Original Article

Comparison of Anxiety and Depression between High Risk and Low Risk Pregnancy on Antenatal Care Program in a Tertiary Hospital in Thailand

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Background: Anxiety and depression in pregnancy are important in public health care and could impact obstetrics outcomes especially in high risk pregnancies. Data about anxiety and depression is limited.

Objective: The aim of this investigation was to compare anxiety and depression between high and low risk pregnancies in Thammasat University Hospital, Thailand.

Materials and Methods: This study was conducted in the Maternal Fetal Medicine and Antenatal Care Clinics at Thammasat University Hospital between July 2019 and August 2019. The study was conducted as a cross sectional study. Two hundred Thai pregnant women were recruited. The pregnant women were categorized into high and low risk criteria in equal numbers and were divided into a study and control group. The Thai Hospital Anxiety and Depression Scale (HADS) was used to evaluate for anxiety and depression in all participants. Binary logistic regression analysis was then conducted.

Results: Total of 200 women who met criteria for the study were recruited. They were divided into high and low risk groups. There were significant differences in gestational age, education, parity and prenatal invasive diagnostic procedures. Participants in the study group had more anxiety and depression score than the control group. Among high risk participants, prenatal invasive procedures (PIP), and placenta previa (PP) were risk factor for anxiety and depression, respectively. Twin pregnancy (Twins) was risk factor for both anxiety and depression.

Conclusion: High risk pregnancies were associated with more anxiety and depression than low risk pregnancies. Twins was significant risk factor of both anxiety and depression while PIP and PP were risk factor for anxiety and depression, respectively.

Keywords: High risk pregnancy, Anxiety, Depression

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The maternal anxiety and depression in pregnancy are essential problems of public health care[1,2]. Prenatal anxiety and depression are associated with postpartum depression[3,4]. Anxiety and depression are more common in western countries, possibly due to differences in lifestyles, attitude, religion, and culture[5]. Data from Asian countries were more limited.

During pregnancy, patients go through major physiological, anatomical, and most importantly, psychological changes. In fact, pregnancies often serve as a major source of stress that can induce psychiatric problems[6]. The initiation of psychiatric disorder often results in embarking another disorder, recurrence of an older one or even a worsening of the current disorder. If the disorder is left untreated, the mother could face gynecological difficulties such as premature birth, depression in pregnancy, intrauterine growth restriction (IUGR) and even suicide attempts in severe cases[7].

Depression and anxiety during pregnancy are regularly undiagnosed and therefore left untreated. In Thailand, 8% of pregnant women are facing depression and statistically higher to around 5 to 15%, compared to neighboring countries[8,9]. The result is associated with data from the American College of Obstetricians and Gynecologists (ACOG) that reported for 14 to 23% that variates with ethnicity and gestational age at diagnosis[10]. Gavin's study showed that depression in pregnancy occurred at 11% in

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first trimester following by 8.5% in the second and third trimester[11]. Depressive disorder, however, occurred in around 25% of women before and during pregnancy and around 10 to 15% had latent severe depression[12].

The assessment of depression and anxiety of pregnancy is rather challenging due to the fact that natural changes in pregnancies, for instance loss of appetite, decrease in libido and sleeping difficulty are similar to symptoms of depressive disorders. The distinguishing differences in depression symptoms are the feeling of worthless, hopeless and helpless.

Depression and anxiety during pregnancy were worsened by stress induced by stigmatic thoughts such as fetal well-being, divorce, financial status and separation from partners[13]. The severity of the depression is increased in cases at risk of birth deformities and obstetric complications such as Down's syndrome, IUGR, chorioamnionitis, and premature labor pain. Due to the lack of data regarding incidence of anxiety and depression in Thai pregnancies, the primary object was comparison of anxiety and depression between high risk and low risk in Thai pregnancy on Antenatal care program in Thammasat University Hospital.

Materials and Methods

This study was conducted in the Maternal Fetal Medicine (MFM) clinic and the Antenatal Care (ANC) clinic of Thammasat University Hospital (TUH) during July 2019 to August 2019. The study was designed as a cross sectional study. Two hundred Thai pregnant women who attended at ANC clinic during the period of study were recruited. The cases were divided into two groups; the high (study group) and low-risk (control group) pregnancy groups. Each group consisted of 100 pregnant women. Thai Hospital Anxiety and Depression Scale (HADS) was used to evaluate for anxiety and depression in all participants[14]. Thai HADS questionnaires comprised of 14 questions, which divided into 2 sessions; 7 anxiety-related and 7 depression-related questions. Each question was scored from 0 to 3 points. Maximum HADS values in anxiety disorder and depression disorder sections were 21 points each. The cut-off point score was 8. Any cases presenting HADS scores higher than 8 would be classified as displaying significant anxiety and depression, respectively. Each patient was provided 30 minutes to complete the questionnaire. The process took place while the patients were waiting the antenatal care clinic. After finishing interview, the cases who had HADS scores more than 8 were counselled and appointed to psychological clinic.

The research protocol was approved by the Human Research Ethics Committee of Thammasat University (MTU-EC-OB-2-040/62). All participants received their diagnosis and plan of treatment in the same manner.

High-risk pregnancy criteria included teenage pregnancy (ages under 20 years old), advanced maternal age (age of 35 years old or higher), maternal medical diseases, intrauterine fetal anomalies and obstetric complications. Maternal medical diseases include chronic hypertension, diabetes mellitus, human immunodeficiency virus (HIV), severe anemia, major thalassemia, and other conditions. Intrauterine fetal complications included fetal anomalies, hydrops fetalis, habitual abortion, Down's syndrome and others not specified. Obstetric complications included twin pregnancy, preeclampsia, pregnancy induced hypertension (PIH), gestational diabetes mellitus (GDM) and others. The study group consisted of the pregnant women who met the high-risk pregnancy criteria as mentioned above. Pregnant women, aged between 20 and 34 years old, without high risk pregnancy criteria were enrolled in the control group.

The demographic characteristic data collection included age, occupation, income, education, marital status, underlying diseases, history of surgery, obstetrical risk in the gestation, previous medical history and fetal risk.

Sample size was calculated based on Loo's study[15]. The standard deviation (SD), alpha and beta errors between the study and control groups were set at 0.5, 0.05 and 0.2, respectively. The needed sample size was set at 100 cases per arm.

Statistical analysis was performed using SPSS (Statistical Package for the Social Science for window), version 17 (SPSS Inc., Chicago, USA). Continuous variables, including HADS quantitative score, were expressed as means and standard deviations.

Category variables were analyzed either by Chi-square or Fisher's exact test with appropriate condition (depending on the satisfied condition). Linear regression analysis was used to evaluate anxiety condition and other demographic data.

Results

Table 1 represented the demographic characteristics of both high and low risk pregnancy groups. In the current study, the high and low risk pregnancy groups had aged between 20 to 45 years old. The mean ages were 33.5$\pm$5.5 years and 28.83$\pm$4.1 years old in high and low risk pregnancy groups, respectively with statistical difference. Also, the mean initial gestational ages at the time of study enrollment was 165.3$\pm$62.6 days and 182.5$\pm$63.7 days in the high and low risk pregnancy groups, respectively. Sixty three percent of the high risk pregnancy group had Bachelor degrees or higher education compared to 47% in low risk group at *p*-value less than 0.001. The majority of women were employees and business owners at 34% and 31% in the high risk group, and 31% and 31% in the low risk group, respectively with no statistical difference. Nulliparity was found in study and control group at percentage of twenty and fifty, respectively with statistical difference. Participants in the study group underwent significantly more prenatal invasive diagnosis procedures than the control group (37%/13%).

Figure 1 showed quantitative HADS between the study and the control groups. 1 Participants in the study group had significantly higher anxiety and depression scores than the control group.

When HADS scores of greater than 8 points was chosen for cutoff point, 39 and 12 percent in study and

Table 1. Demographic characters of study and control groups (n = 100 per group)

	Study	Control	*p*-value
Age (years)*	33.54±5.57	28.83±4.07	<0.001
GA (days)*	165.32±62.61	182.46±63.70	0.45
Body weight (kg)*	66.75±14.26	59.87±12.62	0.26
Height (cm)*	159.08±6.59	158.49±5.63	0.85
BMI (kg/m^2)*	26.32±5.19	23.79±4.70	0.19
Buddhist$^+$	98	97	0.605
Income (baht)$^+$			0.16
<5,000	3	5	
5,000 to 10,000	18	8	
10,001 to 20,000	40	48	
>20,000	39	39	
Occupation$^+$			0.33
Government officer	15	19	
Employee	34	31	
Own business	31	31	
Housewife	14	8	
Others	6	11	
Education ≥ bachelor level$^+$	63	47	<0.001
Multiparity$^+$	80	50	<0.001
Prenatal invasive procedure$^+$	37	13	<0.001

* mean ± standard deviation (SD), $^+$ Percentile (%), Study: high risk pregnancy group, Control: low risk pregnancy group
GA = gestational age, BMI = body mass index

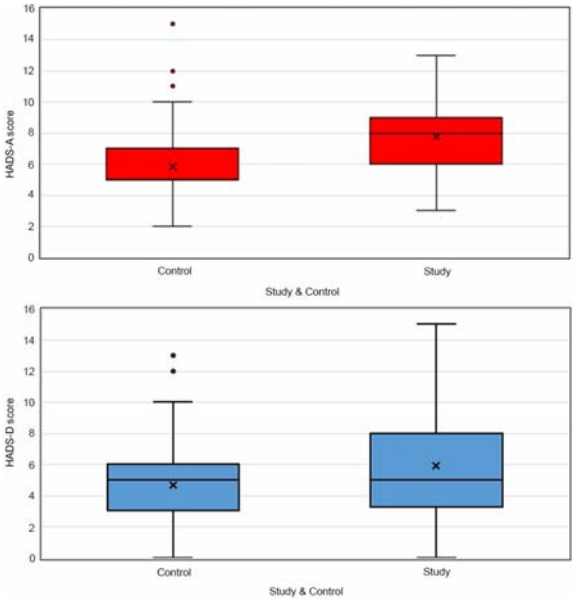

Figure 1. Showed quantitative HADS between the study and the control groups. Participants in the study group had significantly higher anxiety and depression scores than the control group.

control groups were classified as having an anxiety state. In the same manner, 25 and 7 percent of the study and control groups had HADS-D scores higher than 8 which was identified as a depression state as represented in Table 3.

Table 2. Crude and adjusted odds ratio for the prevalence of depressive and anxiety symptoms associated with high risk pregnancy

	Odds ratios (95% CI)	
	Crude	Adjusted*
HADS-A >8	4.69 (2.27 to 9.68)	2.98 (1.17 to 7.60)
HADS-D >8	4.43 (1.82 to 10.80)	3.58 (1.16 to 11.04)

* Adjusted for age, education years
HADS = Hospital anxiety and depression scale, A = anxiety, D = depression

Table 3 represented the factors associated with anxiety and depression among high risk pregnancies by binary logistic regression analysis. Crude and adjusted odd ratio showed significant factors, namely prenatal invasive procedures (PIP), twin pregnancies (twins) and placenta previa (PP) with statistically significance. PIP and PP were risk factor for anxiety and depression, respectively. Twins was risk factor for both anxiety and depression.

Discussion

Maternal pregnancy anxiety and depression were issues of concern in obstetrics cases. In Thailand, no recent literature has dealt with anxiety or depression in pregnant women[14]. As child bearing age has progressively increased in industrialized countries, women in Thailand have

Table 3. Binary logistic regression analysis of anxiety and depression status in high risk pregnancy and their contribution factors

Factors	HADS-A		HADS-D	
	Odds ratio	95% CI	Odds ratio	95% CI
Age	1.06	0.94 to 1.18	1.12	0.98 to 1.28
Education	0.63	0.24 to 1.65	1.23	0.42 to 3.66
GA	1.00	0.99 to 1.01	1.00	0.99 to 1.01
PIP	5.68	2.08 to 15.51*	1.72	0.59 to 5.01
APH	1.41	0.24 to 8.35	0.89	0.90 to 8.74
Anomaly	1.31	0.14 to 12.48	2.05	0.15 to 27.58
Twins	4.46	1.24 to 15.98*	4.32	1.25 to 15.01*
Placenta previa	1.89	0.24 to 15.16	12.86	1.54 to 107.72*

* Significant different

HADS = Hospital Anxiety and Depression Scale, A = anxiety, D = depression, GA = gestational age, PIP = prenatal invasive procedure e.g. amniocentesis, cordocentesis, APH = adverse previous pregnancy history

commensurately delayed their pregnancy and childbearing.

TUH MFM clinic is a tertiary maternal center which receives many of complicated antenatal pregnancies from all provinces in central Thailand. Many pregnant women came to MFM clinic with an advanced age at the beginning of their pregnancies. As a result, 53 percent of our high-risk group were 35 years of age or elder. Pregnant mothers aged 35 or advanced maternal age were all counselled to undergo amniocentesis (AC) or cordocentesis as indicated.

The current investigation (Table 1) found that the high-risk group displayed significantly higher parity, age and greater education (mean 33.54 years and typically with a bachelor's degree or higher) compared to the low risk group. The study group in the current study showed more significant anxiety compared to the control group. However, both groups showed no statistically significant outcome in depression measurements. Abrar's meta-analysis work in 2019 revealed higher level of anxiety symptoms among pregnant women experiencing a medically complicated pregnancy than others[16]. Our findings supported this global report.

Maternal mental health was an important issue supporting healthy pregnancy and safe delivery of the newborn. Older pregnant mothers might have infertility issues or previous miscarriage before their current pregnancy. Today, the internet acts as a giant information source. A patient who was issued an invasive procedure may now could look up details on the internet. One can search "Amniocentesis" in Thai and get overwhelmed by the scientific detail of the protocol, the risks and the financial approval. More educated patients could recognize more of this information and display increased anxiety as a result. Lower educated people who could not reach the scientific meaning of the possible outcomes, could not compared the risk involved.

Low risk pregnant mothers who received invasive procedures showed no significant in anxiety difference to the control group. Average age in the low risk group was 28.8 years compared to 33.5 years in the high risk group. It looked like the older pregnant women were overall anxious about their pregnancies relatively late in their lives.

A higher percentage of the high-risk group were multiparous compared to the low risk group (80 and 50 percent, respectively). Multiparous mothers reported some previous complications, i.e., miscarriage, abnormal fetus and previous adverse outcomes. However, when the mean of multiparous mother age was calculated, in the high and low risk groups, mothers were aged 33.7 and 29.5 years, respectively. From this data, multiparous mothers in the high risk group were significantly older than those in the low risk group. This follows, as age is a risk factor and multiparous mothers were more likely to be older (and thus more likely to be in the high risk category.

The present study revealed that 37 percent of high-risk mothers were subjected to invasive procedures, i.e., AC and cordocentesis, compared to 13 percent in low risk mothers. As the age range of high-risk mothers was between 21 to 45 years of age, a significant portion were older than 35 years and required the procedures mentioned above as listed in the guidelines. The range of low-risk mothers' age was between 20 to 34 years old. Thus, a smaller percentage of low risk mothers were subjected to invasive procedure but with much less number statistically.

This study showed higher anxiety and depression scores as shown in high risk mother data when compared to respective low risk group at $p<0.001$. However, median of both groups were lower than the cutoff value of 8 as indicated to be the anxiety and depression disorder cut off value per 21[14]. The range of scores in HADS-A from this study group was between 1 to 26. Thirty nine percent of that reported HADS-A score higher than 8 compared to 12% of the control group at $p = 0.001$. Similarly, 25% of the study group had HADS-D scores higher than 8 which was the depression cut off value.

This is a much higher percentage than the high HADS-D score (>8) group of the study group at $p<0.001$. Van de Loo found HADS scores at 5.7 and 17.4 percent depression and anxiety on HADS-D and HADS-A

questionnaires in general pregnant mothers[15]. Our high-risk mothers had higher percentage of anxiety than van de Loo's normal population. This result thus reported higher percentages of anxious and depressed pregnant mothers compared to the normal population in previous study.

Binary logistic regression analysis represented the factors associated with anxiety and depression among high risk pregnancy. Crude and adjusted odd ratio showed significant factors, namely PIP, twins and PP with statistically significance. PIP and PP were risk factor for anxiety and depression, respectively. Twins was risk factor for both anxiety and depression. Prenatal invasive procedures i.e. amniocentesis and cordocentesis were counselled in most high risk pregnant mothers. These procedures are known to possibly cause harm to the fetus in utero. But not all pregnant patients had to go through with it. More education to high risk mothers can alleviate their anxieties if they know the benefit of knowing that their fetus has no anomaly. The knowledge reduced anxiety more than abstaining from the procedure.

Twin pregnancy was known produce obstetrics and neonatal complications during the antenatal, perinatal and postpartum periods(6). Pregnant mothers with twins in our study were of younger age than other high risk mothers. Their anxieties and depressions were of normal concern throughout the pregnancy. Health care providers could help alleviate their psychological distress (anxiety and depression) by giving appropriate information and providing good fetal reports every time they came in for antenatal care. Frequent assurance often helps in relieving anxiety and depression.

Good medical advice from health care providers in high risk pregnant mothers could reduce the patient's psychological distress[13,17]. Van de Loo mentioned that pregnant women's anxiety was reduced with the higher gestational age[15]. As a result, the more information and concern the medical provider could spare on these high-risk pregnant mothers, the less psychological distress they would display. Good mental health in this high-risk pregnant mother group could reduce anxiety and depression down the road and result in happy and healthy new mothers and their offspring.

Conclusion

There was a significant difference in anxiety and depression between the high and low risk pregnancy groups. The significant factors among high risk factor was acquired prenatal invasive procedure and twin pregnancy creating anxiety, but not depression.

What is already known on this topic?

Prenatal anxiety and depression are essential problems of public health care and associated with postpartum depression. Depression and anxiety during pregnancy are regularly left undiagnosed and therefore untreated. The assessment of depression and anxiety of pregnancy is rather challenging. Depression and anxiety during pregnancy were worsened by stress induced by stigmatic thoughts such as fetal well-being, divorce, financial status and separation from partners

What this study adds?

High risk pregnancy women had higher anxiety and depression than low risk pregnancy women. The significant factors among high risk factor was acquired prenatal invasive procedure and twin pregnancy creating anxiety but not depression.

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Disclosure

This manuscript is not under consideration by another journal and the final manuscript has been seen and approved by all authors.

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Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Alder J, Fink N, Bitzer J, Hosli I, Holzgreve W. Depression and anxiety during pregnancy: a risk factor for obstetric, fetal and neonatal outcome? A critical review of the literature. J Matern Fetal Neonatal Med 2007; 20:189-209.
2. Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. Curr Opin Psychiatry 2012; 25: 141-8.
3. Graignic-Philippe R, Dayan J, Chokron S, Jacquet AY, Tordjman S. Effects of prenatal stress on fetal and child development: a critical literature review. Neurosci Biobehav Rev 2014; 43: 137-62.
4. Grigoriadis S, Graves L, Peer M, Mamisashvili L, Tomlinson G, Vigod SN, et al. Maternal anxiety during pregnancy and the association with adverse perinatal outcomes: systematic review and meta-analysis. J Clin Psychiatry 2018; 79: 17r12011.
5. Brunton RJ, Dryer R, Saliba A, Kohlhoff J. Pregnancy anxiety: a systematic review of current scales. J Affect Disord 2015; 176: 24-34.
6. Cunningham FG, Lenovo JK. Maternal physiology In: Cunningham FG, Lenovo JK, editors. Williams Obstetrics.25th ed. New York: McGraw Hill Education; 2018; 49-78.
7. Martini J, Petzoldt J, Einsle F, Beesdo-Baum K, Hofler M, Wittchen HU. Risk factors and course patterns of

anxiety and depressive disorders during pregnancy and after delivery: a prospective-longitudinal study. J Affect Disord 2015; 175: 385-95.
8. Fisher J, Cabral de Mello M, Patel V, Rahman A, Tran T, Holton S, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. Bull World Health Organ 2012; 90: 139-49G.
9. Phoosuwan N, Eriksson L, Lundberg PC. Antenatal depressive symptoms during late pregnancy among women in a north-eastern province of Thailand: prevalence and associated factors. Asian J Psychiatr 2018; 36: 102-7.
10. Committee on Obstetric Practice. The American college of obstetricians and gynecologists committee opinion no. 630. Screening for perinatal depression. Obstet Gynecol 2015; 125: 1268-71.
11. Gavin NI1, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence, Obstet Gynecol 2005; 106: 1071-83.
12. Pearlstein T. Depression during pregnancy. Best Pract Res Clin Obstet Gynaecol 2015; 29: 754-64.
13. Biaggi A, Conroy S, Pawlby S, Pariante CM. Identifying the women at risk of antenatal anxiety and depression: A systematic review. J Affect Disord 2016; 191: 62-77.
14. Nilchaikovit T, Lortrakul M, Phisansuthideth U. Development of Thai version of Hospital Anxiety and Depression Scale in cancer patients. J Psychiatr Assoc Thai 1996; 41: 18-30.
15. Van de Loo KFE, Vlenterie R, Nikkels SJ, Merkus PJFM, Roukema J, Verhaak CM, et al. Depression and anxiety during pregnancy: the influence of maternal characteristics. Birth 2018; 45: 478-89.
16. Abrar A, Fairbrother N, Smith AP, Skoll A, Albert AYK. Anxiety among women experiencing medically complicated pregnancy: a systematic review and meta-analysis. Birth 2020; 47: 13-20.
17. Chuenwattana P, Phaophan A, Mongkolchat N. Effect of supportive information on anxiety levels in pregnant women awaiting amniocentesis results: a randomized controlled trial. J Med Assoc Thai 2017; 100: 374-81.

การศึกษาเปรียบเทียบความวิตกกังวลและความซึมเศร้าของสตรีตั้งครรภ์ที่มีความเสี่ยงสูงกับสตรีตั้งครรภ์ที่มีความเสี่ยงต่ำที่เข้ารับการรักษาในโรงพยาบาลตติยภูมิในประเทศไทย

ฆนกาญจน์ หวังรังสิมากุล, ต้องตา นันทโกมล, กันต์กมล จัยสิน, จรรยา ภัทรอาชาชัย, กรณ์กาญจน์ ภมรประวัติธนะ, คมสันติ์ สุวรรณฤกษ์

ภูมิหลัง: ความวิตกกังวลและความซึมเศร้าในสตรีตั้งครรภ์เป็นปัญหาสาธารณสุขและมีผลกระทบต่อผลลัพธ์การตั้งครรภ์โดยเฉพาะอย่างยิ่งในสตรีตั้งครรภ์ความเสี่ยงสูง ข้อมูลเกี่ยวกับความวิตกกังวลและความซึมเศร้ามีจำกัด

วัตถุประสงค์: เพื่อเปรียบเทียบภาวะวิตกกังวลและความซึมเศร้าระหว่างสตรีตั้งครรภ์ความเสี่ยงสูงและต่ำในโรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ

วัสดุและวิธีการ: การศึกษาครั้งนี้กระทำ ณ คลินิกมารดาและทารกและคลินิกฝากครรภ์โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ เป็นการศึกษารูปแบบตัดขวางระหว่างเดือนกรกฎาคมถึงเดือนสิงหาคม พ.ศ. 2562 สตรีตั้งครรภ์ความเสี่ยงสูงและต่ำอย่างละเท่ากัน จำนวน 200 ราย ถูกรวบรวมเข้าการศึกษา ผู้เข้าร่วมศึกษาถูกแบ่งเป็น 2 กลุ่ม คือ กลุ่มศึกษาและกลุ่มควบคุมอย่างละเท่ากัน แบบทดสอบความวิตกกังวลและซึมเศร้าถูกใช้เป็นเครื่องมือในการประเมินผู้เข้าร่วมการศึกษา การวิเคราะห์สถิติใช้เป็นชนิดการวิเคราะห์การถดถอยโลจิสติกส์ทวิ

ผลการศึกษา: สตรีตั้งครรภ์จำนวน 200 คน ถูกรวบรวมเข้าการศึกษาแบ่งเป็นสตรีตั้งครรภ์ความเสี่ยงสูงและต่ำ สตรีทั้งสองกลุ่มมีความแตกต่างกันในแง่ของอายุครรภ์ ระดับการศึกษา จำนวนบุตร และการเข้ารับหัตถการในการวินิจฉัยทารกก่อนคลอด สตรีตั้งครรภ์ในกลุ่มศึกษามีความวิตกกังวลและความซึมเศร้ามากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติในกลุ่มสตรีตั้งครรภ์ความเสี่ยงสูง หัตถการในการวินิจฉัยทารกก่อนคลอดและรกเกาะต่ำมีผลกระทบต่อความวิตกกังวลและความซึมเศร้าตามลำดับ การตั้งครรภ์แฝดมีผลกระทบต่อทั้งต่อความวิตกกังวลและความซึมเศร้า

สรุป: สตรีตั้งครรภ์ความเสี่ยงสูงมีภาวะวิตกกังวลและความซึมเศร้ามากกว่าสตรีตั้งครรภ์ความเสี่ยงต่ำ การตั้งครรภ์แฝดมีผลกระทบทั้งความวิตกกังวลและความซึมเศร้า ขณะที่หัตถการในการวินิจฉัยทารกก่อนคลอดและรกเกาะต่ำมีผลกระทบต่อความวิตกกังวลและความซึมเศร้าตามลำดับ