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Original article

Prevalence and associated factors of anxiety and depression among advanced maternal age pregnancy

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Background: Advanced maternal age is associated with increased rate of various obstetrics risks. Nowadays, there is increasing prevalence of advanced maternal age in Thailand. However, there is still lack of study in anxiety and depression among this group of pregnant women.

Objectives: To examine the prevalence of anxiety and depression as well as associated factors among women with advanced maternal age pregnancy

Methods: We recruited 124 pregnant women age ≥ 35 years old who were in their third trimester (gestational age ≥ 28 weeks) of pregnancy. The subjects were asked to rate: The State-Trait Anxiety Inventory (STAI Form Y) - both state and trait version, The Edinburgh Postnatal Depression Scale (EPDS) - Thai version, The Personal Resource Questionnaire (PRQ) - Part II, and The Dyadic Adjustment Scale (DAS). Univariate and multivariate statistics were used to examine the associated factors of antenatal depression and anxiety.

Results: The prevalence of anxiety and depression were 47.6% and 12.1%, respectively. Lower marital satisfaction and high concern regarding baby care were found to be significantly associated with anxiety ($P < 0.05$ and $P < 0.01$, respectively). Antenatal anxiety was associated with higher severity of concern on pregnancy and delivery related issues, higher STAI-trait score, higher EPDS score, lower PRQ score and lower DAS score with significantly higher STAI-state score ($P < 0.01$). Considering on antenatal depression, marital status (separated/ divorced), having no cramp during 3rd trimester, higher anxiety trait, antenatal anxiety-and history of amniocentesis were found to be significantly associated with antenatal depression ($P < 0.01$). Moreover, higher severity of concern on pregnancy and delivery related issues, STAI-state score, higher STAI-trait score, lower PRQ score and lower DAS score were associated with significantly higher EPDS score ($P < 0.01$).

Conclusions: The prevalence of anxiety in advanced maternal age pregnant women in this study is somewhat higher than in general pregnant women, while the depression is lower than in general pregnant women. Awareness of risk factors may help medical personnel in identifying women of advanced maternal age pregnancy who are at risk for depression and anxiety and provide strategies in helping this group of women.

Keywords: Anxiety, depression, advanced maternal age pregnancy.

Nowadays, women tend to get married later than previous generation due to several economic and social factors. Improving reproductive technologies can help couples achieve pregnancy and give birth at older ages.[1] However, there is higher risk of obstetrics complications for older pregnant women such as pregnancy-induced hypertension, pre-eclampsia and threatened abortion. Moreover, the complications bring higher risks to fetuses as well.[2-4] Anxiety and depression of pregnant women can simultaneously affect themselves and their fetus's health, as well as delivering process. The recent study showed that pregnant women with depression had a higher chance of labor pain and preterm labor.[5] Additionally, anxiety and depression are also the risk factors of miscarriage and low birth weights.[6]

According to literature reviews and related research studies, it can be seen that most of the studies focus on only prevalence and risk factors, as well as effects of pregnant women with anxiety at the age of general standard (18 - 34 years old). However, there is lack of study on pregnant women in older age. Considering the situation in Thailand, it may not be found any supportive direction or policy for older pregnant women, although this group of

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women tends to give birth increasingly in future based on current economic and social conditions. Therefore we aim to study the prevalence and associated factors related to anxiety and depression in pregnant women at older age. We hope the results of this study can be applied as guidelines for diagnosis and treatment process for this group of pregnant women in the future.

Materials and methods

We recruited 124 advanced maternal age pregnant women (age ≥ 35 years) who were in their third trimester (gestational age ≥ 28 weeks). This study has been approved by the Ethics Committee or Institutional Review Board (IRB) of Faculty of Medicine, Chulalongkorn University (COA No. 173/ 2018). All participants were informed of the objectives and methods of the present study. All participants were asked to complete 6 questionnaires which are as follows:

1) Demographic data questionnaires: age, marital status, education level, income, current occupation, family status, history of physical illness, history of substance abused, and self-report on issues of concern on various aspects of pregnancy and delivery (with Likert scale rating on severity of concern on each issue ranging from 0 - 10). Obstetrics information questionnaire. The State-Trait Anxiety Inventory (STAI Form Y) - Thai version[7], i.e., a self-reported questionnaire comprises 40 items rated on a 4-point scale. The STAI measures two types of anxiety – state anxiety, or anxiety about an event (STAI Form Y-1, A-State (The Cronbach's Alpha coefficient in the previous study was 0.90) and trait anxiety, or anxiety level as a personal characteristic (STAI form Y-2, A-trait) (The Cronbach's Alpha coefficient in the previous study was 0.82), each type of anxiety has its own scale of 20 different questions that are scored. Scores are range from 20 to 80 with a higher score correlates with greater anxiety. STAI 2) Scores can be divided into 3 levels: high, moderate, and low levels of anxiety.3) The Edinburgh Postnatal Depression Scale (EPDS) - Thai version[8], i.e., a self-reported questionnaire comprises 10 items rated on a 4-point scale, from 0 to 3, total score ranges from 0 to 30 points with higher scores indicating a greater severity of depression. At the cut-off value ≥ 11 indicates depression (sensitivity of 100 percent and a specificity of 88 percent). The Cronbach's Alpha coefficient in the previous study was 0.80.

The Personal Resource Questionnaire (PRQ)-Part II – Thai version[9] consisting of 5 subscales with 25 items, divided into positive and negative perceptive questions, total scores 4) Is 25 - 125 points. A previous validation study in 36 postpartum women whose babies were separated for care found that Cronbach' Alpha coefficient was 0.77. 5) The Dyadic Adjustment Scale (DAS) - Thai version[10], consisting of 4 subscales with 28 items, divided into 3 levels: high moderate and low. Higher scores indicated more marital relationship quality.

Statistical analysis

The data were analyzed by using SPSS for Windows version 22.0. DescriptiveÃ statistics including percentage, mean and standard deviation (SD) were used to identify participant's characteristics and inferential statistics such as chi-square, *t* - test to determine the prevalence of anxiety and depression in advanced maternal age pregnant women and logistic regression to determine the association factors of anxiety and depression.

Results

There were 124 participants, with mean age at 37.7 ± 2.2 years. Most of the participants were married (96.8%) with mean years of education at 14.8 ± 3.1 years, most of them were working in private sectors (38.7%). Most subjects perceived that they had adequate income. The majority of them (80.6%) were healthy with no history of physical illness, and only 3.2 % had a family history of psychiatric disorder. More than half of the participants were multigravida. Most of their current pregnancies were planned (62.1%), whereas 18.5% are unwanted pregnancy.

More than half of the subjects (51.6%) reported history of premenstrual syndrome (PMS) and disturbing physical symptoms during of the 1st trimester including nausea (60.5%), fatigue (52.4%) and dizziness (50.0%). During the 2nd trimester, 49.2% of the participants had frequent urination, and 49.2% had weight gain. During the 3rd trimester, 66.9% had frequent urination, 57.3% had weight gain, 54.0% had back pain, and 46.8% had cramp. Regarding obstetrics complications 25.0% had gestational diabetes (GDM), 8.9% had placenta previa, 5.6% had threatened abortion, and 4.0% had pregnancy induced hypertension. Amniocentesis were performed in most of the participants (56.5%). Socio-demographic and obstetrics characteristics of the participants are shown in Table 1. and Table 2.

Table 1. Socio-demographic and obstetrics characteristics of the participants (n = 124)

Characteristics	Mean ± SD or n (%)
Age (years)	37.7 ± 2.2
Marital status	
Married	120 (96.8)
Separated	4 (3.2)
Educational level (years)	14.8 ± 3.1
Primary school	2 (1.6)
Secondary school	14 (11.3)
High school	18 (14.5)
Vocational school	6 (4.8)
Graduated and higher	84 (67.7)
Current occupation	
Unemployed	14 (11.3)
Government	22 (17.7)
Private sector	48 (38.7)
Business owner	14 (11.3)
Labor	16 (12.9)
Others	10 (8.1)
Personal income (baht/month)	27,818.0 ± 30,702.4
Family income (baht/month)	59,647.6 ± 53,745.0
Adequacy of income	
Adequate with savings	57 (46.0)
Adequate with no savings	57 (46.0)
Inadequate with no debt	2 (1.6)
Inadequate with debt	8 (6.5)
History of physical illness	24 (19.4)
History of premenstrual syndrome	60 (48.4)
Family history of psychiatric disorder	4 (3.2)
Gravidity	
Primigravida	44 (35.5)
Multigravida	80 (64.5)
History of substance abused before pregnancy	
Caffeine	77 (62.1)
Alcohol	26 (21.0)
Smoking	2 (1.6)
History of substance abused during pregnancy	
Caffeine	34 (27.4)
Alcohol	2 (1.6)
Smoking	1 (0.8)
Previous of pregnancy complications	24 (21.0)
Unplanned pregnancy	47 (37.9)
Unwanted pregnancy	23 (18.5)
Pregnancy complications	
Threatened abortion	7 (5.6)
Gestational Diabetes Mellitus	31 (25.0)
Pregnancy-Induced Hypertension	5 (4.0)
Placenta previa	11 (8.9)
Others	3 (2.4)
Issues of concern (with severity of concern)	
Pregnancy complications	4.1 ± 3.1
Baby health	4.7 ± 3.1
Labor process	4.7 ± 3.1
Breast feeding	3.4 ± 3.1
Baby care	3.1 ± 3.0
STAI-state	38.7 ± 9.3
STAI-trait	33.1 ± 8.7
EPDS	5.2 ± 4.2
PRQ	77.9 ± 10.8
DAS	105.7 ± 16.4

Table 2. Prevalence of disturbing physical symptoms during pregnancy.

Disturbing physical symptoms	n (%)		
	1st TM	2nd TM	3rd TM
Nausea	75 (60.5)	9 (7.3)	5 (4.0)
Dizziness	62 (50.0)	13 (10.5)	8 (6.5)
Odor sensitive	59 (47.6)	14 (11.3)	11 (8.9)
Fatigue	65 (52.4)	22 (17.7)	33 (26.6)
Vaginal bleeding	22 (17.7)	5 (4.0)	6 (4.8)
Frequent urination	36 (29.0)	61 (49.2)	62 (50.0)
Breast discomfort	51 (41.1)	30 (24.2)	30 (24.2)
Hyperpigmentation	16 (12.9)	36 (29.0)	44 (35.5)
Myalgia	14 (11.3)	36 (29.0)	55 (44.4)
Back pain	15 (12.1)	28 (22.6)	67 (54.0)
Cramp	10 (8.1)	40 (32.3)	62 (50.0)
Dyspepsia	13 (10.5)	22 (17.7)	39 (31.5)
Ileus	23 (18.5)	28 (22.6)	25 (20.2)
Constipation	24 (19.4)	42 (33.9)	35 (28.6)
Weight loss	24 (19.4)	4 (3.2)	6 (4.8)
Weight gain	32 (28.5)	61 (49.2)	71 (57.3)

TM = trimester

The prevalence of antenatal depression and anxiety were 12.1% and 47.6%, respectively. Higher severity of concern on pregnancy and delivery related issues, STAI-state score, higher STAI-trait score, lower PRQ score and lower DAS score were significantly correlated with EPDS score which reflects severity of depression. (Table 3.)

Higher severity of concern on pregnancy and delivery related issues, higher STAI-trait score, higher EPDS score, lower PRQ score and lower DAS score were significantly correlated with STAI-state score which reflects severity of anxiety (Table 4.)

Logistic regression analysis demonstrated five factors that were statistically significant predictors for antenatal depression among this group of pregnant women namely; separated/divorced marital status ($P < 0.01$), having no cramp during 3rd trimester ($P < 0.01$), history of amniocentesis ($P < 0.05$), antenatal anxiety ($P < 0.05$) and higher anxiety trait ($P < 0.01$) (Table 5).

Logistic regression analysis demonstrated two factors that were statistically significant predictors for antenatal anxiety among this group of advanced maternal age pregnant women namely; lower marital satisfaction ($P < 0.05$) and highly concern about baby care ($P < 0.01$) (Table 6).

Table 3. Correlation between associated factors and EPDS score.

Variables	*r*	*P* - value
Issues of concern (with severity of concern)		
Pregnancy complications	0.446	< 0.001*
Baby health	0.552	< 0.001*
Labor process	0.596	< 0.001*
Breast feeding	0.449	< 0.001*
Baby care	0.550	< 0.001*
STAI-state	0.773	< 0.001*
STAI-trait	0.746	< 0.001*
The Personal Resource Questionnaire (PRQ)	- 0.587	< 0.001*
The Dyadic Adjustment Scale (DAS)	- 0.505	< 0.001*

*$P < 0.01$

Table 4. Correlation between associated factors and STAI-state score.

Variables	*r*	*P* - value
Issues of concern (with severity of concern)		
Pregnancy complications	0.469	< 0.001*
Baby health	0.590	< 0.001*
Labor process	0.624	< 0.001*
Breast feeding	0.523	< 0.001*
Baby care	0.596	< 0.001*
STAI-trait	0.776	< 0.001*
Edinburgh Postnatal Depression Scale (EPDS)	0.773	< 0.001*
The Personal Resource Questionnaire (PRQ)	- 0.588	< 0.001*
The Dyadic Adjustment Scale (DAS)	- 0.415	< 0.001*

*$P < 0.01$

Table 5. Logistic Regression Analysis for variables predicting antenatal depression.

Variables	Adjusted OR	95% CI	*P* - value
History of amniocentesis	10.079	1.440 - 79.663	0.021*
Antenatal anxiety (STAI-state ≥ 40)	12.500	1.088 - 143.564	0.043*
Separated/divorced marital status	86.599	4.997 - 1500.917	0.002**
Cramp during 3rd trimester	0.051	0.007 - 0.495	0.009**
Higher anxiety trait (STAI-trait ≥ 40)	19.507	2.550 - 149.221	0.004**

*$P < 0.05$, **$P < 0.01$

Table 6. Logistic Regression Analysis for variables predicting antenatal anxiety.

Variables	Adjusted OR	95% CI	*P* - value
Lower marital satisfaction	6.341	1.968 - 20.431	0.002*
Highly concern about baby care	1.582	1.290 - 1.93	< 0.001*

*$P < 0.01$

Discussion

To the best for our knowledge, this is the first study in Thailand to determine the prevalence of anxiety and depression in the advanced maternal age pregnancy population.

Our study found the prevalence of antenatal anxiety and depression of 47.6% and 12.1%, respectively. The prevalence of antenatal anxiety seems to be higher than those in the previous studies. According to the study in Singapore, Thiagayson P, *et al.* [11] found that there are 12.5% of high risk pregnancy women with anxiety, while the study result of Giardinelli L, *et al.* [12] their data were collected in Italy and showed 21.5% of prevalence, and the research; of Algahtani AH, *et al.* [13] done in Saudi Arabia showed 20.5% of prevalence. Regarding to result of the study, it is possible that there are differences in participants' demographic such as ages (mean age around 30) and educational levels.

Considering on the prevalence of depression, our study found that there is 12.1% of prevalence which is lower than those of the previous studies. For example, the study of Giardinelli L, *et al.* [12] showed 21.9% of prevalence of antenatal depression in an Italian sample, while Mohammed KI, *et al.* [14] found 19.0% of prevalence studied in Jordan. Moreover, the prevalence of this study showed lower outcome compared to result in the review article about perinatal depression in Asian women studied by Roomruangwong C, *et al.* [15], which found that overall prevalence of depression during pregnancy to be about 20.0%, as well as the study of Limlomwongse N, *et al.* [16] , which focused on depressive mood in Thai women during late pregnancy in Thailand with 20.5%.

However, the results may vary depending on the difference of demographics, such as age, where previous studies focused on the range of teenage pregnancy to advanced maternal age pregnancy. Another factor is education level, which Mohammed KI, *et al.* [14] found participants with Bachelor Degree or higher to be 39.4%, and Giardinelli L, *et al.* [12] found participants with Bachelor Degree or higher to be 46.4%. The present study focuses on participants with education level of graduated or higher 67.7%. The different standard of cutting of EPDS score in each country is also another factor that may affect the result.

Focusing on change of EPDS score, it shows that increasing EPDS score is related to increasing severity of concern on pregnancy and delivery related issues, STAI-state score, and STAI-trait score. Likewise, increasing of STAI-state score is related to increasing severity of concern on pregnancy and delivery related issues, STAI-trait score, and EPDS score. This is consistent with a previous study of Chen J, *et al.* [17] which was carried on anxiety and depression of pregnant women in China in which the history of complications was showed the factor relating depression and anxiety in 3rd trimester of fetal health, and pregnant anxiety. At the same time, Deklava L, *et al.* [18] showed that pregnant women with anxiety on fetal health have the highest chance to have complications of pregnancy, while Kang YT, *et al.* [19] study on prevalence and related factors of pregnant women in China, and the result revealed that pregnant women had concerns on the issue of pregnancy complications. This study shows that scores of both EPDS score and STAI-state score are positively correlated. This is corresponding to the study of Chua TE, *et al.* [20] which found that depression usually occur overlapping with anxiety. On the contrary, PRQ score and DAS score show decreasing scores contrasting with EPDS score. This is consistent with studies of Kang YT, *et al.* [19], Giardinelli L, *et al.* [12] and Chen J, *et al.* [17] which found that lack of social support and lower marital satisfaction were the factors of depression occurrence.

After the analysis using logistic regression analysis, it shows that there are five factors predicting antenatal depression with statistically significant, namely: antenatal anxiety, history of amniocentesis, separated/ divorced marital status, having cramp during 3rd trimester and higher anxiety trait.

In addition, antenatal anxiety is a predicting factor of depression with statistically significant. With reference to the previous studies, they found that depression usually occurred overlapping with both state and trait anxiety, for example, a study of Chua TE, *et al.* [20] revealed that EPDS scores showed the strongest association with high state anxiety.

Regarding history of amniocentesis, it is found that amniocentesis is related with depression based on statistical significance which was in line with several studies such as study of El-Hage W, *et al.* [21] This study was carried on maternal psychopathology to compare result of undergoing an amniocentesis between two groups of pregnant women: one with amniocentesis and the other with no amniocentesis. The result showed that pregnant women who undergone an amniocentesis had higher EPDS and STAI-state score than pregnant women in control group. However, it cannot be found in our study that pregnant women who undergone an amniocentesis is related to occurrence of anxiety with statistical significance. Whereas study of El-Hage W, *et al.* [21] revealed that increasing score of STAI-state was transient significantly higher levels, and the score decrease after undergone amniocentesis. This is corresponding to study of Kowalcek I, *et al.* [22] which discovered that the actual stress rating showed a significant reduction from prescreening to the post-screening stress which it is result from gaining confirmation of a normal test.

Considering on factor of marital status, separated/ divorced is a risk factor to antenatal depression and this may reflect lower marital satisfaction of the couples. Corresponding to several studies, they found that lower level of marital satisfaction is related to the prevalence of depression.[23, 24]

Interestingly, having cramp during 3rd trimester is significantly negative associated with depression. Based upon the fact that cramp is generally occurred in patients with hypocalcemia, thus it is possible that these pregnant women with depression may have higher levels of calcium which corresponding to a case reported in 1996 that hypercalcemia is associated with depression.[25] However, further research study may be needed for more information.

In addition, the analysis using logistic regression analysis, showed that there were two factors predicting antenatal anxiety in pregnant women: lower DAS score and higher concern about baby care with statistical significance. The lower DAS score revealed lower marital satisfaction and this is a factor used for predicting anxiety following several studies in the past. For example, Bayrampour H, *et al.* [23] studied risk

factors of pregnant women with anxiety and depression at all ages in which 24.0% of pregnant women at age of 35 and over. Result of this study showed that partner tension was a risk factor to prolonged anxiety and depression in pregnant women with statistical significance. Additionally, Nasreen HE, *et al.* [24] focused on prevalence and associated factors of anxiety and depression in Bangladesh in which the data were collected from 720 third-trimester pregnant women at all ages. The result showed 29.0% of these pregnant women had anxiety, and associated factors were about physical violence by spouse and poor partner relationship. Moreover, Kang T, *et al.* [19] studied on Prevalence and risk factors of maternal anxiety in late pregnancy (gestational age at least 38 weeks) and age at under 30 years old in China. The result showed 20.6% of anxiety in which the related factors are from disharmony in family relationship and low marital satisfaction.

Regarding higher concern on baby care, it is found that this anxiety is a predicting factor of antenatal anxiety in advanced maternal age pregnant women. This is corresponding to the study of Deklava L, *et al.* [18] which focusing on prevalence and cause of anxiety of pregnant women. The result showed that pregnant women with fetal health anxiety may face the complications of pregnancy, fetal health and baby care problems.

Our study had some limitations which conducted in specialized population of pregnant women age ≥ 35 who were in their third trimester (gestational age ≥ 28 weeks) and over those who were attending antenatal care in the large tertiary hospital. The findings of this study cannot be generalized to other pregnant women in general age range or in other settings.

Conclusion

The prevalence of anxiety in advanced maternal age pregnant women in this study is somewhat higher than in the general population, while depression is lower than that of the general population. Anxiety was significantly associated with higher concern about baby care, higher anxiety trait, lower social support and lower marital satisfaction, whereas depression was also significantly associated with higher concern on pregnancy and delivery related issues, trait anxiety, lack of social support, lower marital satisfaction, and antenatal anxiety. Moreover, they also significantly have separated/divorced marital status, having a history of amniocentesis, and having no cramps during 3rd trimester when compare to those without depression.

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Conflict of interest

The authors, hereby, declare no conflict of interest.

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