Early life antibiotics exposure: exploring the fine line between treatment and neurodevelopmental risks

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Dear Editor, Antibiotic prescriptions during pregnancy and early postnatal life are common. A recent meta-analysis revealed that globally, 23% of pregnant women used antibiotics.[1] In infants, the incidence of antibiotic consumption over the first 14 months of life increased from 7.5% at birth to 66.1% at 14 months.[2] The first three years of life- including the prenatal period, represent a critical developmental period for the central nervous system (CNS) and gut microbiota. During this time, exposure to antibiotics can affect the structure and function of the microbiota, influencing its communication with the CNS. Numerous studies have suggested that alterations in brain-gut microbiome interactions could be possible mechanisms for disorders such as autism spectrum disorder (ASD), attention-deficit hyperactivity disorder (ADHD), Alzheimer's disease and epilepsy. Similarly, multiple studies have examined the association between antibiotic use and these neurological conditions, although the overall body of evidence remains inconclusive.

A Swedish nationwide cohort study[3] reported an increased risk of ASD and ADHD associated with antenatal and early infancy use of antibiotics, with a stronger association noted for early-life exposure. Findings from a meta-analysis[4] showed that prenatal antibiotic use was significantly associated with an increased risk of ADHD and epilepsy, but not autism or cerebral palsy.

In contrast, a recent large-scale study[5] found no significant association between antibiotic use during pregnancy or early infancy and neurodevelopmental conditions such as ASD, using a sibling analysis model. The study did, however, report a modest risk for epilepsy with antibiotic use during early infancy despite controlling for confounding factors.

These conflicting findings and the influence of various confounding factors warrant further investigation and a cautious interpretation of the existing literature. Antibiotic prescription during pregnancy and early infancy should be based on careful assessment of the potential risks and benefits. The overuse of antibiotics among the public may result from their over-the-counter availability; therefore, policies regulating antibiotic sales should be introduced. Training programmes for healthcare professionals should be implemented to ensure accurate diagnosis of bacterial infections and appropriate antibiotic prescription.

In conclusion, while the relation between antibiotic use during prenatal and postnatal periods and neurological outcomes remains uncertain, cautious prescription practices and policy measures are essential for both maternal and child health.

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