Poverty, Neighbourhood Characteristics and Trajectories of Maternal Depressive symptoms

Mai Thanh Tu, Mark Daniel, Louise Séguin, Yan Kestens
Background

Maternal depression:
- Affects 6 to 25% of women
- May affect mother-infant interaction, attachment and socioemotional development in the child
- Has not often been studied after the postpartum period (child’s first year of life)
Maternal depression and context

- Previous history of depression is a risk factor
- Living in poverty conditions, being unemployed or an immigrant mother are known to be associated with maternal depression (Seguin et al. 1999; Zunzunegui et al. 2007)
- The contribution of neighbourhood characteristics, such as parks, on the incidence of depression has been reported, but not specifically for maternal depression (see review by Mair et al. 2008)
- Very few studies have used longitudinal data to investigate these factors and trajectories of maternal depression
Objectives

- To carry an exploratory study to:
  - Investigate different trajectories of levels of maternal depressive symptoms for up to 7 years after childbirth
  - Describe associations with neighbourhood characteristics while considering individual (maternal) sociodemographic variables
Methods: secondary analyses

Participants

- Mothers from the Quebec Longitudinal Study on Child Development (QLSCD), excluding those with chronic health problems or drug use
- Initial sample of n=2120: representative of singleton births in Quebec in 1997-1998

Measures from QLSCD (n=1611)

- **Standardized depression scores** on an abridged version of Center for Epidemiologic Studies Depression Scale (CES-D) at child ages 1.5, 3.5, 5 and 7 years. Excluded if 2 consecutive data missing
- Demographic information for each participant
  - maternal age, level of education, immigrant status (at child birth)
  - income (below or above low-income cut-off) and work status (whether mother works or not) (at child age 1.5 year)
MEGAPHONE

Montreal Epidemiological and Geographical Analysis of Public Health Outcomes and Neighbourhood Effects

Fully relational, semi-automated geographic information system integrating extensive inventories of social/physical environmental exposure and health outcomes data in the Montreal region. Data available since 2001 only.
Characteristics of the park nearest the participant’s residence, between 2001 and 2005 (child age 1.5-7 years), through postal codes linkages

- Distance to closest park (meters),
- Surface (m²)
- Quality of park using the Normalized Difference in Vegetation Index (NDVI, scale 0-100, ≥30 ≅ more than grass)
- Average greenness 500 meters around the postal code
Trajectories: depressive symptoms

- Low: 42.6%
- Minor: 46.5%
- Elevated: 10.9%

Depression score vs. Child age (years)
## Comparison province of Quebec vs. Montreal region

<table>
<thead>
<tr>
<th>Trajectories</th>
<th>Province of Quebec</th>
<th>Region of Montreal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated</td>
<td>10.9%</td>
<td>12.3%</td>
</tr>
<tr>
<td>Minor</td>
<td>46.5%</td>
<td>46.6%</td>
</tr>
<tr>
<td>Low</td>
<td>42.6%</td>
<td>41.1%</td>
</tr>
</tbody>
</table>
Regression analyses

- **Model 1: Individual demographic characteristics**
  - Immigrant status: Canadian/European vs. non-European
  - Age of mother: < 35 years old vs. ≥ 35 years old
  - Education: junior college + vs. completed or incomplete high school
  - Individual household income: above vs. below LICO
  - Cumulative work status: work vs. did not work
  - Depression at child age 5 months: absence vs. presence

- **Model 2: Neighbourhood aspects**
  - % of individuals living below LICO in the 500m radius
  - Distance to the nearest park: < 500 m vs. ≥ 500 m
  - Surface of the nearest park
  - Greenness intensity of the nearest park: > 30 vs. ≥ 30 NDVI scale
  - Average greenness intensity in 500m radius
## Factors associated with trajectories of depressive symptoms

<table>
<thead>
<tr>
<th></th>
<th>Minor symptoms OR (95% CI)</th>
<th>Elevated symptoms OR (95% CI)</th>
</tr>
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<tbody>
<tr>
<td><strong>Presence of depression at 5 months</strong></td>
<td></td>
<td></td>
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<tr>
<td>No (ref)</td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>6.40 (3.50-11.68) **</td>
<td>8.18 (2.0-23.05) **</td>
</tr>
<tr>
<td><strong>Being an non-European immigrant</strong></td>
<td></td>
<td></td>
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<tr>
<td>No (ref)</td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>2.21 (1.07-4.54) **</td>
<td>3.32 (1.01-10.92) **</td>
</tr>
<tr>
<td><strong>Greenness index for nearest park (NDVI)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 30 (ref)</td>
<td>0.46 (0.24-0.90) *</td>
<td>0.37 (0.08-1.82)</td>
</tr>
<tr>
<td>≥ 30 (≥ more than grass)</td>
<td></td>
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</tbody>
</table>

* $p < 0.05$

** $p < 0.01$
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- Average greenness intensity in 500m radius
In addition to the sociodemographic factors already known in the literature (e.g. prior history of depression, poverty, being a non-European immigrant), the quality of parks in the residential neighbourhood is also associated with specific levels of depressive symptoms in mothers of young children.

Findings presented here are from secondary data analyses. What might be associated with greener parks? Social activities, exercise, playground near school?

Mechanisms underlying these associations along with maternal and child health parameters (e.g. cortisol, stress hormone) for each potential trajectory are being explored.
Acknowledgements

- Institut de la Statistique du Québec, in charge of the QLSCD study
- Centre d’accès aux données de recherche de l'Institut de la statistique du Québec (CADRISQ)
- Béatrice Nikiema and Karine Léger, for technical assistance on MEGAPHONE data extraction
- Funding from CIHR (grant MOP-77835-PSB-CFCA-32950 and fellowship #181755) and FRSQ