Gender specific effects of perinatal influences on the risk for alcoholism in a 45-year Danish birth cohort

Anna Manzardo
Wendy Madarasz
Elizabeth C. Penick
Joachim Knop
Erik Lykke Mortensen

See next page for additional authors

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Authors

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**Methodology**

**The sequelae of premature birth induces a specific biological change** in the nature of this change may be a function of direct injury to myelinated and actively developing within the perinatal timeframe. Limbic structures, including dopamine reward circuitry, are highly vulnerable. Neurodevelopmental Model for alcoholism. Small, premature or growth- delayed male babies appear to be more directly sensitive to the influence of maternal smoking and established constellations of maternal smoking, such as maternal mental illness. However, the association between prematurity and alcoholism was not significant for female babies. The findings implicate neurodevelopmental influences in the pathophysiology of alcoholism and suggest the presence of distinct, gender-specific pathways that lead to the development of alcoholism in men and women.

**Background**

Neonatal Vulnerability  
Babies are at an increased risk of sustaining a neuronal injury at the time of birth due in part to the fact that natural anti-oxidant vitamins and enzymes as well as important blood clotting factors are low. Consequently, newborns have a diminished ability to respond to injury associated with prematurity, birth trauma or perinatal hemorrhage. Male babies appear to be more vulnerable to perinatal insult than female babies for reasons that are not well-defined. Perinatal white matter appears to be selectively sensitive to damage.

Neurodevelopmental Model  
Limbic structures, including dopamine reward circuitry, are highly innervated and actively developing within the perinatal timeframe. Direct disruption of the development of reward circuits in childhood could result in an increased vulnerability to alcoholism as an adult.

**Results**

Independent Effects of Perinatal Markers of Prematurity Birth by Gender on the Risk of Alcohol Dependence

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male Alcohol Dependence</th>
<th>Female Alcohol Dependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prematurity Score</td>
<td>1.12 (1.01-1.24)</td>
<td>1.05 (0.93-1.19)</td>
</tr>
<tr>
<td>Birth Trauma</td>
<td>1.29 (1.06-1.57)</td>
<td>1.16 (0.92-1.46)</td>
</tr>
<tr>
<td>Perinatal Hemorrhage</td>
<td>1.24 (1.02-1.51)</td>
<td>1.16 (0.93-1.44)</td>
</tr>
</tbody>
</table>

**Discussion**

The results suggest that the neurodevelopmental sequelae of premature birth has gender-specific effects on the risk for alcoholism. Small, premature or growth- delayed male babies appear to be selectively vulnerable to alcoholic drinking years later. The previously identified association between maternal smoking and risk for alcoholism among males may be partially explained by the effects of prematurity birth. Female infants appear to be more directly sensitive to the influence of maternal smoking or established constellates of maternal smoking, such as maternal mental illness. However, the association between prematurity and alcoholism was not significant for female babies. The findings implicate neurodevelopmental influences in the pathophysiology of alcoholism and suggest the presence of distinct, gender-specific pathways that lead to the development of alcoholism in men and women.

**Conclusions**

1. The sequelae of premature birth induces a specific biological change in male babies that increases their vulnerability to develop alcoholism later in life.
2. The nature of this change may be a function of direct injury to developing brain systems or possibly a genetic imprinting phenomenon.
3. Female babies are either resistant to the induction of this change or this change has no effect on their vulnerability to develop alcoholism.