

PRENATAL DEPRESSION'S IMPACT ON NEWBORNS AND LONG-TERM EFFECTS ON CHILD DEVELOPMENT

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REVIEW

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ABSTRACT

Background: Depression throughout pregnancy may be a drawback that's still under-addressed in midwifery services, so many studies have found that there is an influence between pregnancy depression on child development in the future.

Objective: To understand prenatal depression's impact on newborns and its long-term effects on child development from mothers who are depressed during pregnancy.

Methods: The author used 10 reliable journals that discuss the impact of prenatal depression on birth outcomes and long-term effects on child development.

Results: Several studies have additionally shown that prenatal depression has an effect on child development. The importance of paying attention to the mental health of mothers by partners, health workers, and the State is a preventive measure for children's health in the future.

Conclusion: There are relationships between prenatal depression on child development, both emotional, behavioral, affective problems, physical growth, intelligence, neurobehavioral development, and other problems which can continue to affect their life. Besides, some studies suggest there is no relationship between prenatal depression and some developmental problems in children. It is better if health workers as doctors and midwives pay attention to the importance of maintaining the mental health of pregnant women as an initial preventive measure.

Keywords: prenatal depression, newborns, child development.

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INTRODUCTION

Depression is a common psychological disorder and often occurs in pregnant women, usually characterized by several symptoms, namely, the mother feels disappointed, feels sad, feels inferior, has sleep disturbances, decreased appetite, gets tired easily, and finds it difficult to concentrate. Prenatal depression can affect a woman's quality of life and is one of the leading causes of disease burden in developed and developing countries. Prenatal depression accounts for approximately 6.2% of life-occurring disabilities.^{1,2} Depression is also one of the risk factors that has a negative effect on birth outcomes during the prenatal period. Depression during pregnancy has been linked to preterm birth (PTB), small for gestational age (SGA), and low birth weight (LBW) in both low, and high-income countries, according to reports.³⁻⁶

Clinical studies show that there is a relationship between the experiences of pregnant women who experience trauma, chronic stress, and others' experience (such as heartaches, busy work schedules, and earthquakes) and changes that occur

significantly in children's neurodevelopment, risk of being left-handed, autism, affective disorders, and cognitive abilities on the child.⁷ Another study found that anxiety or depression experienced by mothers during the prenatal period has shown to have an increased incidence of neurodevelopmental disorders in children, as well as an increase in the risk of developing mental illness for children in the future, in addition to other reports showing that the incidence of depression and judgment during prenatal have linked to children's emotional disabilities.⁸ The aim of this research is to look into prenatal depression's impact on newborns and its long-term effects on the child development of mothers who suffered depression during pregnancy through a literature study.

METHOD

The researcher used 10 journals and literature that discuss prenatal depression's impact on newborns and its long term effects on child development. All the studies were searched from PLOS ONE, Pubmed, NCBI, and Elsevier and analyzed by research using a traditional review.

RESULT

Between 2009 and 2020, a total of ten studies were conducted. Five of these focus on the impact of prenatal depression on newborns. Others focused on the child development of mothers who experienced depression during pregnancy (table 1).

DISCUSS

Prenatal Depression's Impact On Newborn

Even though it has been extensively researched, many concerns about the effect of antenatal depression on adverse birth outcomes remain unanswered. Women with prenatal depression had a 3.22 times higher risk of stillbirth than women with good coping skills, according to a study cohort of 895 pregnant women in Gondar Town, Ethiopia. In comparison to respondents who were not depressed and had support from their partner, the risk of preterm birth was 4.38 times higher for respondents who experienced depression and received moderate support and 4.99 times higher for respondents who experienced depression and received low support. When comparing respondents with mild depression and bad support to respondents without mild depression and strong support, the risk of low birth weight was 3.4 times higher. Indirectly impact on the respondent's ability to cope with stress during major events was also observed. Preterm birth was linked to low birth weight, and there was a strong link between partner support, tobacco use, and low birth weight rates. In conclusion, prenatal depression does not directly influence the incidence of low-birth-weight risk.⁹

Depression during prenatal can be helped through positive support from partners and the ability to manage stress, due to the 4.38- and 4.99-times higher incidence of preterm birth experienced by mothers with poor partner support and the inability to manage stress. Prenatal depression had a major indirect impact on partner-supported preterm birth and childbirth anxiety but had different direct beneficial effects on the incidence of preterm birth. Good spouse support is linked to a lower risk of maternal depression and a lower risk of preterm birth, implying that support for pregnant women at risk should be increased.⁹

Other research has found a connection between depression during the prenatal period and fetal growth. There was a link between prenatal depression and fetal development, despite the fact that there was no statistically significant link between prenatal depression and pregnancy. Depression during pregnancy also had more impacts on the risk of low birth weight than spontaneous early labor, length of pregnancy, and preterm birth. What's worth noting is that depression and stress are different phenomena.¹⁰

A study in Hanoi (Vietnam) found that depressive symptoms were linked to an increased risk of preterm birth and low birth weight, but had no connection to cases of low gestational age.¹⁶ Meanwhile, a study in Korea found that children of women who experience prenatal depression tend to have lower birth weights than women who do not experience depression during pregnancy. Although, if related to gestational age, women who experience prenatal depression tend to have a lower gestational age week compared to women who do not. According to the findings of this research, depression is not linked to the occurrence of low birth weight at term but is linked to gestational age. There is a connection between prenatal

depression and birth weight, which may be due to depression during pregnancy.¹⁴

There are different results between studies conducted in developed and developing countries. Studies in developing countries such as Vietnam, Brazil, and Pakistan, or in populations with a lower socioeconomic status, appear to produce different results than studies in developed countries such as the United States and the United Kingdom, which typically find no connection between prenatal depression and birth weight. Maybe because women who experience prenatal depression and have low socioeconomic status are more prone to being exposed to risk factors such as malnutrition than mothers with prenatal depression in developed countries with high economic.¹⁴

Prenatal depression affects 15 to 65 percent of women around the world. Babies born to mothers who were depressed during their pregnancy had a 1.49 times higher risk of Low Birth Weight and preterm birth. Both genetically and environmentally, the causes of maternal depression and adverse birth effects are well understood. Hormonal dysregulation, prenatal depression, and chronic stress are known to trigger changes in the function of the hypothalamic-pituitary-adrenal axis (HPA), which may result in the activation of cortisol output and release, preventing nutrients and oxygen from reaching the fetus. Depression during pregnancy appears to affect the function of the mother's body systems with a glucocorticoid hormone imbalance which increases susceptibility to fight microbial infections and can lead to poor fetal growth. Meanwhile, prenatal depression and socio-environmental factors can make the mother rarely or unwilling to access health services then can have an impact on the mother's nutritional status during pregnancy (either under or over-nutrition status).¹⁷

Antenatal Depression and Child Development

Many studies have shown that prenatal depression affects a child's growth. According to one systematic review report, newborns of depressed mothers have low orientation, motor skills, the spectrum of states, autonomic stability, and have high Brazelton scale depression scores, and also had higher cortisol levels, while levels of dopamine and serotonin tend lower. Symptoms of major depression during prenatal pressure were also treated with unhealthy nutritional status and were prospectively associated with the impaired cognitive function of the four-year-old child. Other research indicates that children aged 7 and 8 years old whose mothers suffer from clinical depression are more likely to develop emotional-behavioral issues and affective disorders, and exposure to untreated depression during pregnancy have associated with persistent developmental and affective problems.¹¹

Maternal depression during pregnancy is linked to issues such as slow growth and an increased risk of diarrhea in babies. Bodyweight and child adiposity show a different outcome or relationship between mothers with prenatal depression and mothers with postpartum depression. Children born to mothers who suffered from prenatal depression had a lower body weight than children born to mothers who were stable during their pregnancy or children who were subjected to symptoms after birth at the age of three. The systematic review study in the laboratory also found an increase in salivary cortisol levels in children with stressors if compared with children who did not have depressed mothers. In addition, one longitudinal study in the community found that over 16 years following their pregnancy index, nearly two out of three mothers reported a depressive episode that became so severe that it had to be

treated by psychiatry so as not to interfere with their daily activities. This problem probably has an impact on their ability to care for and raise their children. What is surprising is that adolescents aged 16 who were exposed to maternal depression were 4.7 times more likely to experience depression than adolescents who were not exposed. Interestingly, they are significantly more likely to fall into crime.¹¹

Another study stated that the psychological condition of pregnant women has a relation to the development of the fetal neurobehavioral system and continues with the outcome of the child. The results of this study are consistent with the literature supporting the hypothesis of fetal origin, namely that exposure to the prenatal environment, including maternal psychological conditions during pregnancy and uterine physiology, has a lasting effect on one human life cycle.¹² Another study indicated that depressive symptoms during pregnancy predicted poor physical health in childhood, and also partially can affect the health of early childhood in mothers who still have depression since pregnancy. Not only that, but in 20-year-olds, even poor physical health during childhood can lead to increased stress, poor health, and social functioning. So that it can cause illness at high levels of stress, poor health and social functioning can report the prevalence of depression symptoms in adolescents and young adults. Depression also has a significant direct impact on depression in adolescence and other psycho-social effects caused by poor health at an early age.¹³

A cohort study in South London found a significant relationship between maternal depression and children's emotional issues. Prenatal depression is also one of the reasons why children attend schools with special needs. In addition, the

significant consequences of pregnancy depression are also related to behavioral problems in children, as well as the cause of cognitive impairment in them (IQ below 81). That problem can cause considerable cost losses in various sectors in one country, The expense of the public sector exceeds £ 3,030, income is £ 1,400, and the cost of health-related loss of quality of life is almost £ 3,760.¹⁸

In contrast to the above studies, there was no association between depression during pregnancy and other variables such as height, weight, stunting, and obesity in children there is not even a relationship effect between maternal depression and negative outcomes in Sao Paulo's western region. First, it may be because based on a 1-year-old child, and of course, it is not too precise to carry out production in terms of their underdeveloped cognitive and social aspects. In addition, the average physical growth of children in the area is quite good, as evidenced by the low incidence of stunting, which is only 7%. It is known, that mental health during pregnancy also becomes more relevant as children are grown, despite other studies suggesting that the impacts of maternal depression during pregnancy in the early life of the child are evidence for various problems later in life. Second is the availability of access to health facilities in almost all study areas, thus facilitating monitoring of child developmental problems from an early age. The last, may be due to the relatively short EPDS scale and not being sensitive enough to provide a clear distinction between mothers who depression clinically and mothers who are healthy.¹⁵

Table 1. Prenatal Depression's Impact On Newborn and Long-Term Effects for Child Development

Author*	Method	Result
(9)	Cohort Study	- The incidence rate of stillbirths was 1.90%, low birth weight 5.25%, and preterm birth was 16.42%. - There is a relationship between partner support with depression, preterm birth, and low birth weight babies. - The risk of LBW cases was 9.44 times higher, and the risk of preterm birth was 2.19 times higher in respondents who had been exposed to tobacco. - Mothers with prenatal depression had a 3.22 times higher risk of stillbirth than mothers who did not suffer from prenatal depression.
(10)	Systematic Review	- Several studies have discovered a connection between prenatal depression, the occurrence of PTB, and gestational age. - Some reports have found Some studies have discovered a correlation between prenatal depression and cases of low birth weight.a link between prenatal depression and low birth weight cases. - The prevalence of low birth weight is a stronger effect of maternal depression than the length of pregnancy or preterm birth.
(11)	Systematic Review (43 articles)	Pregnancy result : - Prematurity and low birth weight - Preterm labor in women who have a BMI of 19 or higher prior to pregnancy. - Increases cases of preterm births and frequency of babies being admitted to the NICU. - The connection between prenatal depression and preterm birth or low birth weight is, however, debatable.. Fetal effects - Allister DKK (2001), Due to external stimuli, prenatal depression has a direct effect on fetal heart rate and activity changes. - Field DKK (2002), there an increase in fetal activity - Hyperactive in fetuses at five and seven months of gestation. (Dieter et al., 2001)

		Effects in newborns • Lundy et al (1999), Newborns of mothers with prenatal depression tend to have higher levels of the plasmatic hormone cortisol and norepinephrine than those who don't • A decrease in dopamine levels which was found in other studies (Field et al., 2004). • Low birth weight, preterm, and worsening neurobehavioral state. (Field et al., 1985) • Orientation, motor skills, the spectrum of states, autonomic stability, and depression scores on the Brazelton scale tend to be low (Field et al., 2004). • Tend to show less optimal behavior (Lundy et al., 1996). Impact on newborn and child • There was no connection between distress in the mother-baby bond and 14-month-old children whose mothers had a history of depressive disorders or depressive symptoms during pregnancy.. • Children aged 7 and 8 years of mothers who experience depression during pregnancy, especially depression, are at a higher risk of developing mental, behavioral, and affective disorders, according to Ashman Et al (2002). • Prenatal depression is the main factor contributing to external problems between mother and baby such as poor interaction between them, especially in children between 8 and 9 years • According to El Marroun Et al (2014), persistent affective and developmental problems tend to occur in fetuses. Weight (gain/loss) • Physical issues with the infant, such as slow growth and a high risk of diarrhea, keep maternal depression at bay until the baby is born (Rahman et al., 2004). • At age three years, children with antenatal depression have lower body weight Compared to children born to stable mothers or children prone to maternal symptoms after birth, they have more central adiposity (Ertel et al., 2010). Adolescents • Adolescents who were exposed to mothers who had antenatal depression at the age of 16 were 4.7 times more likely to develop depression than those who were not. • Boys who are vulnerable to prenatal depression have a substantially higher chance of committing crimes.
(12)	Systematic review	Agrees with the <i>fetal origin hypothesis</i> states that the environment during pregnancy include the psychological state of mothers, have an effect on the physiology of the uterus and an impact on individual who exposed by prenatal depression on their whole life
(13)	Longitudinal study. 815 Australian teenagers and their mothers were included in the study, and they were tracked for 20 years.	• Children from prenatal depression mothers can be predicted to have poor physical health during their childhood • Children exposed to prenatal depression with decreased physical health during childhood are more likely to experience increased stress, which can worsen their health and social functioning by age 20 • Mothers experiencing prenatal depression have an indirectly significant effect on the incidence of depression in adolescents due to poor health at an early age and other risks.
(14)	Prospective cohort study.	• Low birth weight is more common in children whose mothers have prenatal depression than in children whose mothers are mentally stable during pregnancy, this link is weak when gestational age is considered. • Children of women with prenatal depression during pregnancy have a lower pregnancy rate of several weeks than women who are psychologically healthy during pregnancy. • When pregnancy was considered, there was no connection between prenatal depression and infant birth weight..
(15)	Cohort study	• Depression in mothers during pregnancy is not associated with height, weight gain, stunting, and obesity in children later in life.

		• There was a positive relationship between the measurement results using the <i>Age and Stages Questionnaire</i> and depression. • There was no connection between prenatal depression and any of the studied variables.
(16)	Cohort study	Prenatal depression symptoms were found to be substantially linked to the risk of preterm birth and delivering babies with low birth weight. There was no connection between prenatal depression symptoms and the gestational age of the mother.
(17)	Systematic reviews	• worldwide prevalence of prenatal depression ranges from 15-65% • The results reported the main causes of prenatal depression based on the level of influence were: abuse and violence, lack of support from partners or social (4 articles, 47 studies), a history of maternal or hereditary disorders in the family. • Low birth weight and preterm babies were 1.49 and 1.40 times more likely in children whose mothers had prenatal depression, respectively..
(6)	A meta analysis.	• Prenatal stress has an average effect of OR = 1.66 (95 percent CI = 1.54-1.79) on social and emotional issues in children. • Depression had a higher (OR = 1.79; 95 percent CI = 1.61-1.99) effect than anxiety, which had a lower (OR = 1.50; 95 percent CI = 1.36-1.64) impact. The results of an analysis showing that the impact of depression is more severe when the socio-demographic risk increases • The findings of a study indicating that depression has a greater effect as socio-demographic risk rises.
(18)	Cohort Study	• Children exposed to prenatal depression are more at risk of developing problems such as emotional imbalance, behavior, k = cognitive function around 5% -21%, there is also a high risk that 24% of children enter schools with special educational needs • There are economic loss caused by children who exposed to prenatal depression.

*: seen in references

CONCLUSION

Despite the impact of adverse birth outcomes on mothers with antenatal depression, there is still no definite conclusion. However, many studies show that indirectly, antenatal depression has a relationship with a negative birth result such as low birth weight, premature babies, and gestation age which are also related to the economic situation of the community, husband's support, and nutrition during pregnancy. Several studies conducted, that there a relationship between prenatal depression on child development, both emotional, behavioral, and affective problems, physical growth, intelligence, neurobehavioral development, and other problems which can continue affects their life. Besides, some studies suggest there is no relationship between prenatal depression and some developmental problems in children. It is better if health workers as doctors and midwives pay attention to the importance of maintaining the mental health of pregnant women as an initial preventive measure.

REFERENCES

1. Institute for Health Metrics and Evaluation (IHME). GBD Compare visualizations. Seattle, WA IHME, Univ Washingt [Internet]. 2015;2015. Available from: <http://vizhub.healthdata.org/gbd-compare>.
2. Ferrari AJ, Charlson FJ, Norman RE, Patten SB, Freedman G, Murray CJL, et al. Burden of Depressive Disorders by Country, Sex, Age, and Year: Findings from the Global Burden of Disease Study 2010. *PLoS Med*. 2013;10(11).
3. Grote NK, Bridge JA, Gavin AR, Melville JL, Iyengar S, Katon WJ. A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Arch Gen Psychiatry*. 2010;67(10):1012–24.
4. Brittain K, Myer L, Koen N, Koopowitz S, Donald KA, Barnett W, et al. Risk factors for antenatal depression and associations with infant birth outcomes: Results from a south african birth cohort study. *Paediatr Perinat Epidemiol*. 2015;29(6):504–14.
5. Henriksen L, Schei B, Vangen S, Lukasse M. Sexual violence and neonatal outcomes: A Norwegian population-based cohort study. *BMJ Open*. 2014;4(10).
6. Niemi M, Falkenberg T, Petzold M, Chuc NTK, Patel V. Symptoms of antenatal common mental disorders, preterm birth and low birthweight: A prospective cohort study in a semi-rural district of Vietnam. *Trop Med Int Heal*. 2013;18(6):687–95.
7. Talge NM, Neal C, Glover V. Antenatal maternal stress and long-term effects on child neurodevelopment: How and why? *J Child Psychol Psychiatry Allied Discip*. 2007;48(3–4):245–61.
8. O'Connor TG, Heron J, Golding J, Glover V. Maternal antenatal anxiety and behavioural/emotional problems in children: A test of a programming hypothesis. *J Child Psychol Psychiatry Allied Discip*. 2003;44(7):1025–36.
9. Dadi AF, Miller ER, Woodman RJ, Azale T, Mwanri L. Effect of antenatal depression on adverse birth outcomes in Gondar town, Ethiopia: A community-based cohort study. *PLoS One* [Internet]. 2020;15(6):1–23. Available from: <http://dx.doi.org/10.1371/journal.pone.0234728>

10. Accortt EE, Cheadle ACD, Dunkel Schetter C. Prenatal Depression and Adverse Birth Outcomes: An Updated Systematic Review. Vol. 19, *Maternal and Child Health Journal*. 2015. 1306–1337 p.
11. Gentile S. Untreated depression during pregnancy: Short- and long-term effects in offspring. A systematic review. *Neuroscience* [Internet]. 2017;342:154–66. Available from: <http://dx.doi.org/10.1016/j.neuroscience.2015.09.001>
12. Kinsella MT, Monk C. Impact of maternal stress, depression and anxiety on fetal neurobehavioral development. *Clin Obstet Gynecol*. 2009;52(3):425–40.
13. Raposa E, Hammen C, Brennan P, Najman J. The long-term effects of maternal depression: Early childhood physical health as a pathway to offspring depression. *J Adolesc Heal*. 2014;54(1):88–93.
14. Chang HY, Keyes KM, Lee KS, Choi IA, Kim SJ, Kim KW, et al. Prenatal maternal depression is associated with low birth weight through shorter gestational age in term infants in Korea. *Early Hum Dev* [Internet]. 2014;90(1):15–20. Available from: <http://dx.doi.org/10.1016/j.earlhumdev.2013.11.006>
15. Brentani A, Fink G. Maternal depression and child development: Evidence from São Paulo's Western Region Cohort Study. *Rev Assoc Med Bras*. 2016;62(6):524–9.
16. Van Ngo T, Gammeltoft T, Nguyen HTT, Meyrowitsch DW, Rasch V. Antenatal depressive symptoms and adverse birth outcomes in Hanoi, Vietnam. *PLoS One*. 2018;13(11):1–13.
17. Dadi AF, Miller ER, Bisetegn TA, Mwanri L. Global burden of antenatal depression and its association with adverse birth outcomes: An umbrella review. *BMC Public Health*. 2020;20(1).
18. Bauer A, Pawlby S, Plant DT, King D, Pariante CM, Knapp M. Perinatal depression and child development: Exploring the economic consequences from a South London cohort. *Psychol Med*. 2015;45(1):51–61.