ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1335795

The Effects of Prenatal Depression Levels on Prenatal Attachment: The Moderating Role of Adverse Childhood Experiences

Cansu AKDAG TOPAL [1], Merve MERT KARADAŞ [2], Irem KARAKURT [3], Handan BOZTEPE [3]

[1] Başkent University, Faculty of Health Sciences, Nursing Department
[2] Hacettepe University, Faculty of Nursing, Obstetric and Gynecology Department
[3] Atilim University, Faculty of Health Sciences, Nursing Department

Geliş Tarihi / Received: *01.08.2023,* ***Kabul Tarihi / Accepted:*** *09.02.2024*

ABSTRACT

Objective: This study was conducted to determine the effects of childhood traumas (ACE) and prenatal depression (BECK) on prenatal attachment. **Materials and Methods:** The study population consisted of 277 women in Ankara, Turkey, who were pregnant from 05/01/2022 to 09/01/2022. The pregnant women in the sample were administered the prenatal attachment scale, prenatal depression scale, and childhood trauma scale. The data were analyzed using descriptive statistics and quantile regression analysis. **Results:** The women's childhood trauma experiences mean score was 2.25±1.47 (min-max: 0.00-6.00), prenatal attachment mean score was 42.50±9.82 (min-max: 21.00-67.00), and depression mean score was 7.44±8.45 (min-max: 0.00-37.00). In terms of tau values, the R^2 values for the 1st, 2nd, and 3rd quantile values were found to be 0.014, 0.016, and 0.007, respectively. According to these results, while the BECK variable was statistically significant for tau=0.25, the ACE variable was not. In the model, the BECK and ACE variables are statistically significant for tau=0.50 but not for tau=0.75. **Conclusion:** Our study has demonstrated that prenatal attachment levels can be negatively impacted by childhood traumas and prenatal depression. By taking necessary precautions and implementing programs, it is possible to impact prenatal attachment positively.

Keywords: Depression, Attachment, Adverse Childhood Experience, Pregnancy, Nursing.

Doğum Öncesi Depresyon Düzeylerinin Doğum Öncesi Bağlanmaya Etkisi: Olumsuz Çocukluk Çağı Deneyimlerinin Düzenleyici Rolü

ÖZ

Amaç: Bu çalışma, çocukluk çağı travmalarının ve prenatal depresyonun, prenatal bağlanma üzerindeki etkilerini belirlemek amacıyla yapılmıştır **Gereç ve Yöntem:** Araştırmanın örneklemini Ankara'da 05/01/2022- 09/01/2022 tarihleri arasında gebe olan 277 kadın oluşturmuştur. Gebelere prenatal bağlanma ölçeği, prenatal depresyon ölçeği ve çocukluk çağı travma ölçeği uygulandı. Veriler, tanımlayıcı istatistikler ve kantil regresyon analizi kullanılarak analiz edildi. **Bulgular:** Kadınların çocukluk çağı travma puan ortalamaları 2.25±1.47 (min-maks: 0.00-6.00), prenatal bağlanma puan ortalamaları 42.50±9.82 (min-maks: 21.00-67.00), depresyon puan ortalamaları 7.44±8.45 (min-maks: 0.00-37.00) olarak bulundu. Tau değerleri açısından 1., 2. ve 3. kantil değerleri için R^2 değerleri sırasıyla 0.014, 0.016 ve 0.007 olarak bulunmuştur. Bu sonuçlara göre tau=0.25 için BECK değişkeni istatistiksel olarak anlamlı bulunurken, ACE değişkeni anlamlı çıkmamıştır. Modelde BECK ve ACE değişkenleri tau=0.50 için istatistiksel olarak anlamlı iken tau=0.75 için anlamlı değildir. **Sonuç:** Bu çalışma prenatal bağlanma düzeylerinin çocukluk çağı travmaları ve prenatal depresyondan olumsuz etkilenebileceğini göstermiştir.

Anahtar Kelimeler: Depresyon, Bağlanma, Olumsuz Çocukluk Çağı Deneyimi, Gebelik, Hemşirelik.

Sorumlu Yazar / Corresponding Author: Cansu AKDAG TOPAL, Başkent University, Faculty of Health Sciences, Nursing Department, Ankara, Türkiye
E-mail: cansua05@gmail.com

Bu makaleye atıf yapmak için / Cite this article: Akdag Topal, C., Mert Karadaş, M., Karakurt, I., & Boztepe, H. (2024). The effects of prenatal depression levels on prenatal attachment: the moderating role of adverse childhood experiences *BAUN Health Sci J, 13*(2), 268-275. https://doi.org/10.53424/balikesirsbd.1335795

INTRODUCTION

Due to biological, psychological, and social changes, pregnancy is regarded as a time of vulnerability. While the mother's identity grows throughout pregnancy, there are also noticeable physical changes in the mother's appearance (Camacho et al., 2010). Many expectant women feel conflicted about being pregnant. Women may also feel anxious about their pregnancies, deliveries, and postpartum periods. Pregnancy can be seen from a psychosocial standpoint as a highly emotional condition that can be a significant stressor (Bjelica et al., 2018).

Both a woman's current experiences and her past experiences might have an impact on her pregnancy. The onset and severity of depression symptoms in the perinatal period are particularly influenced by childhood trauma events, which may return during pregnancy (Oosterman et al., 2019; Stigger et al., 2020). The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) defines childhood trauma as exposure to sexual violence, actual or threatened death, or severe damage (American Psychiatric Association, 2013). Being directly exposed to trauma, witnessing trauma, or knowing about the trauma that occurred to a close friend or relative are all included in this (De Bellis & Zisk, 2014). Recent research suggests that stressful childhood experiences can lead to major mental illnesses such as postpartum depression (Barnett et al., 2019; Mal-Sarkar et al., 2021; Okafor et al., 2021). Prenatal maternal depression endangers the health of both moms and newborns. Prenatal depression affects roughly 22% of women, according to studies (Avalos et al., 2016; Fields et al., 2022; Mukherjee et al., 2016) , and it has been found to be a risk factor for postnatal depression(Verreault et al., 2014). Prenatal depression is linked to spontaneous abortions, premature births, maternal substance abuse, low APGAR ratings at birth, and poor mother-infant interactions. Furthermore, children of women suffering from prenatal depression are at risk of developing mental illnesses such as depression (Nowak et al., 2022). As a result, it is critical to comprehend childhood traumas that may result in prenatal depression in the mother.

Maternal childhood trauma may also have a negative impact on mother-infant attachment during pregnancy (Caglayan et al., 2022), and prenatal depression may be an important aspect influencing prenatal attachment (Berthelot et al., 2020; Rollè et al., 2020). Prenatal attachment is characterized as the mother's interest in and attachment behaviours toward her unborn baby and the establishment and acceptance of a loving relationship with the infant (Kara & Nazik, 2021; Salehi & Kohan, 2017). As mother-infant attachment begins during pregnancy and affects postnatal attachment (Caglayan et al., 2022), prenatal attachment is vital in accepting the role of parenthood (Tani et al., 2018).

The experience of becoming a parent and accepting the role of motherhood can be influenced by the mother's past life experiences. In this context, there are studies stating that childhood traumas may be a reason for increasing the development of weak prenatal attachment (Berthelot et al., 2020; Caglayan et al., 2022; Christie et al., 2017). Research indicates that prenatal depression is a significant factor in reduced prenatal attachment, and that mothers with psychiatric disorders often experience decreased attachment during both the prenatal and postnatal periods (Berthelot et al., 2020; Hicks et al., 2018; Özcan et al., 2018). Inadequate prenatal care for both the mother and her baby is connected with low and weak prenatal attachment (Maddahi et al., 2016).

Despite existing literature on the impact of childhood traumas on pregnancy(Mal-Sarkar et al., 2021; Millar et al., 2021; Moog et al., 2016; Nowak et al., 2022; Olsen, 2018; Reuveni et al., 2021), there is a gap in understanding regarding the potential effects of childhood traumas on prenatal attachment and prenatal depression (Berthelot et al., 2020; Caglayan et al., 2022; Nowak et al., 2022). The identification of factors that may affect maternal and infant health is critical for providing adequate care to pregnant women and mitigating potential risks. Accordingly, the current investigation aimed to explore the potential impact of childhood traumas on prenatal depression and prenatal attachment.

Research uqestions;

This study' research questions are following;

- Do prenatal depression levels of pregnant women affect prenatal attachment levels of them?
- Do adverse childhood experiences levels of pregnant women affect prenatal attachment levels of them?

MATERIALS AND METHODS

Settings and participants

The research was conducted on pregnant women in Ankara, Turkey, between May 1, 2022, and September 1, 2022. G*Power 3.1.9.2 (Franz Faul, Universitat Kiel, Germany) was used to determine the sample size of women. It was planned to include 257 women in the study sample with 2 independent predictor variables, with an effect level of medium (0.05), a power level of 90%, and a significance level of 0.05. A total of 305 women were evaluated in terms of eligibility for the study, and 28 women were not included in the study sample because they did not meet the research criteria. The research was completed with 277 women. According to the power analysis at the end of the research, this research was completed at a 92% power level. It is worth noting that a sample size of over 100 is generally considered appropriate for applying a quantile regression (Lê Cook & Manning, 2013). The final sample size for this study was 277, which was deemed sufficient to conduct both multilinear regression and quantile regression. The individuals attending the obstetrics and gynecology outpatient clinic at the hospital were informed about the study. Face-to-face

interviews were conducted to administer questionnaires to those who met the inclusion criteria. Pregnant women who can speak, understand, and write Turkish and have a pregnancy of 20 weeks or more were included in the study. The primary hypothesis posited that pregnant women exposed to childhood traumas would exhibit a decline in prenatal attachment and an increase in prenatal depression levels. In this study, the dependent variable was prenatal attachment score of women and the independent variables were adverse childhood experiences and depression scores of women.

Data collection tools

The data collected by prenatal attachment scale, prenatal depression scale, and childhood trauma scale.

The Prenatal Attachment Inventory

The Prenatal Attachment Inventory was developed to examine pregnant women's prenatal attachment levels. Muller developed the Prenatal Attachment Inventory in 1993. The scale was created to describe pregnant women's thoughts, feelings, and events and measure their attachment levels to the fetus during the prenatal period. The scale has 21 items in total with a 4-point Likert structure. Each item on the scale is worth between 1 and 4 points, and the total scale score is derived by assigning 1 point to the "Never" response, 2 points to the "Sometimes" response, 3 points to the "Often" response, and 4 points to the "Always" response. The scale yields a minimum score of 21 and a maximum score of 84. The higher the pregnant woman's total score on the scale, the stronger her level of attachment. Yilmaz and Beji (2013) performed the scale's Turkish validity and reliability, reporting an internal consistency coefficient of 0.84. This study's Cronbach alpha value was found to be 0.87.

Adverse Childhood Experiences Scale

In order to evaluate any negative experiences during childhood, the Childhood Adverse Experiences Scale Turkish Form (ACE-TR) was used. This survey was developed by Kaiser Permanente- Department of Preventive Medicine in 1997 and asks about emotional, physical, and sexual violence, as well as neglect and divorce, that occurred during the first 18 years of a person's life (Felitti et al., 1998). The scale, which consists of 10 items, is a self-report scale that allows for a yes-no binary response. Gündüz et al. (2018) conducted the Turkish validity and reliability study. Cronbach's alpha was calculated to be 0.742. There is no cutoff point on the scale. The childhood negative experience score is considered high as the scale score increases. This study's Cronbach alpha value was found to be 0.70.

Beck Depression Scale

The level of depression in women was evaluated using the Beck Depression Scale. This assessment tool was created by Beck et al. in 1961 to determine the behavioral indications of depression in both adolescents and adults (Beck, 1961). In 1978, the scale for measuring a patient's status was modified. The severity duplications were eliminated, and patients were required to mark their condition for the previous week, including the present day. In terms of violence, the levels are categorized as follows: minimal (0-9), mild (10-16), moderate (17-29), and severe (30-63) (Hisli, 1989).

Data collection

The researchers gathered the data in person from the Ankara Training and Research Hospital located in Ankara, Turkey. The participants were informed about the study and received an informed consent form before replying to survey. We collected data from expectant mothers in their second and third trimesters by conducting a survey that lasted approximately 15 minutes. The information was then transferred into SPSS 26.0, where it was evaluated and analyzed. This study's Cronbach alpha value was found to be 0.88.

Statistical analysis

Normal distribution condition could not be met in the data and regression model, PAI variable was modeled using quantile regression analysis, which does not require a normality condition. The regression analysis results were performed with R software (R Core Team, 2023) and a quantreg package (Koenker, 2023).

Ethical considerations

Ethic committee approval was obtained from the University Human Research Ethics Committee (Reference Number: E-59394181-604.01.02-33841, Date: 26.04.2022). The authors granted permission for the use of the scales. Prior to filling out the data collection forms, pregnant women were informed about the study and that their participation was completely voluntary. No personal or institutional information was requested as part of the study.

RESULTS

The prenatal attachment inventory scores used in the study were found to be unsuitable for normal distribution due to the Shapiro-Wilk test ($W=0.985$, $p=0.009<0.05$). Additionally, the residuals in the linear regression model estimated by prenatal attachment inventory were not normally distributed ($W=0.986$, $p=0.009<0.014$).

Table 1 presents the socio-demographic characteristics of women. The mean age of the women was 26.97±5.12, and the mean age of their partners was 30.81±5.19. The pre-pregnancy weight of the women was determined as 61.04±9.62. 42.4% of the mothers were graduated from primary school and 40.1% were graduated from high school, 29.6% of the partners were graduated from primary school and 43.3% were graduated from high school. 98.6% of mothers live in the city center and 74.4% do not work. 68.2% of mothers have income equal to or higher than their expenses. Only 17% of mothers smoke during pregnancy. The pregnancies of 70.8% of the mothers were planned. 12.2% of the mothers experienced complications in their previous pregnancies, and 22.0% of the mothers experienced complications in postpartum period in their previous pregnancies.

Table 1: Sociodemographic characteristics of women.

Characteristic	n	%
Age (M±SD)	26.97±5.12 (min-max: 17.0-42.0)	
Partner Age (M±SD)	30.81±5.19 (min-max:20.0-46.0)	
Prenatal weight of women (M±SD)	61.04±9.62 (min-max: 40.0-97.0)	
Newborn weight (g) (M±SD)	3274.21±357.49 (min-max:2270.0-4200.0)	
Education		
Primary education	117	42.2
High school	111	40.1
Graduate/postgraduate	49	17.7
Living area		
City center	273	98.6
Country	4	1.4
Working status		
Yes	71	25.6
No	206	74.4
Partner Education		
Primary education	82	29.6
High school	120	43.3
Graduate/postgraduate	75	27.1
Perceived Economic Situation		
Income less than expense	88	31.8
Income equal/more than expense	189	68.2
Smoking		
Yes	47	17.0
No	213	76.8
Quit	17	6.2
Planned pregnancy		
Yes	197	71.1
No	80	28.9
Birth*		
Vaginal	140	61.0
Cesarean section	90	39.0
Previous birth complications*		
Yes	28	27.1
No	202	72.9
Previous postpartum complications*		
No	216	93.9
Yes	14	6.1

* There is no data on primiparous pregnant women.

Table 2. Score distrubitiun of scales.

Scales	Interquartile Range	Mean	Sd.
ACE	2.00	2.25	1.47
PAI	11.00	42.50	9.82
BECK	11.50	7.44	8.45

ACE: Childhood Adverse Experiences Scale, PAI: The Prenatal Attachment Inventory, BECK: Beck Depression Scale

Table 2 shows the total mean scores of the scales in the study. The women's childhood trauma mean score was 2.25±1.47 (min-max: 0.00-6.00), prenatal attachment mean score was 42.50±9.82 (min-max: 21.00-67.00), and depression mean score was 7.44±8.45 (min-max: 0.00-37.00).

Table 3 presents the results of the quantile regression model created for three different tau values. In terms of tau values, the R2 values for the 1st, 2nd, and 3rd quantile values were found to be 0.014, 0.016 and 0.007, respectively. According to these results, while the BECK variable was statistically significant for tau=0.25, the ACE variable was not. In the model, the BECK and ACE variables are statistically significant for tau=0.50 but not for tau=0.75

Table 3. Factors influensing PAI using quantile regression analysis.

Tau	Coefficient	Beta	SH(Beta)	t	p	R^2
	Min	**Max**	**X**	**Sd.**	**<0.001**	
Scales	BECK	-0.205	0.073	-2.809	**0.005**	0.014
	ACE	-0.241	0.500	-0.481	0.631	
Tau=0.50	Constant	47.895	2.501	19.147	**<0.001**	
	BECK	-0.211	0.097	-2.174	**0.031**	0.016
	ACE	-0.737	0.368	-2.002	**0.046**	
Tau=0.75	Constant	52.435	3.918	13.384	**<0.001**	
	BECK	-0.043	0.144	-0.301	0.763	0.007
	ACE	-0.739	0.664	-1.113	0.267	

R^2: Koenker-Machado, PAI: The Prenatal Attachment Inventory, ACE: Childhood Adverse Experiences Scale, BECK: Beck Depression Scale

DISCUSSION

This study was conducted to determine the effects of childhood traumas and prenatal depression on prenatal attachment. The study's central hypothesis was that prenatal attachment levels would decrease in pregnant women exposed to childhood traumas and prenatal depression. Based on the quantile regression analysis conducted in the study, it is evident that the ACE and BECK variables hold significant statistical value. Therefore, it can be concluded that the hypothesis has been accepted. There is a variance in the conclusions drawn from the literature regarding this matter (Çağlayan et al., 2023; Brown et al.,2021; Hinesley et al., 2020; Sancho- Rossignol et al., 2018; Zhang et al., 2021; Berthelot et al., 2019).

The attachment between a mother and her baby begins during the prenatal period, intensifies with the movements of the developing fetus, and reaches its zenith at the time of birth. This bond is commonly known as prenatal attachment (Coşkuner Potur et al., 2020). Prenatal attachment is directly related to parental behaviors both during pregnancy and the postpartum period. It is believed that forming a strong bond with the fetus is crucial in helping the mother prepare for motherhood, fostering a sense of affection and care towards the infant, and positively impacting the baby's growth and development. (Ozcan et al., 2019). There are several factors that can influence prenatal attachment (Cheraghi et al., 2022; Schaal et al., 2023), such as childhood trauma and prenatal depression (Berthelot et al., 2019; Brown et al., 2021; Çağlayan et al., 2023; Hinesley et al., 2020; Sancho-Rossignol et al., 2018; Zhang et al., 2021).

Experiences like abuse, neglect, and family dysfunction (such as divorce) that occur before age 18 are known as childhood traumas. These traumas can lead to both physical and mental health issues later in life. (Osofsky et al., 2021). Research has been conducted on the impact of childhood traumas on pregnancy and postpartum periods. However, there is a lack of studies exploring the effects of childhood traumas on prenatal attachment (Sancho-Rossignol et al., 2018; Osofsky et al., 2021). Like our study, in a study conducted by Sancho-Rossignol et al. (2018), the connection between pregnant women's exposure to domestic violence during childhood and their prenatal attachment was investigated. According to the research, pregnant women who were exposed to domestic violence during their childhood have lower levels of prenatal attachment (Sancho- Rossignol et al., 2018). Another cross-sectional study similar to our study was conducted by Çağlayan et al. (2023) to explore the impact of childhood traumas on prenatal attachment. Their findings showed that all types of childhood trauma were linked to lower prenatal attachment scores (Çağlayan et al., 2023). In contrast to our study, some previous research revealed that childhood traumas did not directly impact prenatal attachment (Hinesley, 2020; Berthelot, 2019). The discrepancy between our study and the literature may stem from the concept of "psychological resilience." Resilience may be higher in populations with different demographics, such as those with higher levels of education. Individuals with better psychological resilience may therefore be less prone to exhibit psychological symptoms, even if they have experienced childhood trauma (Berthelot, 2019). However, more research is needed in this area due to the limited number of existing studies.

Prenatal depression is a significant factor affecting attachment during pregnancy (Berthelot et al., 2020). Several studies have explored the impact of prenatal depression on prenatal attachment and found that pregnant women with depressive symptoms tend to have lower levels of prenatal attachment, which is consistent with the results of our own study (Goecke et al., 2012; Arguz Cildir, 2020; Medina et al., 2022). A systematic review of 41 studies that support our study found a negative correlation between prenatal attachment and prenatal depression (Rollè et al., 2020). It can pose difficulties for mothers-to-be to adapt to their new responsibilities, ultimately leading to reduced prenatal attachment. Furthermore, another systematic review, including 35 studies, found that detecting and treating depressive symptoms in the prenatal period is an important point in achieving prenatal attachment (Lefkovics et al., 2014). In addition, Lieto et al. (2017) assessed the prenatal attachment status of 156 pregnant women and discovered a significant link between prenatal depression and reduced prenatal attachment (Lieto et al. 2017). Similar to the literature, our current study

revealed a negative effect of prenatal depression on prenatal attachment. It is essential to develop programs that prevent and reduce prenatal depression during the antenatal period to ensure

Limitations and strengths

The study included pregnant women who had reached the 20th week of their pregnancy and had applied to the Antenatal Polyclinic at Ankara Training and Research Hospital. As a result, the findings of our study cannot be generalized. The PAI, ACE, and BECK scales were used to collect self-reported data for the study. For future research, it is suggested that a "longitudinal study model" be utilized. In addition, future studies should consider factors that may affect prenatal attachment, such as age, gestational week, resilience, and coping behaviors. Our study found that the average ACE scale was 2.25 (min 0.00; max 6.00) To better evaluate our findings, it may be useful to expand the range of the ACE score. Despite these limitations, our study is important as it investigates how childhood traumas and prenatal depression impact prenatal attachment.

CONCLUSION

Overall, our study has demonstrated that prenatal attachment levels can be negatively impacted by childhood traumas and prenatal depression. It is important to identify pregnant women who have experienced childhood trauma and prenatal depression during the prenatal period. By taking necessary precautions and implementing programs, it is possible to positively impact prenatal attachment. Healthy prenatal attachment can lead to several benefits, such as aiding pregnant women in adapting to motherhood, preventing complications, maintaining mother-infant attachment after birth, and promoting the baby's development.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: CAT; MMK; HB; İK; **Material, methods and data collection:** CAT; İK; **Data analysis and comments:** CAT; MMK; HB; **Writing and corrections:**.CAT; MMK; HB; İK.

Funding

None

Ethical considerations

Ethic committee approval was obtained from the University Human Research Ethics Committee (Reference Number: E-59394181-604.01.02-33841, Date: 26.04.2022). The authors granted permission for the use of the scales. Prior to filling out the data collection forms, pregnant women were informed about the study and that their participation was completely voluntary. No personal or institutional information was requested as part of the study.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (Fifth edit). American Psychiatric Publishing.

Arguz Cildir, D., Ozbek, A., Topuzoglu, A., Orcin, E., & Janbakhishov, C. E. (2020). Association of prenatal attachment and early childhood emotional, behavioral, and developmental characteristics: A longitudinal study. *Infant Mental Health Journal*, *41*(4), 517-529. https://doi.org/10.1007/s00737-013-0357-8

Avalos, L. A., Raine-Bennett, T., Chen, H., Adams, A. S., & Flanagan, T. (2016). Improved perinatal depression screening, treatment, and outcomes with a universal obstetric program. *Obstetrics and Gynecology*, *127*(5), 917. https://doi.org/10.1097/AOG.0000000000001403

Barnett, W., Pellowski, J., Kuo, C., Koen, N., Donald, K. A., Zar, H. J., & Stein, D. J. (2019). Food-insecure pregnant women in South Africa: a cross-sectional exploration of maternal depression as a mediator of violence and trauma risk factors. *BMJ Open*, *9*(3), e018277. https://doi.org/10.1136/bmjopen-2017-018277

Berthelot, N., Lemieux, R., Garon-Bissonnette, J., & Muzik, M. (2020). Prenatal attachment, parental confidence, and mental health in expecting parents: the role of childhood trauma. *Journal of Midwifery & Women's Health*, *65*(1), 85–95. https://doi.org/10.1111/jmwh.13034

Bjelica, A., Cetkovic, N., Trninic-Pjevic, A., & Mladenovic-Segedi, L. (2018). The phenomenon of pregnancy—A psychological view. *Ginekologia Polska*, *89*(2), 102–106. https://doi.org/10.5603/GP.a2018.0017

Brown, R. H., Eisner, M., Walker, S., Tomlinson, M., Fearon, P., Dunne, M. P., ... & Murray, A. L. (2021). The impact of maternal adverse childhood experiences and prenatal depressive symptoms on foetal attachment: Preliminary evidence from expectant mothers across eight middle-income countries. *Journal of Affective Disorders*, 295, 612-619. https://doi.org/10.1016/j.jad.2021.08.066

Caglayan, I. S. C., Cicek, A. U., Yilmaz, Y., & Sahin, A. E. (2022). The Role of Childhood Trauma on Prenatal Attachment: A Cross-Sectional Study. *The Journal of Nervous and Mental Disease*, 10–1097. https://doi.org/10.1097/NMD.0000000000001610

Camacho, K. G., Vargens, O., Progianti, J. M., & Spindola, T. (2010). Living repercussions and transformations of a pregnancy: Pregnant's perspective. *Ciencia y Enfermería*, *16*, 115–125.

Chen, M., Wang, G., Sun, X., Meng, M., Jiang, Y., Sun, W., ... & Jiang, F. (2023). The effects of maternal prenatal depression on child mental health: The

moderating role of maternal childhood trauma. *Journal of Affective Disorders, 324*, 403-409. Living repercussions and transformations of a pregnancy: Pregnant's perspective. https://doi.org/10.1016/j.jad.2022.12.109

Cheraghi, P., & Jamshidimanesh, M. (2022). Relationship Between Maternal-Fetal Attachment With Anxiety and Demographic Factors in High-risk Pregnancy Primipara Women. *Iran Journal of Nursing, 34*(134), 46-59.

Christie, H., Talmon, A., Schäfer, S. K., De Haan, A., Vang, M. L., Haag, K., Gilbar, O., Alisic, E., & Brown, E. (2017). The transition to parenthood following a history of childhood maltreatment: a review of the literature on prospective and new parents' experiences. *European Journal of Psychotraumatology*, *8*(sup7), 1492834. https://doi.org/0.1080/20008198.2018.1492834

De Bellis, M. D., & Zisk, A. (2014). The biological effects of childhood trauma. *Child and Adolescent Psychiatric Clinics*, *23*(2), 185–222. https://doi.org/10.1016/j.chc.2014.01.002

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American journal of preventive medicine*, *14*(4), 245-258. https://doi.org/10.1016/S0749-3797(98)00017-8

Fields, K., Shreffler, K. M., Ciciolla, L., Baraldi, A. N., & Anderson, M. (2022). Maternal childhood adversity and prenatal depression: the protective role of father support. *Archives of Women's Mental Health*, 1–9. https://doi.org/10.1007/s00737-022-01278-w

Goecke, T. W., Voigt, F., Faschingbauer, F., Spangler, G., Beckmann, M. W., & Beetz, A. (2012). The association of prenatal attachment and perinatal factors with pre-and postpartum depression in first-time mothers. *Archives of gynecology and obstetrics*, *286*, 309-316. https://doi.org/10.1007/s00404-012-2286-6

Grigoriadis, S., VonderPorten, E. H., Mamisashvili, L., Tomlinson, G., Dennis, C. L., Koren, G., ... & Ross, L. E. (2013). The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and meta-analysis. *The Journal of clinical psychiatry*, *74*(4), 8615. https://doi.org/10.4088/JCP.12r07968

Hicks, L. M., Dayton, C. J., Brown, S., Muzik, M., & Raveau, H. (2018). Mindfulness moderates depression and quality of prenatal attachment in expectant parents. *Mindfulness*, *9*(5), 1604–1614. https://doi.org/10.1007/s12671-018-0907-2

Hinesley, J., Amstadter, A., Sood, A., Perera, R. A., Ramus, R., & Kornstein, S. (2020). Adverse childhood experiences, maternal/fetal attachment, and maternal mental health. *Women's Health Reports*, *1*(1), 550-555. https://doi.org/10.1089/whr.2020.0085

Kara, P., & Nazik, E. (2021). Effects of anxiety and social support levels on the prenatal attachment of pregnant women with preeclampsia. *Cukurova Medical Journal*, *46*(3), 889–896. https://doi.org/10.17826/cumj.894664

Koenker, R. (2021). quantreg: Quantile Regression. R package version 5.95. URL https://cran.r-project.org/package=quantreg

Lê Cook, B., & Manning, W. G. (2013). Thinking beyond the mean: A practical guide for using quantile regression methods for health services research. *Shanghai Archives of Psychiatry*, *25*(1), 55–59. https://doi.org/10.3969/j.issn.1002-0829.2013.01.011

Lefkovics, E., Baji, I., & Rigó, J. (2014). Impact of maternal depression on pregnancies and on early attachment. *Infant mental health journal*, *35*(4), 354-365. https://doi.org/10.1002/imhj.21450

Maddahi, M. S., Dolatian, M., & Talebi, A. (2016). Correlation of maternal-fetal attachment and health practices during pregnancy with neonatal outcomes. *Electronic Physician*, *8*(7), 2639. https://doi.org/10.19082/2639

Mal-Sarkar, T., Keyes, K., Koen, N., Barnett, W., Myer, L., Rutherford, C., Zar, H. J., Stein, D. J., & Lund, C. (2021). The relationship between childhood trauma, socioeconomic status, and maternal depression among pregnant women in a south African birth cohort study. *SSM-Population Health*, *14*, 100770. https://doi.org/10.1016/j.ssmph.2021.100770

Mcfarland J, Salisbury A.L, Battle C.L, Hawes K., Halloran K., Lester B.M. (2011). Major depressive disorder during pregnancy and emotional attachment to the fetus. *Archives of Women's Mental Health*; 14: 425-434. https://doi.org/10.1007/s00737-011-0237-z

Medina, N. Y., Edwards, R. C., Zhang, Y., & Hans, S. L. (2022). A longitudinal investigation of young mothers' prenatal attachment, depressive symptoms, and early parenting behaviour. *Journal of Reproductive and Infant Psychology*, *40*(2), 196-211. https://doi.org/10.1080/02646838.2021.1886257

Millar, H. C., Lorber, S., Vandermorris, A., Thompson, G., Thompson, M., Allen, L., Aggarwal, A., & Spitzer, R. F. (2021). "No, you need to explain what you are doing": obstetric care experiences and preferences of adolescent mothers with a history of childhood trauma. *Journal of Pediatric and Adolescent Gynecology*, *34*(4), 538–545. https://doi.org/10.1016/j.jpag.2021.01.006

Moog, N. K., Buss, C., Entringer, S., Shahbaba, B., Gillen, D. L., Hobel, C. J., & Wadhwa, P. D. (2016). Maternal exposure to childhood trauma is associated during pregnancy with placental-fetal stress physiology. *Biological Psychiatry*, *79*(10), 831–839. https://doi.org/10.1016/j.biopsych.2015.08.032

Mukherjee, S., Trepka, M. J., Pierre-Victor, D., Bahelah, R., & Avent, T. (2016). Racial/ethnic disparities in antenatal depression in the United States: A systematic review. *Maternal and Child Health Journal*, *20*(9), 1780–1797. https://doi.org/10.1007/s10995-016-1989-x

Muller, M. E., & Mercer, R. T. (1993). Development of the prenatal attachment inventory. *Western Journal of Nursing Research*, *15*(2),

199-215. https://doi.org/10.1177/0193945993015002

Nieto, L., Lara, M. A., & Navarrete, L. (2017). Prenatal predictors of maternal attachment and their association with postpartum depressive symptoms in Mexican women at risk of depression. *Maternal and Child Health Journal, 21*, 1250-1259. https://doi.org/10.1007/s10995-016-2223-6

Nowak, A. L., Braungart-Rieker, J. M., & Kuo, P. X. (2022). Social support moderates the relation between childhood trauma and prenatal depressive symptoms in adolescent mothers. *Journal of Reproductive and Infant Psychology*, *40*(6), 644–658. https://doi.org/10.1080/02646838.2021.1938980

Okafor, C. N., Barnett, W., Zar, H. J., Nhapi, R., Koen, N., Shoptaw, S., & Stein, D. J. (2021). Associations of emotional, physical, or sexual intimate partner violence and depression symptoms among South African women in a prospective cohort study. *Journal of Interpersonal Violence*, *36*(9–10), NP5060–NP5083. https://doi.org/10.1177/0886260518796522

Olsen, J. M. (2018). Integrative review of pregnancy health risks and outcomes associated with adverse childhood experiences. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *47*(6), 783–794. https://doi.org/10.1016/j.jogn.2018.09.005

Oosterman, M., Schuengel, C., Forrer, M. L., & De Moor, M. H. M. (2019). The impact of childhood trauma and psychophysiological reactivity on at-risk women's adjustment to parenthood. *Development and Psychopathology*, *31*(1), 127–141. https://doi.org/10.1017/S0954579418001591

Osofsky, J. D., Osofsky, H. J., Frazer, A. L., Fields-Olivieri, M. A., Many, M., Selby, M., ... & Conrad, E. (2021). The importance of adverse childhood experiences during the perinatal period. *American Psychologist, 76*(2), 350. https://doi.org/10.1037/amp0000770

Ozcan, H., Ustundag, M. F., Yilmaz, M., Aydinoglu, U., Ersoy, A. O., & Eyi, E. G. Y. (2019). The Relationships between Prenatal Attachment, Basic Personality Traits, Styles of Coping with Stress, Depression, and Anxiety, and Marital Adjustment Among Women in the Third Trimester of Pregnancy. *The Eurasian journal of medicine, 51*(3), 232–236. https://doi.org/10.5152/eurasianjmed.2019.15302

Özcan, N. K., Boyacıoğlu, N. E., Dikeç, G., Dinç, H., Enginkaya, S., & Tomruk, N. (2018). Prenatal and postnatal attachment among Turkish mothers diagnosed with a mental health disorder. *Issues in Mental Health Nursing*, *39*(9), 795–801. https://doi.org/10.1080/01612840.2018.1455773

Potur, D., Doğan Merih, Y., & Demirci, N., (2020). Evaluation of Factors Affecting Prenatal Attachment In Primipara and Multipara Women. Journal of Academic Research in Nursing , vol.6, no.1, 132-140. https://doi.org/10.5222/jaren.2020.65265

R Core Team (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Racine, N., Zumwalt, K., McDonald, S., Tough, S., & Madigan, S. (2020). Perinatal depression: The role of maternal adverse childhood experiences and social support. *Journal of Affective Disorders, 263*, 576-581. https://doi.org/10.1016/j.jad.2019.11.030

Reuveni, I., Lauria, M., Monk, C., & Werner, E. (2021). The impact of childhood trauma on psychological interventions for depression during pregnancy and postpartum: a systematic review. *Archives of Women's Mental Health*, *24*(3), 367–380. https://doi.org/10.1007/s00737-020-01066-4

Rollè, L., Giordano, M., Santoniccolo, F., & Trombetta, T. (2020). Prenatal attachment and perinatal depression: a systematic review. *International Journal of Environmental Research and Public Health, 17*(8), 2644. https://doi.org/10.3390/ijerph17082644

Salehi, K., & Kohan, S. (2017). Maternal-fetal attachment: What we know and what we need to know. *International Journal of Pregnancy & Child Birth*, *2*(5), 38.

Sancho-Rossignol, A., Schilliger, Z., Cordero, M. I., Rusconi Serpa, S., Epiney, M., Hüppi, P., ... & Schechter, D. S. (2018). The association of maternal exposure to domestic violence during childhood with prenatal attachment, maternal-fetal heart rate, and infant behavioral regulation. *Frontiers in Psychiatry, 9*, 358. https://doi.org/10.3389/fpsyt.2018.00358

Schaal, N. K., Marca-Ghaemmaghami, P. L., Märthesheimer, S., Hepp, P., Preis, H., Mahaffey, B., ... & Castro, R. A. (2023). Associations of stress, anxiety, and partner satisfaction with maternal-fetal attachment in women pregnant during the COVID-19 pandemic: an online study. *BMC Pregnancy and Childbirth, 23*(1), 1-8. https://doi.org/10.1186/s12884-023-05804-1

Stigger, R. S., Martins, C. de S. R., de Matos, M. B., Trettim, J. P., da Cunha, G. K., Scholl, C. C., Ramos, M. P., dos Santos Motta, J. V., Ghisleni, G., & Pinheiro, R. T. (2020). Is Maternal Exposure to Childhood Trauma Associated With Maternal-Fetal Attachment? *Interpersona: An International Journal on Personal Relationships*, *14*(2), 200–210. https://doi.org/10.5964/ijpr.v14i2.3983

Tani, F., Castagna, V., & Ponti, L. (2018). Women who had positive relationships with their own mothers reported good attachments to their first child before and after birth. *Acta Paediatrica*, *107*(4), 633–637. https://doi.org/10.1111/apa.14162

Verreault, N., Da Costa, D., Marchand, A., Ireland, K., Dritsa, M., & Khalifé, S. (2014). Rates and risk factors associated with depressive symptoms during pregnancy and with postpartum onset. *Journal of Psychosomatic Obstetrics & Gynecology*, *35*(3), 84–91. https://doi.org/10.3109/0167482X.2014.947953

Zhang, L., Wang, L., Cui, S., Yuan, Q., Huang, C., & Zhou, X. (2021). Prenatal depression in women in the third trimester: Prevalence, predictive factors, and relationship with maternal-fetal attachment. *Frontiers in Public Health, 8*, 602005. https://doi.org/10.3389/fpubh.2020.602005