Effects of Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program on Postpartum Blues (PPB) Mothers: A Randomized Controlled Trial

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ผลของโปรแกรมการเสริมพลังทางบวกและการผ่อนคลายด้วยตนเองในหญิงหลังคลอดที่มีภาวะอารมณ์เศร้า การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุม

นางสาวกฤติพิชญ์ ฐิติพิชญานันท์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรดุษฎีบัณฑิต
สาขาวิชาสาธารณสุขศาสตร์
วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย
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Thesis Title	Effects of Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program on Postpartum Blues (PPB) Mothers: A Randomized Controlled Trial
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Field of Study	Public Health
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กฤติพิชญ์ ฐิติพิชญานันท์ : ผลของโปรแกรมการเสริมพลังทางบวกและการผ่อนคลายด้วยตนเองในหญิงหลังคลอดที่มีภาวะอารมณ์เศร้า การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุม (Effects of Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program on Postpartum Blues (PPB) Mothers: A Randomized Controlled Trial) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร. เนาวรัตน์ กาญจนาคาร, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ศ. นพ. วรพงศ์ ภู่พงศ์, 126 หน้า.

โปรแกรมเซลฟ์อีเออาร์ (Self-EAR) เป็นโปรแกรมทางเลือกที่ถูกแปลงเป็นไฟล์เสียงใส่ในเครื่องเล่น MP3 และพัฒนาสำหรับมารดาที่มีภาวะอารมณ์เศร้าเกิดขึ้นหลังคลอด Self-EAR เป็นชื่อย่อของโปรแกรมมาจากทฤษฎีหลัก 3 ทฤษฎี คือ E=การเสริมพลังทางบวก A=การปฏิญาณตน R=การผ่อนคลาย การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อประเมินผลของโปรแกรมที่มีผลต่อคะแนนภาวะอารมณ์เศร้าหลังคลอดและระดับฮอร์โมน allopregnanolone ในซีรั่มของมารดาหลังคลอดที่มีภาวะอารมณ์เศร้า การวิจัยดำเนินการในจังหวัดพะเยาช่วงเดือนมิถุนายน 2558 ถึง เดือนพฤษภาคม 2559 เป็นการวิจัยแบบสุ่มและมีกลุ่มควบคุม ในมารดาหลังคลอดที่มีภาวะอารมณ์เศร้าจำนวน 76 ราย (กลุ่มทดลอง 39 ราย กลุ่มควบคุม 37 ราย) ผู้เข้าร่วมวิจัยทั้งหมดถูกคัดเลือกให้อยู่ในกลุ่มทดลองหรือกลุ่มควบคุมโดยการสุ่ม เครื่องเล่น MP3 บรรจุโปรแกรมที่แปลงเป็นไฟล์เสียงแล้ว ก่อนมอบให้กลุ่มทดลองนำไปฝึกปฏิบัติตามคำแนะนำในเครื่องเล่นเป็นจำนวน 3 ครั้งต่อวันเป็นเวลา 4 สัปดาห์ ส่วนกลุ่มควบคุมได้รับการดูแลตามมาตรฐานการดูแลมารดาหลังคลอด ประเมินผลโดยการตอบแบบสอบถามด้วยตนเองของมารดาหลังคลอดและวัดผลจากระดับของฮอร์โมน allopregnanolone ในซีรั่ม ก่อนเริ่มเข้าสู่โปรแกรม และติดตามผลเมื่อ 1,2, และ 3 เดือน วิเคราะห์ข้อมูลโดยใช้สถิติ Descriptive statistic, Fisher's Exact Test, Chi-square test, t-test, Mann-Whitney U test และ Repeated Measures Analysis of Variance เมื่อติดตามผลภายหลังการศึกษา 3 เดือน พบว่าโปรแกรมก่อให้เกิดผลในทางที่ดีต่อคะแนนภาวะอารมณ์เศร้า (p-value=0.002) และระดับของฮอร์โมน allopregnanolone ในซีรั่ม (p-value=0.001) ผู้เข้าร่วมวิจัยในกลุ่มทดลองมีผลคะแนนภาวะอารมณ์เศร้าหลังคลอดต่ำกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ และมีระดับของฮอร์โมน allopregnanolone ในซีรั่มสูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ จากผลของการวิจัยมีข้อเสนอแนะว่า โปรแกรมสามารถนำไปปรับใช้เพื่อทำให้ภาวะอารมณ์เศร้าหลังคลอดและระดับฮอร์โมน allopregnanolone ในซีรั่มดีขึ้น

สาขาวิชา สาธารณสุขศาสตร์ ลายมือชื่อนิสิต .....

ปีการศึกษา 2559 ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

ลายมือชื่อ อ.ที่ปรึกษาร่วม .....

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KEYWORDS: POSTPARTUM BLUES / SELF-EAR PROGRAM / SELF-EMPOWERMENT / SELF-AFFIRMATION / PROGRESSIVE MUSCLE RELAXATION

KRITTIPITCH THITIPITCHAYANANT: Effects of Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program on Postpartum Blues (PPB) Mothers: A Randomized Controlled Trial. ADVISOR: ASST. PROF. NAOWARAT KANCHANAKHAN, Ph.D., CO-ADVISOR: PROF. VORAPONG PHUPONG, M.D., 126 pp.

The Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program is an alternative intervention, transformed into MP3 audio files, and developed for new blues postpartum mothers. The study aimed to evaluate the effect of Self-EAR program to improve the postpartum blues scores and serum allopregnanolone level among new blues mothers in Phayao province during June 2015 to May 2016. A randomized controlled trial was conducted among 76 postpartum blues mothers (intervention 39, control 37). All participants were randomly assigned either to the intervention group (Self-EAR program), or the control group (standard postpartum care program). The Self-EAR program was transformed into audio files which installed in the MP3 digital device before provided to the intervention group to implement at home 3 times per day for 4 weeks. Evaluation postpartum blues scores and serum allopregnanolone level by using self-report postpartum blues questionnaires at baseline, 1-month, 2-month, and 3-month follow-up. Data were analyzed by using Descriptive statistic, Fisher's Exact Test, Chi-square test, t-test, Mann-Whitney U test , and Repeated Measures Analysis of Variance. After the 3-month follow-up, the results revealed positive effect of the Self-EAR program on postpartum blues scores [p-value=0.002] and serum allopregnanolone concertations [p-value=0.001]. The postpartum blues scores in the intervention group had statistical sinificant lower than the postpartum blues scores in control group, on the other hand, serum allopregnanolone level in the intervention group had statistical significant higher than serum allopregnonolone level when compared with the control group. The findings suggested that the Self-EAR program was applicable to improve postpartum blues scores and allopregnanolone serum level among new postpartum blues mothers.

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Student's Signature .....
Advisor's Signature .....
Co-Advisor's Signature .....

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LIST OF ABBREVIATIONS

Self-EAR:	Self-Empowerment-Affirmation-Relaxation
PPB:	Postpartum Blues
PPD:	Postpartum Depression
PPS:	Postpartum Psychosis
AP:	Allopregnanolone
EPDS:	Edinburg Postnatal Depression Scale
MP3:	Motion Picture Experts Group 3

CHAPTER I
INTRODUCTION

1.1 Background and rationale

A three type of postpartum affective disorders [Postpartum Blues (PPB), Postpartum Depression (PPD), Postpartum Psychosis (PPS)], postpartum blues is the most common detected with ranging from thirty to seventy-five percent of estimates incidence (Seyfried & Marcus, 2003). Symptoms of postpartum blues begin within the third day to the fifth day after childbirth, and persist for hours up to three weeks of postpartum periods (Murata, Nadaoka, Morioka, Oiji, & Saito, 1998). In addition, a sign of blues were included mood lability, irritability, tearfulness, headache, generalized anxiety, lack of concentration, absent-mindedness and sleep and appetite disturbance(Seyfried & Marcus, 2003).

There are some arguments of biological factors related to the blues; some study mention that the predisposition to develop blues is unrelated to age, race, marital status, socioeconomic status, psychiatric history, environmental stressors, or cultural context. On the other hand, another researches suggest that maternity blues may be related to breastfeeding, insecure physiological and social surrounding, insufficient maternal care in childhood, mood change and poor family support during pregnancy, or parity (C. T. Beck, Reynolds, & Rutowski, 1992a; Glangeaud-Freudenthal, Crost, & Kaminski, 1999; Henshaw, Foreman, & Cox, 2004; Murata et al., 1998; Seyfried & Marcus, 2003; G. S. Stein, 1980).

However, those factors may influence whether the blues lead to major depression. Up to twenty percent of women with the blues will go on to develop major depression in the first year postpartum (O'Hara, Schlechte, Lewis, & Wright, 1991). This finding consistent with many studies, they found a strong relationship between postpartum blues and postpartum depression (C. T. Beck et al., 1992a; Reck, Stehle, Reinig, & Mundt, 2009; Watanabe et al., 2008).

After a period of child birth, most women experienced to maternity blues. An increasing production of placental corticotrophin-releasing hormone (CRH) during pregnant periods made slowly changes of the hypothalamic-pituitary-adrenal (HPA) axis. After placenta delivery, the immediate withdrawal of placenta CRH, caused of an imbalance of the maternal HPA axis. In particular, these changes probably associated of the etiology of the postpartum blues and postpartum mood disorders in general. Study of O'Keane et al., (2011) found that increasing of blues scores correlated with Adrenocorticotropic hormone (ACTH), then inversing correlated with estriol levels (O'Keane et al., 2011).

In the recent past, study about postpartum blues hormone revealed that maternity mood changed due to spontaneously withdrawal of progesterone (Harris et al., 1994b). Nevertheless, some study had conflict among hormone related to blues such as CRH, ACTH, progesterone, prolactin, estradiol, and cortisol (O'Hara et al., 1991; O'Keane et al., 2011). Regarding to review of Neuro-Psychopharmacology & Biological Psychiatry have identified an involvement of neurosteroids (Allopregnanolone) level in both modulating and detecting stress and stress related disorders including anxiety, panic, and depression (Bali & Jaggi, 2014; Brunton, Russell, & Hirst, 2014; Schule, Nothdurfter, & Rupprecht, 2014).

1.2 Statement of a problem

During the first week postpartum, the incidence of maternity blues in the United States has been reported from fifty to sixty-five percent (C. T. Beck et al., 1992a). In The United Kingdom, Stain et al., (1981) reported that an overall maternity blues incidence rate of eighty-five percent (G. Stein, Marsh, & Morton, 1981). Faisal-Cury el al., (2008) surveyed among 113 puerperal women in Brazil using Stein Scale, and reported the prevalence of maternity blues was 32.7 percent (Faisal-Cury, Menezes, Tedesco, Kahalle, & Zugaib, 2008). In German, maternity blues were assessed 2 weeks after delivery among 835 women using telephone interview. The result showed that the prevalence rate of maternity blues among German women was 55.2 percent (Reck et al., 2009). Moreover, In Japan, Watanabe et al., (2008) carried out a longitudinal study among Japanese new mothers, and they found postpartum blues of 43.8 percent (Watanabe et al., 2008)

In Thailand, inadequate evidence based supported either prevalence or current situation of postpartum blues. Most reports were related to postpartum depression, in particularly a national survey reported the prevalence of postpartum depression among Thai women was 8.4 percent (Panyayong, 2013). However, the prevalence of postpartum depression was different in various hospital such as 9.5% in Songklanagarind Hospital (Pitanupong, Liabsuetrakul, & Vittayanont, 2007), 25% in Ramathibodi Hospital (Petpornprapas & Lotrakul, 2009), 22% in the Queen Sirikit National Institute of Child Health (Piyasil & Pichaiyut, 2011), and 20.6% in Siriraj Hospital (Kasak, Serisathien, & Bangpichet, 2013). All of Thai PPD Statistical numbers trend to be higher than international statistic.

Nevertheless, the incidence rate of PPB in Thailand never been earlier systematically reported, including diagnosis and treatment for new mothers, who had experienced with blues, were quite insufficient up to now. According to uncertain of etiology of PPB in case of physical or psychological change, there were many experimental studies related to PPB. In the physical change of PPB, many studies of hormone during postpartum periods were contradicted reports for example, progesterone, prolactin, estradiol, and cortisol (Harris et al., 1994b; O'Hara et al., 1991; O'Keane et al., 2011). Only allopregnanolone -neurosteroids or neuroactive steroids- played an importance role for the pathophysiology regulation of emotional disorders including depression, anxiety, and stress related disorders (Bali & Jaggi, 2014; Nappi et al., 2001; Schule et al., 2014).

In the psychological change aspects, many experimental studies conducted the program to improve mental health in both pregnant women and non-pregnant women; in non-pregnant women such as self-empowerment, and self-affirmation (Kinney, Rodgers, Nash, & Bray, 2003; D. K. Sherman, Bunyan, Creswell, & Jaremka, 2009); in pregnant women such as relaxation, mindfulness meditation, and guide imagery (A. Chiesa & Serretti, 2010; Gedde-Dahl & Fors, 2012; Moffatt, Hodnett, Esplen, & Watt-Watson, 2010; Schaffer et al., 2013).

The result of the psychophysiological evidences found that the counseling program may reduce stress in both pregnant and non-pregnant population, but the integrated program and clinical approach to only postpartum mothers are not attempt up to now. So this study aims to combine psychological technique -self -empowerment, self-affirmation, and relaxation- for reduction of PPB scores.

1.3 Research questions

1.3.1 What is the difference of the effectiveness between Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program and Routine Postpartum Care Program on the reduction of postpartum blues scores?

1.3.2 Can Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program improve serum allopregnanolone among postpartum blues mothers?

1.4 Research hypothesis

1.4.1 The Self-Empowerment-Affirmation-Relaxation [Self-EAR] program can reduce Postpartum Blues Scores.

1.4.2 The Self-Empowerment-Affirmation-Relaxation [Self-EAR] program can improve serum allopregnanolone among postpartum blues mothers.

1.5 Research objectives

1.5.1 General objective:

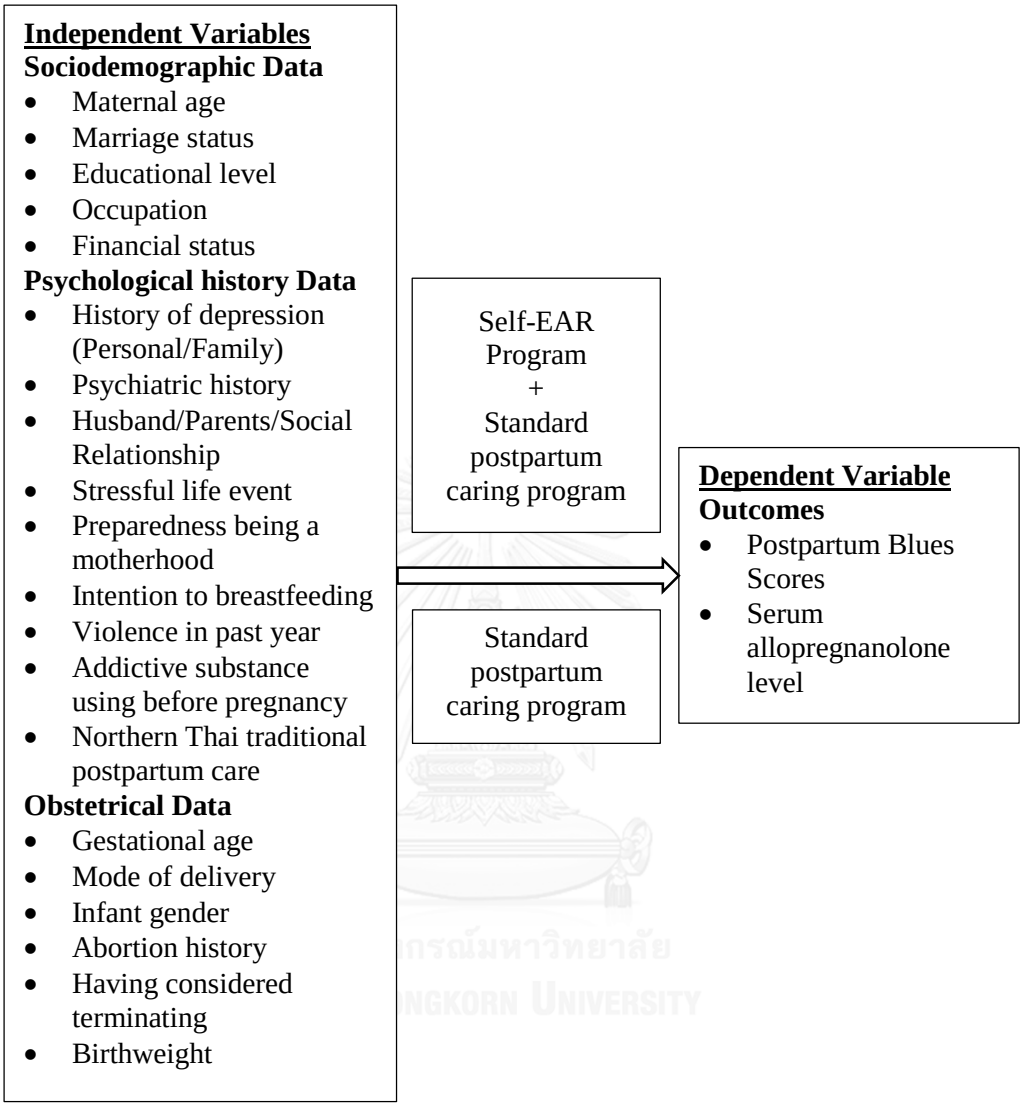
1.5.1.1 To determine the effectiveness of Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program to improve Postpartum Blues.

1.5.2 Specific objective:

1.5.2.1 To assess the effectiveness of program function on reducing Postpartum blues scores.

1.5.2.2 To evaluate the effectiveness of program function on improving serum allopregnanolone (a biochemical marker of Postpartum Blues).

Figure 1. Conceptual framework



1.6 Operational definition

1.6.1 Postpartum Blues: The postpartum blues (PPB), maternity blues, or baby blues is a transient condition that almost of new mothers could experience shortly after childbirth with a wide variety of symptoms which generally involve mood lability, tearfulness, and some mild anxiety and depressive symptoms. Baby blues is not postpartum depression, unless it is abnormally severe.

1.6.2 Postpartum Depression: Postpartum depression (PPD) is moderate to severe depression in a woman after she has given birth. It may occur soon after delivery or up to a year later. Most of the time, it occurs within the first 4 weeks after delivery.

1.6.3 Neurosteroids: Neuroactive steroids, also known as neurosteroids, are endogenous steroids that rapidly alter neuronal excitability through interaction with ligand-gated ion channels and other cell surface receptors. The term 'neurosteroids' was coined by the French physiologist and refers to steroids synthesized in the brain. In contrast, neuroactive steroid refers to steroids that are synthesized by an endocrine gland that then reach the brain through the bloodstream and have effects on brain function. In addition to their actions on neuronal membrane receptors, some of these steroids may also exert effects on gene expression via nuclear steroid hormone receptors. Neurosteroids have a wide range of potential clinical applications from sedation to treatment of epilepsy and traumatic brain injury. Neurosteroids play an important role in controlling anxiety and depression.

1.6.4 Allopregnanolone (AP): Allopregnanolone or (3α-hydroxy-5α-pregnan-20-one) or (3α,5α-tetrahydroprogesterone), generally abbreviated as ALLO or as

3α,5α-THP, is an endogenous inhibitory pregnane neurosteroids. It is synthesized from progesterone, and a potent positive allosteric modulator of the GABAA receptor. Allopregnanolone has effects similar to those of other potentiators of the GABAA receptor such as the benzodiazepines, including anxiolytic, sedative, and anticonvulsant activity. In this study used the human allopregnanolone enzyme-linked immunosorbent assay (ELISA) kits to investigate serum allopregnanolone concentration by using competitive ELISA technique.

1.6.5 Self-Empowerment: Self-Empowerment is a technique to encourages people to gain the skills and knowledge that will allow them to overcome obstacles in life or work environment and ultimately, help them develop within themselves or in the society, and derive the strength to do something through them thoughts and based on the belief that they know what is best for them. In this study proceeded the 3 aspect of Self-Empowerment to approach including controlled oneself, motivated oneself, and reinforced oneself.

1.6.6 Self-Affirmation: The theory of self-affirmation is a psychological theory that was first proposed in the nineteen century with the premise that people are motivated to maintain the integrity of self. These "self-affirmations" enable people to deal with threatening events and information without resorting to defensive biases, by fulfilling the need to protect self-integrity in the face of threat. In this study used self-affirmation to guide behavior and decisions, especially to cope with a negative thinking by repeat affirmations to oneself every day, and every time.

1.6.7 Relaxation techniques: A relaxation technique (also known as relaxation training) is a process, method, activity, or procedure that supports a people to relax; to reach a level of improved calmness; or also reduce states of pain, anxiety, stress or anger. The other health benefits of relaxations techniques are often working as one component of a comprehensive stress management program and be able to release muscle tension, reduce the blood pressure and decrease heart and breathe rates. In this study used progressive muscle relaxation.

16.8 Preparedness being a motherhood: Preparedness being a motherhood compost of 3 aspects which were emotional preparedness, body preparedness, and environment preparedness.

16.9 Violence event in the past year: Violence event in the past year were defined as the event that affected to participants emotional which were loss of their parents, husband, or distinctive person in their family.

1.6.10 Thai traditional postpartum practices (Yu Duan): Postpartum practices or postpartum cares in northern Thai context, Yu Duan, are practices that postpartum women and their family members must be extremely cautious about their activity and diet for a period of 30 days. If postpartum women do something wrong in the postpartum month, they will experience “lom pid duan”- Wind illness may manifest in bodily aches and pains. Most importantly, “lom pid duan” is embodied as madness (like a mad person).

CHAPTER II
REVIEW LITERATURE

The following literature review has been organized into three categories: physiology of postpartum affective disorders; psychophysiological therapy as empowerment theory, self-theory, self-empowerment, self-affirmation, and relaxation; in addition, neurosteroids as a biochemical marker using for detecting stress and stress related disorders.

2.1 Physiology of postpartum affective disorders

During the past decade, the association of psychiatric disorders among the postpartum period has been recognized. In 1968, the psychosis associated with childbirth was first included the diagnostic classification in the American Psychiatric Association [The psychiatric Diagnostic and Statistical Manual of Mental Disorders (DSM)] ("DSM-IV casebook: A learning companion to the Diagnostic and Statistical Manual of Mental Disorders—4th ed," 1994). The postpartum onset was utilized as a modifier for brief reactive psychosis and mood disorders in the psychiatric Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV, 1994). Postpartum onset was defined as a period of depression, mania, or psychosis that has an onset within four weeks after delivery. This period is a time of risk for postpartum mothers face to mood disturbance, including postpartum blues, postpartum depression and postpartum psychosis. Although, symptoms may overlap between these disorders,

not only they have unique risk factors but also each difference of severity (Gale & Harlow, 2003).

2.1.2 Postpartum blues (PPB)

The terms ‘postpartum blues’, ‘maternity blues’, ‘baby blues’ or ‘the blues’ are used to describe a period of time after childbirth when a new mother face to mood change or disturbance. Postpartum blues are mild mood changes that commonly occur during the early postpartum period. The psychiatric Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) ("DSM-IV casebook: A learning companion to the Diagnostic and Statistical Manual of Mental Disorders—4th ed," 1994), defines postpartum blues as a mild and transient disturbance in a mood, prevalence estimates occurring as high as 75 to 80 percent of new mothers. Symptoms usually arise at the third days after delivery and resolve by 3 weeks (C.T. Beck & Driscoll, 2006). The blues are most commonly characterized by mood liability and tearfulness. While the term ‘blues’ implies the presence of low mood, including irritability, anxiety, headache, sleep disturbance, and subjective feelings of confusion such as lack of concentration and absent-mindedness. In women with the blues, they often identified themselves as feeling ‘low spirited’ in contradiction of ‘depressed’, ‘depression is not typical of the blues’. However, others studies have reported depressed mood as characteristic of a postpartum blues. If severe depressive symptoms revealed in the early postpartum period, it should be evaluated for possible postpartum depression. The blues begin within few days after delivery and the highest symptom have been found on the third or the fifth day after childbirth (Seyfried & Marcus, 2003).

The prevalence of postpartum blues generally considered as a cross-culture phenomenon, for example, 85 percent in The United Kingdom (G. Stein et al., 1981), 65 percent in The United states (C. T. Beck, Reynolds, & Rutowski, 1992b), 55.2 percent in Germany (Reck et al., 2009), 32.7 percent in Brazil (Faisal-Cury et al., 2008), and 43.8 percent in Japan (Watanabe et al., 2008). Nevertheless, inadequate evidence reported the prevalence of postpartum blues in Thailand.

Table 1. The association of psychosocial risk factors with the postpartum blues.

Risk factors	**Authors (Years)**	**Results**
Age Race Educational status Marital status Socioeconomic status	(Ballinger, Buckley, Naylor, & Stansfield, 1979) (Hapgood, Elkind, & Wright, 1988) (O'Hara et al., 1991)	No relationship with PPB
Environmental stressors Personality Poor family	(Ballinger et al., 1979) (Kennerley & Gath, 1989a)	Positive relation and increased risk of PPB

2.1.2.1 Psychosocial risk factors

Although, postpartum blues has been initiated in all cultures, several study revealed that no significant relationship between the blues and demographic factors such as age, race, marital status, socioeconomic status, educational status, and environment stressors (Hapgood et al., 1988) (O'Hara et al., 1991). Some study reported that a personal or family history of depression, a greater number of stressful life events

during pregnancy, and inadequate social support during pregnancy such as lack of support from family, friends and husbands have been increased risk of the developing postpartum blues (O'Hara et al., 1991) (Murata et al., 1998). There appears to be positive finding evidence regarding personality and poor family. Other risk factors for postpartum blues are psychiatric history, premenstrual syndrome, mood disturbances during pregnancy such as anxiety, depression, and weeping (Ballinger et al., 1979) (Kennerley & Gath, 1989a).

Table 2. The association of obstetrical risk factors with the postpartum blues.

Risk factors	**Authors (Years)**	**Results**
Parity	(G. S. Stein, 1980) (Kendell, McGuire, Connor, & Cox, 1981) (Condon & Watson, 1987) (Kennerley & Gath, 1989a) (Ehlert, Patalla, Kirschbaum, Piedmont, & Hellhammer, 1990) (O'Hara et al., 1991)	No relationship with PPB
Parity	(Yalom, Lunde, Moos, & Hamburg, 1968) (Nott, Franklin, Armitage, & Gelder, 1976)	Greater risk for PPB
Mode of delivery Psychiatric history Personal/Family history of depression Negative life event Unplanned pregnancy Premenstrual syndrome Having considered terminating Low birth weight Congenital abnormally Difficult labor (Abnormal delivery) Mode of infant feeding	(G. S. Stein, 1980) (Kendell et al., 1981) (Condon & Watson, 1987) (Kennerley & Gath, 1989a) (Ehlert et al., 1990) (O'Hara et al., 1991) (Hannah, Adams, Lee, Glover, & Sandler, 1992)	Positive relation and increased risk of PPB

2.1.2.2 Obstetrical risk factors

Most of study found no relationship with parity, but some found that parity was greater risk for blues (Nott et al., 1976; Yalom et al., 1968). There is little consistent evidence regarding, mode of delivery, having considered terminating, low birth weight, congenital abnormally, difficult labor (abnormal delivery), unplanned pregnancy, and mode of infant feeding (Condon & Watson, 1987) (Hannah et al., 1992).

2.1.2.3 Biological factors

Both postnatal hormone changes and abrupt withdrawal of hormone levels at delivery may possibly cause of postpartum blues. Several studies report a relationship between plasma cortisol level and mood change after delivery (Ehlert et al., 1990) (Okano & Nomura, 1992) (Taylor, Littlewood, Adams, Dore, & Glover, 1994). The withdrawal of gonad steroid hormones operates a causal relationship with mental changes occurring postpartum period. There is greater drop in progesterone levels in women with depressed mood. Nevertheless, some study found no association between mood and plasma concentration of progesterone (Ballinger, Kay, Naylor, & Smith, 1982) (Kuevi et al., 1983) (Heidrich et al., 1994). Regarding prolactin hormone that enabling female mammals to produce milk, several studies found no relationship between blues and prolactin levels (Kuevi et al., 1983) (O'Hara et al., 1991) (Nappi et al., 2001). Furthermore, some evidences supported that free plasma tryptophan levels have positively correlation with blues, but another shown no association (G. Stein, Milton, Bebbington, Wood, & Coppen, 1976) (Handley, Dunn, Baker, Cockshott, & Gould, 1977) (Maes, Ombelet, Verkerk, Bosmans, & Scharpe, 2001). In the recent publication, Allopregnanolone levels, neurosteroids or neuroactive steroids, were

detectable postpartum blues and stress related disorders (Nappi et al., 2001) (Bali & Jaggi, 2014) (Brunton et al., 2014) (Schule et al., 2014).

Table 3. The association of biological factors with the postpartum blues.

Risk factors	Authors (Years)	Result
1. Cortisol	(Handley et al., 1977) (Ballinger et al., 1982) (Okano & Nomura, 1992) (Taylor et al., 1994)	Higher cortisol levels correlated with blues
Cortisol	(Ehlert et al., 1990) (Kuevi et al., 1983) (Harris et al., 1994a) (Nappi et al., 2001)	No link found between cortisol levels and blues
2. Progesterone	(Ballinger et al., 1982) (Kuevi et al., 1983) (Heidrich et al., 1994)	No association found between progesterone levels and blues
3. Prolactin	(Kuevi et al., 1983) (O'Hara et al., 1991) (Nappi et al., 2001)	No relationship found between prolactin levels and blues
4. Tryptophan	(G. Stein et al., 1976) (Handley et al., 1977)	Found positively correlated with blues
Tryptophan	(Maes et al., 2001)	Found no associated with depressed symptoms or tryptophan ratio and blues
5. Allopregnanolone	(Nappi et al., 2001) (Bali & Jaggi, 2014) (Brunton et al., 2014) (Schule et al., 2014)	Allopregnanolone levels were detectable postpartum blues, prevent preterm birth, and associated with stress related disorders

2.1.2.4 Association between postpartum blues and postpartum depression

Prospective study has demonstrated that up to 20 percent of women with postpartum blues will develop postpartum depression (O'Hara et al., 1991). Henshaw et.al, 2004, reviewed that women with severe blues found to be an independent predictor of major and minor depression (Henshaw et al., 2004). Many studies have also proved a positive relationship between blues symptoms and depression in

postpartum period (Handley et al., 1977) (G. S. Stein, 1980) (Hapgood et al., 1988) (O'Hara et al., 1991) (C. T. Beck et al., 1992b) (Hannah et al., 1992).

2.1.3 Postpartum depression (PPD)

Postpartum Depression (PPD), a worldwide mental health problem, affects to both women in postpartum periods and theirs family. Unclear consensuses of etiology of postpartum depression as in case of postpartum blues, then several studies have failed to explore potential psychosocial risk factors. Clinical symptom of postpartum depression is moderate to severe. Major criteria of postpartum depression are five or more of the following symptoms originate within 4 weeks and occur nearly every day or most of the day: depressed mood, diminished interest or pleasure in usual activities, significant weight loss or weight gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, worthlessness or excessive guilt, diminished ability to think or concentrate, or recurrent through of death or suicidal ideation (C. T. Beck et al., 1992b). If suicide and infanticide occur, this is a severe postpartum depression episode. According to the DSM-IV and DSM-IVTR, major postpartum depression onset begins within 4 weeks and up to 12 weeks of delivery. Postpartum depression may arise into the first or second year after childbirth, if lacking of treatment. Prevalence rate of postpartum depression given differences in diagnosis criteria, ranged from 10 to 13 percent. Intense of hormone fluctuations, situational risk, and life stress are three interrelated factors, playing an importance role in the beginning of pathogenesis of postpartum depression ("DSM-IV casebook: A learning companion to the Diagnostic and Statistical Manual of Mental Disorders—4th ed," 1994).

2.1.3.1 DSM-IV criteria for major depressive disorders

2.1.3.1 Criteria for Major Depressive Episode

Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure.

Note: Do not include symptoms that are clearly due to a general medical condition, or mood-incongruent delusions of hallucinations.

- Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g. feels sad or empty) or observation made by others (e.g. appears tearful)
- Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others)
- Significant weight loss when not dieting or weight gain (e.g. a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day
- Insomnia or hypersomnia nearly every day
- Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down)
- Fatigue or loss of energy nearly every day

- Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick)
- Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)
- Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide
- The symptoms do not meet criteria for a Mixed Episode
- The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning
- The symptoms are not due to the direct physiological effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition (e.g. hypothyroidism)
- The symptoms are not better accounted for by Bereavement, i.e. after the loss of a loved one; the symptoms persist for longer than 2 months or are characterized by marked functional impairment, morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms or psychomotor retardation.
- Postpartum onset specifier: Onset of episode within 4 weeks postpartum

2.1.4 Postpartum psychosis (PPS)

In early puerperium, the complex psychosocial stressors and hormonal related change were activated psychotic episode of postpartum psychosis that occurs following childbirth. Postpartum Psychosis (PPS) conditions often develop with women who have history of psychiatric illness, including a history of postpartum psychosis and bipolar disorder. Symptoms of postpartum psychosis (PPS) are included delusions, hallucinations, and disorganized speed and behavior. The prevalence of postpartum psychosis have reported rate between 1 and 2 case per 1,000 postpartum women (Seyfried & Marcus, 2003). Psychosocial risk factors for the development of postpartum psychosis are marital conflict and lack of social support that seem to be associated with increased risk, however in contrast with demographic factors have not been reliably demonstrated to increase the risk of developing postpartum psychosis. By the way there was no association between postpartum psychosis and environmental stress, as well as no other obstetrical or gynecological risk factors have been consistently identified. A postpartum psychosis is both a medical emergency and requires immediate referral to a psychiatrist for treatment, which typically involves inpatient hospitalization. The admission rate of psychosis was extremely high in the first 30 days after delivery (C.T. Beck & Driscoll, 2006).

Table 4. Comparisons among 3 types of the postpartum affective disorders

Disorder	Onset and duration	Symptoms	Treatment
Postpartum Blues	Onset within 3-5 postpartum day and last up to 3 wk.	Mild and transient mood swing	No medical treatment required, but educational program, counseling or combination
Postpartum Depression	Onset within 4 wk. and last up to 1 year	Moderate to severe depression	Counseling, depressive medication , or combination
Postpartum Psychosis	Onset within 1 mo. and last up to 3 mo.	Severe and disorganized behavior, delusions, and hallucinations	Hospitalization and psychotic medication necessary required

2.2 Psychophysiological therapy

2.2.1 Empowerment theory: Psychological empowerment

Empowerment is an intentional ongoing process, involving individuals and groups gain greater access to and control over their resources and a critical understanding of their environment. In general, the term psychological empowerment may be conceptualized to include intrapersonal, interactional, and behavioral components, depends on the context and population being studied (Zimmerman, Israel, Schulz, & Checkoway, 1992). *The intrapersonal component* refers to people beliefs about their ability to exert influence work and sociopolitical contexts important to them. It involving an idea of a self-perception that includes domain-specific perceived control, domain-specific self-efficacy, motivation control, and perceived competence. It may perhaps include perceptions about the exert control over community problems.

The interactional component was conceptualized to involve an individual critical awareness of the transactions between persons and environments that enable them to successfully master social or political systems. It includes knowledge about a critical awareness to understanding causal agents and the development of decision-making and problem-solving skills necessary to actively engage theirs environment. The interactional component connected to self-perceptions about control (intrapersonal component) with exerts influence (behavioral component). The behavioral component was described as individual actions that influence on the social and political environment through participation in community organizations and activities. It is conceptually include of participation in community organizations such as neighborhood associations, political groups, self-help groups, church or religious groups, and service organizations. Other dimensions of the behavioral component consist of participation in community-related activities such as helping people cope with problems in theirs living, communicating public officials, or organizing a neighborhood around an issue (Peterson, 2014).

Concepts of empowerment currently popular use in nursing with the purpose of illustrate and encourage an intellectual of the profession. These concepts are widely used in health related contexts such as health promotion, mental health, and feminine health. Furthermore, many literatures revealed that it also conducted among varied population as children, women, students, parents, and chronic illness patients (Rodwell, 1996).

2.2.2 Self-Theories: Self-Empowerment; Self-Affirmation

2.2.2.1 Self-theories

Self-Theories are an integrative framework for the sociology of emotion that has produces a variety of theoretical paradigms and extensive empirical research. Self-beliefs involve motivation and therefore accomplishment. All sociological sub-determinants have not produced a coherent organizing framework with fit to theoretical and empirical literatures. Self refers to individualities within personalities that cause of motivation. The literature on self-referent responses suggested that the potential for offering such a coherent organizing framework. Theoretical orientation reflects the self-referent nature of emotions and the direct and indirect linear antecedents and consequences of emotional responses. Self-theories addressed the antecedents, consequences, and interrelationships among four categories of self-referent (reflexive) paradigms: (1) self-cognition (including conception, perception, awareness), (2) self-evaluation (a special case of self-cognition in which the person perceives), (3) self-feelings, and (4) self-enhancing or self-protective responses (Kaplan, 1996).

2.2.2.2 Self-empowerment

Self-Empowerment (Synonyms: Self-advocacy, Self-determination, Self-direction, or Self-reliance) is an inspired technique to encourage people to achieve theirs abilities, and to integrate knowledge to adjust their strengths and weaknesses overcoming troubles in their livelihood and overall community (Mackintosh, 1995). This technique is aim to enable personnel decision-making through improving self-esteem and altering individual self-concept, using developing individual motivation,

self-confidence and skills. In addition, developing self-empowerment skills required direct instruction and guided experience enter leadership role ("Self-empowerment," 2013).

Kinney et.al (2003) integrated mind-body-spirit self-empowerment program for enable participants to experience a reduction in distress, improve perceived quality of life, reach a deeper sense of meaning and purpose in life, and experience a greater sense of perceived wellness for breast cancer survivors. The results showed statistically significant improvement and large estimated effect sizes on overall measurement (Kinney et al., 2003).

Designed for qualitative study, the researchers aim to identify the process of self-empowerment for caregivers who caring elderly dementia patients. The results revealed that the inner awareness strongly effect to three inner mechanism parts of the caregivers which is “care ability”, “emotional reconstruction”, and “life management” (Che, Yeh, & Wu, 2006). In the same year, Joe Tye, America's Values Coach and a former hospital executive and was founding president of the Association of Air Medical Services, explains benefit of the Self-Empowerment Pledge toward improving effective of personality and professionally among caregivers in leadership development title. It includes 7 simple promises (7 days pledges) that can improve the quality of mental and emotional health (Tye, 2006).

Table 5. The studies of self-empowerment effect on stress and mental health

Study	Method	Participants	Intervention	Findings
(Kinney et al., 2003)	a single group pre and posttest design	51 women at various stages of breast cancer	mind-body-spirit self-empowerment program	Pre- and post-scores showed statistically significant differences in improvement and large estimated effect sizes on a reduction in a distress, a quality of life, a deeper sense of meaning and purpose in life, and a greater sense of perceived wellness.
(Che et al., 2006)	Qualitative research via face-to-face, in-depth tape recorded interviews observations	9 primary caregivers of elderly with dementia	No	Research results demonstrate the presence of dynamic parts such as inner awareness, care ability, attitude, taking action, faith change and flow of power, and so on. Primary caregivers of dementia elderly can self-empower themselves.
(Clifton, Cadzow, & Rowe, 2009)	Collaboratively research	49 refugee and low-income women	The Priscilla Project: The main program components include committed, volunteer mentoring and education sessions	The Priscilla Project helps to amplify each woman's yearning for equal access and respectful relationships while providing her with many tools for success, successfully challenges the root causes of marginalization, changing the attitudes of the mentees, the mentors, and the broader community.

2.2.2.3 Self-affirmation

The self-affirmation theory hypothesizes that people have a primary motivation to maintain self-integrity, a perception of good-self, virtuous, also predicted and regulated significant outcomes ability. The psychological theory of self-affirmation was first proposed with the premise that people are motivated to maintain the healthiness of the self. Self-affirmation empowers people to deal with threatening events of life without defensive biases (Claude M. Steele, 1988). In historical periods, the concepts of self-affirmation were wildly share of the meaning to be a person of self-integrity. The meaning of self-integrity is an individual perceives concepts of goodness, virtue, and agency. A self-affirmation theory use to investigate self-integrity maintenance, when perception of self was threatened, together with demonstrated as a self-adequacy including positive feedback on a personally important skill (C. M. Steele, Spencer, & Lynch, 1993), (D. K. Sherman & Cohen, 2006).

This theory initiated in the context of dissonance theory, starting from less reasonable of individual decision making even though given the opportunity to affirm an importance value. The hypothesis of self-affirmation is reducing defense mechanism that relevance to individual identity and health threats. Several benefits of this theory are (1) to assist people adjusted an optimal of their threat (2) to guide people verified a greater rightness using powerful healthy messages (3) to point people avoided a violent content of the messages (4) to integrate into the behavioral program for chronic illness patients lessened medical used (David K. Sherman, 2013).

Self-threat be able to stimulate a biological stressor system. Then again values self-affirmation encourages people to fight to threatening. In recently study, the authors want to examine effects of self-affirmation on vulnerable feeling and behavioral

intention to breast cancer risk between 2 experimental group of alcohol consumer and caffeine consumer. The results showed only when participants reading the strong message, they reported greater felling of vulnerability and greater intentions (Klein, Harris, Ferrer, & Zajac, 2011). In addition to other study of self-affirmation interventions, the researchers conducted promise technique in two experimental groups. They found that participants learning to cope with everyday threats using self-affirmation messages. Together with 3 application researches conducted self-affirmation for chronic health threats as breast cancer, hypertensive disorders, and hemodialysis patients. All of them found positive effect of the intervention and health threatening through implementing self-affirmation strategies to motivate behavioral intention, to promote a defensive response, and to improve health status (Morris, Cooper, Goldenberg, Arndt, & Routledge, 2012), (Boutin-Foster et al., 2013), (Wileman et al., 2014).

Table 6. The studies of self-affirmation effect on stress and mental health

Study	Method	Participants	Intervention	Findings
(van Koningsbruggen & Das, 2009)	Internet base RCT	84 participants	The health message closed with the recommendation to do a type 2 diabetes risk test.	Findings showed that self-affirmation decreased message derogation, increased intentions to do an online risk test and promoted online risk test taking among at-risk participants.
(Boutin-Foster et al., 2013)	A theoretical based randomized controlled trial.	220 participants	The Trial Using Motivational Interviewing and Positive Affect and Self-Affirmation in African-Americans with Hypertension (TRIUMPH)	TRIUMPH more fully incorporated motivational interviewing techniques in the protocol in addition to positive affect and self-affirmation.
(Wileman et al., 2014)	A two-armed pilot cluster randomized controlled trial	112 hemodialysis patients	Self-Affirmation Manipulation	Interventions to help patients with ESRD manage their treatment are complex. Whilst caution is necessary, the results from this study provide encouraging support for self-affirmation interventions to help improve adherence in this setting.
(Barkoukis, Lazuras, & Harris, 2014)	A between subject experimental design	60 participants	Self-Affirmation Manipulation	Self-affirmed participants reported significantly lower intentions to dope and temptation to engage in doping under risk-conducive situations.

2.2.3 Relaxation techniques

A relaxation technique (relaxation training) is a process, method, activity, or procedure that supports a people to relax; to reach a level of improved calmness; or also reduce states of pain, anxiety, stress or anger. The other health benefits of relaxations techniques are often working as one component of a comprehensive stress management program and be able to release muscle tension, reduce the blood pressure and decrease heart and breathe rates (Lehrer, 1982). Relaxation in psychology is the emotional state of life with low stressors, as well as there is a lack of anger, anxiety, or fear. The cortex of brain transmitted the signals to the frontal lobe via mild sedative to operate mild jubilation and relaxation. Accomplishment of relaxation can be done by practicing progressive muscle relaxation, meditation, and autogenic training (Goleman, 1986). Relaxation assists improve coping with stress that related with physical and mental health problems. For that reason, feeling relaxed is profitable for an individual's health. The sympathetic nervous system activated hyperarousal, or the acute stress response. Several relaxation techniques known as "formal and passive relaxation exercises" used to improve stressor (Varvogli & Darviri, 2011). There are included of autogenic training, meditation, deep breathing, mind-body relaxation, yoga, self-hypnosis, Qigong, and progressive muscle relaxation. All type of yoga is combine methods such as Zen Yoga, Yoga Nidra, Tai chi, Qigong, and Zhineng Qigong. Various relaxation methods, autosuggestion and prayer, can also be practiced during doing every activities. Listening to classical music or new age music would be improving stress aerosol and increasing relaxed sensation by means of calmness and easiness (Scheufele, 2000) (Barlow, Lehrer, Woolfolk, & Sime, 2007).

Relaxation techniques consist of 3 categories as (1) Physical relaxation techniques (2) Mental relaxation techniques (3) Therapeutic relaxation techniques.

(1) Physical relaxation techniques

Physical relaxation technique divided to 2 types as (1) Breathing techniques (2) Progressive Muscle Relaxation techniques. One of the simply ways to relieve stress is breathing techniques that required slightly effort to practice. The appropriate breathing techniques are deep abdominal breathing that illustrated to reduce everyday anger and irritability emotion (Sargunaraj et al., 1996). In 1905, Edmund Jacobson, an American physician, originated progressive muscle relaxation technique to release muscular stressor. This technique is widely used in both of therapeutic and non-therapeutic field to reduce symptoms triggered by stress as anxiety and sleeplessness (Han, Stegen, De Valck, Clement, & Van de Woestijne, 1996). This practical technique applied to discriminate tension of each particular muscle group, which focused on slowly stretching and loosening an individual set of muscles from head to toes. Jacobson encountered that his technique is practically against a chronic disorders and mental health problems (Lehrer, 1982), (Van Eijk, 2013).

(2) Mental relaxation techniques

Mental relaxation technique divided to 2 types as (1) Meditation (2) Hypnosis relaxation. Formerly, meditation was a worldwide practice, which distributed the valuable physical and psychological outcomes to cope with individual stressor. Meditation is a relaxation technique that establishes inner vitality, clemency, pleasure, patience, forgiveness, and helpfulness. In Buddhist way, meditation is often used as a

pattern of mind training to achieve pure awareness (Sharma & Rush, 2014). Other recently technique use to promote relaxation is Hypnosis Relaxation Therapy that can put a person into artesian state of relaxation. For treatment condition, hypnosis therapy applies to treat symptoms of sense reaction as weight controlled, smoking addicted, allergy relieved, and pain controlled (Smith & Womack, 1987) (Abrahamsen, Baad-Hansen, & Svensson, 2008).

(3) Therapeutic relaxation techniques

Professional psychologists is administers or counselors of therapeutic relaxation techniques. If it necessary, professional psychologists who is very familiar with the techniques would recommend medication to assist the patient with relaxation for the better outcomes.

Table 7. The studies of progressive muscle relaxation techniques effect on stress and mental health.

Study	Method	Participants	Intervention	Findings
(Dehdari, Heidarnia, Ramezankhani, Sadeghian, & Ghofranipour, 2009)	An open uncontrolled trial	110 patients after coronary artery bypass graft (CABG)	Progressive muscular relaxation (PMR) training program	Significant reductions in state anxiety and trait anxiety levels were observed in relaxation group after intervention compared to control group.
(Fink et al., 2011)	A randomized controlled trial	33 pregnant women	progressive muscle relaxation (PMR), and guided imagery (GI)	Intervention showed changes in fetal behavior. The intervention groups had higher long-term variation during and after relaxation compared to the control group.
(Pan, Zhang, & Li, 2012)	A randomized controlled trial	90 ectopic pregnancy receiving methotrexate treatment	Progressive muscular relaxation (PMR)	Both covariance analysis and repeated measures ANOVA showed that muscle relaxation training can effectively improve the anxiety and health-related quality of life of patients with ectopic pregnancy receiving methotrexate treatment.
(Tragea, Chrousos, Alexopoulos, & Darviri, 2014)	A randomized controlled trial	60 primigravida women in second trimester	Relaxation breathing and Progressive muscular relaxation (PMR)	The results of the study demonstrated significant benefits from the use of the techniques in the psychological state of the pregnant women.
(Tragea et al., 2014) (Cont.)	A randomized controlled trial	60 primigravida women in second trimester	Relaxation breathing and Progressive muscular relaxation (PMR)	The systematic implementation of the proposed relaxation techniques contributed in the reduction of perceived stress and increased the sense of control.

Table 7. The studies of progressive muscle relaxation techniques effect on stress and mental health (Cont.)

Study	Method	Participants	Intervention	Findings
(Akmese & Oran, 2014)	A prospective randomized controlled trial	66 pregnant women	Progressive muscular relaxation (PMR)	The results show that progressive muscle relaxation accompanied by music may be an effective therapy for improving pain and quality of life in pregnant women with low back pain

2.3 Neurosteroids (Allopregnanolone-ALLO-AP)

Allopregnanolone (ALLO or 3α,5α-THP) or "3α-hydroxy-5α-pregnan-20-one" or "3α,5α-tetrahydroprogesterone" is an endogenous inhibitory pregnane neurosteroid, that is synthesized from progesterone, and is a powerful confident allosteric modulator of the $GABA_A$ receptor. Allopregnanolone is a potentiator of the $GABA_A$ receptor represents to anxiolytic, anticonvulsant, and sedative action. Allopregnanolone is an endogenous inhibitory neurosteroids with similar characteristic to the tetrahydrodeoxycorticosterone (THDOC), and the 3β-methyl analogue of allopregnanolone, ganaxolone, is under improvement to treat epilepsy and other anxiety conditions (Banga et al., 2013). Allopregnanolone synthesized thru progesterone into 5α-dihydroprogesterone by 5α-reductase type one. Subsequently, 3α-hydroxysteroid dehydrogenase converts 5α-dihydroprogesterone into allopregnanolone. The side

effects of 5α-reductase inhibitors are depression, anxiety, and sexual dysfunction, intervened with the regularly allopregnanolone generating (Melcangi & Panzica, 2014).

2.3.1 Allopregnanolone mechanism

Allopregnanolone definitely modulates all $GABA_A$ receptor isoforms, that containing gamma-aminobutyric acid receptor subunit delta (δ subunits) presents the greatest potentiation. Moreover, allopregnanolone indicates a positive allosteric modulator of the $GABA_A$-rho receptor ($GABA_A$-ρ receptor or $GABA_C$ receptor). Similar to progesterone, allopregnanolone is a negative allosteric modulator of nicotinic acetylcholine receptors, (nAChRs, or nACh receptors), and of the 5-HT3 receptor (five subunits HTR3A, HTR3B, HTR3C, HTR3D, and HTR3E genes) (Banga et al., 2013). In consort with the other inhibitory neurosteroids, allopregnanolone performs to have no action at other ligand-gated ion channels suvh as NMDA, AMPA, kainate, and glycine receptors (Gunn et al., 2014). Dissimilar with progesterone, allopregnanolone takes no action at the nuclear progesterone receptor (nPR, or NR3C3, or nuclear receptor subfamily 3, or group C, or member 3). Nevertheless, intracellular allopregnanolone oxidized into 5α-dihydroprogesterone (an agonist of the nPR), and indirect progestogenic effected to nPR-mediated. Scientists recently discovered that allopregnanolone is an antagonist of membrane progesterone receptors (mPRδ, mPRα, and mPRβ), therefore this action related to neuroprotective and antigonadotropic properties (Gunn et al., 2014).

2.3.2 Allopregnanolone function

Allopregnanolone occupies a various diversity of individual effects such as antidepressant, anxiolytic, stress-reducing, rewarding, pro-social, anti-aggressive, pro-sexual, sedative, pro-sleep, cognitive and memory-impairing, analgesic, anesthetic, anticonvulsant, neuroprotective, and neurogenic effects. The fluctuating allopregnanolone levels play an important role in the pathophysiology of mood, included anxiety, premenstrual syndrome, catamenial epilepsy, and several neuropsychiatric disorders (Stoffel-Wagner et al., 2003). Approximately equivalent to luteal phase total allopregnanolone levels in the range of 1.5–2 nM/L, while lower and higher concentration surges stimulate potent allosteric of $GABA_A$ receptor. Withdrawal levels of allopregnanolone can be able detect negative effects on mood, while extremely levels have a neutral effect (Girdler, Straneva, Light, Pedersen, & Morrow, 2001).

Table 8. The reviewed studies of allopregnanolone effect on stress and mental health

Study	Method	Participants	Findings
(Schule et al., 2014)	Reviewed articles using animal model	107 articles	Reduced levels of allopregnanolone in the peripheral blood or cerebrospinal fluid were found to be associated with major depression, anxiety disorders, premenstrual dysphoric disorder, negative symptoms in schizophrenia, or impulsive aggression.
(Backstrom et al., 2014)	summarized reviewed article	88 articles	Positive modulators of the $GABA_A$ receptor include the progesterone metabolites allopregnanolone in low concentrations to induce adverse, anxiogenic effects whereas in higher concentrations show beneficial calming properties. In women the severity of these mood symptoms are related to the allopregnanolone serum concentrations in an inversion. Low to moderate allopregnanolone concentrations in women increases the changes seen during anxiety reactions. Patients with premenstrual dysphoric disorder show increased sensitivity in $GABA_A$ receptor sensitivity to allopregnanolone. This agrees with findings in animals showing a relationship between changes in alpha4 and delta subunits of the $GABA_A$ receptor and anxiogenic effects of allopregnanolone. The negative mood symptoms in women with PMDD are caused by the paradoxical effect of allopregnanolone mediated via the $GABA_A$ receptor.
(Schiller, Schmidt, & Rubinow, 2014)	Reviewed articles using animal model	110 articles	Existing animal models and our own preliminary data suggest that allopregnanolone may play an important role in the pathophysiology of reproductive mood disorders by triggering affective dysregulation in susceptible women.

Table 8. The reviewed studies of allopregnanolone effect on stress and mental health (Cont.)

Study	Method	Participants	Findings
(Brunton et al., 2014) (Cont.)	summarized reviewed article	379 articles	Allopregnanolone also plays a key role in the fetal brain, where it promotes development and is neuroprotective. The disruption of neurosteroid production in pregnancy, through prenatal stress or other insults, and the immediate and long-term adverse consequences for the offspring. Allopregnanolone treatment can rescue some of these deficits in the offspring.
(Melcangi & Panzica, 2014)	summarized reviewed article	111 articles	Roles of allopregnanolone are neuroprotection in case of lesion, ischemia or peripheral neuropathies, may reduce the symptoms of neurodegenerative diseases in animal models and now translational studies are developed for its therapeutic use, may exert a beneficial effect also in case of neuropathic pain and it is also a potential candidate for the treatment of mood and anxiety disorders, and important physiological roles to reduce stress during pregnancy.

2.3.3 Human Allopregnanolone (AP) (enzyme-linked immunosorbent assay) ELISA Kit.

This ELISA kit applies to the *in vitro* quantitative determination of Human AP concentrations in serum, plasma and other biological fluids. The minimum detectable dose of Human AP is 0.938ng/mL (The sensitivity of this assay, or lowest detectable limit (LDL) was defined as the lowest protein concentration that could be differentiated from zero), detection Range = 1.563-100 ng/mL. This kit recognizes natural and recombinant Human AP. No significant cross-reactivity or interference between Human AP and analogues was observed, repeatability coefficient of variation were < 10%.

2.3.3.1 Test principle:

This ELISA kit uses Competitive-ELISA as the method. The microtiter plate provided in this kit has been pre-coated with AP. During the reaction, AP in the sample or standard competes with a fixed amount of AP on the solid phase supporter for sites on the Biotinylated Detection Ab specific to AP. Excess conjugate and unbound sample or standard are washed from the plate, and Avidin conjugated to Horseradish Peroxidase (HRP) is added to each microplate well and incubated. Then a TMB substrate solution is added to each well. The enzyme-substrate reaction is terminated by the addition of a sulphuric acid solution and the color change is measured spectrophotometrically at a wavelength of 450 nm ± 2 nm. The concentration of AP in the samples is then determined by comparing the OD of the samples to the standard curve.

2.3.3.2 Sample collection and storage:

Serum samples should be clear and transparent and be centrifuged to remove suspended solids. Allow samples to clot for 2 hours at room temperature or overnight at 4℃ before centrifugation for 15 minutes at 1000×g. Collect the supernatant and carry out the assay immediately. Blood collection tubes should be disposable, non-pyrogenic, and non-endotoxin. Samples should be used within 7 days when stored at 2-8℃, otherwise samples must be divided and stored at -20℃ (≤1 month) or -80℃ (≤6 months) to avoid the loss of bioactivity and contamination. Avoid repeated freeze-thaw cycles. Take the samples to room temperature (18-25℃) without extra heating before performing the assay. Predict the concentration before assaying. If the sample concentration is not within the range of the standard curve, users must determine the optimal sample dilutions for their particular experiments.

CHAPTER III
METHODOLOGY

3.1 Research design

A randomized controlled trial was conducted in Phayao provincial hospital, Phayao, Thailand, and was carried out from June 2015 to May 2016 to demonstrate the effect of The Self-Empowerment-Affirmation-Relaxation [Self-EAR] Program on reduction of PPB scores and serum allopregnanolone levels among new postpartum mothers. Randomization was using simple random sampling technique.

3.2 Participants and sampling method

3.2.1 Study area

This research took place at Phayao provincial hospital, with approximately 400 beds. Phayao province was positioned in northern part of Thailand and faraway from Bangkok, the metropolitan of Thailand, about 735 kilometers. First step of the study acquired place at postpartum ward, with approximately 1,500-2,000 birth per year and used standard postpartum caring for all of postpartum women. In second step, the daily schedules were practicing at participants' home.

3.2.2 Participants

The population in this study were the new postpartum blues mothers who got the first lived child, and admitted at postpartum ward on the second or third day after child birth. The suitable maternal age were 20 to 35 years.

3.2.3 Inclusion criteria

1. Postpartum mothers who had the first lived child.
2. Maternal age 20-35 years.
3. Screened by Stein's postpartum blues questionnaire (Q1) ≥ 3 and screened by Edinburgh Perinatal Depression Scale (EPDS) < 13.
4. Hearing activity that will adequate to hear verbal and audio MP3 instruction.
5. Competent to give informed consent.
6. Willing to participate in this study.

3.2.4 Exclusion criteria

Mothers:

1. Had complication including both of medical complication and obstetrical complication.
2. Had psychosis disorder and on antipsychotic medication.
3. Unable to understand and read Thai to the extent necessary to understand MP3 instruction and sign consent.
4. Unaltered accommodation after childbirth.

Infants:

1. Had congenital anomalies.
2. Had medical complication and pediatrical complication.

3.2.5 Estimated sample size

The estimated sample size was calculated by Cochran formula (1963) and cited by (Krebs, 2014) as follow:

$$n \cong \frac{2(z_\alpha + z_\beta)^2 s^2}{d^2}$$

Where:

n = Sample size required from each of the two populations

Z_α = Standard normal deviate for α level of probability ($Z_{0.05}$ is 1.96)

Z_β = Standard normal deviate for the probability of a type II error ($Z_{0.20}$ is 0.84)

S^2 = Variance of measurements

d = $|\mu_A - \mu_B|$ = Smallest difference between means with probability 1-β

When: Using the statistical value in (Ortiz Collado, Saez, Favrod, & Hatem, 2014)

Z_α = $Z_{0.05}$ is 1.96, Z_β = $Z_{0.20}$ is 0.84

S^2 = 5.18 [Variance of intervention]

d = $|\mu_A - \mu_B|$ = |11.11 – 9.34|

[μ_A = The mean of EPDS scores among control group (Ortiz Collado et al., 2014)]

[μ_B = The mean of EPDS scores among treatment group (Ortiz Collado et al., 2014)]

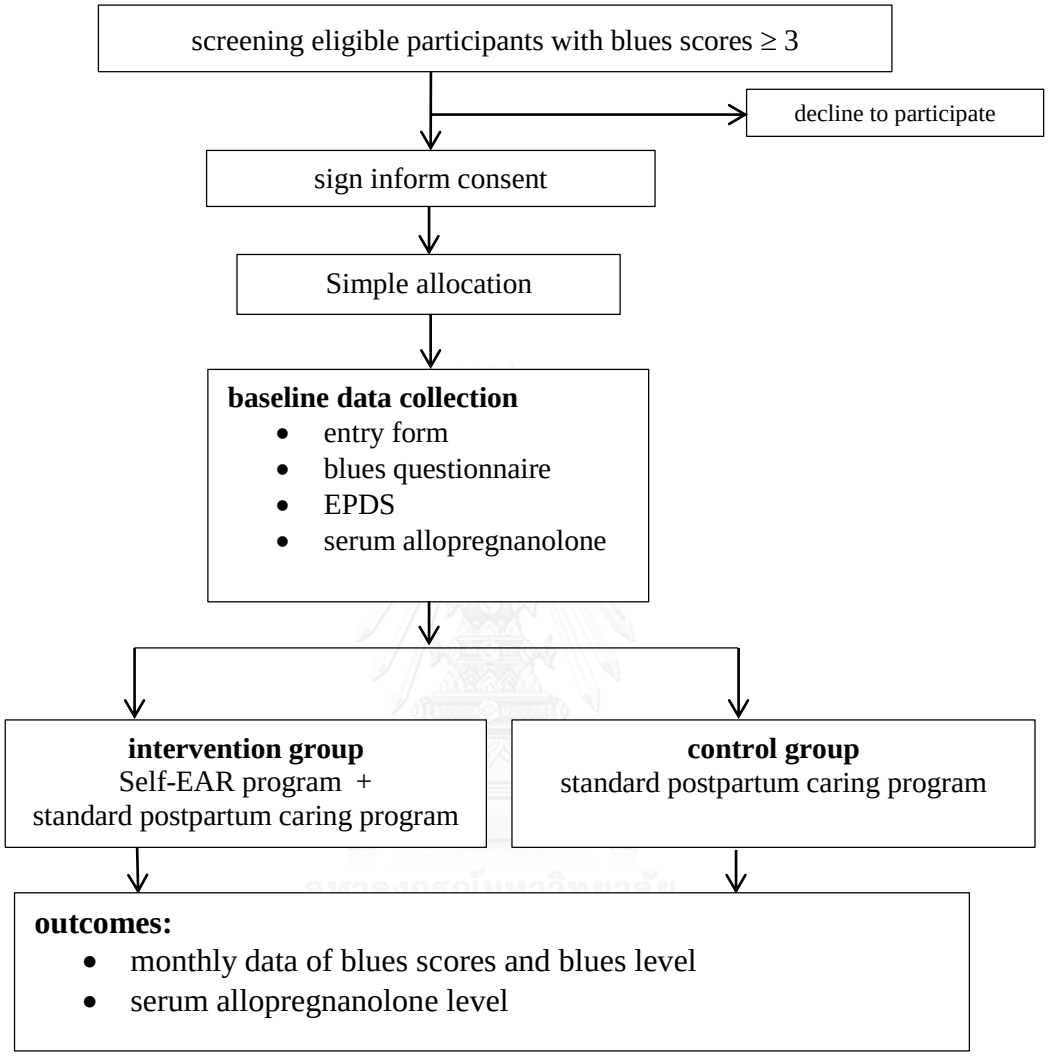
Thus: n = 25.93 and increase 20% for dropout $\Rightarrow$ 31 per group

Overall sample size will be = 62 participants

When the alpha level was significant at 0.05; the Z_α value was 1.96; and the exponential power was 0.84. The smallest difference between mean of both group were derived from the finding of Ortiz et.al, 2014.

3.2.6 Procedures for the randomized controlled trial (Figure 2).

Figure 2. Procedures for the randomized controlled trial recruitment.



Participants recruitment to this study depend on initial screening of postpartum blues scores by using Thai version of postpartum blues questionnaire (Q1) that were translated from Stein's postpartum blues questionnaire (G. S. Stein, 1980) and then screened with EPDS to ensure that at the beginning of the study, participants had no postpartum depression. When, they proved the screening and willing to participate, the researcher and research assistants were gathered baseline data, through

sociodemographic questionnaire and collected blood sample for testing of AP. Simple random allocated was used after the screening. Participants in both intervention and control group were informed about the trial through information sheet. All new mothers enrolled in the intervention group informed about the uncertainties regarding benefit of Self-EAR program on reducing postpartum blues symptoms. Participants enrolled in both intervention group and control group received standard postpartum care program.

Details of standard postpartum caring program were following:

Promote mother-infant contact and breastfeeding

Follow Baby Friendly Hospital Initiative guidelines for infant feeding:

- Encourage exclusive breastfeeding on demand from birth and avoid any supplementation of the baby with water, glucose, or breastmilk substitutes.
- Provide rooming-in for all mothers and babies 24 hours a day.
- Encourage skin-to-skin contact during the postpartum hospital stay with or without breastfeeding.
- Encourage infant feeding when the baby shows signs of readiness, such as rooting, salivating, oral movements, hands or fists at the mouth and movement toward the mother's breasts.
- Do not force infant feeding until the baby indicates that she/he is ready.
- Do not remove the baby from the mother in the first few hours after delivery.
- Conduct all essential examinations of the normal newborn at the mother's bed rather than at a separate examination table.

- Delay nonessential examinations until later. Perform essential examinations with mother and baby together; for example, delay bathing for at least 6 hours or more.
- Delay eye prophylaxis until later to allow for undisturbed eye contact between mother and baby.
- At appropriate times after birth, provide vitamin K, BCG, and ocular prophylaxis against gonorrhea (where local conditions indicate this).

Psychosocial support

- Allow liberal visiting to family members of the women's choice during the postpartum stay. Ideally, offer facilities for a family member to stay with the mother at night.

Discharge

- Use a flexible approach to discharge timing: allow women to judge for themselves when they are ready to return home.
- Ensure an adequate and supportive home situation before discharge, and arrange for intensive follow-up when this is not available to women. Facilitate community contact and referral to local support resources for all women.
- Incorporate women's and their partners' perceptions of care as part of standard audit procedures for effective and appropriate care.

Family planning

- Ensure that family planning advice is provided before discharge.

3.3 Study procedures

3.3.1 Step I: Program development

In the step I, program development, aimed to develop an appropriate component of the Self-EAR program for new postpartum blue mothers. There were 3 steps as follow:

3.3.1.1 Performing a needs assessment

A focus group discussion was used to develop the 10-minute MP3 audio files by brainstorming ideas from 11 postpartum blues mothers who had postpartum blues scores greater and equal to 3, and four nursing instructors from school of nursing, university of Phayao. The Self-Empowerment theory proceeded the 3 aspect approach including controlled oneself, motivation oneself, and reinforcement oneself. The Self-Affirmation theory used to guide behavior and decisions, especially to cope with a negative thinking by repeat affirmations to oneself every day, and every time. The relaxation theory practiced by using the progressive muscle relaxation. The scripts of each technique were transformed into the MP3 audio files (Table 9).

Table 9. The components of MP3 audio files.

Techniques	Content
1. Self-empowerment	- Controlled oneself
	- Motivated oneself
	- Reinforced oneself
2. Relaxation	- Progressive muscle relaxation

3.3.1.2 Designing an implementation plan

For the intervention group, the researchers were explained the process of using and practicing follow the MP3 instructors also demonstrated by researcher and return demonstrated by participants; the researchers plan the schedules to home visiting every week during the intervention periods. The objective of home visiting were to ensure that participants practicing Self-EAR program following MP3 instruction, and Q&A for obstacle when they used the MP3 player. For the control group, the researchers informed them about the process of collecting data at 3-times of follow up at their home.

3.3.1.3 Designing an evaluation plan

All measurement tools were used to collect the data during the times of follow up at baseline, 1-month, 2-month, and 3-month at the participant's home.

3.3.2 Step II: Intervention phase

In the step II (intervention phase), aimed to test the effect of the program on reducing postpartum blues scores, and improved allopregnanolone serum level. This step detail was as follow: preparation for the intervention phase.

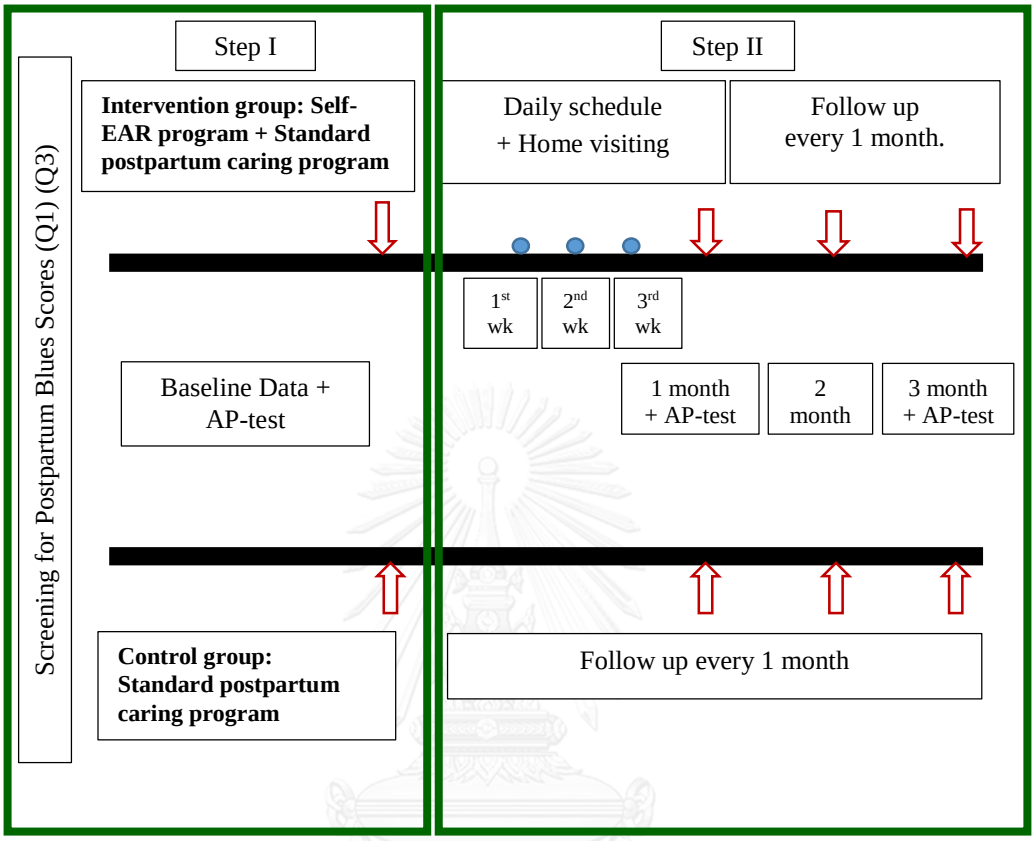
Three research assistants were attending one-day training for understanding the way to implementing and collecting data. For the intervention group, the researchers

plan the schedule to home visiting every week during the intervention periods. For the control group, they were received the standard postpartum caring program as follow: 1) promote exclusive breastfeeding, 2) provide rooming-in for all mothers and babies 24 hours a day, 3) encourage skin-to-skin contact, 4) allow family member visiting and stay with at night, 5) using a flexible discharge timing, 6) family planning advice before discharge and 7) using the same follow-up schedule as the intervention group.

Information sheet and inform consent was provided to participants in both group and explained for their family.

The Self-EAR program was transformed into the MP3 digital devises and provided to the intervention group to practicing at their home 3 times daily (Appendix G). The audio file sorting by time, as the file that listening in the early morning, then the file that listening in the afternoon, and the last file that listening before bedtime. The evaluation of blues scores was gathered at baseline, 1-month, 2-month, and 3-month follow up. Additionally, the evaluation of allopregnanolone serum concentration were collected at baseline, 1-month, and 3-month follow up (Figure 3).

Figure 3. Flow chart of intervention.



3.4 Developing and preparing measurement tools

3.4.1 The sociodemographic questionnaire

The sociodemographic questionnaire was divided into 3 parts:

1) General information: maternal age, marital status, educational status, and financial status.
2) Psychological information: history of depression (personal/family), psychiatric history, stressful life events, addictive substance, family/social relationship, and northern Thai traditional postpartum caring.
3) Obstetrical information: mode of delivery, infant gender, unpreparedness being a motherhood, having considered terminating. Infant birthweight, congenital abnormally, and mode of infant feeding.

3.4.2 Postpartum blues questionnaires

3.4.2.1 Stein's Maternity Blues Scale (G. S. Stein, 1980) (Q1)

Stein's Maternity Blues Scale (Q1) is self-report scale; consist of 13 symptoms as depression, crying, anxiety, tension, restlessness, exhaustion, dreaming, appetite, headache, irritability, concentration, forgetfulness, and confusion.

0 – 2 indicates "absence maternity blues"

3 – 5 indicates "mild maternity blues"

6 – 8 indicates "moderate maternity blues"

≥ 9 indicates "severe maternity blues"

3.4.2.2 Maternity blues Questionnaire (Kennerley & Gath, 1989a) (Q2)

Maternity blues Questionnaire (Q2) (Kennerley & Gath, 1989a) is self-report scale with 28 items that use to assess blues symptoms. Together with 5 points rating scale as “much less than usual” “less than usual” “no different” “more than usual” and “much more than usual”. Blues scores were defined to two categories based on the severity:

The first category “Blues 1 or Severe blues” is the individual sum score that higher than *the mean peak score* (the average of all individual highest scores) for the whole group.

The second category “Blues 2 or Moderate blues” is the individual sum score that higher than *the mean score* (the average of all individual mean scores) for the whole group.

3.4.2.3 Edinburgh Postnatal Depression Scale [EPDS](Q3) *(Cox, Holden, & Sagovsky, 1987)*

EPDS (Q3) is 10-item self-report Scale specifically for postnatal depression in the past 7 days after answer questionnaire. Maximum score is 30, Possible depression ≥ 13. EPDS (Q3) was used to ensure the participants do not have postpartum depression at the beginning of the study.

3.4.2.4 Serum allopregnanolone concentration

Serum allopregnanolone (Nappi et al., 2001) were measured by using Human Allopregnanolone (AP) ELISA Kit. This ELISA kit applied to the *in vitro* quantitative determination of Human AP concentrations in serum, plasma and other biological fluids. The minimum detectable dose of Human AP is 0.938ng/mL (The sensitivity of this assay, or lowest detectable limit (LDL) was

defined as the lowest protein concentration that could be differentiated from zero), detection Range = 1.563-100 ng/mL. This kit recognizes natural and recombinant Human AP. No significant cross-reactivity or interference between Human AP and analogues was observed, repeatability coefficient of variation were < 10%. All blood samples were collected for serum and storage following standard protocol laboratory and operating by expertise technician of School of Allies Health sciences, University of Phayao.

3.5 Research tools evaluation

3.5.1 The questionnaires for data collection

3.5.1.1 Content validity:

The structure questionnaires was validated by three experts, Nursing professor, Obstetrician, and Physician. Intended for standardized research assistance to avoid bias, three research assistants were nursing lecturers from the School of Nursing, University of Phayao. All research assistants were attended one-day training to understand the questionnaires and the way to collect data.

3.5.1.2 Reliability:

A pilot study was carried out with 50 new postpartum mothers who admitted at postpartum ward in Phayao provincial hospital to test the reliability of questionnaires during January to February 2015. The incidence rate of postpartum blues was 62% (Mild = 32%, Moderate = 12%, Severe = 18%, respectively). Cronbach's coefficient alpha was used to test the internal consistency reliability of questionnaires (Table 10).

Table 10. IOC and Cronbach's alpha coefficient

Blues Questionnaires	**IOC**	**Cronbach's Alpha**
Stein's Questionnaire [Q1]	0.922	0.780
Kennerley's Questionnaire [Q2]	0.951	0.849
EPDS [Q3]	0.898	0.825

3.5.1.3 Forward and backward translation:

Asking permission to use and to translate the questionnaires form the principle investigator Prof.George S. Stein from the United Kingdom (G. S. Stein, 1980). The forward and backward translation was done by the language expertise from Chulalongkorn University Language Institute; CULI. Finally, conducted focus group of 10 new postpartum blues mothers was performed to clarify the conceptual meaning of the pre-final version questionnaires.

3.6 Outcome measurement

Participants in both groups were answered self-report questionnaires of postpartum blues at baseline, 1-month, 2-month and 3-month follow up. Serum allopregnanolone concentration were measured at baseline, 1-month, and 3-month follow up. Laboratory technician did not know whether participants were in the intervention or the control group. Venous blood sample collecting was done by registered nurse. Blood samples were centrifuged for serum and then assayed for allopregnanolone level using the competitive ELISA method at School of Allie Health Science laboratory, University of Phayao. The questionnaires were used to collect the general information, postpartum blues scores, and postpartum blues level.

3.7 Data analysis

The data were analyzed as follow:

1) Descriptive statistic and hypothesis testing were used to analyze in this study. Participants in the final assigned group included in the statistical analysis to

analyzed per protocol. Baseline and demographic data were analyzed by using descriptive statistics, including proportions, means, standard deviations, median, and interquartile rank.

2) Continuous outcomes were compared between groups by using unpaired t-test, Mann-Whitney U test (for data did not normal distribution) and presented with standard deviation, 95% confidence interval, median, and interquartile rank. A two-sided p-value of 0.05 indicated of statistical significance. (A two-sided test of hypotheses used because limited evidence of either benefit or risk of the Self-EAR program).

3) Dichotomous variables were analyzed by using Fisher's Exact Test and categorical variables were analyzed using Pearson Chi-Square test.

4) The comparisons of the differences between intervention and control group were tested by using Mann-Whitney U test and Chi-squared test.

5) Comparing of continuous variables in the difference between baseline and 3 times follow up between intervention and control group were analyzed by using Mann-Whitney U Test.

6) Mean different and comparison between groups across the follow up times were used to determine the absolute intervention effect in both intervention and control group were analyzed by using Repeated measures ANOVA to evaluate between baseline data and 3 times follow up.

3.8 Ethical considerations

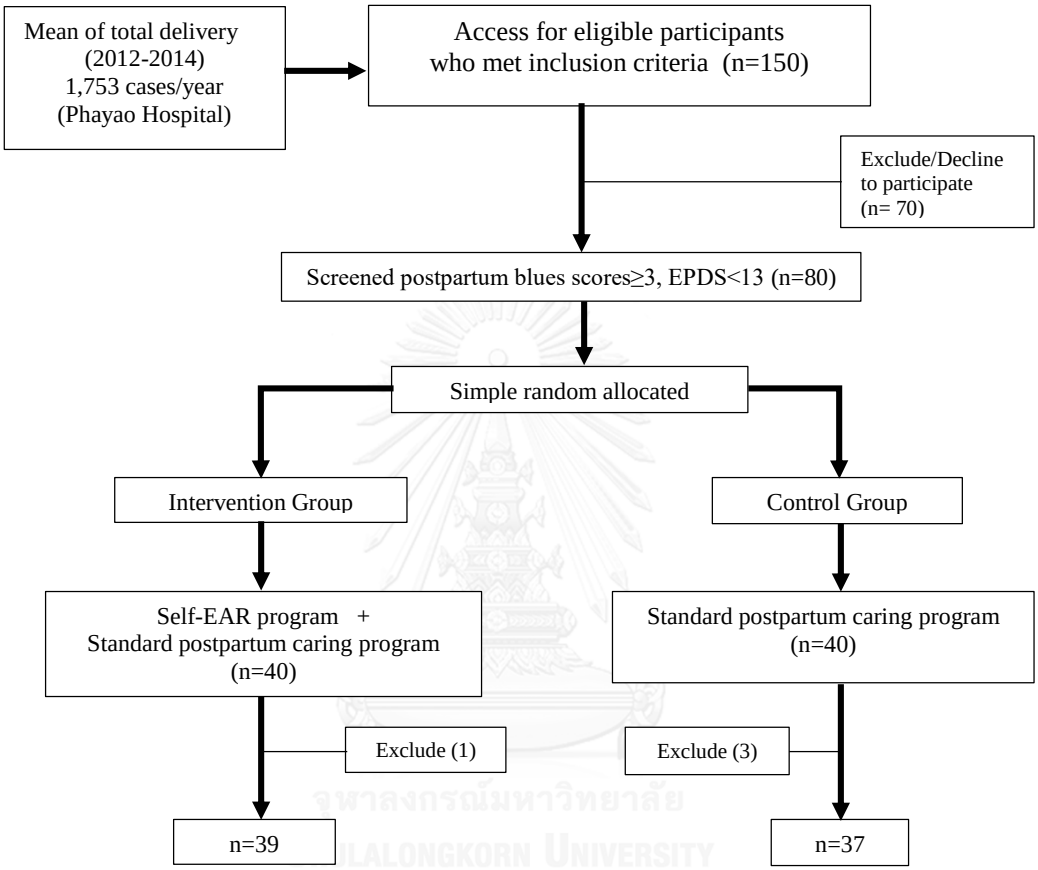
The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group at Chulalongkorn University, and the Research Ethics or Human investigation Committee at the study site, Phayao provincial Hospital, were approved this study protocol. Postpartum mothers were informed of the study and invited to participate if eligible for screening blues scores. Signed informed consent sought from all eligible potential participants. Participants received verbal and written explanation of the study, including potential risk and benefits, and a copy of the consent. Postpartum mothers were informed that they could withdraw from the study at any time without penalty to themselves and their child. All participant data were kept confidentially. Code, but no name, used on questionnaires and others forms. All data and computer media housed in secure locked filing cabinets. Study data and signed consent forms accessed only to study staff. When study participants requested advice on matters beyond the focus of the researcher-participant contacts or had additional problems, research personnel were referred them to their health care provider.

CHAPTER IV
RESULTS

This study aimed to demonstrate the effect of the Self-EAR program on reducing postpartum blues scores and improving allopregnanolone serum level among new postpartum mothers. The participant in this study were new postpartum mothers who screened by using postpartum blues questionnaires (Q1) ≥ 3 at the postpartum ward at Phayao provincial hospital. The three years mean of total delivery of Phayao provincial hospital (2012-2014) were 1,753 cases per year. Among of the 150 participants who admitted in postpartum word during research period, 80 participants were eligible in inclusion criteria. Both of the intervention group and the control group had 40 participants who were allocated by using simple random sampling. One dropout participant in the intervention group and three dropout participants in the control group because they moved to another province Finally, the intervention group had 39 participants and the control group had 37 participants, and the total were 76 participants (Figure 4). All participants gave consent and willing to participate in the study.

This chapter had two sections, the first section was the sociodemographic information composed of three parts as follow: general characteristics, psychological history information, and obstetrical data. The second section was hypothesis testing composted of two parts as follow: the effects of the Self-EAR program on the reduction of the postpartum blues scores, and on the improving of allopregnanolone serum level.

Figure 4. Study Flowchart



4.1 Sociodemographic information

4.1.1 General information of the participants

At baseline periods, there were 39 participant in the intervention group and 37 participants in the control group; the total were 76 participants. All general characteristics of participants at baseline had no significant different between two groups and had small effect size (Cramer's V). Both group had average age around 23 years old. Most of them were Buddhism, graduated secondary school, and average income around 4,000-4,500 bath per month. All of the continuous data in table 11 had statistical significant while test of normality, which were maternal age (Intervention group p-value 0.001, Control group p-value 0.001), personal income (Intervention group p-value 0.001, Control group p-value 0.001), and family income (Intervention group p-value 0.006, Control group p-value 0.001) (Table 11).

Table 11. General characteristic of participants at baseline.

General Characteristics	Intervention group (n%) [n=39]	Control group (n%) [n=37]	p-value
Maternal age			0.451[b]
20-25	27 (69.20)	27 (73.00)	
26-30	9 (23.10)	5 (13.50)	
31-35	3 (7.70)	5 (13.50)	
Median age (IQR)	22.00 (5)	22.00 (6)	0.804[C]
min-max	20-33	20-35	
Religion			0.610[a]
Buddhism	38 (97.40)	35 (94.60)	
Christian	1 (2.60)	2 (5.40)	
Educational level			0.795[b]
Primary school	1 (2.60)	2 (5.40)	
Secondary school	23 (59.0)	24 (64.90)	
Diploma	5 (12.80)	3 (8.10)	
Bachelor	10 (25.60)	8 (21.60)	
Occupation			0.535[b]
Not a career	18 (46.20)	13 (35.10)	
Workers	7 (17.90)	9 (24.30)	
Employees	6 (15.40)	6 (16.20)	
Merchants	7 (17.90)	5 (13.50)	
Farmers	1 (2.60)	4 (10.80)	
Marriage status			1.000[a]
Registered marriage	30 (76.90)	28 (75.70)	
Unregistered marriage	9 (23.10)	9 (24.30)	
Adequate income			0.071[a]
Inadequate	17 (43.60)	24 (64.90)	
Adequate	22 (56.40)	13 (35.10)	
Median personal income (IQR)	1,000 (7499)	1,000 (7749)	0.991[C]
min-max	0-25,000	0-40,000	
Median family income (IQR)	15,000 (8000)	15,000 (9000)	0.596[C]
min-max	6,000-35,000	8,000-60,000	

[a]Fisher's Exact Test, [b]Pearson Chi-Square, [C]Mann-Whitney U test.

4.1.2 Psychological characteristic

The psychological characteristic were as follow: (1) married life, (2) preparedness being a motherhood, (3) anxiety during pregnancy, (4) baby gender match their need, (5) intention to breastfeeding, (6) types of northern Thai traditional postpartum care, (7) consultants, (8) relationship with husband, (9) relationship with parents, (10) social event, (11) violence in past year, and (12) addict substance used. Types of addict substance taking before pregnant were caffeine, diet pills, and alcohol. All physiological characteristics of participants at baseline had no significant different between two groups and had small effect size (Cramer's V) (Table 12).

Table 12. Psychological characteristic of participants at baseline.

Psychological characteristics	Intervention group (n%) [n=39]	Control group (n%) [n=37]	p-value
Married Life			0.7818[a]
Living with husband	30 (76.90)	30 (81.10)	
Don't live with husband	9 (23.10)	7 (18.90)	
Preparedness being a motherhood			0.646[a]
Unprepared	17 (43.60)	19 (51.40)	
Prepared	22 (56.40)	18 (48.60)	
Anxiety during pregnancy			0.819[a]
Not Anxiety	18 (46.20)	19 (51.40)	
Anxiety	21 (53.80)	18 (48.60)	
Baby gender match their need			0.37[a]
Not match	5 (12.80)	8 (21.60)	
Match	34 (87.20)	29 (78.40)	
Intention to breastfeeding			1.00[a]
No intention	4 (10.30)	3 (8.10)	
Intention	35 (89.70)	34 (91.90)	
Types of northern Thai traditional postpartum caring			0.649[b]
Keep worm	34 (87.20)	30 (81.10)	
Lie down by a fire	3 (7.70)	3 (8.10)	
Boiled herb	2 (5.10)	4 (10.80)	
Consultants			0.151[b]
Parents	31 (79.50)	33 (89.20)	
Husband	6 (15.40)	1 (2.70)	
Health personnel	2 (5.10)	3 (8.10)	
Relationship with husband			0.815[b]
Good take care	16 (41.00)	15 (40.50)	
Take care sometimes	22 (56.40)	20 (54.10)	
Quarrel	1 (2.60)	2 (5.40)	
Relationship with parents			0.473[a]
Good take care	27 (69.20)	22 (59.50)	
Take care sometimes	12 (30.80)	15 (40.50)	
Social event helping			1.00[a]
Always	8 (20.50)	7 (18.90)	
Sometimes	31 (79.50)	30 (81.10)	
Violence event in past year			0.241[a]
No	36 (92.30)	37 (100.00)	
Yes	3 (7.70)	0 (0)	

[a]Fisher's Exact Test, [b]Pearson Chi-Square

Table 12.1. Types of addictive substance ever used before pregnant.

Addictive substance	Intervention group (n%) [n=39]	Control group (n%) [n=37]	p-value
Caffeine beverage			0.819[a]
No	21 (53.80)	18 (48.60)	
Yes	18 (46.20)	19 (51.40)	
Diet Pills			0.756[a]
No	32 (82.10)	32 (86.50)	
Yes	7 (17.90)	5 (13.50)	
Alcohol beverage			1.00[a]
No	19 (48.70)	19 (51.40)	
Yes	20 (51.30)	18 (48.60)	

[a]Fisher's Exact Test

4.1.3 Obstetrical characteristic

4.1.3.1 The categorical data of the obstetrical characteristic

The categorical data of the obstetrical characteristic were as follow:

(1) gestational age, (2) types of delivery, (3) baby gender, (4) baby birthweight, (5) intention to abortion, (6) abortion history, (7) contraception, (8) complication during pregnancy, (9) history of illness, (10) family health, (11) baby health, and (12) postpartum complication. All obstetrical characteristics of participants at baseline had no significant different between the intervention and the control group, in addition had small effect size (Cramer's V) (Table 13).

Table 13. Obstetrical characteristic of participants at baseline.

Obstetrical Characteristics	Intervention group (n%) [n=39]	Control group (n%) [n=37]	p-value
Gestational Age (week)			0.175[b]
37 wk - 37^{+6} wk	11 (28.20)	10 (27.00)	
38 wk - 38^{+6} wk	15 (38.50)	8 (21.60)	
39 wk - 39^{+6} wk	11 (28.20)	12 (32.40)	
40 wk - 40^{+6} wk	2 (5.10)	7 (18.90)	
Mode of delivery			0.491[a]
Normal labor	22 (56.40)	17 (45.90)	
Caesarian section	17 (43.60)	20 (54.10)	
Infant gender			0.353[a]
Male	14 (35.90)	18 (48.60)	
Female	25 (64.10)	19 (51.40)	
Having considered terminating			0.737[a]
No	33 (84.60)	33 (89.20)	
Yes	6 (15.40)	4 (10.80)	
Abortion history			0.082[a]
No	37 (94.90)	30 (81.10)	
Yes	2 (5.10)	7 (18.90)	
Contraception used			0.661[b]
No	28 (71.80)	23 (62.20)	
Pills	10 (25.60)	13 (35.10)	
Condom	1 (2.60)	1 (2.70)	
Complication during pregnancy periods			0.494[a]
No	37 (94.90)	37 (100.00)	
Mild preeclampsia	2 (5.10)	0 (0)	
History of illness			1.00[a]
No	36 (92.30)	35 (94.60)	
Mild anemia	3 (7.70)	2 (5.40)	
Family health			0.712 [a]
No	34 (87.20)	34 (91.90)	
Hypertension	5 (12.80)	3 (8.10)	
Baby health			0.61[a]
Healthy	38 (97.40)	35 (94.60)	
Observe 1 day	1 (2.60)	2 (5.40)	
Postpartum complication			1.00[a]
No	38 (97.40)	36 (97.30)	
Mild anemia	1 (2.60)	1 (2.70)	

[a]Fisher's Exact Test, [b]Pearson Chi-Square

4.1.3.2 The continuous data of the obstetrical characteristic

The continuous data of the obstetrical characteristic were as follow: (1) maternal age, (2) gestational age, (3) infant birthweight, (4) infant length, (5) Apgar scores at 1 minute, (6) Apgar scores at 5 minute, (7) Apgar scores at 10 minute, (8) duration of Thai traditional postpartum care, and (9) baby weight at 2 month. Continuous data in table 14 had no statistical significant while test of normality, which were gestational age (Intervention group p-value 0.200, Control group p-value 0.320), birthweight (Intervention group p-value 0.065, Control group p-value 0.050). Although, Continuous data in table 14.1 had statistical significant while test of normality, which were infant length, Apgar at 1 minute, 5 minute, 10 minute, and duration of northern Thai traditional postpartum caring (Intervention group p-value 0.001, Control group p-value 0.001) (Table 14).

Table 14. Obstetrical characteristic of participants in the intervention group.

Obstetrical Characteristics	Intervention group (n=39)			Control group (n=37)			p-value*
	mean (SD)	95% CI Lower Bound	95% CI Upper Bound	mean (SD)	95% CI Lower Bound	95% CI Upper Bound	
Gestational age	38.34 (0.873)	38.06	38.62	38.62 (1.08)	38.26	38.98	0.247
Infant Birthweight	2896.28 (321.863)	2791.95	3000.62	2866.62 (365.671)	2744.7	2988.54	0.454

*t-test

Table 15.1 Obstetrical characteristic of participants in the intervention group.

Obstetrical Characteristics	Intervention (n=39)			Control (n=37)			p-value*
	Median (IQR)	Min	Max	Median (IQR)	Min	Max	
Infant length	50 (3)	47	55	50 (3)	47	57	0.589
Apgar1	9 (0)	7	9	9 (0)	7	9	0.689
Apgar5	10(0)	8	10	10(0)	8	10	0.849
Apgar10	10(0)	8	10	10(0)	9	10	0.411
Yuduan duration	25 (10)	20	30	28 (10)	14	35	0.870

*Mann-Whitney U test

4.2 Hypothesis testing

4.2.1 The median of postpartum blues scores and Allopregnanolone serum level

The median of postpartum blues scores had statistical significant difference between the intervention group and the control group at 1-month, 2-month, and 3-month follow up (p-value 0.001, 0.001, and 0.002 respectively). The median of serum allopregnanolone concentrations had significant difference between the intervention group and the control group at 1-month, and 3-month follow up (p-value 0.001, and 0.001 respectively). Continuous data in table 15 had no statistical significant while test of normality, which were blues scores (Intervention group p-value 0.029, Control group p-value 0.001), serum allopregnanolone level (Intervention group p-value 0.004, Control group p-value 0.016) (Table 15).

Table 16. Median blues score (Q1) and serum allopregnanolone level in the baseline and 3 times of follow up.

Time of data collection	Intervention (n=39)			Control (n=37)			p-value*
	Median (IQR)	Min	Max	Median (IQR)	Min	Max	
Blue Scores							
Baseline	8 (6)	3	15	8 (9)	3	15	0.393
1-mo FU	4 (3)	1	15	8 (5)	1	15	0.001
2-mo FU	4 (7)	0	15	8 (6)	0	19	0.001
3-mo FU	5 (4)	0	14	8 (5)	1	16	0.002
Serum AP level							
Baseline	2.64 (37.25)	4.52	77.18	3.33 (43.63)	4.13	48.69	0.506
1-mo FU	2.99 (43.09)	5.65	43.82	1.35 (15.18)	3.30	51.24	0.001
3-mo FU	4.79 (39.93)	4.70	76.10	1.33 (20.30)	4.06	81.33	0.001

*Mann-Whitney U test

4.2.2 Postpartum blues level using Q1 questionnaire.

The results from Q1 questionnaire categorized into postpartum blues level had statistical significant difference between the intervention and the control group at 1-month, 2-month, and 3-month follow up (p-value 0.014, 0.013, and 0.004 respectively). (Table 16).

Table 17. Postpartum blues levels (Q1) in the baseline and 3 times of follow up.

Blues levels Q1 (Stein)	Intervention (n%) [n=39]	control (n%) [n=37]	p-value*
Baseline			0.215
mild blues	10 (25.60)	16 (43.20)	
moderate blue	11 (28.20)	6 (16.20)	
severe blues	18 (46.20)	15 (40.50)	
1-month follow up			0.014
no blues	9 (23.10)	2 (5.40)	
mild blues	18 (46.20)	11 (29.70)	
moderate blue	6 (15.40)	9 (24.30)	
severe blues	6 (15.40)	15 (40.50)	
2-month follow up			0.013
no blues	15 (38.50)	4 (10.80)	
mild blues	8 (20.50)	5 (13.50)	
moderate blue	8 (20.50)	11 (29.70)	
severe blues	8 (20.50)	17 (45.90)	
3-month follow up			0.004
no blues	10 (25.60)	4 (10.80)	
mild blues	17 (43.60)	6 (16.20)	
moderate blue	6 (15.40)	13 (35.10)	
severe blues	6 (15.4)	14 (37.80)	

*Chi-square test

4.2.3 Postpartum blues level using Q2 questionnaire

The results from Q2 questionnaire presented by postpartum blues level had statistical significant difference between the intervention and the control group at 1-month, and 2-month, follow up (p-value 0.030, and 0.032 respectively). (Table 17).

Table 18. Postpartum blues levels (Q2) in the baseline and 3 times of follow up.

Blues level Q2 (Kennery)	**Intervention (n%) [n=39]**	**control (n%) [n=37]**	**p-value***
Baseline			0.619
No blues	21 (53.80)	17 (45.90)	
Moderate blues	16 (41.00)	19 (51.40)	
Severe blues	2 (5.10)	1 (2.70)	
1-month follow up			0.030
No blues	25 (64.10)	13 (35.10)	
Moderate blues	13 (33.30)	20 (54.10)	
Severe blues	1 (2.60)	4 (10.80)	
2-month follow up			0.032
No blues	25 (64.10)	13 (35.10)	
Moderate blues	11 (28.20)	21 (56.80)	
Severe blues	3 (7.70)	3 (8.10)	
3-month follow up			0.102
No blues	27 (69.20)	18 (48.60)	
Moderate blues	8 (20.50)	16 (43.20)	
Severe blues	4 (10.3)	3 (8.10)	

*Chi-square test

4.2.4 Pairwise Comparisons of Different Time Measurements of postpartum blues scores (Repeated measure ANOVA).

The mean difference of postpartum blues scores in the intervention group had statistical significant different less than the mean difference of postpartum blues scores in the control groups at 1-month, 2-month, and 3-month follow up (p-value 0.001, 0.001 and 0.002, respectively) (Table 18).

Table 19. Pairwise Comparisons of Different Time Measurements of postpartum blues scores in Intervention (i) and Control (c) Groups (n=76)

Time of data collection	Mean Difference (i)-(c)	Std. Error Difference	95% CI		Sig. (2-tailed)
			Lower	Upper	
Baseline	0.613	0.929	-1.238	2.464	0.511
1 month follow up	-2.908	0.775	-4.452	-1.363	0.001
2 month follow up	-3.615	1.068	-5.742	-1.487	0.001
3 month follow up	-2.534	0.797	-4.122	-0.945	0.002

4.2.5 Pairwise Comparisons of Different Time Measurements of Allopregnanolone serum concentrations (Repeated measure ANOVA)

The mean difference of serum allopregnanolone concentrations in the intervention group had statistical significant different higher than the mean difference of serum allopregnanolone concentrations in the control groups at post intervention times and 3-month follow up (p-value 0.001, and 0.001, respectively) (Table 19).

Table 20. Pairwise Comparisons of Different Time Measurements of Allopregnanolone serum concentrations in Intervention (i) and Control (c) Groups (n=76)

Time of data collection	Mean Difference (i)-(c)	Std. Error Difference	95% CI		Sig. (2-tailed)
			Lower	Upper	
Baseline	-3.6018	5.2274	-14.0176	6.8140	0.493
1 month follow up	19.3750	4.3900	10.6279	28.1222	0.001
3 month follow up	24.0461	4.3758	15.3271	32.7650	0.001

4.2.6 Comparison of postpartum blues scores during follow up time using repeated measure ANOVA

The participants in the intervention group had statistical significant difference in postpartum blues scores when compared with the control group (p-value 0.002). Among within-group findings, the postpartum blues scores had statistical significant differences in both the within-group measurements and the interaction effect between groupvmeasurements depending on time (p-value 0.005 and 0.001, respectively) (Table 20).

Table 21. Comparison of postpartum blues scores during follow up time using repeated measure ANOVA

Source	SS	df	MS	F	p-value
Between subject					
Intervention	84.588	1	84.588	9.89	0.002
Error	632.915	74	8.553		
Within subject					
Time	139.137	2.347	59.275	5.098	0.005
Time x Intervention	199.295	2.347	84.903	7.302	0.001
Error	2019.577	173.702	11.627		

4.2.6 Comparison of allopregnanolone serum concentration during follow up time using repeated measure ANOVA

The participants in the intervention group had statistical significant difference in serum allopregnanolone level when compared with the control group (p-value 0.001). Among within-group findings, serum allopregnanolone level yielded statistical significant differences only in the interaction effect between group measurements depending on time (p-value 0.001) (Table 21).

Table 22. Comparison of allopregnanolone serum level during follow up time using repeated measure ANOVA

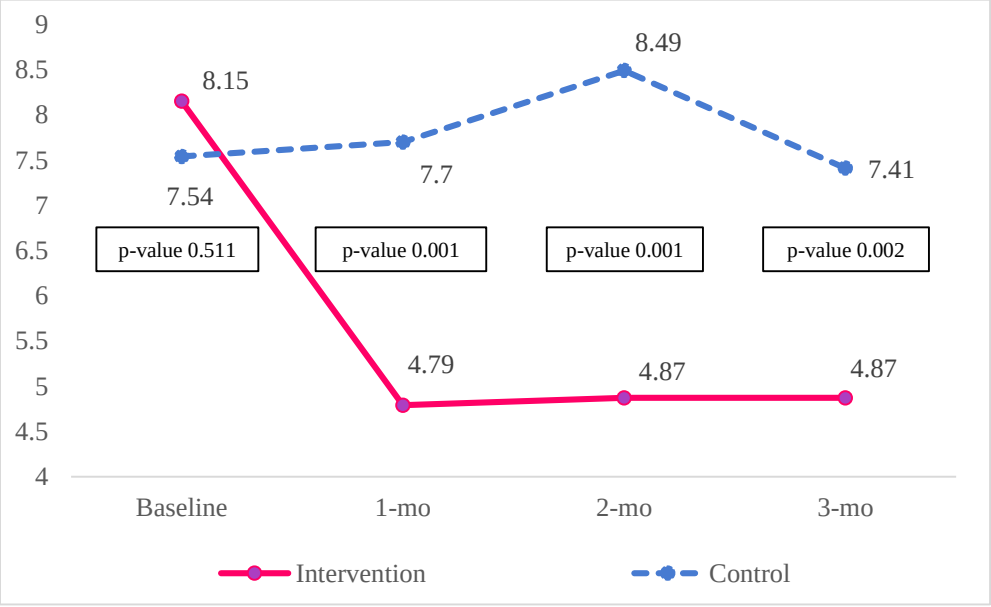
Source	SS	df	MS	F	p-value
Between subject					
Intervention	10035.02	1	10035.020	20.368	0.001
Error	36458.07	74	492.677		
Within subject					
Time	1970.218	2	985.109	2.607	0.077
Time x Intervention	8317.26	2	4158.630	11.007	0.001
Error	55915.33	148	377.806		

4.2.7 Effecting of Self-EAR program evaluation on postpartum blues scores during follow up time.

At the time of baseline, the postpartum blues mean scores in the intervention group was 8.15 and the postpartum blues mean scores in the control group was 7.58, that seem to be the intervention group had higher scores than the control group, but there is no statistical significant different. Furthermore, at all time of follow up, the postpartum blues mean scores in the intervention group was statistically significant lower than the control group, especially at the post intervention times.

The graph line trend apparently displayed that there were a significant difference of postpartum blues scores between the intervention group and the control group during 3 times of follow up (Figure 5).

Figure 5. Effecting of Self-EAR program evaluation on postpartum blues scores during follow up time.

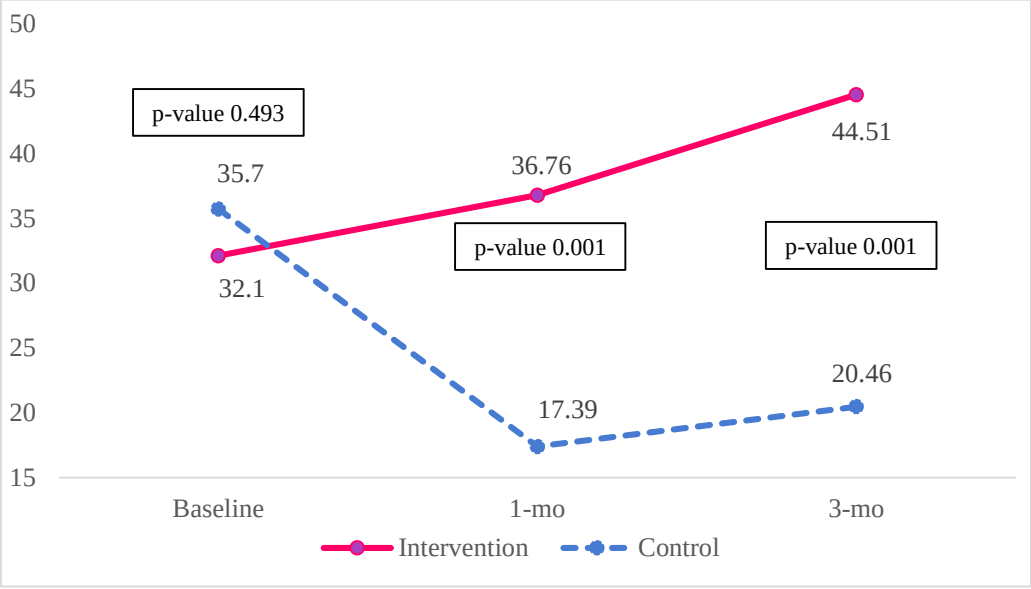


4.2.8 Effecting of Self-EAR program evaluation on allopregnanolone serum concentration during follow up time.

At the time of baseline, the mean of allopregnanolone serum concentration in the control group seem to be higher than the intervention group, but there is no statistical significant different. Furthermore, at all time of follow up, the mean of allopregnanolone serum concentration in the intervention group was statistically significant higher than the control group, especially at the post intervention times.

The graph line trend apparently displayed that there were a significant difference of allopregnanolone serum concentrations between the intervention group and the control group during 2 times of follow up (Figure 6).

Figure 6. Effecting of Self-EAR program evaluation on allopregnanolone serum level during follow up time.



CHAPTER V
DISCUSSION

This chapter present the summary of finding, discussion, limitation, recommendation, further suggestions, and conclusion. The current research demonstrates the effectiveness of the Self-EAR program that intergraded 3 techniques uniquely to new mothers who had faced with blues after childbirth, on reducing postpartum blues scores and improving allopregnanolone serum level.

5.1 Summery of research findings

The Self-EAR program transformed into the MP3 audio files, and implemented among new blues mothers who had postpartum blues scores ≥ 3. The results revealed that the Self-EAR program applicable to decreased postpartum blues scores by increasing allopregnanolone serum level. Both postpartum blues scores and allopregnanolone serum level in the new blues mothers were improved and were sustained to 3-month follow-up. The results of this current study was affirmed a relationship among postpartum blues, allopregnanolone serum level, and the Self-EAR program.

The 10 minute audio MP3 file of the Self-EAR program were related to Self-Theory; the first theory was self-empowerment composted of controlled oneself, motivated oneself, and reinforced oneself; the second theory was self-affirmation that used to guide behavior and decisions, especially to cope with a negative thinking by

repeat affirmations to oneself every day, and every time; and the last was progressive muscle relaxation that used to practice before bedtimes. There were a total of 80 eligible participants who met inclusion criteria (Intervention=40, Control=40). Nevertheless, one in the intervention group and three in the control group were lost from study as they moved to another provinces.

The results revealed that the mean of maternal age of both groups were around 23 years old and gestational age at birth were around 38 weeks. Most of them were Buddhism, graduated at secondary school, do not in a career, registered marriage, and mean income around 4,000-4,500 Bath.

In the psychological characteristic, most of them were living with husband, infant gender matched their need, having intention to breastfeeding, used keep worm technique for northern Thai postpartum care, good relationship with their parents, and do not addicted to addictive substances.

In the obstetrical characteristic, most of them got female infants that had birthweight less than 3,000 grams, no contraception used before pregnant, got healthy infants that birthweight around 2,800 grams, well Apgar scores at 1, 5, and 10 minute around 8-10, had around 25 days for the northern Thai traditional postpartum care. However, the intervention group had higher statistical significant difference on mean of baby weight at 2 month than the control group.

The intervention group had lower statistical significant difference on the average of the blues scores at 3 times of follow up than the control group. Furthermore, the intervention group had higher statistical significant difference on the average of allopregnanolone serum level at 3 times of follow up than the control group.

The results of blues level by using Q1 had statistical significant difference at 3 times of follow up, but the results of blues level by using Q2 had statistical significant difference only at 1-month and 2-month follow up. Similar with the results of the repeated measure ANOVA revealed that the pairwise comparisons of different time measurements of postpartum blues scores and allopregnanolone serum level had statistical significant difference among all of the 3-times follow up. Among within and between subjects finding, the participants in the intervention group had statistical significant difference in postpartum blues scores than the participants in the control group. However, the participants in the intervention group had statistical significant difference in allopregnanolone serum level than the participants in the control group only in the interaction effect between measurements depending on groups.

5.2 Discussion part

5.2.1 Intervention

The Self-EAR program based on 3 theories, self-empowerment, self-affirmation, and relaxation, designed to reducing the postpartum blues scores that were uniquely to new postpartum blues mothers. The Self-EAR program was developed based on previous study relevant to stress reduction program. According to the recently systematic review published article of the mindfulness-based stress reduction (MBSR) or MBSR-based interventions, most of the result also suggested that the program improved stress (Lamothe, Rondeau, Malboeuf-Hurtubise, Duval, & Sultan, 2016). Moreover similarly to the finding of a systematical review for the 8-week Mindfulness Based Stress Reduction program (MBSR) indicated that MBSR program induced structural and behavioral changes in brains (Gotink, Meijboom, Vernooij, Smits, & Hunink, 2016). Nevertheless, both of the systemically review literatures were studying among adult population. As well as, the similarity of the results from a review and meta-analysis publication illustrated that stress reduction program can be able to reduce stress level in healthy people (Alberto Chiesa & Serretti, 2009). Guardino et.al. and Jallo et.al., both of study conducted the RCT with stress controlling programs for high stress pregnant women, and both of them found that the interventions may effectively reduce anxiety and may potentially stress coping benefits (Guardino, Dunkel Schetter, Bower, Lu, & Smalley, 2014; Jallo, Salyer, Ruiz, & French, 2015). (Urizar & Munoz, 2011) conducted the trial to test the effect of a prenatal cognitive behavioral stress management (CBSM) intervention, and the results revealed that prenatal CBSM

interventions regulated biological markers (cortisol) of stress among mothers and their infants over time.

For the progressive muscle relaxation (PMR) program reviewing, previous researchers who conducted PMR among pregnant women, discovered an improvement of well-being outcome such as reducing pain level, perceived stress, and promote quality of life (Akmese & Oran, 2014; Tragea et al., 2014). Furthermore, they were discovered that the PMR program significantly sustained improvement of depression, anxiety, and quality of life among chronic patients (Wang, Luo, Kan, & Wang, 2015; Zhou et al., 2015). In the results of systemically reviews, practicing of the relaxation interventions significantly reduce on depression and anxiety. Furthermore, the impact of the interventions continuing in effect for 6 months (Klainin-Yobas, Oo, Suzanne Yew, & Lau, 2015).

Nevertheless, not any studies conducted a specific intervention to reduce blues during postpartum periods. The Self-EAR program including 3 techniques, self-empowerment, self-affirmation, and progressive muscle relaxation, improved both postpartum blues scores and allopregnanolone serum level. The Self-EAR program covered all of the aspects for postpartum blues mothers, self-empowerment used for control participants' emotion, self-affirmation used to guideline of practicing every day, and relaxation used to decrease body stress, together with sustained up to 3 month follow up.

5.2.2 Postpartum blues scores and Postpartum blues level

This current study used 2 questionnaires translated into Thai language, the first one was Stein's postpartum blues scale (Q1) (G. S. Stein, 1980), and the second one was Kennerley's maternity blues scale (Q2) (Kennerley & Gath, 1989b). The Q1 questionnaire was self-report scale consisted of 13 items, and interpreted by using sum scores (31 total scores). The Q2 was self-report scale with 28 items, and interpreted by using two category; "Blues 1 or severe blues" and "Blues 2 or Moderate blues".

Several investigation studies conducted the prospective study of maternal depressive symptomatology by using Stein's postpartum blues scale (Q1), most from Japan (Takahashi & Tamakoshi, 2014), (Ishikawa et al., 2011), (Watanabe et al., 2008), Brazil (Faisal-Cury et al., 2008), Nigeria (Adewuya, 2005), and Hong Kong (Hau & Levy, 2003). The lastly survey study aimed to determine factors associated with various feelings by using the Maternity Blues Scale (MBS) among pregnant women in Japan (Takahashi & Tamakoshi, 2014).

For the western country, most procedure used the Kennerley's maternity blues scale as the tool for detected blues level in the United Kingdom (O'Keane et al., 2011), and (Henshaw et al., 2004). Therefore, another researches (Pop et al., 2015) in Netherlands, (Gonidakis, Rabavilas, Varsou, Kreatsas, & Christodoulou, 2007) in Greece, and (Glangeaud-Freudenthal et al., 1999) in France. The recently study of (Pop et al., 2015) used 16-item maternity blues scales (MBS) (Q2) as a screening tool in detecting postpartum women at risk for (severe) mood disorders. They said "postpartum women with 'rapid cycling mood symptoms' can be identified with a possible more familiar form of mood disorder"; as a result the Q2 were detectable for mood disorders.

As a results of the Q1 questionnaire was the self-report consisted of 13 items and interpreted by using sum scores. Therefore, it will be use as the screening tool for all postpartum mothers, as well as a results of the Q2 questionnaire was the self-report scale with 28 items, and designed for defined the severity of blues comparing with the group mean score.

5.2.3 Allopregnanolone

This current study applied an Allopregnanolone (AP) neurosteroids hormone as a biochemical marker similar to the study of (Nappi et al., 2001), but different in laboratory technique. The competitive enzyme-linked immunosorbent assay (ELISA) were used to measure the concentration of AP in participant's blood serum, and interpreted the results of the optical density compare with standard curve by using the Curve expert program.

The finding of the recently exploration indicated that AP play an important role as a key regulator in the pathophysiology functions in peripartum periods, remarkable therapeutic perspectives for neurodegenerative and psychiatric disorders, significance actions to depression, anxiety, panic and the context of stress-associated mood disorders (Deligiannidis et al., 2016), (Gunn et al., 2015), (Bali & Jaggi, 2014), (Melcangi & Panzica, 2014). The high level of allopregnanolone serum concentrations were operated as a protective and therapeutic against depression, anxiety disorders, premenstrual dysphoric disorder, schizophrenia, impulsive aggression during peripartum periods (Hellgren, Åkerud, Skalkidou, Bäckström, & Sundström-Poromaa, 2014), (Schule et al., 2014), (Evans, Sun, McGregor, & Connor, 2012).

Moreover, the study in an animal models recommended that allopregnanolone shown an important action by triggering affective dysregulation in the pathophysiology of reproductive mood disorders among susceptible women (Schiller et al., 2014).

5.3 Strength of study

The strengths of this current research were as follow

5.3.1) Study design is randomize controlled trail.

5.3.2) Used allopregnanolone as a biochemical marker.

5.3.3) High response rate (95.0%).

5.4 Limitation of study

The research limitation is the willingness of the participants that may perhaps selection bias.

5.5 Recommendation

- As a results of the Q1 questionnaire was the self-report consisted of 13 items and interpreted by using sum scores. Therefore, it will be use as the screening tool for all postpartum mothers. The researcher will offer the guideline to used Q1 questionnaire to the postpartum ward, Phayao provincial hospital.
- As a results of the Q2 questionnaire was the self-report scale with 28 items, and designed for defined the severity of blues comparing with the group mean score. The researcher will offer the guideline to used Q1 questionnaire to the postpartum ward, Phayao provincial hospital.
- In the part of research results revealed that nearly half of the participants were not preparing themselves to be a motherhood, consequently they need the guidance to prepare their child rearing.

- Furthermore, this research results revealed that nearly 50% of the participants had drank alcohol beverage before they pregnant, therefore they need the guidance to prevent their reused, and also educated them about healthy pregnancy.

5.6 Further study

- The Self-EAR program had the effectiveness and acceptability that could be adapted into daily practices at home for all population not only postpartum mothers but also for all population. Further studies could be implemented among larger population, and longer follow up time, moreover finding factors effected with postpartum blues score and allopregnanolone serum level.

5.7 Conclusion

- The findings suggested that the Self-EAR program was applicable to decrease postpartum blues scores, in addition to increase allopregnanolone level among new postpartum blues mothers. The Self-EAR program covered all of the aspects for postpartum blues mothers, self-empowerment used for control participants' emotion, self-affirmation used to guideline of practicing every day, and relaxation used to decrease body stress, together with sustained up to 2-month follower up.

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APPENDIX

APPENDIX A

(Q1) Stein's Postpartum Blues Questionnaires

(Q1) Stein's Postpartum Blues Questionnaires (Stein, 1980)

Circle the alphabet of the one statement in each group that most accurately describes how you feeling today.

1.	A	I do not feel depressed today.
	B	I feel a little depressed today.
	C	I feel quite depressed today.
	D	I feel so depressed that it is quite painful.
2.	A	I do not feel like crying.
	B	I feel as if I could cry but have not actually cried.
	C	I have shed a few tears today.
	D	I have cried for several minutes today but for less than half an hour.
	E	I have cried for more than half an hour.
3.	A	I feel no more anxious or worried than usual.
	B	At times today I have been anxious and worried.
	C	At times today I have been very anxious and worried.
	D	At times today I have been in a state of panic.
4.	A	I feel calm and relaxed.
	B	I feel a somewhat tense.
	C	I feel very tense.
5.	A	I feel no more restless than usual.
	B	I feel a little restless.
	C	I feel very restless and fine it difficult to settle down to anything.
6.	A	I don't feel any more tried than usual.
	B	I have less energy than usual.
	C	I feel quite exhausted for most of the day.
7.	A	Last night I did not dream.
	B	Last night I had a dream.
	C	Last night my dream woke me from my sleep.
8.	A	My appetite is no worse than usual.
	B	My appetite is not as good as usual.
	C	My appetite is worse today.
	D	I have no appetite at all today.

Have you experienced any of the following today?

9.	Headache	yes	no
10.	Feeling irritable	yes	no
11.	Difficulty concentrating	yes	no
12.	Forgetfulness	yes	no
13.	Confusion	yes	no

APPENDIX B

(Q2) Maternity Blues Questionnaires

(Q2) Maternity Blues Questionnaires (Kennerley, 1989)

Please use the words or phrases below to describe your feelings. Please tick √ in the boxes NO or YES to indicate how you have been feeling today. For each feeling that you have, please also identify how much it is different from your usual feeling.

Feelings	NO	YES	If yes	Mush less than usual	Less than usual	Not different than usual	More than usual	Much more than usual
1. Tearful								
2. Mentally tense								
3. Able to concentrate								
4. Low spirited								
5. Elated								
6. Helpless								
7. Difficult to express feelings								
8. Alert								
9. Forgetful								
10. Anxious								
11. Wishing to be alone								
12. Mental relaxed								
13. Brooding on things								
14. Feeling sorry for yourself								
15. Emotionally numb								
16. Depressed								
17. Over-emotional								
18. Happy								
19. Confident								
20. Changeable in your spirits								
21. Tired								
22. Irritable								
23. Crying without being to stop								
24. Lively								
25. Over-sensitive								
26. Mood swing								
27. Restless								
28. Clam								

APPENDIX C

(Q3) Edinburgh Postnatal Depression Scale

(Q3) Edinburgh Postnatal Depression Scale (Cox, 1987)

Please mark √ in front of the answer closest to your felt during the last 7 days (during last week).

1. I have been able to laugh and see the funny side of things	**6. Things have been getting on top of me**
A As much as I always could	A Yes, most of the time I haven't been able to cope at all
B Not quite so much now	B Yes, sometimes I haven't been coping as well as usual
C Definitely not so much now	C No, most of the time I have copied quite well
D Not at all	D No, I have been coping as well as ever
2. I have looked forward with enjoyment to things	**7. I have been so unhappy that I have had difficulty sleeping**
A As much as I ever did	A Yes, most of the time
B Rather less than I used to	B Yes, sometimes
C Definitely less than I used to	C Not very often
D Hardly at all	D No, not at all
3. I have blamed myself unnecessarily when things went wrong	**8. I have felt sad or miserable**
A Yes, most of the time	A Yes, most of the time
B Yes, some of the time	B Yes, quite often
C Not very often	C Not very often
D No, never	D No, not at all
4. I have been anxious or worried for no good reason	**9. I have been so unhappy that I have been crying**
A No, not at all	A A. Yes, most of the time
B Hardly ever	B B. Yes, quite often
C Yes, sometimes	C C. Only occasionally
D Yes, very often	D D. No, never
5. I have felt scared or panicky for no very good reason	**10. The thought of harming myself has occurred to me**
A Yes, quite a lot	A Yes, quite often
B Yes, sometimes	B Sometimes
C No, not much	C Hardly ever
D No, not at all	D Never

APPENDIX D

Sociodemographic Questionnaire

Please mark √ in front of your collect data and filling the compartment.

Part 1. General information

1. Age_____ years
2. Religion_____
3. Educational level
   - ☐ Primary school
   - ☐ Secondary school
   - ☐ Diploma
   - ☐ Bachelor
4. Occupation _____
5. Personnel income _____ Baht/Month.
   - ☐ Inadequate
   - ☐ Adequate
6. Family income _____ Baht/Month.
7. Marriage status
   - ☐ Single
   - ☐ Couple
   - ☐ Separate
8. Legal status
   - ☐ Registered marriage
   - ☐ Unregistered marriage

Part 2. Psychological Characteristics

9. Married life
   - ☐ Living with husband
   - ☐ Don't living with husband
10. Preparedness being a motherhood
   - ☐ Unprepared
   - ☐ Prepared
11. Anxiety during pregnancy
   - ☐ Not anxiety
   - ☐ Anxiety
12. Baby gender match your need
   - ☐ Not match
   - ☐ Match
13. Intention to breastfeeding
   - ☐ No intention
   - ☐ Intention
14. Types of Northern Thai Traditional Postpartum Care _____
15. Your consultants
   - ☐ Parents
   - ☐ Husband
   - ☐ Health personnel
16. Relationship with your husband _____
17. Relationship with your parents _____
18. How often that you have helping your community event _____
19. Do you have violence in the past year ☐ NO ☐ YES
20. Do you ever used some addicted substance before pregnancy
   ☐ NO ☐ YES
21. Types of addicted substance taking before pregnancy _____

Part 3. Obstetrical Characteristics

22. Gestational age _____
23. Type of delivery _____
24. Infant gender _____
25. Infant birthweight _____ Length _____
26. Apgar 1 _____ Apgar 2 _____ Apgar 5 _____
27. Abortion history ☐ NO ☐ YES
28. Intention to abortion ☐ NO ☐ YES
29. Contraception used _____
30. Complication during pregnancy periods _____
31. History of illness _____
32. Family health _____
33. Baby health _____
34. Postpartum complication _____
35. Baby weight at 2 month _____ grams.
36. Yuduan duration _____ days.

APPENDIX E

The instruments evaluation

All of the instrument was tested by 50 postpartum mothers who were admitted at postpartum word, Phayao provincial hospital. The detail of the reliability and the internal consistency test was presented in the table below:

Q1: Reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.780	0.783	13

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Stein01	9.3200	6.304	.561	.751
Stein02	9.3600	6.562	.367	.769
Stein03	9.4800	5.806	.641	.738
Stein04	9.3400	6.515	.413	.765
Stein05	9.6200	6.322	.359	.772
Stein06	9.2400	6.921	.339	.772
Stein07	9.3400	6.678	.327	.773
Stein08	9.4800	6.336	.390	.768
Stein09	9.3200	6.630	.376	.768
Stein10	9.2600	6.809	.369	.769
Stein11	9.2600	6.890	.316	.773
Stein12	9.5400	6.539	.281	.781
Stein13	9.3600	6.113	.605	.745

Q2: Reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.849	0.849	28

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Ken01	15.3000	99.888	.138	.852
Ken02	15.3800	98.485	.259	.848
Ken03	14.8400	96.178	.323	.847
Ken04	15.5000	98.214	.369	.845
Ken05	14.3200	94.467	.460	.842
Ken06	15.4600	97.315	.382	.845
Ken07	15.3200	96.018	.424	.843
Ken08	14.8600	96.898	.270	.849
Ken09	14.9400	96.956	.230	.851
Ken10	15.1600	95.933	.325	.847
Ken11	15.4800	98.255	.314	.846
Ken12	14.3400	94.800	.368	.845
Ken13	15.2000	95.347	.409	.844
Ken14	15.5000	99.194	.281	.847
Ken15	15.5000	99.969	.212	.849
Ken16	15.5200	99.928	.206	.849
Ken17	15.4000	91.959	.640	.836
Ken18	14.0200	93.449	.575	.839
Ken19	14.4400	92.700	.563	.838
Ken20	15.1200	91.373	.532	.839
Ken21	14.5600	92.415	.429	.843
Ken22	15.1200	91.700	.586	.837
Ken23	15.5000	96.051	.531	.841
Ken24	14.8600	94.653	.422	.843
Ken25	15.4000	99.918	.193	.849
Ken26	15.1000	95.112	.423	.843
Ken27	15.3800	100.077	.166	.850
Ken28	14.7600	92.186	.521	.839

Q3: Reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.825	0.823	10

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EPDS 01	5.2600	7.135	.499	.811
EPDS 02	5.2600	7.053	.541	.808
EPDS 03	5.7200	6.696	.554	.805
EPDS 04	5.6400	6.929	.432	.818
EPDS 05	5.5800	6.657	.540	.807
EPDS 06	5.5400	7.233	.308	.832
EPDS 07	5.5600	6.251	.652	.793
EPDS 08	5.4400	6.496	.643	.795
EPDS 09	5.5800	6.330	.683	.790
EPDS 10	5.1400	7.919	.255	.829

Q1: Internal consistency test

Item-Total Statistics	**Expert1**	**Expert2**	**Expert3**	**IOC**
Stein_01	1	1	1	1.00
Stein_02	1	1	1	1.00
Stein_03	1	1	1	1.00
Stein_04	1	1	1	1.00
Stein_05	1	1	1	1.00
Stein_06	0	1	1	0.66
Stein_07	1	1	1	1.00
Stein_08	0	1	1	0.66
Stein_09	1	1	1	1.00
Stein_10	1	1	1	1.00
Stein_11	0	1	1	0.66
Stein_12	1	1	1	1.00
Stein_13	1	1	1	1.00
Index of Consistency (IOC) = 0.922				

Q2: Internal consistency test

Item	Expert1	Expert2	Expert3	IOC
Ken_01	1	1	1	1.00
Ken_02	1	1	1	1.00
Ken_03	1	1	1	1.00
Ken_04	1	1	1	1.00
Ken_05	1	1	1	1.00
Ken_06	1	1	1	1.00
Ken_07	1	1	1	1.00
Ken_08	1	1	1	1.00
Ken_09	1	1	1	1.00
Ken_10	1	1	0	0.66
Ken_11	1	1	1	1.00
Ken_12	1	1	1	1.00
Ken_13	1	1	1	1.00
Ken_14	1	1	1	1.00
Ken_15	1	1	1	1.00
Ken_16	1	1	1	1.00
Ken_17	1	1	1	1.00
Ken_18	1	1	1	1.00
Ken_19	1	1	1	1.00
Ken_20	1	1	1	1.00
Ken_21	0	1	1	0.66
Ken_22	0	1	1	0.66
Ken_23	0	1	1	0.66
Ken_24	1	1	1	1.00
Ken_25	1	1	1	1.00
Ken_26	1	1	1	1.00
Ken_27	1	1	1	1.00
Ken_28	1	1	1	1.00
Index of Consistency (IOC) = 0.951				

Q3: Internal consistency test

Item	**Expert1**	**Expert2**	**Expert3**	**IOC**
EPDS_01	1	1	1	1.00
EPDS_02	1	0	1	0.66
EPDS_03	1	0	1	0.66
EPDS_04	1	1	1	1.00
EPDS_05	1	1	1	1.00
EPDS_06	1	0	1	0.66
EPDS_07	1	1	1	1.00
EPDS_08	1	1	1	1.00
EPDS_09	1	1	1	1.00
EPDS_10	1	1	1	1.00
Index of Consistency (IOC) = 0.898				

APPENDIX F

Focus group guideline

Focus group discussion guideline for postpartum blues mothers

Objective: To assess the need for a desirable self-EAR program among postpartum blues mothers.

Time for focus group: 45-60 minutes

Questions:

1. What did every mothers know about postpartum blues?
2. How did every mothers have explained their experiences about postpartum blues?
3. What did every mothers need when they were felling blues?
4. If every mothers have opportunity to cope with postpartum blues, what were their expectation?
5. Please, pick up one of the most article that you like from the given list of articles prepared for postpartum blues mothers.

APPENDIX G

Self-empowerment and Progressive muscle relaxation scripts

Self-empowerment and Progressive muscle relaxation scripts

(1) This audio file used to listen in the early morning.

Every mothers who listening, this part of the program saying about; How to control your mood.

1.1 Avoid rumination. You may find yourself thinking about something negative, even when you really don't want to. There are a number of tricks you can use to control your mind and stop ruminating

- Think about the worst case situation. Although this seems counterintuitive and like it would just lead to even more ruminating, when you think about the worst case scenario, and then think about whether you would be able to handle it; you'll likely find that you can imagine yourself handling the situation and this can help decrease your worry.
- Schedule time for yourself to worry. By setting aside time to think about your problem, you can rest assured that it will get the attention it maybe needs; this can help you stop thinking excessively about your problem when you don't want to.
- Go for a walk. Getting out and about can get your mind off of your worries, either simply because of the exercise itself or because you will be taking in new information sights, sounds, smells which can help your mind wander to other, less distressing things.

1.2 Believe in yourself and that you can change. If you don't believe that you can change you're not going to try nearly as hard as if you believe success is possible. So, make sure that you're using positive thinking to face your problem. Try to keep in mind that you can change the way you think, that you can improve.

- Studies show that individuals adopting this "growth" mindset are more likely to make desired improvements than those who view their traits and skills as fixed and unchangeable.

1.3 Be optimistic about your abilities. You might think that being accurate about your ability to control yourself is key. However, studies show that being overly optimistic about your ability to control your behavior can help give you even more self-control.

- To be optimistic, try telling yourself that you will succeed and control your mind over and over again, even if in the moment you don't believe so.
- Try also to remind yourself of times where you successfully controlled your mind as intended. Reflect only on these successes and not on any self-control failures you might have had.

1.4 Re-appraise what you are struggling to control. Try changing how you look at the thing you are struggling to control. For example, if a part of your mind really wants to have wine but you are trying to stop drinking, try imagining the wine as poison. Imagine it going all through your body, infecting your cells and organs. Studies show that having individuals mentally transform (re-appraise) desirable things into less desirable things facilitates their self-control efforts to avoid the desirable thing.

- To do this, really try vividly imagining and playing along with the idea that the object you wish to avoid has changed its properties.

(2) This audio file used to listen in the afternoon.

Every mothers who listening, this part of the program saying about; How to control your mood (Continuous to previous files).

2.1 Stop overgeneralizing. Overgeneralizing means taking a single occurrence of a negative experience and projecting it onto other experiences or to your predictions about how the future will be. For example, someone who overgeneralizes might say, "I had a difficult childhood, so my life is going to be difficult forever." To stop overgeneralizing, you might:

- Take it upon yourself to change your own future through hard work and persistence. For example, if you had a difficult childhood and think your life is going to be difficult forever, you might identify ways in which you want your life to improve, and work to improve them.
- Continuing the example, perhaps you want more meaningful relationships and a better job. You might research ways to obtain those things and then set goals for yourself in those domains to accomplish.

2.2 Avoid personalization. This is a thought trap where you take personal responsibility for things that are out of your control. For example, if you fell down, you might say "It is my fault that I fell" when in reality the situation was entirely out of your control.

- To avoid personalization, try to think carefully and logically about events that you are personalizing. It can help to ask yourself some questions. For example, you might ask yourself “What would I actually have done from my falling down, given that I'll be careful more”.

2.3 Stop jumping to conclusions. This is a thought trap that involves thinking certain things without any evidence to back those thoughts up. For example, someone who jumps to conclusions might think that a person doesn't like him without any evidence supporting that assertion.

- To stop jumping to conclusions, you can pause and think more before reaching judgments. It can help to ask yourself questions about the thought. For example, you can ask yourself if you really know that the thought you are having is true. You can also ask yourself to identify specific pieces of evidence that would suggest that the thought is true. Using the prior example, someone who thinks a person doesn't like him might ask himself to identify particular conversations with that person that provide evidence for the claim.

2.4 Avoid terrible think. This is a negative thought trap wherein the person blows things out of proportion. For example, someone who is catastrophizing after failing a test might say "My life is ruined, I'll never get a good thing now" stop terrible think, work on thinking more positively. You can also ask yourself questions that employ logic and reason.

(3) This audio file used to listen before bedtimes.

Every mothers who listening, this part of the program saying about; How to practice the progressive muscle relaxation. General Procedure:

12.1 Body scan related to progressive muscle relaxation, during a body scan you mentally "scan" your muscles looking for areas of tension. Close your eyes. Start with your head and move down your body. Ask yourself, "Where am I tense?" Scan your muscles looking for signs of tension. Ask yourself, "Is my forehead relaxed? Is my jaw relaxed?" and so forth. Scan your face, neck, shoulders, arms, hands, chest, back, stomach, buttocks, legs, and feet. Whenever you discover an area of tension, gently move the muscle to loosen it, and then relax it. In a body scan, you do not necessarily need to tense the muscle before you relax it.

12.2 Lying down on the bed with eyes closed and loosely hands. Take a few slow, deep breaths. Extend right arm and tense your fist to the point of pressure but not of strain. Hold the tension for 5-7 seconds, and then let your hand relax back. Let your hand and arm relax for 10-20 seconds. Repeat the previous step, tensing and relaxing your right fist for a second time. Continue alternating tension with relaxation for each of the remaining muscle groups. Remember to keep breathing as you tense your muscles. After you have tensed and relaxed one muscle group, move on to the next. Below you will find a sample sequence of muscles to tense and relax, but progressive muscle relaxation can be done with a fewer number or greater number of muscle groups as well. For example, you may choose to tense just one fist at a time, both fists at the same time, or perhaps even tense your entire arm along with the fist in the first step. You may also choose to spend more time with an especially tense muscle before moving on to the next

muscle. It is not important that you tense your muscles in a certain way. Do this in whatever manner is comfortable for you. You should never tense to the point of pain. Also try to keep any muscles not currently being tensed in a relaxed state. Practice once per day, if possible. It is an acquired skill and you will get better at it with practice.

12.3 Possible progressive muscle relaxation sequence: Hands: clench each fist, Upper arms: bend elbows and tense your upper arms, Shoulders: lift your shoulders towards your ears, Neck: let neck drop to your chest, Forehead and scalp: raise eyebrows, Face: scrunch up face, Tongue: press tongue against roof of mouth, Chest: tighten chest muscles, Upper back: pull shoulders forward, Lower back: roll head and upper back down and forward, stretching the lower back, Buttocks: squeeze buttocks, Abdomen: tighten stomach muscle, Thighs: while sitting with knees bent at 90 degree angle, tense thigh muscles or press upper legs together from knees to hips to create tension, Calves: lift toes off ground towards your shins, Feet: gently curl toes down so they are pressing into the floor.

12.4 When you have finished tensing and relaxing each muscle group, sit quietly for another a minute or two. Use your imagination to further relax your muscles. Focus on one muscle group at a time. Going from one to the next, visualize the muscles spreading out; getting long, loose, and more deeply relaxed. Lying down quietly for a few more minutes and feel the relaxation. To finish this exercise, gently stretch and slowly open your eyes.

APPENDIX H

Human AP (Alopregnanolone) ELISA Kit

Human AP (Alopregnanolone) ELISA Kit

(1) Test principle:

The ELISA kit uses competitive ELISA as a method. The microliter plate provided in this kit has been pre-coated with AP. During the reaction, Human AP in the sample or standard competes with a fixed amount of AP on the solid phase supporter for sites on the biotinylated detection Antibody specific to human AP. Excess conjugate and sample or standard are washed from the plate, and Avidin conjugated to Horseradish Peroxidase (HRP) is added to each microplate well and incubated. Then a TMB substrate solution is added to each well. The enzyme substrate reaction is terminated by the addition of a sulphuric acid solution and the color change is measured spectrophotometrically at a wavelength of 450 nm ± 2nm. The concentration of Human AP in the sample is then determined by comparing the OD of the samples to the standard curve.

(2) Sample collection and storage:

Samples should be clear and transparent and be centrifuged to remove suspended solids.

Serum: Allow samples to clot for 2 hours at room temperature or overnight at 4^{O}C before centrifugation for 15 minutes at 1000xg. Collect the supernatant and carry out the assay. Samples should be stored at 2-8 ^{O}C (7 days), -20 ^{O}C (≤1month) or -80 ^{O}C (≤6 month) to avoid the loss of bioactivity.

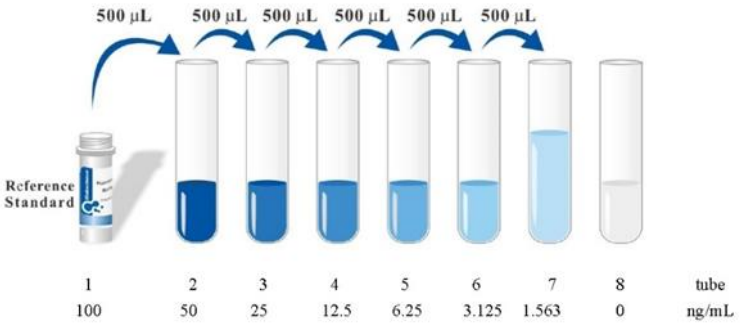
(3) Reagent preparation:

Bring all reagents to room temperature (18-25℃) before use.

3.1 Wash Buffer: Dilute 30 mL of Concentrated Wash Buffer into 750 mL of Wash Buffer with deionized or distilled water. Put unused solution back at 4℃. If crystals have formed in the concentrate, warm it with 40℃ water bath (Heating temperature should not exceed 50℃) and mix

it gently until the crystals have completely dissolved. The solution should be cooled to room temperature before use.

3.2 Standard: Prepare standard within 15 minutes before use. Centrifuge at 10,000×g for 1 minute, and reconstitute the Standard with 1.0 mL of Reference Standard & Sample Diluent. Tighten the lid, let it stand for 10 minutes and turn it upside down for several times. After it dissolves fully, mix it thoroughly with a pipette. This reconstitution produces a stock solution of 100 ng/mL. Then make serial dilutions as needed (making serial dilution in the wells directly is not permitted). The recommended concentrations are as follows: 100, 50, 25, 12.5, 6.25, 3.125, 1.563, and 0 ng/mL. If make standard solution at the concentration of 50 ng/mL, should take 0.5 mL standard at 100 ng/mL, add it to an EP tube with 0.5mL Reference Standard & Sample Diluent, and mix it. Procedures to prepare the remained concentrations are all the same. The undiluted standard serves as the highest standard (100 ng/mL). The Reference Standard & Sample Diluent serves as the zero (0 ng/mL). Standards can also be diluted according to the actual amount, such as 200μL/tube.



3.3 Biotinylated Detection Ab: Calculate the required amount before experiment (50μL/well). In actual preparation, you should prepare 100~200μL more. Centrifuge the stock tube before use; dilute the concentrated Biotinylated Detection Ab to the working concentration using Biotinylated Detection Ab Diluent (1:100).

3.4 Concentrated HRP Conjugate: Calculate the required amount before experiment (100μL/well). In actual preparation, prepare 100~200μL more. Dilute the Concentrated HRP Conjugate to the working concentration using HRP Conjugate Diluent (1:100). Substrate Reagent: As it is sensitive to light and contaminants, so shouldn't open the vial until need it. The needed dosage of the reagent can be aspirated with sterilized tips and the unused residual reagent shouldn't be dumped back into the vial again.

(4) Assay procedure:

Bring all reagents and samples to room temperature before use. Centrifuge the sample again after thawing before the assay. All the reagents should be mixed thoroughly by gently swirling before pipetting. Avoid foaming. It's recommended that all samples and standards be assayed in duplicate.

4.1 Add Sample and Biotinylated Detection Ab: Add 50μl of Standard, Blank, or Sample per well. The blank well is added with Reference Standard & Sample Diluent. Immediately add 50 μl of Biotinylated Detection Ab working solution to each well. Cover with the Plate sealer we provided. Gently tap the plate to ensure thorough mixing. Incubate for 45 minutes at 37°C. (Solutions are added to the bottom of micro ELISA plates well, avoid inside wall touching and foaming as possible.)

4.2 Wash: Aspirate each well and wash, repeating the process three times. Wash by filling each well with Wash Buffer (approximately 350μl) using a squirt bottle, multi-channel pipette, manifold dispenser or automated washer. Complete removal of liquid at each step is essential to good performance.

After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and pat it against thick clean absorbent paper.

4.3 HRP Conjugate: Add 100µl of HRP Conjugate working solution to each well. Cover with a new Plate sealer. Incubate for 30 minutes at 37°C.

4.4 Wash: Repeat the aspiration/wash process for five times as conducted.

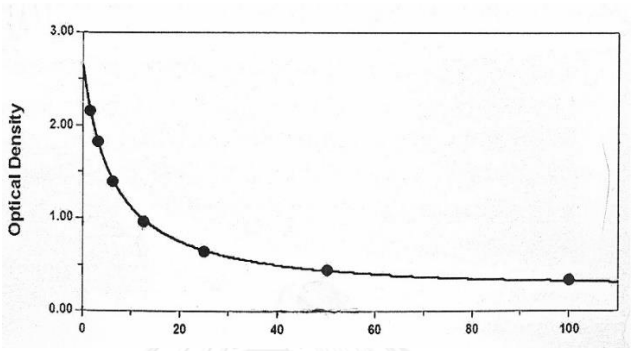
4.5 Substrate: Add 90µl of Substrate Solution to each well. Cover with a new Plate sealer. Incubate for about 15 minutes at 37°C. Protect from light. The reaction time can be shortened or extended according to the actual color change, but not more than 30 minutes. When apparent gradient appeared in standard wells, and then can terminate the reaction.

4.6 Stop: Add 50µl of Stop Solution to each well. Color turn to yellow immediately. The adding order of stop solution should be as the same as the substrate solution.

4.7 OD Measurement: Determine the optical density (OD value) of each well at once, using a microplate reader set to 450 nm. You should open the microplate reader ahead, preheat the instrument, and set the testing parameters, and put all the unused reagents back into the refrigerator according to the specified storage temperature respectively until their expiry.

(5) Calculation of results:

Average the duplicate readings for each standard and samples. Create a standard curve by plotting the mean OD value for each standard on Y-axis against the concentration on the X-axis and draw the best fit curve through the point on the graph. Recommended to use me professional software to do this, such as Curve-Expert 1.3 or 1.4.



APPENDIX I

The Ethical Consideration

AF 02-12

The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University
Jamjuree 1 Building, 2nd Floor, Phyathai Rd., Patumwan district, Bangkok 10330, Thailand,
Tel/Fax: 0-2218-3202 E-mail: eccu@chula.ac.th

COA No. 122/2015

Certificate of Approval

Study Title No. 077.1/58 : **EFFECTS OF SELF-EMPOWERMENT-AFFIRMATION-RELAXATION (SELF-EAR) PROGRAM ON POSTPARTUM BLUES (PPB) MOTHERS, PHAYAO PROVINCE, THAILAND. A RANDOMIZED CONTROLLED TRIAL**

Principal Investigator : MISS KRITTIPITCH THITIPITCHAYANANT

Place of Proposed Study/Institution : College of Public Health Sciences, Chulalongkorn University

The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University, Thailand, has approved constituted in accordance with the International Conference on Harmonization – Good Clinical Practice (ICH-GCP) and/or Code of Conduct in Animal Use of NRCT version 2000.

Signature: Prida Tasanapradit Signature: Nuntaree Chaichanawongsaroj

(Associate Professor Prida Tasanapradit, M.D.) Chairman

(Assistant Professor Nuntaree Chaichanawongsaroj, Ph.D.) Secretary

Date of Approval : 15 June 2015 Approval Expire date : 14 June 2016

The approval documents including

1) Research proposal
2) Patient/Participant Information Sheet and Informed Consent Form
3) Researcher
4) Questionnaire

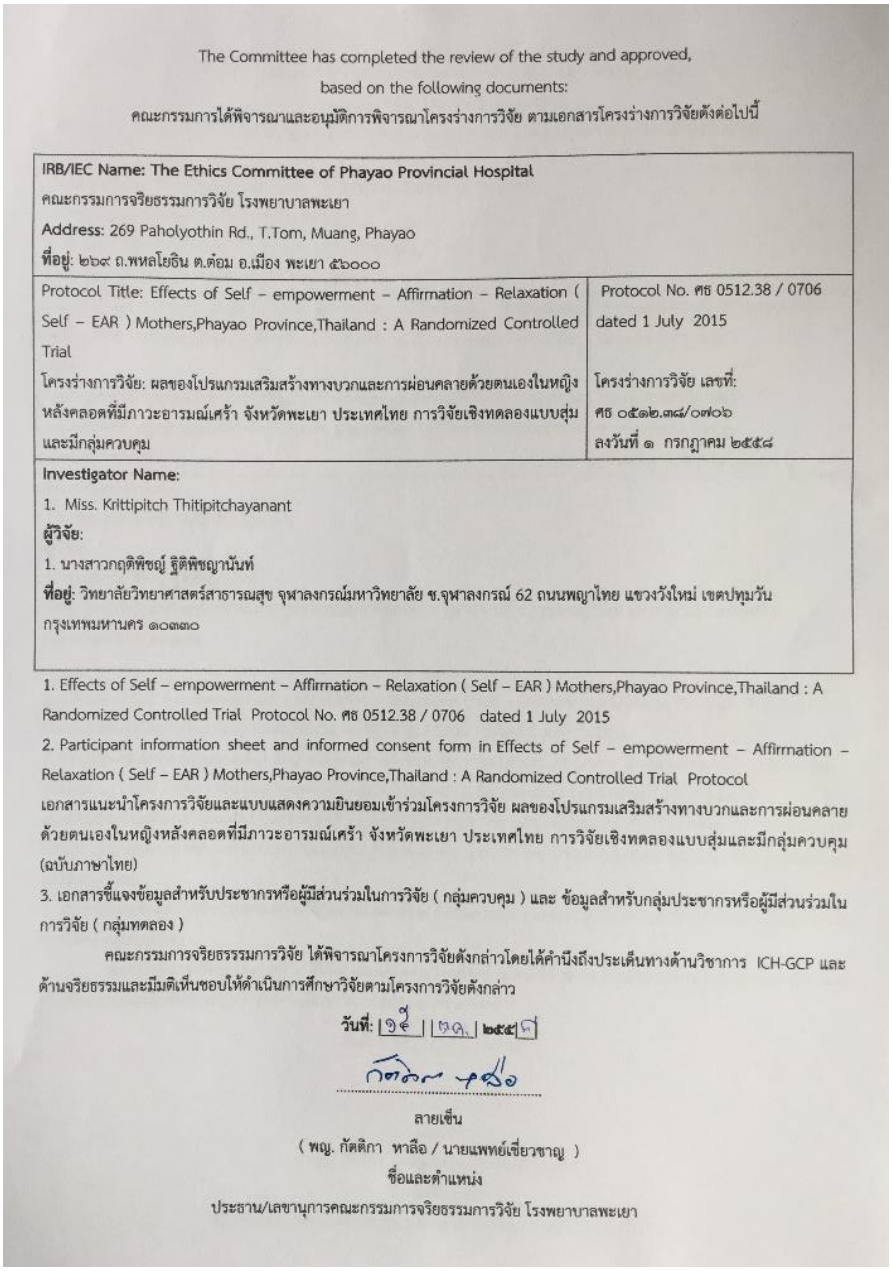
Protocol No. 077.1/58
Date of Approval 15 JUN 2015
Approval Expire Date 14 JUN 2016

The approved investigator must comply with the following conditions:

1. *The research/project activities must end on the approval expired date of the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (ECCU). In case the research/project is unable to complete within that date, the project extension can be applied one month prior to the ECCU approval expired date.*
2. *Strictly conduct the research/project activities as written in the proposal.*
3. *Using only the documents that bearing the ECCU's seal of approval with the subjects/volunteers (including subject information sheet, consent form, invitation letter for project/research participation (if available).*
4. *Report to the ECCU for any serious adverse events within 5 working days*
5. *Report to the ECCU for any change of the research/project activities prior to conduct the activities.*
6. *Final report (AF 03-12) and abstract is required for a one year (or less) research/project and report within 30 days after the completion of the research/project. For thesis, abstract is required and report within 30 days after the completion of the research/project.*
7. *Annual progress report is needed for a two- year (or more) research/project and submit the progress report before the expire date of certificate. After the completion of the research/project processes as No. 6.*

APPENDIX I

The Ethical Consideration



The Committee has completed the review of the study and approved,
based on the following documents:
คณะกรรมการได้พิจารณาและอนุมัติการพิจารณาโครงร่างการวิจัย ตามเอกสารโครงร่างการวิจัยดังต่อไปนี้

IRB/IEC Name: The Ethics Committee of Phayao Provincial Hospital คณะกรรมการจริยธรรมการวิจัย โรงพยาบาลพะเยา **Address:** 269 Paholyothin Rd., T.Tom, Muang, Phayao **ที่อยู่:** ๒๖๙ ถ.พหลโยธิน ต.ต่อม อ.เมือง พะเยา ๕๖๐๐๐	
Protocol Title: Effects of Self – empowerment – Affirmation – Relaxation (Self – EAR) Mothers,Phayao Province,Thailand : A Randomized Controlled Trial โครงร่างการวิจัย: ผลของโปรแกรมเสริมสร้างทางบวกและการผ่อนคลายด้วยตนเองในหญิงหลังคลอดที่มีภาวะอารมณ์เศร้า จังหวัดพะเยา ประเทศไทย การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุม	Protocol No. ศธ 0512.38 / 0706 dated 1 July 2015 โครงร่างการวิจัย เลขที่: ศธ ๐๕๑๒.๓๘/๐๗๐๖ ลงวันที่ ๑ กรกฎาคม ๒๕๕๘
Investigator Name: 1. Miss. Krittipitch Thitipitchayanant **ผู้วิจัย:** 1. นางสาวกฤติพิชญ์ ฐิติพิชญานันท์ **ที่อยู่:** วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย ซ.จุฬาลงกรณ์ 62 ถนนพญาไทย แขวงวังใหม่ เขตปทุมวัน กรุงเทพมหานคร ๑๐๓๓๐	

1. Effects of Self – empowerment – Affirmation – Relaxation (Self – EAR) Mothers,Phayao Province,Thailand : A Randomized Controlled Trial Protocol No. ศธ 0512.38 / 0706 dated 1 July 2015
2. Participant information sheet and informed consent form in Effects of Self – empowerment – Affirmation – Relaxation (Self – EAR) Mothers,Phayao Province,Thailand : A Randomized Controlled Trial Protocol
เอกสารแนะนำโครงการวิจัยและแบบแสดงความยินยอมเข้าร่วมโครงการวิจัย ผลของโปรแกรมเสริมสร้างทางบวกและการผ่อนคลายด้วยตนเองในหญิงหลังคลอดที่มีภาวะอารมณ์เศร้า จังหวัดพะเยา ประเทศไทย การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุม (ฉบับภาษาไทย)
3. เอกสารชี้แจงข้อมูลสำหรับประชากรหรือผู้มีส่วนร่วมในการวิจัย (กลุ่มควบคุม) และ ข้อมูลสำหรับกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย (กลุ่มทดลอง)

คณะกรรมการจริยธรรมการวิจัย ได้พิจารณาโครงการวิจัยดังกล่าวโดยได้คำนึงถึงประเด็นทางด้านวิชาการ ICH-GCP และด้านจริยธรรมและมีมติเห็นชอบให้ดำเนินการศึกษาวิจัยตามโครงการวิจัยดังกล่าว

วันที่: ๑๕ | ๗ค. | ๒๕๕๘

ลายเซ็น
(พญ. กัตติกา หาลือ / นายแพทย์เชี่ยวชาญ)
ชื่อและตำแหน่ง
ประธาน/เลขานุการคณะกรรมการจริยธรรมการวิจัย โรงพยาบาลพะเยา

APPENDIX J

List of Experts

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   Faculty of Nursing, Chiangmai University

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3. **Dr. Khajohnsilp Pongsawatkul**

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4. **Dr. Sawitree Nangola**

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