Incidence and Prevalence of Stuttering in Children Who Are Hard of Hearing

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Background

• The incidence of stuttering (the percentage of the general population that at one point in their life has exhibited stuttering-like behaviors)
  • Traditionally estimated to be around 5%
  • But the incidence is likely higher (around 8%) due to a lack of reporting and the transient nature of stuttering in the preschool years (Yairi & Ambrose, 2013).

• The prevalence of stuttering (the percentage of the general population that is exhibiting stuttering-like behaviors at a given point in time)
  • Estimated to be around 0.7% in the general population.
  • However, the prevalence is higher in the preschool (2-3%) and school age (~1%) years (Yairi & Ambrose, 2013).

• Evidence suggests that the prevalence of stuttering is significantly lower in school age children with significant hearing loss.
  • Two teacher report-based surveys targeting “schools for the deaf” found that out of a total of 28,000 students only 14 cases of stuttering were reported, a prevalence of only 0.05% (Backus, 1938; Harms & Malone, 1939).
  • A teacher report-based survey of 77 “schools for the hearing impaired” found that only 12 children exhibited stuttering out the 9,930 students enrolled in the schools, a prevalence of 0.12% (Montgomery & Fitch, 1988). It is important to note that 3 children stuttered in the oral mode, 6 in the manual mode and 3 stuttered in both modes.

• Limitations of previous research:
  • Surveys were filled out by teachers who were likely unfamiliar with the students during the preschool years when stuttering is most prevalent.
  • Most of the children had severe to profound hearing loss, making it difficult to know if the degree of hearing loss plays role in stuttering prevalence.
  • Surveys did not explicitly describe what defines stuttering behavior.

Research Questions

1. What is the incidence and prevalence of stuttering in children who are hard of hearing?
2. What is the age of onset of stuttering in hard of hearing populations?
3. Are there differences in the speech, language or hearing abilities between children who have recovered from stuttering versus those who may persist in stuttering in the hard of hearing population?

Methods

• Electronic surveys were emailed to 303 parents of children with mild to moderate hearing loss that had participated in Outcomes of Children With Hearing Loss (OCHL) study (Tomblin et al. 2015). 194 parents responded to the survey, a 64% response rate. The average age of children at the time of survey submission was 8.05 years.
  • The surveys began with a detailed description of what stuttering is and what stuttering is not, and then asked a series of questions about whether their child had ever stuttered and details about the stutter.
  • Speech, language and hearing data from the OCHL project were used to compare children who recovered from stuttering to children who were still stuttering at the time of survey submission. Analysis was conducted using the OCHL data collected at the 3 and 4 year visits. These ages were analyzed based on the average age of stuttering onset from this sample. Due to the longitudinal nature of the OCHL project, not all children had data for this analysis.

Results

Research question #1

<table>
<thead>
<tr>
<th># of survey responses</th>
<th>Reported to have ever stuttered</th>
<th>Incidence</th>
<th>Reported to still be stuttering</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>194</td>
<td>33</td>
<td>17.01%</td>
<td>10</td>
<td>5.15%</td>
</tr>
</tbody>
</table>

* indicates a significant difference compared to a population incidence of 8%, (z=4.49, p<.0001)
** indicates a significant difference compared to a population prevalence of 1.5%, (z=3.88, p<.0001)

Research question #2

<table>
<thead>
<tr>
<th>Average age at survey submission</th>
<th>Average age of stuttering onset (years)</th>
<th>Average duration of stuttering (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovered (n=23)</td>
<td>7.70</td>
<td>3.24*</td>
</tr>
<tr>
<td>Still stuttering (n=10)</td>
<td>7.30</td>
<td>4.75*</td>
</tr>
</tbody>
</table>

* indicates a significant difference in the age of onset, p<.020
** were still stuttering, so the duration of stuttering is really the time since onset.

Research question #3

Speech and Language Measures from the 3 Year Protocol

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>3rd Decile</th>
<th>1st Decile</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAFA</td>
<td>11</td>
<td>75.43</td>
<td>6.39</td>
<td>0.93</td>
</tr>
<tr>
<td>MCA Language</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>MCA Vocalt*</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>MCA Sentence*</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Preceptive</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Expressiv*</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Communication</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Socialization</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Motor</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
<tr>
<td>Varticl Adaptability Behav</td>
<td>12</td>
<td>7.46</td>
<td>5.60</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Selected References


Discussion

• Previous research has provided evidence of a very low prevalence of stuttering in children with significant hearing loss. In contrast, the results from this study showed that children with mild to moderate hearing loss may have a significantly higher incidence and prevalence of stuttering compared to typically hearing children.

• Besides a higher incidence and prevalence of stuttering, this sample was similar to typically hearing children in two trends that may help to predict recovery or persistence:
  1. The children who were still stuttering at the time of survey submission (those who may persist in stuttering) had a significantly later stuttering onset compared to the children who had recovered from stuttering. This is similar to what has been found in typically hearing children (Yairi & Ambrose, 2005).
  2. At 4-5 years of age (near the time of stuttering onset), the children who were still stuttering at the time of survey submission (those who may persist in stuttering) had significantly lower TOPEL Phonological scores compared to the children who recovered from stuttering. Similarly, Padden, Ambrose and Yairi (2002) discussed how poorer phonological abilities chose to stuttering onset may be a predictive factor of stuttering persistence in the typically hearing population.

Take Away Points

• Mild to moderate-severe hearing loss is not a protective factor for stuttering onset or persistence. In fact, the prevalence of stuttering may be higher in this population compared to the general population.

• Despite the significant speech and language needs that children with mild to moderate hearing loss may have, Speech-Language Pathologists should appropriately prioritize stuttering treatment like they would in the typically hearing population.

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