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## OBSTETRICS

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# Postpartum Blues and Late Postpartum Depressive Symptoms at Her Royal Highness Princess Mahachakri Sirindhorn Medical Center

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### ABSTRACT

**Objectives:** To identify association between postpartum blue and late postpartum depressive symptoms (LPDS) and incidence of both conditions with other risk factors of LPDS at Her Royal Highness Princess Mahachakri Sirindhorn Medical Center.

**Materials and Methods:** Case-control study where 128 mothers were assigned to complete Thai Edinburgh Postnatal Depressive Scale (Thai EPDS) at 2 days and 6 weeks postpartum to detect postpartum blues and LPDS, respectively. Risk factors of LPDS were assessed using bivariate analysis. Multiple logistic regression was used to identify the association between postpartum blues and LPDS along with other risk factors of LPDS.

**Results:** Majority of participants in this study were aged between 26 - 35 years old (52.4%), and multiparous women (67.2%) accounting more than nulliparous women (32.8%). Postpartum blues was significantly associated with LPDS with adjusted odds ratio (OR) 7.16 (95% confidence interval (CI) 1.87-27.39). The incidence of postpartum blues was 24.2% while the incidence of LPDS was 15.6%. Other significant risk factors were lack of support in newborn care with aOR of 4.48 (95% CI 1.31-15.33), breastmilk inadequacy with aOR of 8.62 (95% CI 2.33-31.84) and Bangkok and vicinity habitation with aOR 4.99 (95% CI 1.29-19.28).

**Conclusion:** Postpartum blues are highly associated with late postpartum depressive symptoms and being an early prediction of postpartum depression.

**Keywords:** postpartum blues, postpartum depression, late postpartum depressive symptoms.

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**Received:** 28 October 2021, **Revised:** 27 December 2022, **Accepted:** 12 January 2022

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# อารมณ์เศร้าหลังคลอดกับอาการซึมเศร้าหลังคลอดตอนปลาย ณ ศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี

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## บทคัดย่อ

**วัตถุประสงค์:** หาความสัมพันธ์ระหว่างอารมณ์เศร้าหลังคลอด (Postpartum blues) กับอาการซึมเศร้าหลังคลอดตอนปลาย (Late postpartum depressive symptoms) ณ ศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี และศึกษาอุบัติการณ์ของภาวะทั้งสอง รวมถึงปัจจัยเสี่ยงต่างๆ ของอาการซึมเศร้าหลังคลอดตอนปลาย

**วัสดุและวิธีการ:** การศึกษาแบบมีกลุ่มควบคุม (Case-control study) เพื่อหาความสัมพันธ์ระหว่างอารมณ์เศร้าหลังคลอดกับอาการซึมเศร้าหลังคลอดตอนปลาย โดยมารดาในกลุ่มตัวอย่าง 128 คน ได้ทำแบบสอบถาม Thai Edinburgh Postnatal Depressive Scale (Thai EPDS) ที่สองวันและหกสัปดาห์หลังคลอดเพื่อหาบรรดาที่มีอารมณ์เศร้าหลังคลอดและมารดาที่มีอาการซึมเศร้าหลังคลอดตอนปลาย และใช้ multiple logistic regression เพื่อหาความสัมพันธ์ระหว่างอารมณ์เศร้าหลังคลอดกับอาการซึมเศร้าหลังคลอดตอนปลาย และปัจจัยเสี่ยงอื่นๆ

**ผลการศึกษา:** มารดาส่วนใหญ่ที่เข้าร่วมในการศึกษามีอายุในช่วง 26-35 ปี คิดเป็นร้อยละ 52.3 และพบเป็นมารดาที่ตั้งครรภ์ท้องหลังมากกว่าท้องแรก คิดเป็น ร้อยละ 67.2 และ 32.8 ตามลำดับ จากการศึกษาพบว่าอารมณ์เศร้าหลังคลอดและอาการซึมเศร้าหลังคลอดมีความสัมพันธ์กันอย่างมีนัยสำคัญทางสถิติ (adjusted odds ratio (OR) 7.16, 95% confidence interval (CI) 1.87-27.39) โดยพบอุบัติการณ์ของอารมณ์เศร้าหลังคลอด ร้อยละ 24.2 และอุบัติการณ์ของอาการซึมเศร้าหลังคลอดตอนปลาย ร้อยละ 15.6 ปัจจัยเสี่ยงต่ออาการซึมเศร้าหลังคลอดตอนปลายได้แก่ การขาดความช่วยเหลือในการดูแลทารก aOR 4.48 (95% CI 1.31-15.33), ปัญหาน้ำนมแม่ไม่เพียงพอ (aOR 8.62, 95% CI 2.33-31.84) และการอาศัยในกรุงเทพฯ และบริเวณพล (aOR 4.99, 95% CI 1.29-19.28)

**สรุป:** อารมณ์เศร้าหลังคลอดและอาการซึมเศร้าหลังคลอดมีความสัมพันธ์กันอย่างยิ่ง โดยสามารถใช้อารมณ์เศร้าหลังคลอดทำนายภาวะซึมเศร้าหลังคลอด (Postpartum depression) ได้

**คำสำคัญ:** อารมณ์เศร้าหลังคลอด, ภาวะซึมเศร้าหลังคลอด, อาการซึมเศร้าหลังคลอดตอนปลาย

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## Introduction

Postpartum is a stressful moment for women. It increases the risk of several mental illnesses. Spectrum of postpartum mood disorders ranging from postpartum blues to postpartum depression. Postpartum blues or so-called maternity blues is a time-limited mood or emotional instability occurring within 1<sup>st</sup> week postpartum, and usually resolves within ten days as the process of mental adaptation. Mothers with postpartum blues still have happiness as predominant mood but tend to be more emotionally labile and experience various depressive symptoms such as insomnia, anxiety, inability to concentrate and irritability. On the other hand, postpartum depression shares the same symptoms to postpartum blues but with more of its severity. The symptoms mimic major depressive disorder according to diagnostic and statistical manual of mental disorders (DSM-V) criteria such as depressed mood, sleep disturbance, unexplained guilt, loss of energy, diminished ability to concentrate or even suicidal thought or attempts. Postpartum depression usually lasts longer than 2 weeks and may continue up to 12 months. Postpartum blues are spontaneously resolved by six weeks postpartum. Women whose symptoms persist beyond six weeks are considered to experience late postpartum depressive symptoms (LPDS). LPDS poses risk for postpartum depression<sup>(1, 2)</sup>.

ACOG committee opinion No.757 recommended that Obstetricians and Gynecologists should perform mental health assessment using validated screening tools to identified mothers with postpartum depression at comprehensive postpartum visit, and provide referral program together with close monitoring care after detection of high risk mothers<sup>(3)</sup>. Since postpartum depression associated with maternal and neonatal morbidity, one of the most severe consequences is maternal suicide and infanticide, thus being able to diagnose patients with LPDS helps them to receive timely intervention and may prevent clinical progression to postpartum depression<sup>(3, 4)</sup>.

Several risk factors have been associated with postpartum depression in Thailand. They are including extreme maternal age, divorced status, low family income, unplanned pregnancy, newborn sickness, non-breastfeeding mother, unemployed, inadequate support

from family and domestic violence<sup>(5)</sup>. Furthermore, recent studies showed that postpartum blues was one of the important risk factors of postpartum depression<sup>(6, 7)</sup>. However studies in Thailand are yet to show such association.

The purpose of this study was to identify association between postpartum blues and LPDS at Her Royal Highness Princess Mahachakri Sirindhorn Medical Center. Secondary objectives were to find the incidence of postpartum blues and LPDS using Thai EPDS questionnaire, and to identify other significant risk factors of LPDS.

## Materials and Methods

### Participants

Thai mothers who gave birth at the HRH Princess Maha Chakri Sirindhorn Medical Center between 1<sup>st</sup> May 2020 - 31<sup>st</sup> Dec 2020 who are more than 18 years old with single livebirth newborn and have given consent were enrolled in the study. Mothers who were diagnosed with psychological disease e.g., bipolar disorder and depressive disorder in past history or in current treatment process, mothers who undergone first questionnaire at 2 days postpartum with the result that highly suggestive of underlying depressive symptoms, and mothers who were unable to follow-up at postpartum clinic were excluded from the study.

### Methods

This was a case-control study conducted at the HRH Princess Maha Chakri Sirindhorn Medical Center between 1<sup>st</sup> May 2020 - 31<sup>st</sup> December 2020. It was approved by Ethical Committee of Srinakharinwirot University.

In sample size calculation, a case-control study formula was used with alpha at 0.05 and beta at 0.2. We used postpartum blues as an exposure and late postpartum depressive symptoms group (LPPD group) as a case group. From previous study in Thailand, the incidence of late postpartum depressive symptoms was about 20% at 6 weeks postpartum<sup>(8)</sup>, result in ratio of late postpartum depression group (LPPD) and non-late postpartum depressive group (non-LPPD group) at 0.2. Proportion of postpartum blues mother in LPPD group

from previous study in Japan was 50% and proportion of postpartum blues mother in non-LPPD group was 10%. After calculation, a total of 72 participants were required to identify association between postpartum blues and LPDS<sup>(6)</sup>.

All eligible mothers who gave birth to single livebirth newborn between 1<sup>st</sup> May 2020 - 31<sup>st</sup> Dec 2020 at the HRH Princess Maha Chakri Sirindhorn Medical Center were given informed consent before participating in this study. At the time of the first questionnaire, evaluation of underlying psychological disorder, e.g., bipolar disorder and depressive disorder were carried out by history taking. Patients with psychological disorder were withdrawn from the study and were assigned for psychiatrist referral. Then the first self-administered questionnaire was offered at 2 days postpartum during hospitalization. The questionnaire inquired demographic data of participants including age, habitation (Bangkok and vicinity habitation or country habitation), religious, education, occupation, personal income, family income, dysmenorrhea, unplanned pregnancy (pregnancy at the time when no children were desired), family history of psychological disorders, length of hospital stay, birth body weight of newborn and newborn status after birth. In this study, we defined sick newborn status as neonatal intensive unit (NICU) admission. Then postpartum blues was evaluated by using Thai Edinburgh Postnatal Depressive Scale (Thai EPDS) with the cut-off score of 10 and more.

The second self-administered questionnaire was then completed at 6 weeks postpartum. Mothers were alone in an isolated room at the postpartum clinic, apart from family, baby and doctors. The questionnaire included postpartum and parenting information, e.g., support in newborn care, sleep deprivation (defined by total sleep time less than 6 hours of sleep per night as postpartum mother's average nighttime total sleep time was 6 hours during first 2 months<sup>(9)</sup>), breastmilk adequacy (subjectively by mothers) and evaluation of LPDS using Thai EPDS score of 10 or more.

The Edinburgh Postnatal Depressive Scale was developed in 1987 to detect postpartum depression because the standard screening tools for general population may not detected postpartum depression due to maternal adaptation and less concerned of symptoms.

EPDS is 10-item self-reporting screening tools containing questions about many depressive symptoms. At cut-off point 12/13, it has 86% sensitivity, 78% specificity and a positive predictive value of 73% for postpartum depression<sup>(10)</sup>. EPDS is used worldwide and available in many languages such as French, Spanish, Dutch, Swedish, Chinese, Turkish, Arabic and Thai<sup>(11)</sup>.

Thai Edinburgh Postnatal Depressive Scale (Thai EPDS) was developed compared with DSM-IV criteria in diagnosed postpartum depression. It has a degree of agreement at 0.38, accuracy at 0.93 and Cronbach's alpha coefficient of 0.80. At the cut-off score of 10, Thai EPDS has 88-90% specificity and 60-100% sensitivity in detection minor and/or major depression<sup>(12, 13)</sup>.

### **Statistical analysis**

Descriptive statistics were used to analyze demographic data and characteristic of participants presented in percentage, mean  $\pm$  standard deviation (SD), median and interquartile range.

Univariate analysis using chi-square test and independence t-test were performed to depict the differences between late postpartum depressive symptoms and non-depressed group for the following factors: age, parity, occupation, dysmenorrhea, unplanned pregnancy, habitation, route of delivery, second stage duration, length of hospital stay, low birth weight status of newborn, family income, family type, support in newborn care, sleep deprivation, breastfeeding status, breastmilk adequacy and postpartum blues. Factors with significant level at 0.3 after univariate analysis was then undergone colinearity tested then multiple logistic regression was performed. All statistical analysis was performed using SPSS version 26.

## **Results**

Total participants of 171 mothers were enrolled. Forty-three were unable to follow-up at postpartum period and were excluded. No participant has ongoing psychological disorder. Consequently 128 mothers participated in this study. Demographic data of late postpartum depressive symptoms group and non-late postpartum depressive symptoms group are shown in

Table 1. Categorical data were demonstrated in frequency and percentages. All continuous data which had non-normal distribution were demonstrated in median and interquartile range.

The only risk factor which was significantly different between LPPD and non-LPPD group was postpartum blues. However, the proportion of women who had young

age, unplanned pregnancy, low family income, low birth weight and long second stage of labor duration tended to have more late postpartum depressive symptoms.

Among 128 participants, thirty-one had postpartum blues at 2 days postpartum. Incidence of postpartum blues in our study was 24.2%. Incidence of late postpartum depressive symptoms was 15.6%.

**Table 1.** Participants characteristics and comparison between postpartum depression and non-postpartum depression group.

Variables	Total (n = 128)	LPPD group (n = 20)	Non-LPPD group (n = 108)	p value
Age (years)				0.467
18 - 25	43 (33.6%)	5 (25%)	38 (35.2%)	
26 - 35	67 (52.3%)	13 (65%)	54 (50%)	
More than 35	18 (14.1%)	2 (10%)	16 (14.8%)	
Habitation				0.130
Urban and suburban country	83 (64.8%)	10 (50%)	73 (57%)	
Rural	45 (35.2%)	10 (50%)	35 (43%)	
Religious				0.525
Buddhist	107 (83.6%)	18 (90%)	89 (82.4%)	
Muslim	21 (16.4%)	2 (10%)	19 (7.6%)	
Education				0.348
Less than high school	19 (14.8%)	5 (25%)	14 (13%)	
High school to junior college	67 (52.3%)	10 (50%)	57 (52.8%)	
Bachelor or more	42 (32.8%)	5 (25%)	37 (34.2%)	
Planned pregnancy				0.094
Yes	79 (61.7%)	9 (45%)	38 (35.2%)	
No	49 (38.3%)	11 (55%)	70 (64.8%)	
Income (baht)				0.793
Less than 10,000	48 (61.7%)	8 (40%)	40 (37%)	
10,000 - 30,000	71 (55.3%)	10 (50%)	61 (56.5%)	
More than 30,000	9 (7%)	2 (10%)	7 (6.5%)	
Family Income (baht)				0.298
Less than 20,000	52 (40.6%)	5 (25%)	47 (43.6%)	
20,000 - 50,000	65 (50.8%)	13 (65%)	52 (48.1%)	
More than 50,000	11 (8.6%)	2 (10%)	9 (8.3%)	
Dysmenorrhea				0.647
Yes	70 (54.7%)	11 (55%)	48 (44.4%)	
No	58 (45.3%)	9 (45%)	60 (55.6%)	
Family history/ past history of psychological disorder				1.000
Yes	0	0	0	
No	128 (100%)	20 (100%)	108 (100%)	
Parity				0.456
Nulliparous	42 (32.8%)	8 (40%)	34 (31.5%)	
Multiparous	86 (67.2%)	12 (60%)	74 (68.5%)	
Second stage of labor duration (minutes)	0 (0,10)	0 (0,5)	1 (0,10.5)	0.181
Route of delivery				0.380
Normal vaginal delivery	54 (42.2%)	6 (30%)	48 (44.4%)	
Operative vaginal delivery	3 (2.3%)	1 (5%)	2 (1.9%)	
Cesarean section	71 (55.5%)	13 (65%)	58 (53.7%)	
Birth weight (grams)	3070 (2810, 3370)	3040 (2690, 3260)	3070 (2850, 3385)	0.322
Estimated blood loss after delivery (ml)	400 (200, 600)	375 (200, 500)	400 (200, 600)	0.690
Newborn status after birth				0.742
Well baby	107 (83.6%)	16 (80%)	91 (84.3%)	
Sick NB	21 (16.4%)	4 (20%)	17 (15.7%)	
Length of hospital stay (days)	4 (3,5)	4 (3,5)	4 (3,5)	0.158
Postpartum blues				< 0.01
Yes	31 (24.2%)	12 (60%)	19 (17.6%)	
No	97 (75.8%)	8 (40%)	89 (82.4%)	

LPPD: late postpartum depressive symptoms, NB: newborn

Risk factors for LPDS after univariate analysis are shown in Table 2. Risk factors of LPDS with p value less than 0.3 from univariate analysis were enrolled in multiple logistic regression. Those factors were sleep deprivation

(odds ratio (OR) 1.71, 95% confidence interval CI 0.64-4.60), unplanned pregnancy (OR 2.25, 95%CI 0.86-5.91), isolated family type (OR 1.92, 95%CI 0.73-5.03), second stage of labor duration (OR 3.00, 95%CI 0.65-

13.78), length of hospital stay (OR 2.89, 95%CI 0.49-16.95), low birth weight newborn (OR 3.64, 95%CI 0.79-16.63), lack of support in newborn care (OR 6.86, 95%CI 2.46-19.18), breastmilk inadequacy (OR 7.13, 95%CI

2.39-21.26), operative delivery including operative vaginal delivery and cesarean section (OR 1.87, 95%CI 0.67-5.22) and Bangkok and vicinity habitation (OR 2.09, 95%CI 0.79-5.47).

**Table 2.** Possible risk factors of late postpartum depressive symptoms after univariate analysis.

Factors	Crude OR	95%CI	p value
Age (years)			
18 - 25	1.05	0.19 - 6.00	0.954
26 - 35	1.93	0.40 - 9.44	0.419
More than 35	1		
Habitation			
Bangkok and vicinity	2.09	0.79 - 5.47	0.135
Country	1		
Religious			
Buddhist	1		
Muslim	0.52	0.11 - 2.43	0.407
Family type			
Isolated	1.92	0.734 - 5.027	0.184
Extended	1		
Education			
Less than high school	2.64	0.66 - 10.55	0.169
High school to junior college	1.30	0.41 - 4.10	0.657
Bachelor or more	1		
Employment			
Unemployed	1.11	0.37 - 3.35	0.858
Employed	1		
Income (baht)			
Less than 10,000	0.70	0.12 - 4.01	0.689
10,000 - 30,000	0.57	0.10 - 3.17	0.524
More than 30,000	1		
Family Income (baht)			
Less than 20,000	0.48	0.08 - 2.86	0.419
20,000 - 50,000	1.13	0.22 - 5.85	0.889
More than 50,000	1		
Planned pregnancy			
Yes	1		
No	2.25	0.86 - 5.91	0.099
Marital status			
Married	1		
Divorced	1.37	0.15 - 12.92	0.784
Parity			
Nulliparous	1.45	0.54 - 3.88	0.458
Multiparous	1		
Second stage of labor duration			
Less than 10 min	1		
10 min and more	3.00	0.65 - 13.78	0.158
Route of delivery			
Normal vaginal delivery	1		
Operative vaginal delivery and Cesarean section	1.87	0.67 - 5.22	0.234
Birth body weight			
Less than 2500 g	3.64	0.79 - 16.63	0.096
2500 g and more	1		
Estimated blood loss			
Less than 500 ml	1		
500 - 1000 ml	0.75	0.26 - 2.16	0.594
More than 1000 ml	1.43	0.26 - 7.74	0.679
Breastmilk adequacy			
Yes	1		
No	7.13	2.39 - 21.26	< 0.01
Adequate support in newborn care			
Yes	1		
No	6.86	2.46 - 19.18	< 0.01
Sleep deprivation (less than 6 hours of sleep per night)			
Yes	1.71	0.64 - 4.60	0.287
No	1		
Length of hospital stay			
≤ 5 days	1		
> 5 days	2.89	0.49 - 16.95	0.240
Postpartum blues			
Yes	7.03	2.53 - 19.54	< 0.01
No	1		

OR: odds ratio, CI: confidence interval

Table 3 shows risk factors of late postpartum depressive symptoms after multiple logistic regression. Significant risk factors of late postpartum depressive symptoms, after adjusted by sleep deprivation, family income, unplanned pregnancy, isolated family type, second stage duration, length of hospital stay, and low

birth weight newborn, were postpartum blues (adjusted odds ratio (aOR) 7.156, 95%CI 1.87-27.39), lack of support in newborn care (aOR 4.479, 95%CI 1.31-15.33), breastmilk inadequacy (aOR 8.620, 95%CI 2.33-31.84) and Bangkok and vicinity habitation (aOR 4.989, 95%CI 0.05-0.775).

**Table 3.** Risk factors of late postpartum depressive symptoms after multiple logistic regression.

Factors	Crude OR	95%CI	p value	Adjusted OR	95%CI	p value
Postpartum blues	7.03	2.53 - 19.54	< 0.01	7.156	1.87-27.39	< 0.01
Lack of support in newborn care	6.86	2.46 - 19.18	< 0.01	4.479	1.31-15.33	0.017
Breastmilk inadequacy	7.13	2.39 - 21.26	< 0.01	8.620	2.33-31.84	< 0.01
Operative delivery (including operative vaginal delivery and cesarean section)	1.87	0.67 - 5.22	0.234	3.244	0.84-12.54	0.088
Bangkok and vicinity habitation	2.09	0.79-5.47	0.135	4.99	1.29-19.28	0.02

\* Adjusted Odds ratio by sleep deprivation, family income, unplanned pregnancy, isolated family type, second stage duration, length of hospital stay and low birth weight newborn. OR: odds ratio, CI: confidence interval

## Discussion

The incidence of LPDS in our study was 15.6% and many possible factors of late postpartum depressive symptoms were studied. After multiple logistic regression, significant risk factors of late postpartum depressive symptoms were postpartum blues (OR 7.156, 95%CI 1.87-27.39), lack of support in newborn care (OR 4.479, 95%CI 1.31-15.33), breastmilk inadequacy (OR 8.620, 95%CI 2.33-31.84) and urban habitation (OR 4.989, 95%CI 0.05-0.775).

The incidence of postpartum blues and late postpartum depressive symptoms are usually underestimated due to lack of detection, unawareness and self-limited nature. Evidences from recent studies have supported that postpartum blues is associated with postpartum depression. Maternal depression has consequences that may affect the whole family including impaired maternal-child interactions, unhealthy interaction between couples and disrupt relationship of whole family members<sup>(6, 7)</sup>.

In this study, the incidence of postpartum blues was 24.2%, while the incidence of LPDS was 15.6%. As mentioned earlier that postpartum blues was a significant risk factor of LPDS, participants who experienced postpartum blues early during hospitalization were prone to develop depressive symptoms up to 7 folds greater than those without postpartum blues. Other significant risk factors

identified in this study were lack of support in newborn care, breastmilk inadequacy and habitation. Inadequate support in newborn care from other family members resulted in maternal exhaustion and led to late postpartum depressive symptoms. Breastmilk inadequacy, feeling of dissatisfaction in amount of breastmilk, posed a higher risk for late postpartum depressive symptoms. Participants who live in Bangkok and vicinity, had higher risk in developing late postpartum depressive symptoms. On the other hand, operative delivery doesn't posed a higher risk for late postpartum depressive symptoms.

Postpartum blues incidences are different among countries, reaching as high as 50% in many countries<sup>(10, 11)</sup>. In Thailand postpartum blues are around 45.7 - 51.8%<sup>(12, 13)</sup>, which is much higher than the incidence in this study. One study included only postpartum mother with newborn admission in NICU care which might be the causative effect of higher blues incidence<sup>(13)</sup>. Another was a multicentered study conducted in 4 hospitals located in Bangkok and nearby province which may have different setting of socioeconomic background of participants from our study<sup>(12)</sup>.

Incidence of LPDS is lower than postpartum blue, ranging from 3.5-63.3%, depending on characteristics of the population. Some population produce higher risk of postpartum depression e.g. socioeconomic, cultural

influences and social construction<sup>(4, 14)</sup>. However, studies in Thailand showed the incidence of postpartum depression ranging from 8.4% to 16.8% in which consistent with our study<sup>(8, 13)</sup>.

This study showed that postpartum blues was associated with LPDS after adjusted with multiple logistic regression. It was consistent with a study conducted in Japan which showed odd ratios of 6.17<sup>(6)</sup>. Another significant risk factor was breastmilk inadequacy. Evidence from multiple studies demonstrated that mothers without breastfeeding or having difficulties in breastfeeding were at risk for postpartum depression<sup>(4, 5, 13)</sup>. Furthermore, lack of support in newborn care and urban habitation posed higher risk of LPDS. This was relevant with several previous studies. Bangkok and vicinity habitation may promote LPDS because each individual family might be less involved to one another and having more separated lifestyle<sup>(4)</sup>. While newborn care was a great deal of motherhood, lack of support from other family members may induced a feeling of overwhelming responsibility and guilt to many mothers<sup>(4, 5, 10, 15)</sup>.

In this study, no participant were drop out due to emerging severe depression that need earlier intervention prior to 6 week postpartum visit. All women with LPDS detected in this study were refered to psychiatry clinics for proper intervention. Twenty mothers that had significant depressive symptoms by screening tools were refered to psychiatrist and four of them had major depressive disorder (all had history of postpartum blues at 2 days postpartum). Additionally, three mothers were diagnosed with adjustment disorder, six mothers were assigned to follow-up without certain diagnosis and unfortunately seven mothers were lost to follow-up.

The strength of this research was this being the first case-control study in Thailand to identify the association between postpartum blues and LPDS. Identification of postpartum blues can help in early detection of postpartum depression, promoting the development of standard screening programme, follow-up protocols and provide interventions for psychological support.

Limitation of this study was that documentation of postpartum blues and late postpartum depressive symptoms were taken place at a single point of time. Extended timing of study can provide precise magnitude of problems. Furthermore, calculation for sample size was aimed to defined the association between postpartum blues and late postpartum depressive symptoms as a primary objective. More sample size may be needed to identify precise magnitude effect and significance of other risk factors. Also, this study was a single-centered study. This may limit the generalization, thus multicentered study is suggested.

## Conclusion

Postpartum blues were highly associated with late postpartum depressive symptoms and being an early prediction for postpartum depression. Early detection of postpartum blues during postpartum hospitalization is useful to identify patient at risk of developing late postpartum depressive symptoms.

## Acknowledgments

- This study was supported by a research grant from Faculty of Medicine, Srinakharinwirot University (Grant No 527/2563).

- Psychiatric department, Faculty of medicine, Srinakharinwirot University for providing further follow up program and treatment.

- Kamolrat Watchaporn, M.D. for developing Thai Edinburgh Postnatal Depressive scale and given permission to use in this study.

## Potential conflicts of interest

The authors declare no conflicts of interest.

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