

Critical Review on The Effect of Maternal Depression Towards Infants' Gut Microbiota

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Structured Abstract

Background: The gut microbiota plays a fundamental role in early life by supporting immune function, metabolic regulation, and neurodevelopment. Emerging research suggests that maternal depression whether during pregnancy or after childbirth may disrupt the establishment of a healthy gut microbiome in infants. This review explores how maternal depression influences infant gut microbiota, with emphasis on pro-inflammatory cytokines, breastfeeding behaviors, and maternal-infant bonding.

Literature review: Maternal depressive symptoms are linked to increased inflammatory responses, reduced quality and duration of breastfeeding, and limited mother-infant interaction, all of which can influence microbial colonization in infants. Studies reveal that both prenatal and postnatal maternal depression can alter the abundance and diversity of beneficial microbes such as *Bifidobacterium* and *Lactobacillus*, while promoting harmful bacteria like *Escherichia coli*. This imbalance, or dysbiosis, may impair immune development and disrupt the gut-brain axis, thereby increasing susceptibility to disorders including asthma, allergies, anxiety, autism spectrum conditions, and metabolic diseases. Elevated levels of pro-inflammatory cytokines such as IL-6, TNF- α , and IL-1 β are common in depressed mothers and are thought to influence microbial and immune development in infants.

Objectives: This review aims to examine the relationship between maternal depression (prenatal and postnatal) and infant gut microbiota, assess current evidence regarding inflammatory cytokines involved, evaluate how gut microbiota disruption may impair the gut-brain axis, explore the physiological and behavioral pathways underlying this connection, and identify effective interventions to reduce risks associated with maternal depression.

Conclusion: In conclusion, maternal mental health significantly influences infant microbial colonization. Targeted interventions such as psychosocial support, dietary supplementation, and enhanced breastfeeding practices may help mitigate these effects and promote healthier developmental outcomes in infants.

Keywords: Maternal Depression, Infant Microbiota, Inflammation, Gut-Brain Axis, Breastfeeding

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