Evidence on Spoken Language Development in Deaf/Hard of Hearing Children at Transition to School-age in the United States: A Systematic Review


Abstract

Advances in technology, early identification, and early intervention for development of spoken language provide greater opportunity for hearing loss children to be successful in mainstream education. Many expect age-appropriate spoken language skills by school-entry. The current study investigated the extent evidence on spoken language skills of deaf/hard of hearing children in the USA at transition to school-age (4 – 7 years of age). Evidence published from 2001 through 2010 investigating spoken language skills (i.e., vocabulary, syntax, speech intelligibility) and academic skills (i.e., literacy, math, social interaction) was reviewed. Multiple search engines, databases, reference sections, and professional websites yielded 145 studies that met search criteria. Of those, 93 were specific to the United States and 1 met the study criteria for age at amplification or implantation, early intervention to develop spoken language, and age of participants (4 – 7 years of age). Results indicate a need for much more research in this area.

Background

Hearing loss is one of the most common birth defects in America (Ross, Holatrum, Gaffney, Green, et al., 2008). The overwhelming majority of these children (nearly ninety percent) are born to hearing parents who communicate over spoken language (NYSDOH, 2009) and who want their children to develop spoken language (Brown, 2006). The overwhelming majority of these children (nearly ninety percent) are born to hearing parents who communicate over spoken language (NYSDOH, 2009) and who want their children to develop spoken language (Brown, 2006).

Prior research on deaf/hard of hearing children in mainstream education suggested that greater spoken language proficiency was positively related to increased self-esteem and social interaction with hearing peers (Kluwin, Stinson & Collarossi, 2002); and that speech intelligibility and general spoken language skills were related to successful mainstrecthing (Nunes & Pretzlik, 2001; Wilkins & Ertmer, 2002). However, there were few studies of preschool-aged children, and most studies failed to examine literacy skills at school entry; thereby preventing identification of baseline skills (Kluwin, Stinson & Collarossi, 2002). In addition, studies lacked high quality rigor involving methodology, sample size, and construct (Hyde & Power, 2004).

More recent studies have claimed that technological advances, together with early identification, amplification, and early intervention for spoken language development have significantly improved outcomes (Tye-Murray, 2004; Moeller, 2000; Nicholas & Geers, 2000). But what is the level and extent of the evidence to support these claims? What do we really know about the outcomes for children identified and amplified by two years of age, who have received early intervention for development of spoken language and who are now transitioning to school-age? How do their spoken language skills compare to hearing peers with whom they will be mainstreamed?

Purpose

We conducted a systematic literature review to:

1. determine the extent and level of evidence on spoken language skills for deaf/hard of hearing children at transition to school-age, who received early intervention to develop spoken language;
2. identify specific areas of communication (i.e., vocabulary, pragmatics, syntax, speech intelligibility) that have been identified as predictors of mainstream success.

Methods

Multiple search engines (i.e., Google, Google Scholar, Yahoo, Ask), databases (i.e., ERIC, PsychInfo, EbscoHost, College Research Journals), and bibliographies of peer-reviewed articles were investigated, using various combinations of the following keywords: deaf, hard of hearing, hearing impaired, oral language, spoken language, literacy, and deaf/hard of hearing children in school-age (Tye-Murray, 2004; Collarossi, 2002).

Studies had to meet the following criteria:
1) Be published between 2001 – 2010;
2) Be conducted on children in the USA;
3) Be either experimental, quasi-experimental, or single-study experimental in design;
4) Include children who were enrolled in spoken language EI programs; and
5) Involve children who were between 4 and 7 years of age (transition to school-age) at the time of the study.

Results

A total of 72 studies were conducted in the USA. Of those, 6 involved children 4 years to 7 years of age. Just 3 focused on children developing spoken language in EI and only 1 study compared deaf/hard of hearing children’s skills to those of hearing peers on specific outcomes.

Geers, Moog, Biedenstein, Brenner & Hayes (2009) used a quasi-experimental design to investigate spoken language outcomes in children at 5 to 6 years of age. Children from 20 states and 39 different EI programs (n = 153) were evaluated. Spoken language outcomes for receptive vocabulary, expressive vocabulary, receptive language, expressive language, and verbal IQ were examined. Predictors included age at identification, age at implant, duration of implant use, gender, and parent education level. Children whose non-verbal IQ was less than 70 were excluded.

Multiple regression analysis identified four predictors that had the largest impact on spoken language outcomes: non-verbal IQ, parent education level, gender and age at implant. Together they explained between 35.9 – 43.5% of the variance in spoken language. Non-verbal IQ accounted for the greatest amount of variance, across all outcome areas (15.6% - 24.3%). Table 1 shows the outcome areas, total variance explained by the 4-predictor set, and the variance explained by non-verbal IQ.

Conclusions

Evidence on spoken language skills of children with hearing loss, at transition to school-age, is extremely limited;
2) Few studies include children developing a single mode of communication, specifically spoken language;
3) From the limited existing evidence, over 50% of the factors involved in development of spoken language remain unexplained.

References

La Salle University

Table 1

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Total variance</th>
<th>Non-verbal IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive Vocabulary</td>
<td>43.5%</td>
<td>16%</td>
</tr>
<tr>
<td>Receptive Vocabulary</td>
<td>35.9%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Verbal Intelligence</td>
<td>48.1%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Receptive Language</td>
<td>41.8%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Expressive Language</td>
<td>39.3%</td>
<td>15.6%</td>
</tr>
</tbody>
</table>

Bibliography of reviewed articles available upon request.