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Augmentative and Alternative Communication for Preschool Children: Intervention goals and use of technology

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Abstract

This study sought to describe speech-language interventions for preschool-aged children who required AAC as provided by AAC experts and by general speech language pathologists who were not AAC experts. The study also examined the types of technology used in AAC intervention by AAC experts. A retrospective chart review was conducted in which clinic records of 38 preschool-aged children who received expert AAC services were examined. Results showed that interventions provided to the children by general speech language pathologists (who were not AAC experts) tended to be broader in scope, focusing on reducing underlying impairments. Interventions provided by AAC experts tended to focus on improving activities and participation and were oriented toward improving functional communication. The most commonly used AAC intervention tools by AAC experts were low tech and simple digitized devices.

Keywords

AAC; developmental disabilities; technology

Young children with developmental disabilities are at risk for significant communication problems [1, 2]. These problems may be related to deficits in cognition, language, speech motor control, sensation, or several of these areas. Regardless of the cause, communication challenges can lead to educational and social isolation [1], and can have a detrimental impact on nearly all aspects of development [2-4].

Augmentative and alternative communication (AAC) systems and strategies are an important avenue to enhance communication development and social participation for anyone who cannot meet all of their communication needs using speech alone [5]. For young children who may be at-risk for communication challenges, Romski and Sevcik[1] suggest that AAC interventions should be introduced *before* communication failure occurs. AAC interventions can provide an important foundation for language development [1], a tool for social participation [6], and can serve to facilitate development of natural speech [7, 8]. Thus, even if a child with early risk factors eventually develops speech that is adequate for meeting all communication needs, early AAC intervention has other developmental benefits.

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Speech Language Pathologists who serve preschool children

Speech language pathologists (SLP) can play a leading role in identifying and serving children who may benefit from AAC. However, SLPs differ in their level of knowledge and skills with AAC; thus, their role(s) can vary. Three general roles that SLP's may play with regard to AAC have been described in the literature [9, 10]. These are AAC experts, SLPs in integrated practice, and finders / referrers[10].

AAC experts have highly specialized knowledge and skills that are specific to AAC. AAC experts typically have completed advanced coursework or extensive continuing education in AAC and have significant clinical experience with AAC assessment and intervention. These therapists often work in settings that offer comprehensive AAC services and include multidisciplinary expertise. AAC experts have competence with the full range of current AAC technologies and typically will have access to a variety of AAC devices for use in assessment and intervention. AAC experts may work with individuals and their families intensively for a short period of time and then perform periodic follow-up and consultation as necessary. Day-to-day intervention after an AAC system has been acquired or initially established may fall on SLPs who provide a more general range of services in educational or community-based settings

SLPs in integrated practice [10] provide a broad range of speech, language, and feeding / swallowing services to children with disabilities; basic AAC intervention is likely to be among the services provided. Indeed, SLPs in integrated practice may have training and / or experience in AAC, but limited access to and / or knowledge of current AAC technology. These therapists may be able to initiate AAC interventions using low tech communication boards, books, and perhaps simple digitized devices. However, SLPs in integrated practice will usually need to refer children who require more complex voice output technology and / or have access concerns to AAC experts. SLPs in integrated practice may be the primary service providers for AAC intervention after the expert AAC assessment has been completed and equipment obtained.

Finders / referrers are SLPs who have limited knowledge and skills in AAC and therefore do not provide AAC-related treatment. However, these SLPs may refer individuals who need AAC to service providers with appropriate expertise.

Because the different types of SLPs have different knowledge and skill bases, we were interested in examining differences and similarities among goals identified by the three types of SLPs for the same children. We hypothesized that the goals identified by AAC experts would likely have a stronger compensatory focus that emphasized functional communication while the goals identified by the other two types of SLPs would be broader in scope, targeting a range of skills across speech, language, feeding / swallowing, and functional communication domains.

AAC Technology and Young Children

AAC systems and strategies can range from very simple to very complex. Technology can and often does play an important role in AAC, providing access, for example, to a large dynamic vocabulary and text-to-speech voice output. However, research has demonstrated that young children who are typically developing have difficulty using complex technology for communication, and although they do show learning over a period of weeks, their performance remains sub-optimal [11, 12]. Although research on typically developing children cannot be directly generalized to children with disabilities, it is probably a safe assumption that what is difficult for typical children would be even more difficult for children with various kinds of cognitive, language, motor, or sensory disabilities. Researchers have interpreted the findings of studies examining technology learning in typical children to suggest that “AAC technologies

should be re-designed to increase their appeal, expand their function, and reduce their learning demands" (pg. 206)[4].

There has been little research examining the extent to which different types of AAC systems and strategies are used with young children who have significant communication challenges. However, one study showed that the more sophisticated high tech voice output AAC systems were used with only 15% of preschool children who required AAC and were receiving early intervention services [13]. Binger and Light [13] suggested that one reason for this finding may have been that SLPs lacked knowledge and experience with high tech AAC systems. Studies have not examined the extent to which AAC experts employ different kinds of technology with children who require AAC. However, there are clearly important clinical implications to this question, given recent research findings [11, 12].

In the present study, we examined the types of technology employed by AAC experts who provided AAC assessment and / or intervention services to preschool-aged children. We hypothesized that because AAC experts had access to the full range of AAC technologies, they would be more likely to employ high tech tools. Thus, we expected that an analysis of the different kinds of technology used by AAC experts working with preschool children would reveal that high tech tools were employed with the majority of children.

The two specific research questions addressed in this study were as follows:

1. How do goals developed by AAC experts differ from those developed by other SLPs for the same children?
2. What kinds of tools are used most commonly in intervention by AAC experts?

Method

This study employed a retrospective analysis of clinic records of young children who received AAC services through two AAC specialty programs in the Midwestern region of the United States between 1999 and 2004. One program was a regional AAC clinic, providing center-based AAC assessment and intervention services to children and adults across the lifespan. The other program was community-based, providing AAC services within the local county to young children (up to 48 months of age) and to adults (over 21 years of age). Both programs shared the same personnel (speech language pathologists and occupational therapists) and physical resources, including AAC equipment. Speech language pathologists had at least 5 years of intensive clinical AAC experience and mastery-level skills with AAC technology [14]. All personnel also had access to a full range of state-of-the-art AAC equipment for all services provided.

Participants

Data addressing the research questions were obtained by retrospective review of the clinic records of young children who received AAC services through the two programs. Because children up to the age of 48 months were eligible for services through one of the targeted AAC programs, we included only children who were 48 months or younger at the time of initial evaluation in this review. Records documenting services through the end of each child's 48th month of life were included in this study. Clinic records were available for 38 children.

Of the 38 cases that were reviewed, 23 were male and 15 were female. The mean age when children were first seen by AAC experts was 29 months (SD 7 months; median age 30 months). The mean age for males was 30 months (SD 7 months; median age 28 months), and for females was 29 months (SD 8 months; median age 31 months).

Procedures and Analyses

The following information was of interest for this study: 1.) goals addressed by speech language pathologists who were not AAC experts at the time of referral; 2.) goals addressed by AAC experts; and 3.) AAC systems used in evaluation and therapy by the AAC experts.

After obtaining charts, several key documents were identified that contained information regarding the three areas of interest. These were: a clinical intake form completed by the caregiver and / or therapist(s) working with the child; the Individualized Education Plan or an Individualized Family Service Plan (current at the time of referral), depending on the child's age; an AAC assessment report written by the AAC expert(s); plan of care documentation for AAC services including goals and objectives for those children receiving therapy; and individual session notes for AAC services.

All narrative relating to each of the three areas of interest (SLP goals; AAC expert goals; tools used by AAC experts) was transcribed verbatim into a database for further analysis. A qualitative methodology [15-18] was employed to reduce and interpret data. A three step process was used to analyze verbatim transcriptions from the charts within each of the three areas of interest.

The first step involved separating the verbatim narratives into stand-alone content units [15] (if necessary). The second step of data analysis involved pooling units across children and organizing units into super-ordinate categories based on conceptual similarities, or themes. This step was completed by the first and second authors together, using discussion and consensus. After consensus was reached regarding categories, operational definitions were developed for each category of goals and for each category of technology. The third step of data analysis involved determining coding agreement. Intra-rater agreement was obtained by having the first author re-organize 50% of the data (from step 2, above) into super-ordinate categories a second time. Intra-rater agreement, defined as the number of categorical agreements divided by agreements plus disagreements, was .93. Inter-coder agreement was obtained by having a third person, who was not involved in the initial coding, re-code all units (100% of the data) (from step 2, above) into super-ordinate categories based on the operational definitions. Definitions were provided for categorizing goals identified by SLPs who were not AAC experts, goals identified by AAC experts, and tools used by AAC experts. Inter-coder agreement, defined as the number of categorical agreements divided by agreements plus disagreements, was .90. Super-ordinate categories for each area of the three areas, along with frequency counts for units within each category are provided in Tables 1-3.

Because this study was designed to be descriptive in nature, inferential statistics were not employed. Data reported below are based on descriptive statistics (means) and refer to general tendencies within the descriptive data.

Results

Speech and language therapy goals at the time of referral to AAC experts

Information regarding ongoing speech and language therapy was available for 30 of the 38 children. Table 1 shows that six categories of speech and language goals were being targeted across children at the time of referral for AAC. Goals focused on acquisition of early cognitive skills, oral-motor development, language development, vocal/speech development, feeding, and functional communication. Goal areas were addressed with similar frequency among the children (approximately 50% of children were working on each goal area) with the exception of functional communication, which was addressed more often than the other goal areas; and acquisition of early cognitive skills, which was addressed less often than the other goals.

Intervention goals identified by AAC experts

Of the 38 children who were seen by AAC experts, 31 received therapy and 7 were seen for evaluation only. Of the 31 children seen for therapy by AAC experts, information regarding AAC goals and objectives was available for 29 children. Table 2 shows the categories of goals targeted by AAC experts. The most common goals included the use of multiple modes of communication and expanding the repertoire of communicative intents used by the child. Nearly 90% of the children seen for therapy had one or both of these goals identified. Other goal areas that were targeted by AAC experts included language development, cognitive development, and social participation. Continued evaluation was also a goal for many of the children.

AAC systems used in assessment and / or intervention

Data regarding AAC systems were available for all 38 children. The average number of AAC systems or strategies tried in therapy and / or evaluation by the AAC experts was 7.4 per child (range = 1-19). Table 3 shows the categories of different AAC systems that were identified for the children. Results indicate that more than 80% of children tried simple digitized devices containing a limited number of messages on a static display and digitized (recorded) voice output. Nearly 80% tried low tech communication boards, books, and symbols. Far fewer children tried high tech computer-based or dedicated systems (40% and 32%, respectively). Finally, approximately 16% of children tried the use of manual signs as part of their AAC assessment and / or intervention.

Discussion

In the literature, three different roles for SLPs, based on their knowledge and skills in AAC, have been identified [9, 10]. These are: AAC expert, SLP in integrated practice, and finders / referrers. In the present study we examined goals identified by AAC experts and goals identified by SLPs who were not AAC experts (SLPs in general practice and finders / referrers). It is important to note that we were unable to differentiate between SLPs in general practice and finders / referrers because our data were obtained from a retrospective review of clinic records. Consequently, the only information available about clinicians who wrote the most current goals in each child's IEP or IFSP was that they were not AAC experts (as evidenced by the fact that the child had been referred to an AAC expert). Not surprisingly, there were both similarities and differences in the goals that the two groups of SLPs identified for the same children.

With regard to similarities, both types of SLPs identified goals focused on language and cognitive development and they did so in similar proportion. However, as hypothesized, the other types of goals identified by AAC experts were more oriented toward multimodal communication, social participation, and expression of different communicative intents. SLPs who were not AAC experts were more oriented toward foundational speech and feeding goals than the AAC experts, who did not identify any such goals. This is not entirely surprising given the differences in the scope of services provided by the two types of SLPs. One interesting observation is that within the frame of the World Health Organization's International Classification of Functioning, Disability, and Health [19] our data suggest that SLPs who were not AAC experts addressed more goals that emphasized reducing underlying impairment (e.g. goals focused on acquisition of foundational skills such as vocal development, oral-motor development, and feeding), while AAC experts identified more goals that emphasized reducing activity limitations and participation restrictions. However, it is also interesting to note that 68% of children had at least one functional communication-oriented goal identified by SLPs who were not AAC experts in their IEP or IFSP. At the same time, it is concerning that 32% of the children did not have any functional communication goals prior to referral to an AAC

expert. One explanation for this finding may be a lack of knowledge and skills in AAC on behalf of the SLPs who wrote the IEP or IFSP (presumably these were finders / referrers). This finding provides further evidence for the importance of pre-professional training in AAC and an important rationale for referring children to AAC experts.

In a previous study, Binger and Light [13] found that high tech tools were used infrequently with preschool-aged children who required AAC. They suggested that one reason for this finding may have been a lack of knowledge and / or experience with higher tech AAC tools. In the present study, we examined AAC experts' use of different types of AAC tools with preschoolers. Results showed that on average, assessment and / or intervention provided by AAC experts employed many different tools for each child. However, low tech systems and strategies (e.g. communication boards, books, digital photos, simple digitized voice output devices) were used considerably more often than high tech tools (computer software, high end voice output devices). This finding was particularly interesting given that the AAC experts had a full complement of state-of-the-art AAC technology available as well as mastery-level knowledge and skills in the use of that technology. Researchers have suggested that AAC systems should be re-designed to reduce learning demands [4, 12], which in turn would make them more appropriate for young children. However, in the interim, another potential option is to focus early AAC intervention efforts on use of simpler solutions (e.g. line drawings, images from the internet, or digital photographs) such as those used by the AAC experts in the present study. Low tech tools are low cost, readily available, and require little expert knowledge and skill to implement. Indeed, such tools are often readily within the grasp of SLPs in integrated practice. By expanding goals areas to include a stronger focus on functional communication and participation, SLPs in integrated practice may be able to provide more expert-like AAC services to young children with complex communication needs.

Conclusions

In summary, there are many potential limitations to this retrospective chart review. Of particular importance is that only information documented within the chart could be included in our analyses. Over the course of behavioral assessment and / or treatment, it is impossible to document in detail every single observation that a clinician may make. However, we assume in this study that the important and noteworthy aspects of assessment and treatment were in fact noted and thus represented in this study.

Results of this work provide an initial broad descriptive glimpse into the characteristics of the services that children who may benefit from AAC receive. Results suggest that AAC experts and general SLPs identified some similar and some different goals for young children. AAC experts tended to be more functionally oriented, while SLPs who were not AAC experts tended to be more foundational skill or impairment-oriented. Finally, this study showed that AAC experts used simple tools such as pictures, communication boards, and simple digitized devices, more often than they used high tech computerized tools. This finding suggests that sophisticated technology is not necessary to initiate early AAC interventions with young children.

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Table 1

Categories of speech and language identified by SLPs who were not AAC experts. Note that goals are not mutually exclusive and that data were available for 30 of 38 children.

Goal area	Examples	N	% (of 30)
Acquisition of early cognitive skills	• improve alertness • improve cause-effect	10	33.3%
Oral-motor development	• participate in oral motor play with teethers and textured toys • reduce drooling • reduce oral defensiveness	13	43.3%
Language development	• increase expressive vocabulary • increase receptive vocabulary • follow 1-step directives	14	46.7%
Vocal / Speech development	• imitate vocal play, speech sounds, words • increase quantity and variety of vocalizations • produce consonant-vowel combinations • increase phonetic repertoire • engage in babbling	15	50.0%
Feeding	• improve chewing / biting • tolerate different textures • improve cup drinking	16	53.3%
Functional communication	• indicate yes/no • participate in choice making • express wants and needs • improve multimodal communication in real contexts (e.g. use picture symbols or AAC device, use signs)	20	66.7%

Table 2

Categories of intervention goals identified by AAC experts. Note that goals are not mutually exclusive and that data were available for 29 of 31 children who received therapy services.

Goal area	Examples	N	% (of 29)
Increase social participation	• improve social interaction • increase communicative opportunities	11	37.9%
Ongoing evaluation	• extended communication device trial • explore additional AAC systems	11	37.9%
Acquisition of early cognitive skills	• improve knowledge of basic concepts • increase intentional use of communicative behavior • improve cause-effect	12	41.4%
Language development	• increase receptive vocabulary • follow 1-step directives	15	51.7%
Use of multimodal communication	• use of eye gaze • use of aided symbols and devices • use of unaided signs and gestures • use of vocalizations and speech • reduce aversive behaviors • concurrent use of different communication modalities	26	89.6%
Expand repertoire of communicative intents	• initiate communication • indicate wants and needs • share information • comment • request • terminating / rejecting • choice making • directing others / planning	26	89.6%

Table 3

Categories of AAC systems used in evaluation and therapy. Note that systems are not mutually exclusive. Data were available for 38 of 38 children.

AAC system/strategy	Examples	N	% (of 38)
Manual signs	• Pidgin signed English • Signing Exact English	6	15.8%
Computer-based communication software/ hardware	• Intellikeys • Speaking Dynamically Pro	12	31.6%
High tech dedicated AAC devices	• Mercury • Vantage • Dynamyte • Dynavox	15	39.5%
Low tech communication boards, books, and symbols	• Digital photos • Communication book • Picture Communication Symbols	30	78.9%
Simple digitized devices	• Step-by-step • Big Mac • Go Talk	32	84.2%