

Critical Review:

Does auditory-verbal therapy result in positive language outcomes for children with hearing loss?

Paula Malecki

M.Cl.Sc (SLP) Candidate

University of Western Ontario: School of Communication Sciences and Disorders

This critical review examines the effect of auditory-verbal therapy on language outcomes in children with hearing loss. A search of the literature yielded five papers with study designs including matched-group case control, single group, and longitudinal single group. Overall, the literature reviewed indicates that auditory-verbal therapy results in positive language outcomes for children with hearing loss. Clinical implications and evidence-based recommendations for professional practice are discussed.

Introduction

Children with hearing loss are at increased risk of language delays compared to hearing peers throughout early childhood and into the school years (Vohr et al., 2012). However, studies have shown that early identification and early intervention for infants with mild, moderate, severe, and profound hearing loss mediate the detrimental impact of permanent hearing loss on language skills (Holstrum, Biernath, McKay, & Ross, 2009; Vohr et al., 2012). With modern improvements to hearing aids and cochlear implant technology, there has been greater emphasis on listening-based therapies for children with hearing loss, such as auditory-verbal therapy (Fairgray, Purdy, & Smart, 2010).

Auditory-verbal therapy (AVT) is an early intervention education option that facilitates optimal acquisition of spoken language through listening by young children with hearing loss (Dornan, Hickson, Murdoch, & Houston, 2009). With the auditory-verbal approach, the development of spoken language is emphasized through early identification of hearing loss, optimal amplification, and intensive speech and language therapy where parents serve as the primary language models for their children (Eriks-Brophy, 2004). This approach to language intervention is based on the notion that most children with mild to profound hearing loss can learn to communicate through oral language if provided with appropriate amplification, abundant language stimulation, and adequate opportunities to develop their residual hearing (Eriks-Brophy, 2004).

Evidence is accumulating to suggest that AVT is an appropriate intervention model for children with hearing loss (Rhoades, 2006). There is preliminary evidence that AVT results in positive language outcomes for children with hearing loss and that the language development of

these children is comparable to that of children with normal hearing. Therefore, a nonsignificant difference in language development between children with hearing loss and children with normal hearing is a positive outcome as it suggests that their progress is keeping up with normal development.

With increasingly greater numbers of professionals and parents choosing to implement this approach worldwide (Rhoades, 2006), it is important to develop a strong evidence base that will inform professionals and parents about the effectiveness of this approach.

Objectives

The primary objective of this paper is to critically review the existing literature regarding the impact of AVT on language outcomes among children with hearing loss. The secondary objective is to propose clinical implications and evidence-based recommendations for professional practice.

Methods

Search Strategy

The following computerized databases were used to find articles related to the topic of interest: PsycINFO, PubMed, and Scopus. Keywords for the databases included: [(auditory-verbal therapy) AND (language outcomes) AND (young children) OR (children)]. Examination of reference lists from retrieved articles revealed further studies for review.

Selection Criteria

The studies selected for inclusion in this critical review were required to investigate language outcomes of children with hearing loss who received AVT. Only studies meeting this criteria were included in this review; however, no limitations were set on the

geographical location of participants, participant gender, type of hearing loss, type/age of amplification for the children with hearing loss, or study design.

Data Collection

Results of the literature yielded five articles congruent with the aforementioned selection criteria reporting studies of the following designs: matched-group case control study (3), single group design (1), and longitudinal design with a single group (1).

Results

Matched-group case control studies

Dornan, Hickson, Murdoch, and Houston (2007) compared the speech and language developmental progress of 29 children (2-6 yrs) with hearing loss who were receiving parent-based, intensive one-to-one auditory-verbal therapy (1x/wk minimum for 6 mos) to that of a normal hearing control group (n=29) matched for total language age, receptive vocabulary, gender, and head of household education level. Assessments completed pre-treatment and nine months later were administered by a Speech-Language Pathologist (SLP) using standardized assessments commonly employed in this area of research to measure receptive and expressive language, receptive vocabulary, and total language scores, as well as other measures not relevant to the present review. Appropriate two-sample t-tests revealed that both groups of children made the same significant developmental progress in receptive and expressive language, receptive vocabulary, and total language.

In 2009, Dornan, Hickson, Murdoch, and Houston reported a longitudinal analysis of the developmental progress of 25 of the original 29 pairs of children from their 2007 study. Of interest to the present review, the language abilities of participants were reassessed 21 months after the original assessment, using the same test battery. Appropriate paired sample t-tests revealed that the children with hearing loss made the same significant progress in auditory comprehension, oral expression, and total language at the same rate as the children in the control group. However, for the control group, the change in receptive vocabulary scores from initial assessment to 21 months later was significantly higher than the change for the experimental group. Nevertheless, the mean score of the children with hearing loss for receptive vocabulary was within the typical range for the test. It is important to note that a greater number of children with hearing loss had age-appropriate total language scores at the 21 month posttest compared to the pretest.

In the final stage of their research, Dornan, Hickson, Murdoch, Houston, and Constantinescu (2010) continued to examine speech and language outcomes of 19 of the original 29 pairs of children 50 months later after 70 months of AVT (on average). Language outcomes were measured in the same way, as well as other skills not relevant to this review. Appropriate nonparametric statistics (Wilcoxon signed rank; Mann Whitney U) revealed that for total language scores, auditory comprehension, oral expression, and receptive vocabulary, both groups made significant progress over 50 months, and the change in scores over this period of time was not significantly different between the groups. It is important to note that while the majority of children with hearing loss scored within the typical range or above for total language and receptive vocabulary at the 50 month posttest, all of the children with normal hearing scored within the typical range for both measures.

The authors noted some limitations and strengths of their research. One limitation is that the generalization of the outcomes may be limited to groups with relatively high-level socioeconomic backgrounds, which is associated with better language outcomes for children with normal hearing (Hart and Risley, 1995; as cited in Dornan et al., 2010). Secondly, a control group of children with hearing loss not receiving AVT was not utilized. Thirdly, selection criteria for the participants in the study included the absence of other significant cognitive or physical disabilities. Therefore, the outcomes for the experimental group may not be applicable to those with comorbid conditions in addition to hearing loss. Fourthly, selection criteria also included English-only language use by parents with their child. Therefore, the results of the study may not be generalizable to children who are not native English speakers. A strength of this study is that, although they had normal hearing, a control group was utilized with carefully matched participants. Additionally, several communication domains (language reception and expression, receptive vocabulary, and speech skills) were examined. Overall, the results of this study provide suggestive evidence regarding the positive impact of AVT on auditory comprehension, oral expression, total language, and receptive vocabulary skills in children with hearing loss.

Single-group design

Fairgray, Purdy, and Smart (2010) investigated changes in understanding of spoken language, complexity of expressive language, and other speech measures not relevant to the current review in 7 children (5-17yrs) with moderate-to-profound hearing losses after a period of intensive weekly speech-language therapy based on

auditory-verbal principles. Therapy was provided by an SLP who was also certified as a Spoken Language Specialist in Auditory-Verbal Therapy and included weekly follow-up activities for home practice (about 20 minutes per day). Baseline assessment using a 'gold standard' standardized test of language occurred over several sessions at the beginning of the participant's AVT program, and follow-up assessment occurred immediately after 20 individual one-hour appointments. Appropriate Wilcoxon Matched Pairs Tests revealed significant gains in the understanding of spoken language. Significant gains in expressive language were not seen on standardized testing. The authors note that while vocabulary was not formally measured, anecdotally it appeared that vocabulary improved with therapy for all participants.

One limitation of the study is that expressive and receptive language skills were assessed using one standardized test, and only a few subtests were statistically analyzed. Additionally, language skills were measured only once at pre- and post-treatment, which fails to rigorously establish baseline and change in performance. Another limitation of the study is the small sample size, which reduces the generalizability of the results to the population at large. A strength of the study is that the authors provided a detailed description of how each of the AVT principles were incorporated in the intervention. Overall, this study provides somewhat suggestive evidence that AVT results in positive receptive language outcomes in children with hearing loss.

Longitudinal design with a single group

Rhoades and Chisholm (2000) examined the global language growth rate of 40 children (average age of 3 yrs) with at least moderate hearing losses who participated in AVT sessions (1-2 hrs/wk for 1 year minimum), and whether the gap between chronological age and language age narrowed for these children. One of three standardized assessments commonly employed in this type of research to measure global language was administered to each child upon entry into the AVT program and at least annually to monitor progress. Results of appropriate two-way repeated measures ANCOVAs revealed that, on average, children receiving AVT progressed more than might be expected as a function of normal development growth alone. Additionally, for the 14 children who had been professionally released (i.e. "graduated") from the AVT program, there were essentially no differences between the children's chronological ages and their equivalent receptive and expressive language ages.

A limitation of this study is the absence of a control group with matched subjects. Furthermore, the parents of the children in the study represented a well-educated group. Thus, because parents/caretakers are heavily involved in AVT therapy, it might not be possible to apply the findings to a group of children with hearing loss who have parents with less education. Additionally, the results were based on age-equivalent scores, which should be interpreted with caution as these scores can be highly ineffective in reporting performance on standardized tests (Maloney & Larrivee, 2007). Based on demographic data, the children in this study represented a heterogeneous group (i.e. those who might be/were diagnosed as cognitively delayed). This could be a limitation in that the influence of these factors is unknown, but it could be a strength in that the population of children who are deaf or hard of hearing are a demographically heterogeneous group. Overall, this study provides somewhat suggestive evidence that children with hearing loss receiving AVT learn language at a faster rate than they would without AVT intervention, and that AVT makes it possible to narrow the gap between chronological age and global language age.

Discussion and Conclusion

The studies reviewed collectively offer preliminary evidence suggesting that AVT results in positive language outcomes in children with hearing loss. While all of the reviewed studies provided a positive outcome, there were methodological limitations within these studies. Results should be interpreted with caution.

One limiting factor is the use of small sample sizes in many of the studies, which reduces the generalizability of the results. Another factor is that a control group comparing treatment types or, for example, comparing children receiving AVT to children with hearing loss on a wait list for intervention services was not used in any of the studies, which makes attributing the results to the intervention rather than maturation difficult. Additionally, some of the studies used only one standardized test to measure each area of language development pre- and post-treatment, which may not be adequate to fully test language abilities. In all of the studies, language skills were measured only once pre-treatment, which fails to rigorously establish baseline.

Despite these limitations, the results suggest that AVT leads to favourable language outcomes. The strongest evidence was demonstrated by the series of studies conducted by Dornan et al. (2010), who concluded that language attainments of participants with hearing loss were the same as a matched control group with normal hearing over a 50 month time period, suggesting that the

children with hearing loss kept up with normal language development. Fairgray et al. (2010) found significant gains in receptive language scores among children with hearing loss. Significant gains in expressive language were not seen on standardized testing, however only a small number of subtests from one assessment tool were statistically analyzed for expressive language in this study. Rhoades and Chisholm (2000) found that children with hearing loss receiving AVT learned language at a faster rate than might be expected as a function of normal developmental growth, and that AVT makes narrowing the gap between chronological age and global language age possible. Overall, these studies provide preliminary evidence that AVT results in positive language outcomes and is therefore an appropriate intervention option for children with hearing loss. However, other approaches for children with hearing loss exist, such as the Auditory-Oral Approach, and research is needed to compare language and other outcome measures of children receiving one approach to children receiving the other.

Clinical Implications

It is the role of SLPs and other professionals who are certified Listening and Spoken Language Specialists to provide parents of children with hearing loss with information regarding intervention options that is based on research evidence. It is recommended that although this intervention option is highly compelling clinically, clinicians should consider there to be preliminary evidence suggesting that AVT is an appropriate intervention option for facilitating language development in children with hearing loss. Due to the aforementioned limitations, however, it is suggested that SLPs and other professionals interpret results from the compiled evidence with caution.

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