Environmental Exposures Influence on the Antenatal Microbiome and Health of Offspring

Michelle Lynn Wright PhD, RN

Angela R. Starkweather PhD, ACNP-BC, CNRN, FAAN

University of Connecticut, School of Nursing
Disclosure

• We have no conflicts of interest, sponsorships or commercial support to report

Objectives:

• Identify exposures that may alter the maternal microbiome

• Discuss potential health implications for offspring health related to altered antenatal microbiome composition
Outline

• Background
• Methods
• Results
• Discussion
Interaction between Maternal & Fetal Environments

Preconception

Pregnancy

Birth

Adulthood

Maternal Exposome

Health Outcomes
Mechanisms influencing Development

Endogenous Factors
• Genetic variant
• Neurohormones
• Oxidative stress
• Inflammation

Exogenous Exposures (Exposome)
• Stress
• Medications
  • Diet
  • Pollutants

Contributors to Fetal Programming During Pregnancy

Fetal Environment  Maternal Exposome

Offspring
• Microbiome/Immunity
• HPA Axis Responsiveness
• DNA Methylation
• Telomere Length

Susceptibility to Diseases

Altered initial microbiome composition associated with altered methylation

Altered gut microbiome influences development of HPA axis responsiveness
2 Questions:

1. What is known about the antenatal microbiome?

2. Do variations in the antenatal microbiome influence offspring health?
Integrative Review

Key words:
- Microbiome
- Microbiota
- Antenatal period
- Pregnancy
- Offspring
- Birth outcomes

Literature search:
Potentially relevant publications identified by literature search with keywords (n=254)

Filter:
Publications preliminarily meeting inclusion criteria (n=76)

Publications excluded after review of title and for duplication (n=178)

Publications selected for full-text retrieval and assessed for methodological quality (n=28)

Publications excluded after review of abstract (n=48)

Publications included for integrative review (n=20)

Publications excluded after methodological appraisal (n=8)
Results Overview

• Small sample sizes

• Observational and randomized control trials

• Ambiguous findings
Main factors identified

- Medications
- Maternal Comorbidities
- Diet

- Non-probiotic studies
- Probiotic Studies
Potential Health Implications

- Obesity
- Asthma
- Inflammatory Bowel Disease
- Preterm Infants
- Diarrhea
- Death
- Altered Resident Microbes
- Atopy
- Late Onset Sepsis
- Necrotizing Enterocolitis
Clinical Implications

- Mode of birth
- Infant feeding
- Environmental toxicants
- Antibiotic use
Thank you!

Questions?

Recently accepted for publication: