

AFFECTIVE DEVELOPMENT OF CHILDREN DUE TO ANXIETY DURING PREGNANCY: A LITERATURE REVIEW

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ABSTRACT

Given its potential to affect the growing fetus, maternal mental health during pregnancy is essential. Anxiety during pregnancy is associated with the socio-emotional development of the child, potentially resulting in behavioral and emotional issues in the future. Children of mothers who experience anxiety during pregnancy are predicted to experience poorer growth and development in infancy and preschool age. This study aims to determine the effects of anxiety during pregnancy. This study used a literature review approach from 8 relevant articles from the online databases Scopus, PubMed, Google Scholar, and Garuda. The inclusion criteria of this study were original research in Indonesian or English, respondents measured anxiety during pregnancy, and measurement of infant/child affective patterns, which were fully accessible. The findings indicated that a child's affective development and anxiety during pregnancy are significantly correlated. It can be characterised by decreased attention to facial expressions in infants crying, sleeping, and feeding. In addition, the child may experience impaired socio-individual neurodevelopment, fine motor and emotional development, and poorer language. This can lead to negative behavioral development, such as hyperactivity and emotional disturbances, from preschool to adulthood. The more often and longer the mother experiences anxiety, the more likely the child is to have emotional and behavioral disorders.

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Highlights:

1. The link between problems with development in children and maternal prenatal anxiety is of great interest.
2. However, Long-term developmental consequences from infancy to preschool have not received much attention.

INTRODUCTION

In a clinical and public health context, anxiety is a significant health risk. This includes that experienced by pregnant

women. Women who experience significant physical and psychological changes during pregnancy are more likely to experience symptoms of anxiety and depression¹.

Pregnancy-related anxiety is detrimental to both the mother's and the child's health². Pregnant women who have it are more likely to have a caesarean delivery and to experience eating disorders³, increasing the prevalence of depression⁴, decreased sleep quality⁵, increased risk of suicide⁶, and postpartum emotions and negative parenting behaviors⁷. Feelings of fear and worry are hallmarks of mental health conditions known as anxiety disorders, which usually arise as a response to excessive fear or excessive worry about a particular situation⁸. Anxiety in pregnant women depends on the risk factors that affect it. The higher the risk factors for pregnant women's pregnancy, the higher the anxiety level of the mother^{9,10}.

Maternal mental health during pregnancy should be of particular concern as it can potentially hurt the developing fetus⁸ both physiologically, emotionally, and cognitively¹¹. A lower gestational age is linked to anxiety throughout pregnancy. And hurts fetal neurodevelopment and childbirth outcomes¹². Among them may increase the risk of low birth weight¹³, allergic disorders^{14,15}, increased risk of childhood asthma and poorer growth in infancy and preschool age¹⁶, higher body mass index at 54 months of age¹⁷, emotional and behavioral problems¹⁸, lower estimates of infant brain development¹⁹, and negative temperament²⁰ in their children.

Because of the fetus's quick development, early life events can affect neurodevelopment, potentially increasing susceptibility to developmental and neuropsychiatric problems²¹. Maternal control of emotional states is critical for children during pregnancy and childhood²². Mothers who manage their emotions are

less likely to experience affective problems in infants²³. Nevertheless, stress, anxiety, and depression during pregnancy frequently go undiagnosed by medical practitioners and are poorly managed²⁴. Given that the prevalence of anxiety and depressive symptoms during pregnancy and after childbirth varies widely across regions and poses significant risks to mothers and their babies, this study aimed to describe the effects that anxiety during pregnancy can have, particularly on the child's affective development.

METHODS

This type of research is descriptive observational, using a literature review method from various articles published in national and international journals. The research article was searched online through Scopus, PubMed, Google Scholar, and Garba Rujukan Digital (Garuda) databases. This method aims to increase knowledge and understanding of the topics discussed by presenting research results published in journals to provide factual information or analysis from relevant literature reviews.

This article review used eight published primary research articles to obtain research data. The literature reviewed was from 2019 to 2024, with the keywords anxiety, pregnancy, maternal, child, and development. The inclusion criteria of this study include original research in Indonesian or English, respondents measuring anxiety during pregnancy, and measurement of infant/child affective patterns, which can be accessed in full. The exclusion criteria are review articles that do not follow the research objectives.

RESULTS

Based on the review of eight articles, anxiety during pregnancy can significantly affect affective disorders in infants/children, as shown in Table 1.

The research is quantitative, based on the review of the eight articles above. It uses a prospective longitudinal study method and a cohort study, which observes respondents at certain times to see their

development from pregnancy to infancy/childhood, even preschool.

The respondents in the study were pregnant women up to the babies they had given birth to. Measured from the time of pregnancy, mainly from the second trimester gestational age and some from the first trimester, during labour to 1-8 weeks after delivery and preschool.

Table 1. Literature Review

Author	Title	Type, Sample, Research Location	Results
Schwarze et al. (2024) ²²	The role of perinatal maternal symptoms of depression, anxiety and pregnancy-specific anxiety for infants' self-regulation: A prospective longitudinal study	Prospective longitudinal study; N = 225 mother-infant dyads in Germany	Anxiety, particularly during a mother's pregnancy, was the most significant predictor of newborn self-regulation issues. It explained as much as 18% of the variance and predicted crying, sleeping, and feeding issues. Anxiety related to pregnancy was still a strong predictor of newborn self-regulation issues, even after considering the mother's postpartum emotional symptoms.
Zhang et al. (2023) ⁸	Impact of pregnancy-related anxiety on Preschoolers' emotional and behavioral development: Gender specificity, critical time windows, and the cumulative effect	Cohort study; N = 1699 mother-infant dyads in China	Preschool-aged children of moms with pregnancy anxiety are far more likely to exhibit aberrant mood or behavior. Compared to males, girls appear to be more susceptible to parental pregnancy anxiety, particularly in terms of emotional disruption. Pregnancy anxiety that occurs in the third trimester of pregnancy has a significant impact on children's emotional disturbance problems. Children who have emotional disorders and behavioral issues are more likely to be born to mothers who have had anxiety for an extended period throughout their pregnancy.
Rogers et al. (2023) ²⁵	Association of maternal and paternal perinatal depression and anxiety with infant development: A longitudinal study	Longitudinal study; N= 1539 mother-infant, 793 parent couples in Australia	Depressive and anxious feelings in mothers before childbirth have been linked to lower social-emotional and linguistic development in infants. Maternal anxiety symptoms were related to worse overall development at 8 weeks postpartum.
López-Morales et al. (2023) ²⁶	Prenatal anxiety during the pandemic context is related to the neurodevelopment of 6-month-old babies.	Longitudinal study; N = 105 mother-child dyads in Argentina	Negative experiences of the pandemic are indirectly related to children's socio-individual and fine motor neurodevelopment during the third trimester through signs of maternal anxiety, acting as a mediator.

McGuinn et al. (2022) ²⁷	The influence of maternal anxiety and cortisol during pregnancy on childhood anxiety symptoms	Cohort study; N=496 mother-infant dyads in Mexico	We discovered a link between increased anxiety symptoms in the mother during pregnancy and increased anxiety symptoms in the offspring (β : 1.30, 95% CI: 0.19, 2.41). We also found a correlation between increased maternal total cortisol production during pregnancy and increased child anxiety symptoms (β : 1.13, 95% CI: 0.25, 2.01).
Wang et al. (2021) ²⁸	Gender-specific effect of pregnancy-related anxiety on preschoolers' emotional and behavioral development: A population-based cohort study	Cohort study; N = 3443 mother-infant dyads in China	Anxiety related to pregnancy was present in 31.6% of cases overall. Preschool boys born to mothers who experienced pregnancy-related anxiety in the first and third trimesters were more likely to have behavioral issues than those whose mothers did not experience such anxiety during pregnancy. Anxiety related to pregnancy during the first, third, and both trimesters has been linked to hyperactivity and complex issues in preschoolers. Anxiety associated with pregnancy during the first trimester and in the first and third trimesters raised the risk of emotional issues and complex problems for preschool girls.
Thiel et al. (2020) ²⁹	Specific relations of dimensional anxiety and manifest anxiety disorders during pregnancy with difficult early infant temperament: A longitudinal cohort study	Cohort study; N = 2206 mother-infant pairs in Norway	Eight weeks after giving birth, some distinct and noteworthy factors may contribute to a difficult infant's temperament, including generalised anxiety disorder, agoraphobia, fear of labor, and specific phobias.
Porter et al. (2019) ³⁰	Perinatal maternal mental health and infant socio-emotional development: A growth curve analysis using the MPEWS cohort	Cohort study; N=282mother - infant dyads in Australia	Mothers who experience symptoms of depression and anxiety in early pregnancy have the potential to cause impaired social development and the development of their children's emotions. 19% of moms reported feeling anxious, and 23% of mothers with depression had children with emotional problems.

DISCUSSION

The time during pregnancy is challenging because it encompasses social, psychological, and physiological elements; women who experience problems from any of these conditions will experience depression, anxiety, or stress, which can have a negative impact. Anxiety and depression in pregnant and postpartum women can have a significant effect on fetal development and child behavior²². Mothers

who experience high anxiety symptoms have an increased risk of having a child with developmental delays at age 3³¹. Therefore, to optimise the mother's, child's, and family's physical and mental health over the long run, the latest prenatal care guidelines from the World Health Organisation (WHO) emphasise the need to detect and manage psychosocial aspects in pregnant women and infants³².

Fetal exposure to anxiety during maternal pregnancy has long-term implications for the health and welfare of the child. Schwarze et al. (2024) mentioned that anxiety in pregnancy has more potential to cause affective disorders and behavioural problems in infants, such as crying, sleeping, and feeding, compared to anxiety in the postpartum period. In addition, in other studies, socioemotional development in infants is shown by infants' attention to faces that show emotional behavior²². Children born to moms who underwent more intense pregnancy apprehension throughout pregnancy showed decreased attention to facial expressions.

Maternal anxiety during pregnancy is associated with children's socio-individual neurodevelopment and fine motor skills²⁶ and poor emotional and language development²⁵. Research indicates that symptoms of anxiety and depression in pregnant mother may hurt the development of their unborn child since they have been linked to poor social-emotional, linguistic, and motor development. In addition, higher maternal anxiety in pregnancy is also associated with higher anxiety symptoms in the child. It was shown that increased levels of total cortisol production in the mother during pregnancy were linked to increased anxiety symptoms in a developing child²⁷.

A challenging infant's temperament at eight weeks postpartum may be significantly influenced by maternal mental health conditions such as anxiety disorders, specific phobias, agoraphobia, and fear of childbirth²⁹. Temperament during childhood has been demonstrated to be associated with mental health issues later in life, including anxiety disorders and depression³³. Porter et al. (2019) revealed that at twelve months

of age, children of mothers who experienced higher levels of psychological distress throughout the early stages of pregnancy and the postpartum period were more likely to have social-emotional issues³⁰.

Furthermore, in the preschool period, it has been demonstrated that worry associated with pregnancy affects preschoolers' psychological and behavioral growth. Pregnant women who suffer anxiety for extended periods are more likely to have internalising as well as externalising issues in their offspring⁸. Anxiety during pregnancy may be linked to boys' externalizing issues, such as hyperactivity and behavioral issues, whereas it raises the possibility of girls' problems internalizing, like emotional issues²⁸.

Anxiety during pregnancy can affect a child's behavioural development through the parenting style. The negative impact on child behavior development associated with parenting involves less affection, interaction, attention, neglect, and limitation. Mothers who experience anxiety during pregnancy tend to use an overprotective parenting style³⁴. The brain areas responsible for generating and controlling reactions to threats exhibit structural and functional alterations in children raised by overprotective mothers³³. Parenting style can affect a child's brain structure, and the effects are hereditary. Recent studies have found that more negative parenting throughout childhood is associated with higher intrinsic functional connectivity in the amygdala, and this effect is maintained into adulthood^{36,37}. Thus, the results suggest that Maternal and perinatal health is a significant risk factor for the development of the newborn and should be regularly evaluated in families during pregnancy and the adjustment to

being a parent.

This review has several strengths. First, only methodologically sound studies were included in the evidence synthesis, ensuring that conclusions were based on the strongest available evidence. Second, most reference studies were conducted by directly investigating respondents with relatively large numbers of 105 - 3443 mother-child pairs. Third, we also conducted a comprehensive search to find studies that examined the psychometric properties of general anxiety scales and pregnancy-specific anxiety measures ¹⁻³. However, this study also has some limitations. This study used a relatively small sample size and a purposive sampling method, which may limit the generalizability of the findings to a broader population. The search was limited to research articles in English and restricted to publications from 2019 to 2024 by analyzing correlational relationships, so the direction of causal relationships cannot be known, and the associations found may be explained by confounding variables. Future research on the impact of prenatal health on child development may be more reliable and broadly applicable if it uses bigger sample sizes, randomized controlled designs, and thorough control of confounding variables. Furthermore, the validity and reliability of results may be enhanced by including objective measurements of newborn developmental outcomes and considering pertinent postnatal variables.

CONCLUSION

Maternal mental health during the perinatal period plays a critical role in child development. Continuous attention to maternal psychological well-being,

beginning in the preconception phase and extending through pregnancy and postpartum, is essential to reduce the risk of developmental delays and affective disorders in children. Early screening, timely intervention, and sustained maternal support are key to preventing adverse outcomes for mothers, infants, and families. Policymakers and healthcare professionals must establish standardized perinatal mental health monitoring protocols to identify at-risk individuals and implement appropriate interventions, promoting the well-being of current and future generations.

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CONFLICT OF INTEREST

In this literature review, none of the authors has a conflict of interest.

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AUTHOR CONTRIBUTION

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting, and approval of this manuscript for publication.

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