Sex Differences in the Association between Prenatal Second-hand Smoke Exposure and Infant Development

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Introduction

- Environmental toxicants play an important role in the health of many living in urban settings such as Atlanta.
- In those settings, exposure to toxicants, like nicotine, are amplified due to the unequal dispensation of outdoor sources and the greater smoking rates in these areas (Pirkle et al., 1996).
- Approximately half of the urban populations located in areas that do not meet national ambient air quality standards are African American (Travis et al., 1994).
- Maternal prenatal smoking is associated with several developmental complications including detriments in motor development in infants and deficits in infant visual and auditory attention (Evlampidou et al., 2015; Windham et al., 1999; Jacobsen et al., 2007).
- Previous research has relied on self-report which may not accurately capture all nicotine exposures inside and outside the home.
- This study aimed to (1) examine the association between prenatal nicotine exposure and infant motor development in an urban sample and (2) explore an infant’s biological sex as a moderator.

Methods

Participants
72 African American mothers (M= 25.11 years, SD= 5.185) and their infants (M= 203.63 days, SD= 26.23, 55.6% Male) from Georgia participated in this study. Mothers were recruited for the CCHEM² cohort from either Grady Memorial or Emory Midtown Hospital.

Procedure and Measures

Prenatal Measurements
Visit 1/Visit 2
- Serum cotinine (ng/ml)
- Maternal self-report smoking behaviors
- Demographic questionnaires

Home Visit
- Serum cotinine (ng/ml)
- Maternal self-report smoking behaviors
- Second-hand smoking behaviors

6-month Visit
- Bayley Scales of Infant and Toddler Development (3rd Ed.)
- Demographic questionnaires

Findings

Table 1. Bivariate Correlations Between Smoke Exposure Measurements and Bayley Scaled Scores (SS)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cognitive</th>
<th>Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Cotinine</td>
<td>0.35</td>
<td>0.28</td>
</tr>
<tr>
<td>Maternal Smoking</td>
<td>0.26</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Table 2. Bivariate Correlations Between Self-Reported Smoking Behaviors and Cotinine Samples

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cognitive</th>
<th>Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking Report</td>
<td>0.30</td>
<td>0.25</td>
</tr>
<tr>
<td>Self-Report Smoking</td>
<td>0.26</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Conclusion

- Maternal prenatal cotinine levels were not significantly associated with infant motor development nor was this interaction moderated by the infant’s sex.
- Maternal self reports of smoke exposures in pregnancy were related to lower fine motor development scores, but sex did not moderate this association.
- Findings show that boys may be more vulnerable to nicotine in terms of their receptive language development.
- Maternal prenatal smoking is associated with decreased auditory responsiveness due to nicotine’s influence on outer hair cell loss in the ear (Jacobson et al., 1984; Fried 1993).
- Self-report measures were significantly correlated with prenatal cotinine levels.
- The self-report measures did not demonstrate the same outcomes as the cotinine samples despite being correlated.
- Cotinine levels in this sample indicated high levels of second-hand smoke exposure, suggesting continued public health concerns in this area.
- Future research is needed to examine potential effects of timing of prenatal exposure.

References


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