Severe cognitive impairment within a multiply affected South Asian family with a high risk of schizophrenia

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Introduction

• One of the core symptoms of schizophrenia is severe cognitive dysfunction which current interventions are ineffective in treating. There has been limited focus on whether specific cognitive deficits are experienced by different ethnic populations. Research to date by our team has identified that South Asian patients experience similar cognitive dysfunction to Caucasian populations (Saleem et al., 2013).

• It is well known that schizophrenia has a strong genetic component. Cognitive impairments are seen in unaffected siblings of schizophrenia patients (Egan et al., 2001) and patients with a family history of psychosis have a higher level of cognitive dysfunction than those without a family history (Taberés-Seisdedos et al., 2003).

• Twin studies suggest that this is mainly due to genetic rather than environmental factors (Sullivan et al., 2003). This genetic component may differ between ethnic groups and families and its study could enhance our understanding of this debilitating illness.

• This study forms part of wider research looking into possible genetic explanations for cognitive dysfunction within multiply affected families and focuses on the extent of cognitive dysfunction within one such family.

Aims

• The aim of this study is to investigate the cognitive deficits of members of a multiply affected South Asian family compared to a control group of South Asian chronic schizophrenia patients and healthy South Asian controls.

Participants

Table 1: Participant demographics

<table>
<thead>
<tr>
<th></th>
<th>Number in group</th>
<th>Age (mean)</th>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy controls</td>
<td>17</td>
<td>27</td>
<td>Male</td>
<td>10</td>
</tr>
<tr>
<td>Chronic controls</td>
<td>17</td>
<td>30</td>
<td>Male</td>
<td>7</td>
</tr>
<tr>
<td>Unaffected family members</td>
<td>3</td>
<td>35</td>
<td>Male</td>
<td>2</td>
</tr>
<tr>
<td>Affected family members</td>
<td>4</td>
<td>35</td>
<td>Male</td>
<td>1</td>
</tr>
</tbody>
</table>

• Participants were matched by ethnicity. All chronic schizophrenia patients and family members were stable on medication at the time of testing. Three family members were being treated with clozapine and 1 with olanzapine.

Method

• All participants underwent cognitive testing using the Cambridge Neuropsychological Test Automated Battery. The tests used were:

Pattern Recognition Memory (PRM): A test of visual memory where the participant chooses between a pattern they have already seen and a novel pattern.

Spatial Recognition Memory (SRM): A test of visual memory where the participant chooses between a location in which they have already seen a shape and a novel location.

Intra/Extra Dimensional Set Shifting (IED): A test of executive function where the participant learns rules which are then changed.

Stockings of Cambridge (SOC): A test of spatial planning and executive function where the participant needs to copy a pattern in as few moves as possible.

Preliminary Results

<table>
<thead>
<tr>
<th></th>
<th>SRM - correct responses (max score 25)</th>
<th>PRM - correct responses (max score 25)</th>
<th>IED - total errors</th>
<th>SOC - number of moves to solve 5 move problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Healthy controls</td>
<td>17.68 (1.2)</td>
<td>22.05 (1.6)</td>
<td>15.52 (6.9)</td>
<td>6.34 (1.2)</td>
</tr>
<tr>
<td>Chronic controls</td>
<td>13.52 (2.5)</td>
<td>17.47 (4.6)</td>
<td>19.82 (9.5)</td>
<td>8.97 (2.1)</td>
</tr>
<tr>
<td>Unaffected family members</td>
<td>15.33 (3.1)</td>
<td>18.00 (2.0)</td>
<td>25.67 (10.0)</td>
<td>9.83 (0.76)</td>
</tr>
<tr>
<td>Affected family members</td>
<td>10.75 (3.1)</td>
<td>12.75 (2.1)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Unaffected family members

• Unaffected family members performed significantly worse than healthy controls on the SRM (t(18) = 2.357, p<0.05), the PRM (t(18) = 3.214, p<0.01), the SOC (t(18) = 3.98, p<0.001) and the IED (t(18) = 2.22, p<0.05).

• No significant differences were found between the unaffected family members and the chronic control group on any of the tests.

Affected family members

• The affected family members made fewer correct responses than the chronic control group on the PRM which just failed to reach statistical significance (t(19) = 1.95, p=0.07). The affected family members also made fewer correct responses than the chronic control group on the SOC (t(19) = 1.62, p=0.13) but again it failed to reach significance. The affected family members performed significantly worse than unaffected members on the PRM (t(5) = 3.374, p<0.05).

• Too few affected family members completed the SOC and IED for analysis.

Discussion and Conclusion

• These results show that unaffected members of a multiply affected family underperform on cognitive tasks compared to healthy controls. However, although the results show statistically significant differences, the small number of subjects means the results should be interpreted with caution. Further family members will be tested to confirm this trend.

• There were no differences between unaffected family members and chronic controls on any of the tasks, suggesting that unaffected family members are as cognitively impaired as chronic schizophrenia patients.

• Chronically affected family members showed slightly more impairment than other chronic schizophrenia patients. The family members assessed so far show an insignificant trend towards more severe impairment in aspects of visual memory. A larger sample of family members may show significant differences between them and the chronic control group.

• Further testing will look at the possible genetic influences.

• The aim of our future research is two-fold; to investigate the genetic component of schizophrenia within this multiply affected family and to investigate whether treatment of the cognitive dysfunction could improve outcomes.

• A targeted cognitive remediation program implemented early could improve cognition and functioning and reduce the severity of other symptoms in the patients.

• Treating the cognitive deficits in high risk family members could improve outcomes and potentially delay the onset of psychosis.

References


• Tabares-Seisdedos et al. (2003). Specific executive/attentional deficits in patients with schizophrenia or bipolar disorder who have a positive family history of psychosis. Journal of Psychiatric Research, 37, 479–486.