

# The difference of depression level in pregnant women based on the acceptance of pregnancy during the COVID-19 pandemic: a study on pregnant women in Bontang, East Kalimantan

I Putu Satrya Wijaya<sup>1,2\*</sup>, Titin Andri Wihastuti<sup>3</sup>, I Wayan Arsana Wiyasa<sup>4</sup>,  
Muhammad Chair Effendi<sup>5</sup>

<sup>1</sup>Doctoral Program in Medical Science, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia;

<sup>2</sup>Department Obstetrics-Gynecology, Pupuk Kaltim Hospital, Bontang, East Kalimantan, Indonesia;

<sup>3</sup>Departement of Biomedical Nursing Science, Faculty of Health Science, Universitas Brawijaya, Malang, Indonesia;

<sup>4</sup>Division of Fertility, Endocrinology, and Reproduction, Obstetrics and Gynecology Laboratory, Saiful Anwar General Hospital, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia;

<sup>5</sup>Department of Pediatric Dentistry, School of Dentistry Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia;

\*Corresponding author:

I Putu Satrya Wijaya;  
Doctoral Program in Medical Science, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia;  
[satrya\\_wijaya@student.ub.ac.id](mailto:satrya_wijaya@student.ub.ac.id)

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## ABSTRACT

**Background:** Antenatal depression in pregnant women becomes less of a concern, leading to the worse condition of developing postpartum blues, ranging from moderate to severe degrees. In this study, antenatal depression was detected as a psychosocial impact on pregnant women, and their perspective on accepting pregnancy may alter due to the COVID-19 pandemic.

**Methods:** This study used a cross-sectional study design. A total of 257 pregnant women were enrolled in this study with a purposive sampling technique. Inclusion criteria: healthy pregnant women (over 18 years) from trimester I until trimester III. Antenatal depression was measured using a PHQ-9 scale questionnaire. Data were analyzed using SPSS version 20.0 for Windows.

**Results:** The prevalence of antenatal depression of 257 pregnant women was: 80.95% had mild depression, 14.12% had moderate depression, 4.69% had moderate or severe depression, and 0.79% had severe depression. The factor analysis results indicated that refusal of pregnancy had the highest correlation coefficient (coef. 0.586;  $p=0.000$ ) on the incidence of antenatal depression compared to the history of abortion, parity, financial deficits, and conflicts with partners. During the assessment, pregnant women who reported refusal of their pregnancy felt that their pregnancy was a burden because it occurred at a challenging time.

**Conclusion:** Changes in psychosocial status through determinants of antenatal depression in pregnant women in East Kalimantan during the COVID-19 pandemic are expected to be the initiation of policy and antenatal depression screening formulation for each pregnant woman and mental health improvement during pregnancy.

**Keywords:** Antenatal Depression, Pregnant Women, PHQ-9 score.

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## INTRODUCTION

During pregnancy, women are expected to be able to adapt physically and psychologically along with the growth of their fetus.<sup>1,2</sup> Pregnancy has been stigmatized as a wonderful and pleasant journey of a woman's life. However, the woman's inability to adapt to her pregnancy mentally and physically will trap her in thinking that their pregnancy is a burden instead of a pleasant experience.<sup>3</sup> A pregnant woman may have difficulty accepting the pregnancy because of some unpleasant conditions that can alter her perception of her pregnancy.

Mothers or families are generally unaware of unpleasant feelings because, unfortunately, Indonesian people pay less attention and open up to psychological needs during pregnancy.<sup>4,5</sup> No specific boundaries define unpleasant feelings in terms of terminology during pregnancy. Still, mood disorders, lack of energy, irritability, poor physical and cognitive function, forgetfulness, tiredness, and insomnia during pregnancy are indicators of antenatal depression.<sup>6-9</sup>

The cause of depression during the perinatal period is uncertain, but dramatic hormonal changes during

pregnancy and childbirth can lead to more sensitive feelings and unstable emotional conditions.<sup>10-12</sup> Several cultural aspects are suggested to be associated with antenatal depression.<sup>13-15</sup> Perinatal mental health disorders can affect pregnant women of all ages, ethnicities, and socioeconomic backgrounds. They are hidden cases that are often realized and treated too late, so the improvement and treatment process do not go well. In addition, the stigma that arises from self and social towards psychiatric treatment sometimes makes patients disobedient to treatment and embarrassed to ask for help.<sup>5</sup>

WHO reported about 10% of pregnant women experienced mental disorders, especially depression.<sup>16</sup> In America, according to the latest data released in May 2020, the number of cases of perinatal depression is fairly high. One in every 7 to 10 pregnant women has a depressive tendency. A previous study revealed that it is estimated that between 10% and 20% of women across the country have a perinatal mental illness. Of the women with perinatal mental illness, 31% had a previous mental health problem.<sup>17</sup> Unfortunately, there is no valid data on the depressive tendencies experienced by pregnant women in the previous study.<sup>18</sup> Despite the lack of valid information, the number of cases is allegedly quite high. Search results on the website of the Indonesian Ministry of Health with the keyword 'postpartum depression' show the press releases that contain data from Riskesdas 2007 regarding the national average number of mild emotional and mental disorders in general. This indicates that medical screening and public awareness about mental disorders must improve greatly. The reality of refusal might initiate the mental disorder tendency that they are pregnant. The mental health bad stigma that Indonesian people believe prevents the person with mental tendencies from ignoring the red flags. Labeling, exclusion, and stereotypes toward people with mental health disorders make the sufferer choose to remain silent or avoid consultation. As a result, based on the previous studies, 12 million people aged over 15 years experienced depression, and 19 million people over 15 years experienced mental-emotional disorders.<sup>4,5,18</sup>

Since March 2020, the world has experienced a non-natural disaster, the COVID-19 pandemic. The global pandemic greatly impacted the nation's sectors, including health, economy, social, etc. It has great potential for the emergence of mental health problems, including in pregnant women.<sup>5</sup> The major change of daily activities or New Normal period is sometimes unpleasant since people have to deal with the major transmission, boredom, and stress due to independent isolation or working/schooling from home, economic problems due to the number of layoffs, choosing a safe place of delivery to

be a great potential for emergence mental disorders in pregnant women.<sup>19,20</sup> Most people do not know where to go for help because the psychological conditions they feel, coupled with limited access due to regional restrictions, have caused many mental health problems due to the COVID-19 pandemic that has not been handled properly. Therefore, it is necessary to analyze antenatal depression to break down the groups at risk of the impact of the pandemic, especially pregnant women.

## METHODS

This study used an analytical observational design with a cross-sectional study approach. Participants in this study were pregnant women who came to the Obstetrics and Gynecology Polyclinic at the Pupuk Kaltim Bontang Hospital, Indonesia. The recruitment of 257 pregnant women (trimester I until trimester III) who were included in the antenatal phase was performed within 3 months. The participant must have had the criteria of not being younger than 18 years old. At this age, women are considered mature enough to make decisions independently of involvement in this study. The participant should have a normal pregnancy without complications (Gemelli). Regarding the topic of this study, pregnant women must manifest mental disorders or have other pregnancy complications such as antenatal bleeding, cardiovascular disease, and chronic diseases such as diabetes mellitus were excluded.

### Data collection and procedure

This research was conducted at the obstetrics clinic at Pupuk Kaltim Hospital, Bontang, Indonesia. Ethical approval was obtained from the ethics committee of Mulawarman University regarding the Helinsky II procedure rule no. 30/KEPK-FK/IV/2021. Pregnant women who came were approached and explained by trained midwives who understood this research assignment (accidental sampling technique). All participants were asked to complete an informed consent form before data collection. Three hundred fifteen pregnant women were approached, and 290 pregnant women enrolled as

participants and got a questionnaire. A total of 33 pregnant women did not complete the questionnaire, so only 257 data from pregnant women were analyzed.

### Socio-demographic and clinical measures

The socio-demographic characteristics studied in this study included age, level of employment, education, tendency to refuse pregnancy, conflicts with partners, and current financial concerns. The obstetric factors that are the risk of antenatal depression, such as gestational age, history of abortion, and parity, were also studied in this study.

### Antenatal depression measurement

Antenatal depression was measured by a PHQ-9 score of 9 items referring to previous studies.<sup>21,22</sup> Responses to each question were assessed using a Likert-style (3-point) ranging from 0 (never had any complaints) to 3 (complaints are widespread among pregnant women). The assessment results of all items are then summed into a total score, then compared with the standard PHQ-9 score. Theoretically, the standard PHQ-9 score for the depression measuring scale has a value range between 0 to 27, which is then categorized into 4, namely: (i) 5-9 as a mild depressive case, (ii) 10-14 as a moderate depressive case, (iii) 15-19 as moderate-severe depression and 20 as severe depressive.<sup>23-26</sup> All of these symptoms were assessed based on complaints felt at least in the last 2 weeks.<sup>27</sup>

### Data analysis

Statistical analysis results were presented as mean value and standard deviation, while qualitative data were presented in frequency distribution and percentages tables. Analysis of factors associated with antenatal depression and pregnancy refusal was tested by univariate analysis (chi-square or Fisher's exact test, as appropriate) and multivariate analysis (logistic regression). The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 software. P-values less than 0.05 were considered statistical significance values in this study.

## RESULTS

### Participants' maternal characteristics

Table 1 shows the maternal and obstetric characteristics of each participant. More than half (64.37%) of the participants were aged 21 years to 30 years. Fifty-nine percent of pregnant women are in their third-trimester pregnancy. Most participants have a high school education (47.24%) and a bachelor's degree (35.43%); more than half of them are housewives (70.64%). Fifty-seven percent of pregnant women were in the multigravida group, 81.32% of mothers accepted their pregnancy, and 80% reported having no history of abortion. Around 75.49% of pregnant women stated they were not experiencing conflict with their current partner.

### Antenatal depression

Generally, women in Indonesia are less able to share their feelings or acceptance of their pregnancy with their partner and family. However, no data provides valid evidence of this. Table 1 confirms that 80.95 % of the pregnant women involved in this study experienced mild depression, 14.12% moderate depression, 4.69% moderate-severe depression, and 0.79% experienced severe depression.

### Factors associated with antenatal depression

One of the factors associated with antenatal depression is unplanned or unwanted pregnancy.<sup>8</sup> Table 2 shows that unwanted pregnancy has the highest influence on pregnant women compared to other factors (Coefficient=0.586;  $p=0.000$ ). Refusal of pregnancy is a condition that is not easily recognized during pregnancy by the mother. The investigation continued with factor analysis to determine the factors influencing the refusal of pregnancy.

### Factors influencing refusal of pregnancy during the COVID-19 pandemic

Table 3 shows that current pregnancy refusal is related to a history of abortion, financial deficit, conflict with a partner, and parity. Women who declared they did not want the pregnancy, mostly those with no history of abortion. The more pregnant women have a history of abortion, the

**Table 1. Socio-demographic data and obstetrical characteristics of the study subject.**

Characteristics	Frequency	Percentage (%)
Age		
≤ 20 years old	5	1.90
21-30 years old	168	65.40
31-40 years old	81	31.50
> 40 years old	3	1.20
Gestational Age		
Trimester I	47	18.30
Trimester II	59	23.00
Trimester III	151	58.80
Education		
Primary Education	7	2.70
Junior Secondary Education	8	3.10
Senior Secondary Education	122	47.70
Associate Degree	28	10.30
Bachelor Degree	92	35.50
Master Degree	1	0.40
Occupation		
Housewife	178	69.30
Civil servants	51	19.80
Private employee	28	10.80
Abortion History		
Yes	33	12.80
No	224	87.20
Parity		
Primigravida	90	35.02
Multigravida	147	57.20
Grandemultigravida	20	7.78
Attitude (thoughts) toward pregnancy		
Wanted	209	81.32
Unwanted	48	19.68
Economic Problem		
Yes	108	42.02
No	149	57.98
Partner relationship		
None	194	75.49
Yes	63	24.51
PHQ-9		
Mild Depression	207	81.18
Moderate	36	14.12
Moderate-Severe	12	4.69
Severe	2	0.78

PHQ: Patient Health Questionnaire

refusal to pregnancy decreases (coef. -0.417;  $p=0.000$ ). Refusal of confirmed pregnancy was higher in pregnant women with higher parity (coef. 0.230;  $p=0.000$ ). The existence of conflict with a partner also increases or is directly proportional to the refusal of pregnancy with a coef value. 0.436 ( $p=0.000$ ). The financial crisis faced by families during the COVID-19 pandemic mediated an increase in refusal of pregnancy (coef. 0.272;  $p=0.000$ ).

### Perceptions that shape the attitude of refusal of pregnancy

This study revealed that pregnancy refusal was due to the mother's perception that the pregnancy happened at an inappropriate time ( $p=0.000$ ) and the perception that pregnancy was a burden ( $p=0.000$ ). This suggests that some women may express the extraordinary feeling of being pregnant and tend to enjoy it immensely. Still, some women will behave otherwise and perceive the period of pregnancy as something unpleasant.

**Table 2. Comparison of the incidence of antenatal depression (PHQ-9) based on the distribution of socio-demographic data and obstetric factors of pregnant women.**

Indicators	PHQ-9 scale				P	Linear regression
	Mild depression	Moderate depression	Moderate-severe depression	Severe depression		
Age (years) (mean±SD)	28.9±4.7	27.6±3.2	27.9±3.7	28±5.7	0.037*	(-0.107) 0.000*
Gestational age, n (%)						
Trimester I	28 (10.90)	8 (3.10)	4 (1.60)	1 (0.40)	0.297	
Trimester II	45 (17.50)	9 (3.50)	-	-		
Trimester III	139 (54.10)	15 (5.80)	5 (1.90)	3 (1.20)		
Education, n (%)						
Primary	3 (1.20)	2 (0.80)	1 (0.40)	-	0.598	
Junior Secondary	6 (2.30)	2 (0.80)	-	-		
Senior Secondary	95 (37.00)	19 (7.40)	7 (2.70)	2 (0.80)		
Associate Degree	24 (9.30)	4 (1.60)	-	-		
Bachelor Degree	78 (30.40)	9 (3.50)	2 (0.80)	-		
Master Degree	3 (1.20)	-	-	-		
Occupation, n (%)						(0.481)
Housewife	140 (54.40)	28 (10.90)	7 (2.70)	3 (1.20)	0.000*	0.001*
Civil servants	33 (12.80)	7 (2.70)	8 (3.10)	3 (1.20)		
Privat Employee	25 (9.70)	1 (0.40)	1 (0.40)	1 (1.20)		
Abortion history, n (%)						(-0.109)
Yes	28 (10.90)	4 (1.60)	1 (0.40)	0	0.782	0.000*
No	102 (70.80)	27(10.50)	10 (3.90)	5 (1.90)		
Parity, n (%)						
Primigravida	75 (29.20)	11 (4.30)	3 (1.20)	-	0.238	
Multigravida	120 (46.70)	22 (8.60)	5 (8.60)	1 (0.40)		
Grandemulti-gravida	14 (5.40)	3 (5.40)	2 (5.40)	1 (0.40)		
Pregnancy refusal, n (%)						
Yes	29 (11.30)	12 (4.70)	5 (1.90)	2 (0.80)	0.000*	(0.586)
No	178 (69.30)	24 (9.30)	5 (1.90)	2 (0.80)		0.000
Economic problem, n (%)						
Yes	76 (29.60)	24 (9.30)	9 (2.30)	2 (0.80)	0.000*	(-0.584)
No	136 (52.90)	12 (4.70)	1 (0.40)	-		0.000*
Conflict with partner, n (%)						
No	171 (66.50)	19 (7.40)	1 (0.40)	3 (1.20)	0.000*	(0.173)
Yes	36 (14.00)	18 (7.00)	8 (3.10)	1 (0.40)		0.000*

\*Statistically significant if p-value less than 0.05

## DISCUSSION

Unfortunately, pregnant women who experience severe depression have never been treated professionally, and their families do not even realize the condition. Moderate to severe antenatal depression was also experienced by mothers with higher education, although it was not significantly correlated. This finding supports previous studies which revealed that education was not a valid indicator of antenatal depression. However, several studies indicated that the group of mothers with high education tended to experience depression.<sup>28-32</sup> Antenatal depression can be measured in each pregnant woman. Still, its tendency to develop from a moderate

**Table 3. Socio-demographic and obstetric factors that influence pregnancy refusal during the COVID-19 pandemic.**

Indicator	Pregnancy Acceptance		P	Linear Regression
	Accepted	Rejected		
Abortion history, n (%)				
Yes	28 (10.90)	7 (2.70)	0.023*	(-0.417)
No	155 (60.30)	67 (26.10)		0.000*
Parity, n (%)				
Primigravida	83 (32.30)	6 (2.30)	0.004*	(0.230)
Multigravida	113 (44.70)	35 (13.60)		0.000*
Grandemulti	12 (4.70)	8 (1.60)		
Economic problem, n (%)				
Yes	75 (29.20)	33 (12.80)	0.000*	(0.272)
No	134 (52.10)	15 (5.80)		0.000*
Conflict with partner, n (%)				
No	172 (66.90)	22 (8.60)	0.000*	(0.436)
Yes	37 (14.40)	26 (10.10)		0.000*

\*Statistically significant if p-value less than 0.05

to severe condition is likely to happen during the first trimester of pregnancy and increase in the third trimester. The increase in depressive episodes in the first and third trimesters is mostly associated with adaptation to the new status that the participants were bearing a child during that time, which can increase the anxiety about the baby, especially in this challenging time.<sup>33-35</sup> Moderate to severe antenatal depression was more identified in pregnant women who did not work. 19.68% of pregnant women stated that they did not want to get pregnant at this time. Half of the participants (42.02%) of pregnant women experienced a financial deficit, and 24.41% of pregnant women stated that they were experiencing marital conflict during the interview. The results of this study are consistent with the results of previous studies regarding factors associated with antenatal depression.<sup>36,37</sup>

Antenatal depression scores in this study were associated with factors such as age, occupation, history of abortion, refusal (refusal) of pregnancy, conflict with a partner, and the financial crisis experienced by pregnant women during the COVID-19 pandemic. The results of this study indicate that pregnant women who experience an economic crisis in their family have confirmed moderate to severe depression, as presented in [Table 2](#). These results are not different from previous studies, which stated that the incidence of depression was strongly associated with financial adversity.<sup>38,39</sup> Among the obstetric factors assessed in our study, a history of miscarriage and refusal of pregnancy were associated with antenatal depression, a finding consistent with other studies on postpartum depression.<sup>8,39</sup> Marital status and quality of marital relationships have contributed to antenatal depression. It is stated that the incidence of depression is lower in single mothers compared to women who do not receive support from a partner.<sup>8,17</sup> Deficit of support from a partner or social environment is widely cited as a contributor to feelings of helplessness and hopelessness in pregnant women.<sup>11,40</sup> Consistent with the results of previous studies, the results of this study also prove that conflict with a partner is related to the level of depression in pregnant women, as shown in [Table 2](#).

In general, unwanted pregnancies can arise due to unplanned pregnancies at the wrong time. Pregnancy refusal is a reproductive health issue that has become a trend over the past 2 decades. WHO reported that of the 210 million pregnancies in 2005, 81 million were unplanned, and only about 41 million women were chosen to keep the baby until childbirth.<sup>41-43</sup> Mothers with unwanted pregnancies tend to be in a participant group at risk of experiencing disharmony issues with their families, with a high tendency toward abortion. Moreover, if they keep the pregnancy, the baby will likely bear underweight, and the lack of maternal connection makes them neglect prenatal care obligations or even the baby.<sup>44,45</sup> It is important to recognize the mother's condition based on physical needs and psychological needs that do not appear to be an equally important part to pay attention to by families and health workers.

The results of this study revealed that pregnancies during a challenging pandemic tend to raise the potential of antenatal depression that ranges from mild to severe conditions. It is suggested that pregnant women at polyclinic should apply the assessment of antenatal depression and seek professional help, if necessary. Pregnant women who have antenatal depression tendencies, especially mild to moderate levels, are highly advised to communicate with a psychotherapist about the implementation of cognitive-behavioral therapy or interpersonal therapy. Generally, this treatment can help pregnant women to overcome depression and repress its negative impacts.<sup>46,47</sup> This study focuses on antenatal depression during the COVID-19 pandemic. Therefore, further studies about antenatal depression during pre- and post-pandemic were highly required as a comparison.

## CONCLUSION

We revealed that every pregnant woman experienced depression from a mild to very severe range based on the PHQ-9 scale. Depression during pregnancy is associated with a history of abortion, refusal of the current pregnancy, financial difficulties, and conflicts with partners. Refusal of pregnancy at this time is highly

influenced by the perception of pregnancy that occurred during the challenging era and the inappropriate times that lead to the feeling that pregnancy is a burden. Based on this, it can be concluded that not all pregnancies are indicators of a woman's happiness, and social factors are important indicators that determine the quality of a happy pregnancy.

## CONFLICT OF INTEREST

We declare that there is no conflict of interest regarding the publication of this paper.

## ETHICAL CONSIDERATION

Human studies were approved by the Health Research Ethics Committee, Medical Faculty of Mulawarman University (approval number: 30/KEP-FK/IV/2021).

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## AUTHOR CONTRIBUTION

All authors are responsible for the study's conception and design, data analysis and interpretation, article drafting, critical revision of the article, final approval, and data collection. A Clinical Pathology consultant from Pupuk Kaltim Bontang, and the Physiological laboratory staff of the Medical Faculty, Universitas Brawijaya, supported this research.

## REFERENCES

- Blackmore ER, Moynihan JA, Rubinow DR, Pressman EK, Gilchrist M, O'Connor TG. Psychiatric symptoms and proinflammatory cytokines in pregnancy. *Psychosom Med.* 2011;73(8):656-63.
- Rayburn WF. Prenatal care. Foreword. *Obstet Gynecol Clin North Am.* 2008;35(3):xi-xii.
- Kementerian Kesehatan RI. Profil Kesehatan Indonesia tahun 2018. 2018.
- Kementerian Kesehatan RI. Rencana Aksi Kegiatan 2020 - 2024 Direktorat P2 Masalah Kesehatan Jiwa Dan Napza. 2020.
- Stuart-Parrigon K, Stuart S. Perinatal depression: an update and overview. *Curr Psychiatry Rep.* 2014;16(9):468.
- Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiatry.* 2004;26(4):289-295.

7. 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.
8. Amiel Castro RT, Pinard Anderman C, Glover V, O'Connor TG, Ehlert U, Kammerer M. Associated symptoms of depression: patterns of change during pregnancy. *Arch Womens Ment Health.* 2017;20(1):123-128.
9. Vianna P, Bauer ME, Dornfeld D, Chies JA. Distress conditions during pregnancy may lead to pre-eclampsia by increasing cortisol levels and altering lymphocyte sensitivity to glucocorticoids. *Med Hypotheses.* 2011;77(2):188-191.
10. Dadi AF, Miller ER, Woodman R, Bisetegn TA, Mwanri L. Antenatal depression and its potential causal mechanisms among pregnant mothers in Gondar town: application of structural equation model. *BMC Pregnancy Childbirth.* 2020;20(1):168.
11. O'Keane V, Marsh MS. Depression during pregnancy. *BMJ.* 2007;334(7601):1003-1005.
12. Izadirad H, Niknami S, Zareban I, Hidarnia A. Effects of Social Support and Self-Efficacy on Maternal Prenatal Cares Among the First-Time Pregnant Women, Iranshahr, Iran. *J Family Reprod Health.* 2017;11(2):67-73.
13. Roomuangwong C and Epperson CD. Perinatal depression in Asian women: prevalence, associated factors, and cultural aspects. *Asian Biomed.* 2011;5(2):179-193.
14. Underwood L, Waldie KE, D'Souza S, Peterson ER, Morton SM. A Longitudinal Study of Pre-pregnancy and Pregnancy Risk Factors Associated with Antenatal and Postnatal Symptoms of Depression: Evidence from Growing Up in New Zealand. *Matern Child Health J.* 2017;21(4):915-931.
15. Fisher J, Cabral de Mello M, Patel V, Rahman A, Tran T, Holton S, Holmes W. 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(2):139G-149G.
16. Baranov V, Bhalotra S, Biroli P, et al. Maternal Depression, Women's Empowerment, and Parental Investment: Evidence from a Randomized Controlled Trial. *American Economic Review.* 2020;110(3):824-59.
17. Kementerian Kesehatan RI. Laporan Riskesdas 2018. 2018.
18. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychol Health Med.* 2021;26(1):13-22.
19. Shorey SY, Ng ED, Chee CYI. Anxiety and depressive symptoms of women in the perinatal period during the COVID-19 pandemic: A systematic review and meta-analysis. *Scand J Public Health.* 2021;49(7):730-740.
20. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606-613.
21. Negeri ZF, Levis B, Sun Y, He C, Krishnan A, Wu Y, et al. Depression Screening Data (DEPRESSD) PHQ Group. Accuracy of the Patient Health Questionnaire-9 for screening to detect major depression: updated systematic review and individual participant data meta-analysis. *BMJ.* 2021;375:n2183.
22. Patrick S, Connick P. Psychometric properties of the PHQ-9 depression scale in people with multiple sclerosis: A systematic review. *PLoS One.* 2019;14(2):e0197943.
23. Zhao Y, Chan W, Lo BC. Comparing five depression measures in depressed Chinese patients using item response theory: an examination of item properties, measurement precision and score comparability. *Health Qual Life Outcomes.* 2017;15(1):60.
24. Woldetseny YK, Belachew T, Tesfaye M, Spielman K, Biesalski HK, Kantelhardt EJ, Scherbaum V. Validation of the Patient Health Questionnaire (PHQ-9) as a screening tool for depression in pregnant women: Afaan Oromo version. *PLoS One.* 2018;13(2):e0191782.
25. Levis B, Benedetti A, Thombs BD; DEPRESSion Screening Data (DEPRESSD) Collaboration. Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: individual participant data meta-analysis. *BMJ.* 2019;365:l1476.
26. Manea L, Gilbody S, McMillan D. A diagnostic meta-analysis of the Patient Health Questionnaire-9 (PHQ-9) algorithm scoring method as a screen for depression. *Gen Hosp Psychiatry.* 2015;37(1):67-75.
27. Agostini F, Neri E, Salvatori P, Dellabartola S, Bozicevic L, Monti F. Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. *Matern Child Health J.* 2015;19(5):1131-1141.
28. Srinivasan N, Murthy S, Singh AK, Upadhyay V, Mohan SK, Joshi A. Assessment of burden of depression during pregnancy among pregnant women residing in rural setting of Chennai. *J Clin Diagn Res.* 2015;9(4):LC08-LC12.
29. Adewuya AO, Fatoye FO, Ola BA, Ijaodola OR, Ibigbami SM. Socio-demographic and obstetric risk factors for postpartum depressive symptoms in Nigerian women. *J Psychiatr Pract.* 2005;11(5):353-358.
30. Karmaliani R, Asad N, Bann CM, Moss N, McClure EM, Pasha O, Wright LL, Goldenberg RL. Prevalence of anxiety, depression and associated factors among pregnant women of Hyderabad, Pakistan. *Int J Soc Psychiatry.* 2009;55(5):414-424.
31. Stewart RC, Umar E, Tomenson B, Creed F. A cross-sectional study of antenatal depression and associated factors in Malawi. *Arch Womens Ment Health.* 2014;17(2):145-154.
32. Bunevicius R, Kusminskas L, Bunevicius A, Nadisauskiene RJ, Jureniene K, Pop VJ. Psychosocial risk factors for depression during pregnancy. *Acta Obstet Gynecol Scand.* 2009;88(5):599-605.
33. Lee AM, Lam SK, Sze Mun Lau SM, Chong CS, Chui HW, Fong DY. Prevalence, course, and risk factors for antenatal anxiety and depression. *Obstet Gynecol.* 2007;110(5):1102-1112.
34. Marchesi C, Bertoni S, Maggini C. Major and minor depression in pregnancy. *Obstet Gynecol.* 2009;113(6):1292-1298.
35. Records K, Rice M. Psychosocial correlates of depression symptoms during the third trimester of pregnancy. *J Obstet Gynecol Neonatal Nurs.* 2007;36(3):231-242.
36. Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: a systematic review. *Am J Obstet Gynecol.* 2010;202(1):5-14.
37. Reading R, Reynolds S. Debt, social disadvantage and maternal depression. *Soc Sci Med.* 2001;53(4):441-453.
38. Azad R, Fahmi R, Shrestha S, Joshi H, Hasan M, Khan ANS, Chowdhury MAK, Arifeen SE, Billah SM. Prevalence and risk factors of postpartum depression within one year after birth in urban slums of Dhaka, Bangladesh. *PLoS One.* 2019;14(5):e0215735.
39. Rwakarema M, Premji SS, Nyanza EC, Riziki P, Palacios-Derflinger L. Antenatal depression is associated with pregnancy-related anxiety, partner relations, and wealth in women in Northern Tanzania: a cross-sectional study. *BMC Womens Health.* 2015;15:68.
40. Sonfield A, Kost K, Gold RB, Finer LB. The public costs of births resulting from unintended pregnancies: national and state-level estimates. *Perspect Sex Reprod Health.* 2011;43(2):94-102.
41. Yazdkhasti M, Pourreza A, Pirak A, Abdi F. Unintended Pregnancy and Its Adverse Social and Economic Consequences on Health System: A Narrative Review Article. *Iran J Public Health.* 2015;44(1):12-21.
42. Karaçam Z, Onel K, Gerçek E. Effects of unplanned pregnancy on maternal health in Turkey. *Midwifery.* 2011;27(2):288-293.
43. Wessel J, Endrikat J, Büscher U. Elevated risk for neonatal outcome following denial of pregnancy: results of a one-year prospective study compared with control groups. *J Perinat Med.* 2003;31(1):29-35.
44. Jenkins A, Millar S, Robins J. Denial of pregnancy: a literature review and discussion of ethical and legal issues. *J R Soc Med.* 2011;104(7):286-291.
45. Auer J, Barbe C, Sutter AL, Dallay D, Vulliez L, Riethmuller D, et al. Pregnancy denial and early infant development: a case-control observational prospective study. *BMC Psychol.* 2019;7(1):22.
46. Adnyana IBP, Liwang F, Negara KS, Manuaba IBP, Bhargah, A, Prabawa IPY. Clinical risk factor of preeclampsia: a five-year retrospective study in Bali Royal Hospital, Bali-Indonesia. *Gineco. Eu.* 2018;14(3):89-93.
47. Fitrikasari A, Wardani ND, Sumekar TA, Saktini F, Asikin HG, Sulchan M. The role of psychosocial stressors, carbohydrate and protein intake on serum serotonin and cortisol levels in patients with depression: a preliminary evaluation. *Bali Medical Journal.* 2021;10(1):137-141.



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