Preconceptional maternal anxiety is associated with childhood emotional problems, independent of the effect of post-natal depression

Janis Baird, Megan Jarman, Sian Robinson, Wendy Lawrence, Mary Barker, Keith Godfrey, Cyrus Cooper, Hazel Inskip

MRC Lifecourse Epidemiology Unit
University of Southampton
Background

- Maternal depression is associated with behavioural problems in children
- Most of the evidence relates to post-natal depression
- In the ALSPAC cohort, anxiety during pregnancy and post-natal depression had independent effects on child behaviour at 4 years
- Lack of evidence on depression or anxiety during preconception and child behaviour problems
Aim

To examine the association between maternal anxiety before pregnancy and child behaviour at 3 years of age.
Southampton Women’s Survey

12,583 non-pregnant Southampton women aged 20-34 years interviewed between 1998 and 2002

Subsequent pregnancies studied, ultrasound scans and interviews

3158 births

Children followed-up at 6, 12, 24 & 36 months. Samples seen at 4, 6-7, 8-9 and 11-13y

Adapted from Inskip et al. Int J Epidemiol. 2006
Methods

- Women enrolled during the latter half of recruitment completed the General Health Questionnaire (GHQ-12).
  - Scores of 3 or more indicate significant psychological distress.
- Edinburgh Post-natal Depression Scale (EPDS) completed 6 months after birth – scores of 13 or more indicate probable post-natal depression.
- When children were 3 years of age, child behaviour was assessed with the Strengths and Difficulties Questionnaire (SDQ).
- Answers to the SDQ were used to define behaviour problems:
  - Hyperactivity
  - Conduct disorders
  - Emotional problems
Statistical analysis

- Binary regression used to derive prevalence rate ratios (PRR) for child behaviour problems
- Adjustment for effects of potential confounding factors
- Maternal confounding factors
  - Educational attainment
  - Receipt of benefits
  - Number of children
  - Employment
  - Smoking
- Child confounding factors
  - Gender
  - Diet
  - Sleep duration
- Explored effect of post-natal depression separately
Maternal characteristics

<table>
<thead>
<tr>
<th>Characteristics of mothers (n=1511)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational attainment</td>
<td></td>
</tr>
<tr>
<td>≤GCSE</td>
<td>531 (35.1)</td>
</tr>
<tr>
<td>A levels/HND</td>
<td>628 (41.6)</td>
</tr>
<tr>
<td>Degree or above</td>
<td>352 (23.3)</td>
</tr>
<tr>
<td>In receipt of benefits</td>
<td>489 (32.5)</td>
</tr>
<tr>
<td>In employment</td>
<td>433 (28.8)</td>
</tr>
<tr>
<td>Smoked in pregnancy</td>
<td>128 (12.4)</td>
</tr>
<tr>
<td>Preconceptional distress</td>
<td>615 (41.6)</td>
</tr>
<tr>
<td>Post-natal depression</td>
<td>417 (27.5)</td>
</tr>
</tbody>
</table>
### Characteristics of children

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=787</td>
<td>n=731</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>3.0 (3.0-3.1)</td>
<td>3.0 (3.0-3.1)</td>
<td>0.7</td>
</tr>
<tr>
<td>Sleep duration (hours (IQR))</td>
<td>11.5 (11.0-12.0)</td>
<td>11.5 (11.0-12.0)</td>
<td>0.1</td>
</tr>
<tr>
<td>Hyperactivity (n (%))</td>
<td>174 (22.1)</td>
<td>116 (15.9)</td>
<td>0.002</td>
</tr>
<tr>
<td>Conduct disorders (n (%))</td>
<td>198 (25.2)</td>
<td>168 (23.0)</td>
<td>0.3</td>
</tr>
<tr>
<td>Emotional problems (n (%))</td>
<td>143 (18.2)</td>
<td>138 (18.9)</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Association of maternal distress with child behaviour at 3 years of age

Error bars are 95% confidence intervals.

- Hyperactivity
- Conduct disorders
- Emotional problems

No distress: Red
Distress: Blue
Relationship of maternal preconceptional distress with child behaviour

<table>
<thead>
<tr>
<th>Maternal distress</th>
<th>Unadjusted</th>
<th>Adjusted&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Adjusted&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>PRR (95% CI)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>96 (23.1%)</td>
<td>1.31 (1.05, 1.63)</td>
<td>96 (23.1%)</td>
</tr>
<tr>
<td>Conduct disorders</td>
<td>123 (29.6%)</td>
<td>1.34 (1.11, 1.61)</td>
<td>123 (29.6%)</td>
</tr>
<tr>
<td>Emotional problems</td>
<td>101 (24.2%)</td>
<td>1.48 (1.19, 1.84)</td>
<td>101 (24.2%)</td>
</tr>
</tbody>
</table>

<sup>a</sup> adjusted for educational attainment and number of children

<sup>b</sup> adjustment for as <sup>a</sup> with addition of post-natal depression
Percentage of children with hyperactivity according to maternal depression

Error bars are 95% confidence intervals.

Pregnancy period in which depression occurred:
- None
- Pre only
- Post only
- Pre and post
Percentage of children with conduct disorders according to maternal depression

Error bars are 95% confidence intervals

Pregnancy period in which depression occurred:
- None
- Pre only
- Post only
- Pre and post
Percentage of children with emotional problems according to maternal depression

Error bars are 95% confidence intervals

- None
- Pre only
- Post only
- Pre and post

Pregnancy period in which depression occurred
## Relationship of maternal depression with child behaviour

<table>
<thead>
<tr>
<th>Maternal depression</th>
<th>None</th>
<th>Preconception</th>
<th>Post-natal</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperactivity</td>
<td>-</td>
<td>1.12 (0.77, 1.63)</td>
<td>1.45 (1.12, 1.88)</td>
<td>1.69 (1.28, 2.22)</td>
</tr>
<tr>
<td>Conduct disorders</td>
<td>-</td>
<td>1.13 (0.82, 1.54)</td>
<td>1.33 (1.07, 1.67)</td>
<td>1.68 (1.34, 2.12)</td>
</tr>
<tr>
<td>Emotional problems</td>
<td>-</td>
<td>1.43 (1.02, 2.0)</td>
<td>1.24 (0.94, 1.63)</td>
<td>1.75 (1.33, 2.31)</td>
</tr>
</tbody>
</table>
Summary of findings

• Around 40% of mother had preconceptional distress and a fifth had probable post-natal depression
• Around a fifth of children had hyperactivity or emotional problems and a quarter had conduct disorders
• Maternal preconceptional distress was associated with an increased risk of child behavioural difficulties, particularly emotional problems at 3 years of age
• The influence of maternal distress on child behaviour was still in evidence once we adjusted for post-natal depression
Strengths and limitations

• **Strengths**
  - SWS is a population-based study
  - Adjustment for important confounding factors
  - GHQ-12 is a sensitive instrument for detecting depression and anxiety disorders
  - EPDS measure of post-natal depression

• **Limitations**
  - GHQ-12 data collected during second phase of SWS
  - Measure of child behaviour based on parental report
  - No measure of depression or anxiety during pregnancy
Comparison with previous studies

• Link between post-natal depression and behavioural and emotional problems in childhood is well established
• ALSPAC findings - anxiety during pregnancy predicted behavioural and emotional problems independent of post-natal depression
• ALSPAC focused on pregnancy not preconception
• To the best of our knowledge, these analyses in SWS are first to demonstrate that preconception is linked to child behaviour
Implications

Three time points at which maternal psychological problems can affect child behaviour

Recognition of women with psychological distress during preconception might facilitate the prevention of childhood emotional problems
Acknowledgements

The SWS Study Group

Nurses/midwives
Teachers
Research assistants
Administrative staff
Computing staff
Psychologists

Dieticians/nutritionists
Ultrasonographers
Clerical staff
Statisticians
Doctors
Lab staff
Radiographers

Funders:
MRC, NIHR, ARUK, University of Southampton, Dunhill Medical Trust, BHF, FSA, Hope, Wellcome Trust

Young women and children in Southampton