Mediating role of prenatal depression in attachment and maternal-fetal attachment in women who receive prenatal education

Ling Zhang  
Anhui Psychiatric Center, Anhui Medical University

Lei Wang  
Anhui Psychiatric Center, Anhui Medical University

Qiuyu Yuan  
Anhui Psychiatric Center, Anhui Medical University

Shu Cui  
Anhui Psychiatric Center, Anhui Medical University

Cui Huang  
Anhui Psychiatric Center, Anhui Jianzhu University

Kai Zhang  
Chaohu Hospital, Anhui Medical University

Xiaqin Zhou (zhouxqlulu@126.com)  
Anhui Medical University

Research article

Keywords: Prenatal depression, Prenatal education, Attachment dimension, Maternal-fetal attachment

DOI: https://doi.org/10.21203/rs.3.rs-55987/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

Prenatal depression and attachment are factors that affect the establishment of an intimate relationship between a mother and fetus, and prenatal education plays an important role in helping pregnant women adapt to a maternal role and changes during pregnancy. The study explored differences in prenatal depression and maternal-fetal attachment (MFA) scores between a prenatal education group and no prenatal education group, as well as the effects of maternal depression scores and attachment dimensions on maternal intimacy with the fetus.

Methods

The Edinburgh Postnatal Depression Scale (EPDS), Experience of Close Relationship (ECR) scale, Maternal Antenatal Attachment Scale (MAAS) and a general data scale were used to investigate 222 pregnant women who received prenatal education and 118 pregnant women who did not receive prenatal education in the third trimester of pregnancy. An exploratory analysis was performed to analyze the effects of depression score and attachment on MFA in pregnant women who received prenatal education.

Results

The results showed that pregnant women who received prenatal education had higher MFA and lower depression scores than those who did not receive prenatal education, and prenatal depression partially mediated the relationship between attachment avoidance and MFA quality.

Conclusions

Women who received prenatal education had low prenatal depression scores and high MFA. Maternal depression and attachment avoidance may affect the emotional bond between mother and fetus and should be taken seriously; they can be prevented by prenatal education and early intervention.

Background

Pregnancy is a significant and arduous process that can be extremely challenging for a woman physiologically and psychologically. Currently, an increasing number of scientists are turning their attention to the mental health of pregnant women, especially with regard to prenatal depression. According to a recent multisite cross-sectional study, 28.4% of pregnant women suffered from depression during pregnancy [1]. Prenatal depression affects not only the mood of the pregnant women and the intimate bond with her unborn fetus [2] but also the neurodevelopment of the newborn after birth; moreover, it can increase the risk of mental health issues in the child [3]. Perry et al showed that
depressive symptoms in pregnant women during the third trimester were important risk factors for weak maternal attachment to the fetus [4]. A woman’s antenatal depression level can significantly predict the degree of attachment to the fetus [5, 6]. In addition, a previous study also showed that depression during pregnancy was negatively correlated with maternal attachment to the fetus [7].

Maternal-fetal attachment (MFA) is the mother’s emotional connection to the fetus and is an important indication of whether the pregnant mother can adapt to changes in pregnancy and assume maternal responsibility [8]. In addition, MFA can predict the postpartum mental status of mothers, such as the presence of anxiety and depression, and affect postpartum mother-infant attachment quality [9]. Pregnant women with weak MFA are less likely to engage in health promotion activities and more likely to have an unhealthy newborn than those with strong MFA [3]. MFA can be affected by factors other than prenatal depression. Personality characteristics of pregnant women, such as adult attachment, can also affect MFA.

Attachment is defined as an emotional connection between an individual and their primary caregiver in the earliest stage of life. Attachment behavior forms an internal working model during individual development, and when people encounter difficulties or significant changes in life, such as pregnancy, the internal working model is activated and manifested in different ways, eliciting emotional and behavioral responses. Catherine’s quality-stress model showed that relationship templates dominated by fear or lack of security, such as insecure attachment, may become a personality trait, making women more vulnerable to perinatal depression than those without this trait [10]. The level of prenatal attachment affects maternal-infant attachment after delivery [11]. A study of 165 pregnant women in Poland found that a pregnant woman's type of attachment affects her image as a mother and her connection with her fetus [12].

To assist pregnant women in adapting to these new physiological and psychological changes, proper prenatal education is very important and necessary. There is a wide variety of prenatal education available for pregnant women. The compliance of pregnant women could be improved by flexible antenatal health education [13]. Prenatal education could reduce complaints during pregnancy and improve the quality of life of pregnant women [14]. In addition, pregnant women who receive prenatal education have a greater sense of well-being and satisfaction in terms of overall quality of life and health than those who do not [15]. However, a study in a Chinese population found that the rate of participation in prenatal education was very low due to lack of time and sufficient resources [16].

Previous studies have indicated connections among prenatal depression, attachment and MFA. Depression partially mediated the connection between insecure attachment and mother-infant attachment after birth [17]. Additionally, a few studies focused on the effects of prenatal depression on dimensions of attachment (avoidance and anxiety) and the relationship between the pregnant mother and the unborn fetus (MFA), especially among women who received prenatal education.

Therefore, in the current study, we aimed to identify the prevalence of depression in the trimester, the influence of prenatal education on women's prenatal depression score and MFA score, and whether
prenatal depression mediates the attachment dimension and MFA.

**Methods**

**Participants**

Data were collected at the antenatal clinic of Chaohu Hospital of Anhui Medical University from September to November 2019. The inclusion criteria were as follows: 1) pregnant women in their third trimester who were between 18-45 years old and who were willing to take part in the study; 2) women with a gestational age of 28-40 weeks; and 3) women with singleton gestation. The exclusion criteria were as follows: 1) women with a previous history of mental illness; 2) women with a high-risk pregnancy (gestational diabetes, hypertension and preeclampsia). We administered 360 questionnaires, and finally analyzed 340 questionnaires after excluding incomplete and invalid questionnaires. The sample recovery rate was 94.4%.

**Procedures**

The ethics committee of Chaohu Hospital of Anhui Medical University approved the study protocol. The procedures used in this study adhered to the principles of the Declaration of Helsinki. All the women signed informed consent forms. The evaluation and screening of all scales were completed by two nurses and three uniformly trained graduate students, and standardized instructions were given to all participants.

**Measures**

**Demographic characteristics**

We used a self-designed questionnaire to collect demographic characteristic data, including age, gestational age, working status, prenatal education, planned or unplanned pregnancy, and so on, of pregnant women enrolled in our study.

**MFA**

The Maternal Antenatal Attachment Scale (MAAS) was used to assess the MFA of the participants [18]. The MAAS is a self-reported scale that includes 19 questions with a 5-point scoring system. The scale includes two dimensions: the "quality of attachment" dimension and the "intensity of attachment" dimension. Attachment quality indicates the emotional experience with regard to the fetus, and attachment intensity indicates the time and energy devoted to the fetus by the pregnant women.

**Attachment**

Attachment in all pregnant women was assessed with the Experience of Close Relationship (ECR) scale. The Chinese version of the ECR scale has excellent reliability and validity [19]. The scale has two dimensions: anxiety and avoidance. The avoidance subscale includes 18 items, indicating the avoidance
of intimacy and interdependence. The anxiety subscale also includes 18 items and indicates concerns about exclusion and abandonment.

**Prenatal depression**

The Edinburgh Postpartum Depression Scale (EPDS) was chosen to assess the participants’ severity of depression [20]. The EPDS can be used to screen for not only postpartum depression but also depression during pregnancy. The EPDS contains a total of 10 items. The total score ranges from 0 to 30, and the higher the score is, the more serious the degree of depression. The content validity ratio is 0.93. The \( \alpha \) coefficient is 0.76. Nine points was considered the critical cutoff for diagnosing maternal depression.

**Data analysis**

We used the Statistical Package for Social Sciences (IBM SPSS 22.0) for all analyses conducted in this study. If the two groups were consistent, a t test was selected. If not, the Mann-Whitney U test was selected. Before the mediation analysis, Pearson’s correlation was calculated to determine the correlations between attachment anxiety or avoidance, the maternal depression score, and the MFA score. Finally, we found pairwise correlations between avoidance, the depression score, and attachment quality. Subsequently, SPSS process script was used to analyze the mediating effect. A \( p \) value of 0.05 was considered to be statistically significant.

**Results**

**Demographic characteristics of the participants**

Three hundred forty pregnant women were enrolled in our study. The mean age of the pregnant women was 28.26 (SD = 4.38) years, and the mean gestational age was 35.42 (SD = 4.67) weeks. The majority had a high school or junior college diploma (51.77%), and those with a junior high school or bachelor’s degree or higher accounted for 22.35% and 25.88% of the total, respectively. In addition, 58.24% of the pregnant women were not employed. The majority of pregnant women were pregnant for the first time (61.76%). The majority of women had planned their pregnancy (61.47%). Additionally, 82.06% of the participants reported that they were satisfied with their marriage. When asked whether they had participated in prenatal education during the pregnancy period, 65.29% of pregnant women said yes. Only 19.12% of the participants reported that they could not accept the body shape change due to pregnancy. Our results also showed that regarding attachment, 185 (54.41%) participants were insecure, and 155 (45.59%) participants were secure. A total of 209 (61.47%) pregnant women had an EPDS score of less than 9, and a total of 38.53% of the pregnant women had a score of 9 or higher, indicating prenatal depression.

**Differences in the prenatal depression score and MFA score between the prenatal education and no prenatal education groups**
As shown in Table 1, compared with the no prenatal education group, the prenatal depression score was lower in the prenatal education group (6.67 ± 4.12 vs 8.55 ± 5.11, p < 0.01). In addition, the score of each MFA dimension was higher in the prenatal education group than in the no prenatal education group (74.25 ± 6.99 vs 71.63 ± 7.68, p < 0.01; 27.87 ± 4.36 vs 26.80 ± 5.15, p < 0.05; 46.39 ± 4.19 vs 45.01 ± 5.66, p < 0.05).

**Table 1** Comparison of prenatal depression scores and MFA between the prenatal education and no prenatal education groups

| Variable           | Prenatal education group | No prenatal education group | t/Z    | p    |
|--------------------|--------------------------|-----------------------------|--------|------|
| EPDS score         | 6.67±4.12                | 8.55±5.11                   | -3.291 | 0.001|
| Total score of MFA | 74.25±6.99               | 71.63±7.68                  | 3.063  | 0.006|
| MFA intensity      | 27.87±4.36               | 26.80±5.15                  | -2.236 | 0.025|
| MFA quality        | 46.39±4.19               | 45.01±5.66                  | -1.967 | 0.049|

Legend: 1. EPDS, Edinburgh Postpartum Depression Scale.

2. MFA, Maternal-fetal attachment.

As seen in Table 2, the score of MFA quality was significantly negatively correlated with the score of attachment avoidance and prenatal depression (p < 0.05; p < 0.01), while the score of attachment avoidance was positively correlated with the score of prenatal depression (p < 0.05).

**Correlation analysis results for each variable**

**Table 2** Correlation analysis results of each variable

| Variable          | Avoidance | Anxiety | EPDS score | Total score of MFA | MFA intensity | MFA quality |
|-------------------|-----------|---------|------------|--------------------|---------------|-------------|
| Avoidance         | 1.000     |         |            |                    |               |             |
| Anxiety           |           | 1       |            |                    |               |             |
| EPDS score        | 0.210*    | 0.407*  | 1          |                    |               |             |
| Total score of MFA| -0.154    | 0.059   | -0.047     | 1                  |               |             |
| MFA intensity     | -0.091    | 0.134*  | 0.119      | 0.837*             | 1             |             |
| MFA quality       | -0.204*   | -0.052  | -0.202**   | 0.830*             | 0.446*        | 1           |

Legend: *p < 0.05, **p < 0.01


**Exploratory analysis**

The mother’s prenatal depression score played an intermediary role between the mother’s attachment avoidance and MFA quality. Mother attachment avoidance had an indirect effect on MFA quality ($b = -0.2268$, 95% CI = [-0.5171--0.0676]). Figure 1 shows the coefficients of the relationships among the independent, mediating, and outcome variables.

**Discussion**

To the best of our knowledge, this is the first study on the effects of attachment and prenatal depression on MFA in pregnant women who received antenatal education. These results are helpful for understanding the influence of attachment and depression on MFA.

In our study, a total of 38.53% of the participants suffered from prenatal depression, which is higher than that reported in the existing literature [21]. A possible explanation is that the pregnant women we included were in their third trimester and, the fear of delivery during this time was accompanied by increased fatigue, physical pain, poor sleep, and frequent urination. Another explanation is that the EPDS diagnostic criteria for depression may be different in foreign studies. Nevertheless, the results showed that prenatal depression was very common in the third trimester of pregnancy and should be given adequate attention.

According to whether the participants received prenatal education in the hospital during their latest pregnancy, our research results showed that the pregnant mothers who had received prenatal education had higher MFA and lower prenatal depression scores than those who had not received prenatal education. Our results were consistent with the results obtained in a previous study [22]. Prenatal education not only increased the rates of prenatal examinations and promoted communication with doctors but also improved women’s attitudes towards delivery [16]. In addition, prenatal education can help pregnant women accept and adapt to the role of mother [23].

Further analysis revealed that maternal attachment avoidance was negatively related to MFA quality, which is consistent with previous research results [24]. People with secure attachment are more likely to assume the role of a parent [25]. Self-reported romantic attachment predicts high avoidance scores on the parental role scale in pregnant women, and they may face difficulties in developing their maternal identity [12]. Those who attached great importance to attachment avoidance felt uncomfortable with intimacy and invalidated the attachment system [26]. In fact, when perceiving positive emotional information, people with high attachment avoidance are unable to experience positive emotions; to avoid the activation of the attachment system, they tend to deactivate their emotional channels and hide their feelings [27]. Thus, we can infer that in the third trimester, pregnant women with high avoidance may not respond to fetal movement, and as a result, the emotional experience with regard to the fetus may be relatively low.

The exploratory mediation analysis showed that low maternal attachment avoidance directly and indirectly reduced the MFA quality score through the prenatal depression score. The results suggested
that an avoidance attitude toward the attachment subjects rendered them susceptible to the interference of depression symptoms, reducing emotional investment in the fetus. The possible mechanism is that the internal working model of attachment has an important impact on an individual's cognition, emotion, and behavior with regard to interpersonal communication, and the avoidance attachment model formed in childhood leads to a sense of mistrust of others in pregnant women. This internal working model is triggered by stressful events such as pregnancy and leads to depression during pregnancy, further reducing the emotional investment and energy devoted to the fetus, that is, poor MFA. Condon indicated that parental psychological variables could affect MFA quality. Moreover, attachment avoidance-related deactivation strategies are associated with depression maintenance [18]. In a recent study by Huang and colleagues, the prenatal maternal depression score affected the MFA score [28]. It seems that attachment avoidance and the prenatal depression score both affect the mother's intimate connection to the unborn fetus. However, no mediating role of the prenatal depression score was observed in attachment anxiety and attachment intensity, and a previous study showed that caregivers with a higher degree of avoidance are less responsive than those with a lower degree of avoidance [29]. Attachment quality is related to the mental health of mothers, while the intensity of attachment has nothing to do with mental health [30]. Our results revealed the relationship between attachment avoidance and the prenatal depression score and their effects on the degree of emotional communication and interaction between the mother and the fetus, further providing a basis for understanding the development of maternal-fetal relationships. In addition, prenatal depression symptoms were found to be negatively correlated with prenatal MFA [31, 32].

In prenatal screening, the timely detection of low-quality MFA and the application of effective interventions on the basis of the prenatal depression score or the type of mother attachment can help pregnant women adapt to their changing role in a timely manner. This can prevent incidents such as domestic child violence and allow women to better care for their newborn to ensure healthy and balanced development [33].

Our study has two limitations. First, this study was restricted by its cross-sectional design, and we did not track postpartum maternal and infant attachment, which should be evaluated in the next step of our work. In addition, data collection was based on a convenience sampling, so our participants may not represent the general pregnant population. However, despite these limitations of our research, our findings provide new ways insights into antenatal education and interventions.

**Conclusions**

The study revealed the importance of adult attachment and maternal depression in improving MFA, especially in pregnant women who receive prenatal education. Our results suggest that prenatal education should be highly promoted. Moreover, reducing the prenatal depression score may have the potential to improve MFA. For example, to improve pregnant women's understanding of these psychological conditions during the pregnancy period, their depression tendency should be considered in the prenatal education course, and corresponding nursing measures should be implemented. In addition,
the personality characteristics of pregnant women, such as attachment, should also be seriously considered. Institutions should help people with different attachment dimensions and offer them appropriate guidance to better adapt the role of mother. Early assessment of mothers’ mental health, including attachment during pregnancy, is necessary to identify high-risk mothers [18], and preventive interventions to improve attachment quality and early evaluations are more cost-effective.

**Abbreviations**

**EPDS:** Edinburgh Postpartum Depression Scale.

**ECR:** Experience of Close Relationship

**MAAS:** Maternal Antenatal Attachment Scale

**MFA:** Maternal-fetal attachment

**CI:** Confidence interval

**Declarations**

**Ethics approval and consent to participate**

The ethics committee of Chaohu Hospital of Anhui Medical University approved the study protocol. All participating pregnant women signed an informed consent form.

**Consent for publication**

All participants agreed to record and publish anonymous data.

**Availability of data and materials**

All the data supporting our findings have been presented in the manuscript; the datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The author did not report potential conflicts of interest.

**Funding**

This study was supported by the National Natural Science Foundation of China (81801341), the Anhui Provincial Key R&D Programme (202004j07020030). These funds are only used to provide a small amount of financial compensation for each research participant participating in the research.

**Authors' contributions**
The manuscript was designed by written by authors LZ and KZ. Data was collected by LZ and LW, analysed by LZ, QY, SC, CH, and verified by XZ. All authors read and approved the final manuscript.

Acknowledgements

We would like to profoundly thank all the pregnant women who participated in this study and the medical staff in the antenatal clinic of the Chaohu Hospital of Anhui Medical University who cooperated with us.

References

1. Zhang L, Yang X, Zhao J, Zhang W, Cui C, Yang F, Ma R, Jia Y. Prevalence of Prenatal Depression Among Pregnant Women and the Importance of Resilience: A Multi-Site Questionnaire-Based Survey in Mainland China. Frontiers in psychiatry. 2020;11:374.

2. Binda V, Figueroa-Leigh F, Olhaberry M. Antenatal and postnatal depressive symptoms: Association with quality of mother-infant interaction. Infant Behav Dev. 2019;57:101386.

3. Lahti M, Savolainen K, Tuovinen S, Pesonen AK, Lahti J, Heinonen K, Hämäläinen E, Laivuori H, Villa PM, Reynolds RM, et al. Maternal Depressive Symptoms During and After Pregnancy and Psychiatric Problems in Children. J Am Acad Child Adolesc Psychiatry. 2017;56(1):30–9.

4. Perry DF, Ettinger AK, Mendelson T, Le HN. Prenatal depression predicts postpartum maternal attachment in low-income Latina mothers with infants. Infant Behav Dev. 2011;34(2):339–50.

5. Alhusen JL, Gross D, Hayat MJ, Rose L, Sharps P: The role of mental health on maternal-fetal attachment in low-income women. Journal of obstetric, gynecologic, and neonatal nursing: JOGNN 2012, 41(6):71–81.

6. McFarland J, Salisbury AL, Battle CL, Hawes K, Halloran K, Lester BM. Major depressive disorder during pregnancy and emotional attachment to the fetus. Arch Women Ment Health. 2011;14(5):425–34.

7. Rubertsson C, Pallant JF, Sydsjö G, Haines HM, Hildingsson I. Maternal depressive symptoms have a negative impact on prenatal attachment – findings from a Swedish community sample. Journal of Reproductive Infant Psychology. 2015;33(2):153–64.

8. Alhusen JL. A literature update on maternal-fetal attachment. Journal of obstetric gynecologic neonatal nursing: JOGNN. 2008;37(3):315–28.

9. Petri E, Palagini L, Bacci O, Borri C, Teristi V, Corelli C, Faraoni S, Antonelli P, Cargioli C, Banti S, et al: Maternal-foetal attachment independently predicts the quality of maternal-infant bonding and post-partum psychopathology. The journal of maternal-fetal & neonatal medicine: the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2018, 31(23):3153–3159.

10. Monk C, Leight KL, Fang Y. The relationship between women’s attachment style and perinatal mood disturbance: implications for screening and treatment. Arch Women Ment Health. 2008;11(2):117–29.
11. Daglar G, Nur N. Level of mother-baby bonding and influencing factors during pregnancy and postpartum period. Psychiatria Danubina. 2018;30(4):433–40.
12. Zdolska-Wawrzkiewicz A, Chrzan-Dętkoś M, Bidzan M. Maternal attachment style during pregnancy and becoming a mother in Poland. Journal of reproductive infant psychology. 2018;36(1):4–14.
13. Chen J, Huang J, Ooi S, Lin L, Chen C, Liu Y, Yao S. Effect of flexible patterns of health education on enhancing the compliance of pregnant women from Tibet, China. Medicine. 2020;99(1):1–5.
14. Yikar SK, Nazik E. Effects of prenatal education on complaints during pregnancy and on quality of life. Patient Educ Couns. 2019;102(1):119–25.
15. Bahrami N, Simbar M, Bahrami S. The Effect of Prenatal Education on Mother's Quality of Life during First Year Postpartum among Iranian Women: A Randomized Controlled Trial. International journal of fertility sterility. 2013;7(3):169–74.
16. Shi Y, Wang D, Yuan Y, Jiang Y, Zeng Q, Chang C. The effect of prenatal education curriculum on mother's prenatal examination utilization, delivery mode and recovery status: a cross-sectional survey in China. Environ Health Prev Med. 2015;20(6):397–403.
17. Nonnenmacher N, Noe D, Ehrenthal JC, Reck C. Postpartum bonding: the impact of maternal depression and adult attachment style. Arch Women Ment Health. 2016;19(5):927–35.
18. Condon JT. The assessment of antenatal emotional attachment: development of a questionnaire instrument. Br J Med Psychol. 1993;66(2):167–83.
19. Li T, Kazuo K. Measuring Adult Attachment: Chinese Adaptation of the ECR Scale. Acta Psychologica Sinica. 2006;38(3):399–406.
20. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. The British journal of psychiatry: the journal of mental science. 1987;150:782–6.
21. Gelaye B, Rondon MB, Araya R, Williams MA. Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. The lancet Psychiatry. 2016;3(10):973–82.
22. Chang S, Park S, Chung C. Effect of Taegyo-focused prenatal education on maternal-fetal attachment and self-efficacy related to childbirth. Taehan Kanho Hakhoe chi. 2004;38(8):1409–15.
23. Altiparmak S, Coşkun AM. Effect of prenatal training on information and satisfaction level of a pregnant woman. Journal of Human Sciences. 2016;13(2):2610–20.
24. Selcuk E, Günaydın G, Sumer N, Harma M, Salman S, Hazan C, Dogruyol B, Ozturk A. Self-reported romantic attachment style predicts everyday maternal caregiving behavior at home. J Res Pers. 2010;44(4):544–9.
25. Chrzan-Dętkoś M, Łockiewicz M. Maternal romantic attachment, and antenatal and postnatal mother–infant attachment in a sample of Polish women. European Journal of Developmental Psychology. 2015;12(4):429–42.
26. Walsh J, Hepper EG, Marshall BJ. Investigating attachment, caregiving, and mental health: a model of maternal-fetal relationships. BMC Pregnancy Childbirth. 2014;14(1):1–9.

27. White LO, Wu J, Borelli JL, Rutherford HJ, David DH, Kim-Cohen J, Mayes LC, Crowley MJ. Attachment dismissal predicts frontal slow-wave ERPs during rejection by unfamiliar peers. Emotion. 2012;12(4):690–700.

28. Huang YL, Chen SH, Tseng HH. Attachment avoidance and fearful prosodic emotion recognition predict depression maintenance. Psychiatry research. 2019;272:649–54.

29. Feeney BC, Collins NL. Predictors of caregiving in adult intimate relationships: an attachment theoretical perspective. J Personal Soc Psychol. 2001;80(6):972–94.

30. Condon JT, Corkindale C. The correlates of antenatal attachment in pregnant women. Br J Med Psychol. 1997;70(4):359–72.

31. McNamara J, Townsend ML, Herbert JS. A systemic review of maternal wellbeing and its relationship with maternal fetal attachment and early postpartum bonding. PloS one. 2019;14(7):e0220032.

32. Rollè L, Giordano M, Santoniccolo F, Trombetta T. Prenatal Attachment and Perinatal Depression: A Systematic Review. International journal of environmental research and public health 2020, 17(8).

33. Flexon JL, Greenleaf RG, Lurigio AJ. The effects of self-control, gang membership, and parental attachment/identification on police contacts among Latino and African American youths. Int J Offender Ther Comp Criminol. 2012;56(2):218–38.