Impact of Exposure to Air Pollution on Cervicovaginal Microbial Communities
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Introduction

- Vaginal microbial communities can be dominated by anaerobic (CST IV) or Lactobacillus (other CSTs) species
- CST IV is a risk factor for spontaneous preterm birth (sPTB) and is more common among Black than White populations
- Aims:
  - (1) quantify associations of air pollution, specifically particulate matter <2.5μm in diameter (PM2.5), with vaginal microbiota
  - (2) explore the extent to which racial disparities in PM2.5 exposure might explain racial differences in the prevalence of CST IV

Methods

- Secondary analysis of 569 participants of the Motherhood & Microbiome study
- PM2.5 exposures from NASA satellite and EPA ground monitor data
- Vaginal swabs from 16-20 weeks’ gestation were analyzed using 16S rRNA sequencing and hierarchical clustering assigned CSTs.
- Multivariable logistic regression models calculated adjusted odds ratios of CST IV (vs. other CSTs) per interquartile range (IQR) increment of PM2.5
- Race-stratified and mediation analyses

Results

- Higher PM2.5 exposure was associated with CST IV (aOR 1.41, 95% CI 1.04-1.92).
- Black participants (vs. White) had higher median PM2.5 exposure (10.6 vs. 9.6 μg/m3, P<0.001) and higher prevalence of CST IV (46% vs. 11%, P<0.001).
- Mediation analysis revealed that higher PM2.5 exposure may explain 5.4% (P=0.028) and 4.9% (P=0.066) of the Black-White disparity in CST IV in unadjusted and adjusted models.

Conclusion

- PM2.5 was associated with CST IV, a risk factor for sPTB.
- PM2.5 exposure may partially explain racial differences in CST IV.

Works Cited


Table 1: Characteristics of 569 participants in Motherhood and Microbiome pregnancy cohort with vaginal microbiota data at 15 weeks of gestation and PM2.5 data in 1st trimester

Table 2: Unadjusted and adjusted associations of PM2.5 exposure with high risk cervicovaginal microbiota (Community State Type IV (CST IV)). Odds ratios presented per interquartile range increment of PM2.5 exposure.

Figure 1. Development of analytic cohort

Figure 2. Mean annual PM2.5 in the Philadelphia, PA region in 2015