# Prevalence and Factors Associated with Antepartum Depression: A University Hospital-Based

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## ABSTRACT

**Objective:** This study aimed to assess the prevalence of and factors associated with antepartum depression among Thai women.

**Materials and Methods:** All pregnant women attending the Antenatal Care Clinic at Songklanagarind Hospital from June to August 2020 were invited to participate and evaluated through self-administered questionnaires. Multivariate logistic regression models were used for the data analysis in order to control for potential confounders.

**Results:** 435 women were in their first, second, and third trimester of pregnancy (20.2 %, 39.5 %, and 40.2 %, respectively). The majority of them reported normal Rosenberg's Self-esteem Scale scores (83.4 %) and a high level of perceived social support (74.5 %). Moreover, according to the Edinburgh Postnatal Depression Scale (EPDS) scores, the prevalence of antepartum depression was 10.6 %. A multivariate logistic regression analysis showed that factors associated with antepartum depression were second trimester of pregnancy, survival and below-survival levels of income, unintended pregnancy, and low level of self-esteem.

**Conclusion:** One-tenth of pregnant Thai women suffered from depression. Advanced gestational age, low income, unintended pregnancy, and low self-esteem were significant factors associated with antepartum depression.

**Keywords:** Antepartum; associated factors; depression; pregnancy; prevalence (Siriraj Med J 2021; 73: 652-660)

## INTRODUCTION

Depression is a common psychiatric disorder.[1,2] The World Health Organization (WHO) reported depression as the third cause of global burden of disease in 2004 and the second cause in 2020, and it estimates depression will be the leading cause of "lost years of healthy life" worldwide by 2030.[1] Women are twice as likely to develop depression, especially during pregnancy, due to the physical, physiological, and hormonal changes they undergo.[3]

Antepartum depression is characterized by depressive symptoms like low mood or sadness, feeling of worthlessness, loss of interest or pleasure, sleep disturbance, and changes in appetite[4]; it affects both the maternal health and family life of women.[5] Moreover, it is often considered to be associated with adverse pregnancy outcomes such as preterm birth and low birth weight.[6-8] Untreated antepartum depression leads to postpartum depression[9], resulting in malnourishment and a poor relationship between mother and child.[10]

Systematic reviews have estimated the overall prevalence of antepartum depression at around 6.2 - 9.2 % in high-income countries and 19.2 - 23.5 % in low-to middle-income countries.[11-13] The onset of antepartum depression most commonly occurs during the third trimester.[14] The potential risk factors of antepartum

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depression can be categorized into four aspects-the personal background, obstetric, psychological or psychiatric, and social and family aspects. The personal background and obstetric aspects involve factors such as parity[15], advanced maternal age[16,17], unintended pregnancy[18,19], and obstetric complications.[20] In addition, low self-esteem[18], experiencing negative life events[11], history of depressive symptoms[15,21], history of illness during the previous month[22,23], and family history of psychiatric disorders[15], which belong to the psychological or psychiatric aspect, are significant factors associated with antepartum depression.

Moreover, in regards to the social and family aspect, factors such as low socioeconomic status[22], lack of partner support[23] or poor marital relationship[24], history of intimate partner violence[11,12], differences in religion and/or culture between partners[13], having a partner with a smoking and drinking habit[15,18], difficult relationship with the mother-in-law, lack of parenting knowledge[12], and baby gender selection or gender preference due to the family-related circumstances[17,23] are potential risk factors for persistent depression during pregnancy.

The risk factors associated with antepartum depression may differ among countries. Limited data concerning these issues are available from Asian countries. In Thailand, only one study on this topic has been conducted in the past ten years (2010). It reported a 10.3 % prevalence of antepartum depression, but it did not explore its associating risk factors.[25] Therefore, we conducted this study to determine the prevalence of antepartum depression across gestational ages and identify its associating risk factors. This research may provide useful information for both psychiatrists and obstetricians in their efforts to establish antepartum depression screening programs aimed at the early detection, prevention, and timely management of severe depression among pregnant women.

## MATERIALS AND METHODS

After approval by the Ethics Committee of the Faculty of Medicine, Prince of Songkla University (REC: 63-083-3-4), this cross-sectional study was conducted at Songklanagarind Hospital, which is an 800-bed university hospital that serves as a tertiary referral center in Southern Thailand. All methods were carried out following relevant guidelines and regulations. Written informed consent was obtained from all participants before enrollment. All pregnant women, who were at least 18 years old and attended the hospital's Antenatal Care Clinic (ANC) from June to August 2020, were invited to participate in this study. We included all the pregnant women who were able to complete all parts of the questionnaires. Those with a self-reported history of psychiatric illness and who did not complete the questionnaires in full, declined to participate in the study, or could not read or write the Thai language, were excluded. The sample size was calculated based on an estimated prevalence (P = 0.1, alpha = 0.05 and d = 0.03); at least 395 participants were deemed necessary for enrollment.

All eligible pregnant women were asked to answer the self-reported questionnaires anonymously. Then the researcher informed the participants about the results immediately after their completion. If they had EPDS scores of greater than or equal to 11, which was considered a positive screening for depression, the psychiatrists in the research team performed in-depth interviews by using DSM-V criteria for definite diagnosis and proper management.

### Measures

The data collection tools consisted of the demographic data questionnaire, the Rosenberg's Self-esteem Scale, the Multidimensional Scale of Perceived Social Support

1) The demographic characteristics questionnaire consisted of questions enquiring about the woman's age, gestational age, educational level, occupation, religion, healthcare coverage scheme, marital status, family income, pregnancy intention, gravidity, parity and abortion, obstetric complications, history of substance abuse, underlying medical illness, and family and partner profiles.

2) Rosenberg's Self-esteem Scale-Thai version[26] consisted of 10 questions related to positive and negative feelings about themselves. All items were rated via a 4-point Likert scale ranging from "0" (strongly disagree) to "3" (strongly agree). The total score ranged from 0 - 30; a score greater than 25 indicated a high level of self-esteem, scores in the 15 - 25 range represented a normal level of self-esteem, and the ones less than 15 signified a low level of self-esteem.[27] A Cronbach's alpha coefficient of 0.86 has been reported for this tool.[26]

3) The Multidimensional Scale of Perceived Social Support (MSPSS)-Thai version[28] comprised 12 questions grouped into 3 subcategories: family, friends, and significant others. All items were rated using a 7-point Likert scale ranging from "1" (very strongly disagree) to "7" (very strongly agree). The total score ranged from 12 - 84, and the score of each subpart ranged from 1 to 7; a score of 1 - 2.9 was indicative of low support level, a score in the 3 - 5 range was deemed to represent

moderate-level support, and those from 5.1 to 7 were considered to represent a high level of support.[29] The Cronbach's alpha coefficient for this questionnaire has been reported to be 0.91.[28]

4) The Edinburgh Postnatal Depression Scale (EPDS)-Thai version[30] consisted of 10 questions. All items were rated using a 3-point scale. The total score ranged from 0 - 30; the cut-off score of > 11 was the optimal cut-off points for screening both antepartum and postpartum depression according to previous study.[30,31] The Cronbach's alpha, sensitivity, and specificity values for this tool have been determined to be 0.87, 100.0 %, and 92.6 %, respectively.[30]

### Statistical methods

Descriptive statistics, the chi-square test, the Fisher's exact test, and multivariate logistic regression analyses were used in the data analysis. A p-value of < 0.05 was considered to represent statistical significance.

## RESULTS

### Demographic characteristics

A total of 447 pregnant women attended the Antenatal Care Clinic during the study period, and 435 of them (97.3 %) agreed to complete the questionnaires. Most women were in the third and second trimesters. Overall, the mean (SD) maternal age was 32.0 (5.2) years, and the mean (SD) gestational age was 23.8 (10.3) weeks. The majority of the participants were Buddhist (69.0 %), had a high educational level (72.2 %), had a Bachelor's degree or higher), were employees (36.3 %), and had a low monthly household income (66.9 %). Besides, most women were multigravida (65.3 %) and had planned their pregnancies (77.7 %). About one-fourth of them had experienced pregnancy complications such as gestational diabetes mellitus, fetal anomaly, and threatened abortion during the current pregnancy. However, the majority of participants had no underlying medical illnesses (85.7 %). Moreover, only 10 participants (2.3 %) had a family history of psychiatric illness such as major depressive disorder, persistent depressive disorder, generalized anxiety disorder, and schizophrenia.

### Self-esteem

Using the Rosenberg's Self-esteem Scale-Thai version, the mean (SD) total score of self-esteem was 21.4 (3.3). The majority of participants had a normal level of self-esteem (83.4 %); only 6 participants had low self-esteem (1.4 %), and 15.2 % had high self-esteem (Table 1).

### Perceived social support

The Multidimensional Scale of Perceived Social Support (MSPSS)-Thai version revealed a mean (SD) total score of 69.3 (9.6) for perceived social support. The majority of participants had a high level of perceived social support (74.5 %), and only 2 participants (0.5 %) reported having a low level of perceived social support (Table 1).

**TABLE 1.** EPDS, self-esteem, and perceived social support scores categorized by trimester (N = 435).

| Questionnaire measures | Total (N = 435) | Trimester; number (%) First trimester (n = 88) | Second trimester (n = 172) | Third trimester (n = 175) | Chi² P-value |
|---|---|---|---|---|---|
| **EPDS**[a] | | | | | 0.095 |
| < 11 | 389 (89.4) | 81 (92.0) | 147 (85.5) | 161 (92.0) | |
| ≥ 11 | 46 (10.6) | 7 (8.0) | 25 (14.5) | 14 (8.0) | |
| **Self-esteem**[b] | | | | | 0.293* |
| Low | 6 (1.4) | 2 (2.3) | 1 (0.6) | 3 (1.7) | |
| Normal | 363 (83.4) | 77 (87.5) | 139 (80.8) | 147 (84.0) | |
| High | 66 (15.2) | 9 (10.2) | 32 (18.6) | 25 (14.3) | |
| **MSPSS**[c] | | | | | 0.530* |
| Low | 2 (0.5) | 0 (0) | 0 (0) | 2 (1.1) | |
| Moderate | 109 (25.1) | 19 (21.6) | 47 (27.3) | 43 (24.6) | |
| High | 324 (74.5) | 69 (78.4) | 125 (72.7) | 130 (74.3) | |

**Note:** [a]EPDS = the Edinburgh Postnatal Depression Scale; [b]Self-esteem = the Rosenberg's Self-esteem Scale; [c]MSPSS = the Multidimensional Scale of Perceived Social Support
* Fisher's exact test

**Prevalence of antepartum depression**

Using the Edinburgh Postnatal Depression Scale (EPDS)-Thai version, the mean (SD) total score was 5.8 (3.9). The prevalence of antepartum depression according to EPDS was 10.6 %. The prevalence of antepartum depression in the first, second and third trimesters was 1.6 %, 5.7 %, and 3.2 %, respectively. However, after in-depth interviews by psychiatrists using the DSM-V criteria for major depressive disorder, it was revealed that only 3 participants (0.7 %) had major depressive disorder, whereas the remaining 43 participants (9.9 %) had adjustment disorder with depressed mood.

**Factors associated with antepartum depression**

To identify factors associated with antepartum depression, demographic characteristics, self-esteem, and perceived social support were included in the univariate analysis. Variables with p-values of less than 0.2 from the univariate analysis were included in the final model of the multivariate logistic regression analysis. These factors were trimester of pregnancy, educational level, occupation, health coverage, income, pregnancy intention, complications during current pregnancy, family history of psychiatric illness, partner's educational level, partner's underlying diseases, self-esteem, and perceived social support (Table 2). The multivariate analysis showed that trimester of pregnancy, income, pregnancy intention, and self-esteem level were significant factors associated with antepartum depression (Table 3).

With regard to the factors associated with antepartum depression, women in the second trimester faced a 2.7 times increased risk for antepartum depression compared to those in the first trimester. Likewise, compared to the pregnant women with a high income level, those who reported survival and below-survival levels of income experienced a 3.2 and 5.4 times increased risk for antepartum depression, respectively. Similarly, unintended pregnancy was associated with a 2.3 times higher risk for antepartum depression than intended pregnancy. On the other hand, a normal level of self-esteem was found to exert a protective influence against antepartum depression (Table 3).

## DISCUSSION

This study indicated that the prevalence of depression during the antepartum period assessed via EPDS was 10.6 %. Comparing the prevalence of our study with those reported by previous researches, it was similar to the one found by a study from Thailand (10.3 %) even if using the different tools.[25] Thus, we can conclude that for the screening of antepartum depression we can use both EPDS (our study) and Two-question screening for depression, Thai-version (previous study) for screening antepartum depression in ANC. However, our rate was lower than those found in low-to middle-income countries (19.2 - 23.5 %) but higher than those reported in high-income countries (6.2 - 9.2 %).[11-13] These differences might be due to the differences in study instruments, population ethnicity, family background, and gestational age at enrollment. The factors identified to associate with antepartum depression were advanced gestational age, low monthly household income, unintended pregnancy, and low self-esteem. Surprisingly, gestational age in the second trimester has not been reported before as a significant factor associated with antepartum depression. This might be due to a change in appearance and body image, along with quickening of the baby. Moreover, obstetricians can detect fetal abnormalities from ultrasound as well as various pregnancy problems. All these abnormalities can lead to anxiety or stressful in pregnant women.

Regarding family income, compared to pregnant women with a high level of income, those with survival or below-survival income levels had a significantly increased risk of experiencing antepartum depression. This result was similar to the findings reported by previous studies.[18,22] An explanation for this could be the possibility that economic problems can result in stress and anxiety, especially for women who play an important role in family care, provide food for family members, pay for various family expenses and antenatal care, and is expected to shoulder the cost of other medical care in the future. Nevertheless, it was women's point of view which Thai people normally underestimate their income.

Similarly, unintended pregnancy was associated with twice the likelihood of antepartum depression compared to intended pregnancy. This finding was consistent with those of previous studies conducted in Jordan and Kenya.[18,19] Unplanned pregnancies can lead to concerns about oneself, the family, and the baby's future. Furthermore, unintended pregnancy was high in our study because of high ratio of Islamism in Southern Thailand that they cannot do any contraception according to the principles of their religious.

Conversely, normal self-esteem protected pregnant women from antepartum depression. This finding was in line with the results reported by a study conducted in Jordan.[19] Women with a higher level of self-esteem tend to feel more valuable than those with a lower level of self-esteem. Therefore, the women with a normal level of self-esteem may feel less fearful or insecure and also

**TABLE 2.** Demographic characteristics, self-esteem, and perceived social support categorized by EPDS score (N = 435).

| Variables | Total (N = 435) | EPDS[a]; number (%) < 11 (n = 389) | EPDS[a]; number (%) ≥ 11 (n = 46) | Chi² P-value |
|---|---|---|---|---|
| **Age (years)** | | | | 0.622 |
| < 35 | 293 (67.4) | 264 (67.9) | 29 (63.0) | |
| ≥ 35 | 142 (32.6) | 125 (32.1) | 17 (37.0) | |
| ***Trimester*** | | | | 0.095 |
| First | 88 (20.2) | 81 (20.8) | 7 (15.2) | |
| Second | 172 (39.5) | 147 (37.8) | 25 (54.3) | |
| Third | 175 (40.2) | 161 (41.4) | 14 (30.4) | |
| **Educational level** | | | | 0.197 |
| Below Bachelor's degree | 121 (27.8) | 104 (26.7) | 17 (37.0) | |
| Bachelor's degree and higher | 314 (72.2) | 285 (73.3) | 29 (63.0) | |
| **Occupation** | | | | 0.159 |
| Employee/self-employed | 199 (45.7) | 175 (45) | 24 (52.2) | |
| Government employee | 158 (36.3) | 147 (37.8) | 11 (23.9) | |
| Housewife/unemployed | 78 (17.9) | 67 (17.2) | 11 (23.9) | |
| **Religion** | | | | 0.414* |
| Buddhism | 300 (69) | 272 (69.9) | 28 (60.9) | |
| Islam | 132 (30.3) | 114 (29.3) | 18 (39.1) | |
| Christianity | 3 (0.7) | 3 (0.8) | 0 (0.0) | |
| **Health coverage** | | | | 0.093 |
| Civil Servant Medical Benefit Scheme (CSMBS) | 152 (34.9) | 140 (36) | 12 (26.1) | |
| Universal Coverage Scheme (UCS) | 45 (10.3) | 36 (9.3) | 9 (19.6) | |
| Social Security Scheme (SSS) | 101 (23.2) | 88 (22.6) | 13 (28.3) | |
| Out-of-pocket | 137 (31.5) | 125 (32.1) | 12 (26.1) | |
| **Marital status** | | | | 0.637* |
| Single/divorced | 13 (3) | 11 (2.8) | 2 (4.3) | |
| Married | 422 (97) | 378 (97.2) | 44 (95.7) | |
| **Monthly household income (Baht/month)** | | | | 0.058 |
| < 30,000; low income | 291 (66.9) | 254 (65.3) | 37 (80.4) | |
| ≥ 30,000; high income | 144 (33.1) | 135 (34.7) | 9 (19.6) | |
| ***Standard of living*** | | | | < 0.001 |
| High | 222 (51) | 211 (54.2) | 11 (23.9) | |
| Survival | 183 (42.1) | 156 (40.1) | 27 (58.7) | |
| Below survival | 30 (6.9) | 22 (5.7) | 8 (17.4) | |
| **Family structure** | | | | > 0.99 |
| Nuclear | 306 (70.3) | 274 (70.4) | 32 (69.6) | |
| Extended | 129 (29.7) | 115 (29.6) | 14 (30.4) | |
| ***Pregnancy intention*** | | | | 0.002 |
| Unintended | 97 (22.3) | 78 (20.1) | 19 (41.3) | |
| Intended | 338 (77.7) | 311 (79.9) | 27 (58.7) | |
| **Parity** | | | | 0.878 |
| Nulliparity | 151 (34.7) | 136 (35) | 15 (32.6) | |
| Multiparity | 284 (65.3) | 253 (65) | 31 (67.4) | |

**TABLE 2.** Demographic characteristics, self-esteem, and perceived social support categorized by EPDS score (N = 435). (Continue)

| Variables | Total (N = 435) | EPDS[a]; number (%) < 11 (n = 389) | EPDS[a]; number (%) ≥ 11 (n = 46) | Chi² P-value |
|---|---|---|---|---|
| **Complications during this pregnancy** | 84 (19.3) | 70 (18) | 14 (30.4) | 0.068 |
| **Number of children** | | | | 0.568 |
| 0 - 1 | 173 (39.8) | 157 (40.4) | 16 (34.8) | |
| > 1 | 262 (60.2) | 232 (59.6) | 30 (65.2) | |
| **Complications during previous pregnancies** | 106 (24.4) | 91 (23.4) | 15 (32.6) | 0.232 |
| Previous miscarriage | 89 (20.5) | 76 (19.5) | 13 (28.3) | 0.233 |
| Smoking | 3 (0.7) | 2 (0.5) | 1 (2.2) | 0.285* |
| Alcohol consumption | 47 (10.8) | 41 (10.5) | 6 (13) | 0.615* |
| Underlying medical illness | 62 (14.3) | 54 (13.9) | 8 (17.4) | 0.674 |
| Family history of psychiatric illness | 10 (2.3) | 7 (1.8) | 3 (6.5) | 0.078* |
| ***Self-esteem***[b] | | | | < 0.001 |
| Low | 6 (1.4) | 2 (0.5) | 4 (8.7) | |
| Normal | 363 (83.4) | 321 (82.5) | 42 (91.3) | |
| High | 66 (15.2) | 66 (17) | 0 (0) | |
| **MSPSS**[c] | | | | 0.006 |
| Low-to-moderate | 111 (25.5) | 91 (23.4) | 20 (43.5) | |
| High | 324 (74.5) | 298 (76.6) | 26 (56.5) | |
| **Partner's demographic characteristics** (n=432)** | | | | |
| **Educational level** | | | | 0.166 |
| Below Bachelor's degree | 226 (52.3) | 197 (51) | 29 (63) | |
| Bachelor's degree and higher | 206 (47.7) | 189 (49) | 17 (37) | |
| **Occupation** | | | | 0.79 |
| Employee/self-employed | 285 (66) | 253 (65.5) | 32 (69.6) | |
| Government employee | 140 (32.4) | 127 (32.9) | 13 (28.3) | |
| Stay-at-home dad/unemployed | 7 (1.6) | 6 (1.6) | 1 (2.2) | |
| **Religion** | | | | 0.223* |
| Buddhism | 300 (69.4) | 273 (70.7) | 27 (58.7) | |
| Islam | 130 (30.1) | 111 (28.8) | 19 (41.3) | |
| Christianity | 2 (0.5) | 2 (0.5) | 0 (0.0) | |
| Smoking | 191 (44.2) | 169 (43.8) | 22 (47.8) | 0.715 |
| Alcohol consumption | 182 (42.1) | 163 (42.2) | 19 (41.3) | > 0.99 |
| **Other substance abuse** | | | | |
| (E.g. Cannabis) | 3 (0.7) | 2 (0.5) | 1 (2.2) | 0.287* |
| Underlying medical illness | 27 (6.2) | 22 (5.7) | 5 (10.9) | 0.19* |
| Psychiatric illness | 1 (0.2) | 1 (0.3) | 0 (0.0) | > 0.99* |

**Note:** [a]EPDS = the Edinburgh Postnatal Depression Scale; [b]Self-esteem = the Rosenberg's Self-esteem Scale; [c]MSPSS = the Multidimensional Scale of Perceived Social Support

* Fisher's exact test; ** There were 3 missing values.

**TABLE 3.** Factors associated with antepartum depression by multivariate regression analysis.

| Factors | Crude OR[a] (95 % CI[b]) | Adjusted OR[a] (95 % CI[b]) | P-value LR[c] test |
|---|---|---|---|
| **Trimester** | | | 0.018 |
| First | Ref[d] | Ref[d] | |
| Second | 1.97 (0.82, 4.75) | 2.73 (1.04, 7.21) | |
| Third | 1.01 (0.39, 2.59) | 1.06 (0.38, 2.95) | |
| **Standard of living** | | | 0.001 |
| High | Ref[d] | Ref[d] | |
| Survival | 3.32 (1.6, 6.9) | 3.23 (1.5, 6.96) | |
| Below survival | 6.98 (2.54, 19.17) | 5.35 (1.78, 16.03) | |
| **Pregnancy intention** | | | 0.021 |
| Intended | Ref[d] | Ref[d] | |
| Unintended | 2.81 (1.48, 5.31) | 2.3 (1.15, 4.6) | |
| **Self-esteem level** | | | < 0.001 |
| Low* | Ref[d] | Ref[d] | |
| Normal | 0.07 (0.01, 0.37) | 0.06 (0.01, 0.39) | |
| High | 0 (0, inf.) | 0 (0, inf.) | |

**Note:** [a]OR = odds ratio; [b]CI = confidence interval; [c]LR = likelihood-ratio; [d]Ref = reference category

*We could not use a normal self-esteem value as a reference due to the imprecision of the estimation (the 95 % CI was too wide).

experience less stress or anxiety than those with a low level of self-esteem. Thus, this may serve as an indication for targeting the enhancement of the self-esteem of pregnant women in our country. In addition, screening pregnant women with low self-esteem using Rosenberg's Self-esteem Scale-Thai version during antenatal care might be useful.

Finally, the information provided by our findings might prove useful in establishing a screening program that utilizes EPDS for pregnant women in the future, which can be applied from the first trimester of the antepartum period. The rationale of using the first trimester as a reference point was is based on evidence from a previous study, which demonstrated an increasing risk for antepartum depression with advancing gestational age.[14] Such programs may be especially beneficial for women at risk for antepartum depression, e.g., those with unintended pregnancy, low family income, low self-esteem, and a gestational age of the second trimester onwards. This screening would be very helpful for the early detection, prevention, and timely management of severe depressive episodes among pregnant women. Furthermore, health agencies that play a role in pregnancy care should design and conduct activities aimed at enhancing the self-esteem of pregnant women, their ability to manage stress properly, as well as their problem-coping skills during antenatal visits. In addition, educating family members and other influential persons about the detection, care, and prevention of antenatal depression would be a worthwhile goal. We recommend that the antenatal care book, which is made available as a handout for the general public, should contain essential information regarding the warning signs of depression as well as appropriate self-care to prevent depression during pregnancy. Moreover, for pregnant women with unintended pregnancy, critical socioeconomic problems, and severe psychiatric disorders that are at risk for major depression with suicidal ideation, termination of pregnancy at an early gestational age should be offered as an option. Such strategy may prevent suicide during pregnancy. Additionally, effective contraception, sex education also risks and benefit of multiparity should be provided to women who wish to prevent future unintended pregnancies.

### Strengths and limitations

To our knowledge, this is the only study on this topic conducted in Thailand during the past decade, which employed an adequate sample size and covered pregnant women in all trimesters of pregnancy. Another strength of this study is that we identified factors associated with antepartum depression, which can be very useful in detecting pregnant women at risk for this significant health problem. However, our study suffered from some limitations. It utilized self-administered questionnaires; therefore, some misunderstandings regarding the intended meaning of the questions might have occurred. Nevertheless, to minimize this, the questionnaires were validated and showed good reliability (good Cronbach's alpha coefficient values). Another drawback was that our data were collected from pregnant women without any previous history of depression or other psychiatric illnesses in the lower part of Southern Thailand. Hence, this dataset may not represent fairly the situation of pregnant women in the whole country.

### Future recommendations and implications

For further study, screening from the first ANC visit until the postpartum period and conducting multi-centric research on this topic are necessary before making a definite guideline for screening depression during pregnancy.

## CONCLUSION

One-tenth of Thai women responders were found to suffer from antepartum depression via EPDS screening. Advanced gestation, low income, unintended pregnancy, and low self-esteem were determined to relate to antepartum depression. Future longitudinal studies encompassing the time interval from the first antenatal visit to the postpartum period should be conducted in order to assess the exact onset of depression. Furthermore, multi-centric studies are recommended.

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