Maternal Peripartum Antibiotic Usage and Depressive Symptoms at 1-month Postpartum

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Background

The gut-brain-axis (Figure 1) is a bidirectional signaling pathway between the gut microbiome and stress response systems of the brain, and is increasingly being studied for its role in affecting mood. Antibiotic exposure can contribute to an abnormal, or dysbiotic, gut microbiome by altering the microbial composition, and this is suggested as a mechanism for the increased risk of depressive symptoms in non-pregnant, non-postpartum persons. The immunological, metabolic, and endocrine changes that occur during pregnancy influence the overall functioning of the gut microbiome and represent a potentially robust pathway for exploring the effect of antibiotic-induced gut dysbiosis as a contributing factor in the development of postpartum depression (PPD).

Antibiotic Exposure and Gut Microbiome Dysbiosis

Purpose

This study sought to investigate whether maternal antibiotic exposure during the third trimester of pregnancy and through the first 14 days postpartum is associated with depressive symptoms at 1-month postpartum (Figure 2), the time identified in the DSM-V as diagnostic of PPD. This is the first step to defining the microbiome postpartum depression.

Methods

An a secondary data analysis was conducted on a prospective pregnancy cohort from Denver, Colorado. The original study enrolled 201 women during the prenatal period (Figure 3), with the aim of investigating the psychoneuroimmunology of postpartum depression. A second data collection point was 1-month postpartum. With the recent recognition of the contribution of the microbiome gut-brain-axis to mood, and the increase in the use of antibiotics during pregnancy and the postpartum period shown to affect the microbiome, we have demonstrated a need for additional studies to investigate directly the relationship between the gut microbiome, antibiotic exposure, and risk for postpartum depression.

Results

Table 1. Prenatal and postnatal recruitment and inclusion criteria.

Recruitment Inclusion Criteria

- Prenatal: Women in the 3rd trimester
- Age 18-40
- Anticipated vaginal birth of a single infant
- No chronic illness
- No previous psychiatric conditions
- No prescribed oral or herbal medications
- Non-smoker

Postnatal: Uncomplicated vaginal birth
- Singleton infant
- Mom and infant discharged together within 72 hours post delivery

Table 2. Data collection points and measurements.

Time Points
- Prenatal (32-36 weeks)
- Birth - Day 14 postpartum
- 1-month postpartum

Measures
- Demographic
- Edinburgh Postnatal Depression Scale (EPDS)
- Perceived Stress Scale (PSS)
- Antidepressants

Table 3. Statistical analysis.

- Statistical Tests: Test & Chi-Square
- Linear Regression

Table 4. Demographic and Clinical Characteristics of Women Receiving Antibiotics (n=125)

- Age, mean (SD)
- Income, mean (SD)
- Personal History of Depression
- Prenatal Day 14 Depressive Symptoms

Results Cont.

Table 5. Final Regression Model

Antibiotic exposure is a significant predictor of postpartum depressive symptoms.

Conclusions

With the recent recognition of the contribution of the microbiome gut-brain-axis to mood, and the increase in the use of antibiotics during pregnancy and the postpartum period shown to affect the microbiome, we have demonstrated a need for additional studies to investigate directly the relationship between the gut microbiome, antibiotic exposure, and risk for postpartum depression.

Future Implications

- Gut Microbiome & PPD

3. Antibiotic Overuse & Resistance Gut Microbiome Dysbiosis Screening & DSM-V criteria

Future work in this area of research will provide new evidence and considerations for modifying clinical practice guidelines for the use of antibiotics during the peripartum period.

References