavior scores and antepartum hemorrhage ( $r = -.185$ ;  $p < .05$ ). However, as reflected in **Table 4**, those with higher health promoting behavior scores may have a lower risk for antepartum hemorrhage. As noted in **Table 5**, no significant correlations were found among health promoting behavior scores and infant outcomes.

**Table 3** Descriptive Statistics for Health Promoting Behaviors (n=142)

Health Promoting Behaviors	Mean (S.D.)	Range
<b>Total</b>	157.08 (21.43)	98-204
<b>Subscales</b>		
Health responsibility	28.16 (4.49)	17-36
Physical activity	20.63 (3.80)	13-29
Nutrition	27.38 (4.09)	14-36
Spiritual growth	28.75 (4.40)	17-36
Interpersonal relationship	28.28 (4.45)	16-36
Stress management	23.87 (4.03)	13-32

**Table 4** Correlations for Health Promoting Behaviors and Maternal Outcomes (n = 142)

Variables	1	2	3	4	5	Health Promoting Behaviors
1. Gestational diabetes mellitus	-	-.029	-.086	.037	.136	-.018
2. Pregnancy induced hypertension		-	-.047	-.064	-.049	.108
3. Ante partum hemorrhage			-	.107	.202*	-.185*
4. Premature labor				-	.074	-.051
5. Type of delivery					-	.028

\* p<.05

**Table 5** Correlations for Health Promoting Behaviors and Infant Outcomes (n = 142)

Variables	1	2	3	4	Health Promoting Behaviors
1. Birth weight	-	.461**	.269**	.020	.025
2. Gestational age at birth		-	.567**	.101	.013
3. 5-minute APGAR			-	.335**	-.037
4. Congenital anomalies				-	-.146

\*\* p<.01



## **Discussion**

Regarding the frequency of maternal and infant outcomes, this study found three out of four participating women ( $n = 94$ ; 65.5%) had complications during pregnancy or during the perinatal period. Moreover, one quarter of them experienced adverse infant outcomes, such as fetal distress, preterm birth, low infant birth weight, and mild meconium stain. These findings are similar to those reported in previous studies.<sup>2, 12</sup>

The fact subjects had high scores for health promoting behaviors suggest that they usually had good health promoting behaviors during their pregnancy. These findings are consistent with many quantitative and qualitative studies in the literature.<sup>25, 31</sup> A possible explanation could be that women who chose to get pregnant later in life are more likely to have a higher education level and higher family income making them more likely to be knowledgeable about and able to participate in health promoting behaviors.<sup>31</sup> Furthermore, they may have planned well for their pregnancies by preparing themselves both physically and psychologically.<sup>32</sup> However, some of the subjects did have poor health promoting behaviors during pregnancy, including low physical activity levels and low levels of stress management. These findings are similar to those that have been previously reported.<sup>32, 33</sup>

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. However, it must be recognized that very few women experienced antepartum hemorrhage in this study. Contrary to previous findings among pregnant African-American women,<sup>33</sup> no significant relationships were found, in this study, among the subjects' health promoting behaviors and other pregnancy outcomes. It is possible that other variables, (i.e., biological factors, psychosocial factors, and

situational influences) had more effect on adverse maternal outcomes in older pregnant Thai women than health promoting behaviors. Furthermore, health services provided by the Royal Thai Government permit older pregnant women easy access to health care. Thus, the pregnant women, in this study, were in a position to take good care of themselves.

Finally, no significantly correlations were found among the women's health promoting behaviors and their infants' birth outcomes. These results are similar to those of Neggers and associates<sup>33</sup> who concluded, in African-American pregnant women, health practice scores are not associated with any pregnancy outcomes. However, other factors, such as maternal stress, family income, and social support have been noted to influence infant birth outcomes in pregnant women.<sup>34-36</sup> This suggests that variables, not associated with health promoting behaviors, may have more influence on infant outcomes in older pregnant Thai women than actual health promoting behaviors.

## **Limitations and Recommendations**

Although the researchers were able to recruit a sample that exceeded the original estimate needed to address the purpose of the study, the purposively obtained sample was comprised of older pregnant Thais who attended specific public hospital antenatal clinics. Thus, it is possible that the women were not generally representative of older pregnant Thais. The recruitment of a more diverse sample from other geographic areas of Thailand is needed to validate and enhance the generalizability of the findings. In addition, not all of the women who received care in the selected antenatal clinics participated in the study. Thus, those who did volunteer to participate in the study may have provided different responses and experienced different perinatal outcomes from the women who declined to participate. Furthermore, the



self-report measurement of the women's behaviors and attitudes relied on their recall. In addition, personal biases also may have affected the reliability of the women's reported health behaviors. Thus, future research needs to include means of data collection that involve more than just self-report instruments (i.e. observations, personal journals, and interviews of family members, as well as study subjects).

## Conclusions

This study described the relationships among health promoting behaviors and maternal and infant outcomes in older pregnant Thai women. These women have distinct concerns, opportunities, and health risks during their prenatal period, labor, and delivery. Early identification of health promoting behaviors may offer a unique opportunity for nurses to provide effective teaching and counseling to assist pregnant women to engage in more optimal health behaviors. Older pregnant women, in particular, should be made aware of the benefits of preconception and early prenatal care and encouraged to obtain first trimester screening and early healthcare interventions as needed.

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## ความสัมพันธ์ระหว่างพฤติกรรมส่งเสริมสุขภาพที่มีผลต่อภาวะสุขภาพของมารดาและทารกในหญิงตั้งครรภ์อายุ 35 ปีขึ้นไป

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**บทคัดย่อ:** จำนวนหญิงตั้งครรภ์อายุมากกว่า 35 ปีขึ้นไปในประเทศไทยมีจำนวนเพิ่มมากขึ้น ประมาณร้อยละ 36 ของหญิงตั้งครรภ์เป็นมารดาที่มีอายุมาก ซึ่งหญิงตั้งครรภ์กลุ่มนี้เผชิญกับภาวะแทรกซ้อนทั้งในมารดาและทารก การศึกษาถึงปัจจัยที่มีผลกระทบต่อภาวะสุขภาพของมารดาและทารกในหญิงตั้งครรภ์อายุ 35 ปีขึ้นไปยังมีจำกัด ดังนั้นการวิจัยครั้งนี้เป็นการวิจัยเชิงบรรยายมีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างพฤติกรรมส่งเสริมสุขภาพและภาวะสุขภาพของมารดาและทารกในหญิงตั้งครรภ์อายุมากกว่า 35 ปี

กลุ่มตัวอย่างถูกเลือกโดยการเจาะจงคุณสมบัติตามที่ระบุไว้จำนวน 142 ราย เป็นหญิงตั้งครรภ์อายุ 35 ปีขึ้นไปที่มารับการฝากครรภ์ โรงพยาบาลรัฐบาลในภาคตะวันออกเฉียงเหนือจำนวน 4 แห่ง เก็บรวบรวมข้อมูลโดยใช้แบบสอบถาม ปัจจัยส่วนบุคคล และพฤติกรรมส่งเสริมสุขภาพ ส่วนข้อมูลภาวะสุขภาพของมารดาและทารกรวบรวมจากแบบบันทึกทางการแพทย์และการพยาบาลของกลุ่มตัวอย่างแต่ละราย

ผลการศึกษาพบว่าภาวะแทรกซ้อนในหญิงตั้งครรภ์อายุมากที่พบบ่อยได้แก่ เบาหวานจากการตั้งครรภ์ การเจ็บครรภ์คลอดก่อนกำหนด การตั้งครรภ์ทารกทำแท้ง ภาวะความดันโลหิตสูงเนื่องจากการตั้งครรภ์ ถุงน้ำคร่ำแตกก่อนกำหนดคลอด และภาวะตกเลือดก่อนคลอด ส่วนภาวะแทรกซ้อนของทารกได้แก่ ภาวะพร่องออกซิเจน ทารกคลอดก่อนกำหนด และน้ำหนักตัวแรกคลอดน้อย กลุ่มตัวอย่างมีพฤติกรรมส่งเสริมสุขภาพอยู่ในระดับสูง และยังพบว่าพฤติกรรมส่งเสริมสุขภาพมีความสัมพันธ์ทางลบกับภาวะตกเลือดก่อนคลอดอีกด้วย ดังนั้น พยาบาลควรจัดกิจกรรมส่งเสริมให้หญิงตั้งครรภ์มีพฤติกรรมส่งเสริมสุขภาพที่ดีต่อไป เพื่อป้องกันภาวะแทรกซ้อนและดำรงไว้ซึ่งภาวะสุขภาพที่ดีของมารดาในหญิงตั้งครรภ์กลุ่มนี้

*Pacific Rim Int J Nurs Res 2013 ; 17(1) 28-38*

**คำสำคัญ:** หญิงตั้งครรภ์อายุมาก การส่งเสริมสุขภาพ การตั้งครรภ์เสี่ยง การดูแลในระยะตั้งครรภ์ ผลของการตั้งครรภ์

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