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Analysis of Preferences Regarding Augmentative Language System for Children with Autism Spectrum Disorders Among Speech Language Pathologists

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ABSTRACT

Background: Autism Spectrum Disorder (ASD) can be identified as a neurodevelopmental disorder characterized by communication deficits and social impairments. Augmentative Alternative Communications (AAC) has long been identified as widely acclaimed in supporting children with speech deficits or speech disorders; however, there are sparse explorations in terms of professional predilections in low-resourced settings like Pakistan regarding AAC communication support. The role and necessity of speech-language pathologists (SLPs) in AAC support and utilization cannot-be-belabored; therefore, the need to acquire knowledge from these professionals can define the boundaries of excellence in such settings. Objective: To determine the professional predilections of SLPs regarding the utilization of Augmentative Language Support Systems in children with ASD in Lahore, Pakistan, and associated factors. Methods: The descriptive cross-sectional study was applied to collect data from 127 SLP professionals using purposive sampling. Information was collected through a structured questionnaire assessing demographically, training, AAC support utilization, and perceptions regarding effectiveness. Data analysis was applied through SPSS 25.0 using Chi-squared test and odds ratios to compare data from different categories. Results: Most respondents comprised female (74.84%) professionals, mostly early-career personnel (63% using AAC with 1-3-year-experience). PECS was overwhelmingly preferred (93.73%) and found most effective (94.5%), whereas VOCAs held little support (6.3%). Only 10-15% of SLP complied with AAC in 80.3% of cohorts, although effectiveness was perceived by 86.6% regarding AAC support; 36.6% feared demerits. Conclusion: SLP in Lahore prefers PECS far above VOCAs in viability but underlines little utilization of AAC support despite acquiescence in effectiveness alongside fear of demerits. Further training and exposures to variegated AAC devices are warranted in these settings to overcome challenges in ASD support services in children.

Keywords
Autism Spectrum Disorder, Augmentative and Alternative Communication, PECS, VOCAs, Speech-Language Pathologists, Pakistan.

INTRODUCTION

Autism Spectrum Disorder (ASD) can be considered a complex neurodevelopmental disorder that manifests in the form of challenges in social communication, interactions, and restricted and repetitive patterns of behavior (1). The incidence of ASD has increased in the global population, ranging from 0.6% in the global population to 1 in every 54 children in the United States of America (2,3). Incidences in Pakistan are low due to the absence of diagnostic facilities and lack of knowledge about ASD in medical professionals and caregivers (4). All these factors underscore the critical need to devise interventions aimed at helping children with ASD in communication and social interactions.

Children with ASD display diverse communication deficits, from nonverbal communication to fluent but pragmatic communication impairments (5). These issues have strong impacts on social interactions, schooling, and the quality of life (6,7). It has long been demonstrated that early communication interventions can increase children 's development, especially when families and experts work hand in hand towards the execution of these strategies (8). In this context, communication gaps faced by children unable to communicate linguistically can effectively be filled through AAC methods.

AAC ranges from low to high technology methods, such as picture communication symbols, communication boards, sign language, and speech-generating devices (9). Studies have shown that AAC facilitates communication, but it can also increase social interactions, reduce problem behaviors, and increase academic engagement (10,11). The Picture Exchange Communication System (PECS), which was developed as a low-tech AAC tool, has proved effective in facilitating communication initiation and vocabulary increase in children with ASD (12,13). High technology objects such as Voice Output Communication Aids (VOCAs) appear to increase the complexity of communication as well as social

interactions (14). Notably, it has been shown that AAC does not delay speech development but rather helps in facilitating the acquisition of speech in children with ASD (15).

The role of speech-language pathologists (SLPs) in evaluating communication skills, AAC system selection, user and caregiver training, and follow-up of intervention outcomes cannot be overlooked (16). The professional judgement of SLPs has played an important role in understanding whether AAC interventions attain optimal results or not. But it has been found that the preference of SLPs in using AAC devices can be affected by several factors such as training, experience, cultural issues, and availability of resources (17,18). Not much work has been published in Pakistan regarding these professional SLP preferences despite global studies showing both effectiveness of AAC and complexity in professional SLP decisions (19).

It has clinical implications because knowledge about the attitudes and preferences of SLPs can help in designing the course curriculum and can make services to children with ASD in culturally diverse environments much better. Hence, the aim of conducting this research was to investigate the attitudes of SLPs in Lahore, Pakistan, towards using augmentative language systems in children with ASD. The aim of conducting this research was to investigate the attitudes of SLPs in Lahore, Pakistan, towards using Augmentative Language Systems in children with autism spectrum disorder.

MATERIALS AND METHODS

For conducting this study, the observational design was descriptive in nature and was applied because of its capability to measure the preference and practice of the SLPs at any point in time. The data collection process took place in Lahore, Pakistan, at several institutes like Rising Sun, Dimensions, Autism Resource Center, and Oasis, and the process continued for 6 months from January to July 2023 after approval from the institutional review committee.

The sampling procedure utilized was purposive sampling in order to ensure that the sample included SLPs who actively worked with children who have ASD. Inclusion criteria included at least having at least a bachelor's degree in speech-language pathology, having at least one year of work experience in the clinical setting, and having children with ASD in the current practice setting. The inclusion criteria included both males and females. Exclusion criteria included professionals in other related professions, diploma holders, or having less than at least one year of experience in the clinical setting.

After taking written-informed consent from the participants, they were orientated about the purpose of the research. Using face-to-face design, a pre-designed and structured questionnaire was delivered. It included three sections. The first section included characteristics of the individual such as age, gender, level of education, and experience working in the clinical setting. The second section was related to AAC system knowledge and experience. The final section included knowledge about AL in children suffering from ASD. It was developed from existing literature (20). It was tested with some SLP practitioners in pilot studies to check internal consistency.

These main variables included the demographically and professionally identified qualities of the participants, AAC system use, and perceived effectiveness of named AAC systems. Functional definitions included definition in keeping with global norms: the definition of ASD included persistent challenges in communication, interaction, and restricted or repetitive patterns (21), while AAC systems included low technology devices such as PECS or communication boards, as well as high technology devices such as VOCAs or SGDs.

To reduce the potential sources of bias, the sample was obtained from multiple centers. Anonymity of the responses was ensured in order to reduce the socially desirable bias. Professional bias was eliminated because of the use of purposive sampling; hence, all those sampled had expertise in the relevant area.

The sample size was determined using an estimated prevalence of 15% in children with ASD who need AAC interventions at 95% confidence level with 5% margin of error; the sample size required was 127. This guarantees robust power in descriptive and comparison analyses.

All data analyses in the current study were performed using the Statistical Package for Social Sciences (SPSS) computer program, version 25.0. For quantitative data like age, mean and standard deviations are used to summarize the result. For nominal data like gender, professional background, and AAC preference, the result was presented using frequencies and percentage. For comparisons between subgroups, chi-square test analysis was employed. Statistical significance was taken at $p < 0.05$. Data missingness was checked and handled using listwise deletion.

Informed written consent was obtained from all the participants. Confidentiality was assured through anonymous answers, and the participants were made aware of their freedom to withdraw from the study without any penalty at any point in time. No risk was involved in conducting the research. The ethical standards as per the Declaration of Helsinki (22) were followed.

RESULTS

The demographic profile of participating Speech-Language Pathologists (SLPs) demonstrated a strong predominance of females, with 95 (74.8%) compared to 32 males (25.2%), a difference that was statistically significant (p=0.001). The professional experience distribution revealed that the majority, 80 respondents (63.0%), had 1–3 years of experience, while 40 (31.5%) had 3–6 years and only 7 (5.5%) had more than six years (p<0.001). Educational background followed a similar pattern, with most participants holding a BS in Speech-Language Pathology (102, 80.3%), compared to 20 (15.8%) with an MS and 5 (3.9%) with a postgraduate diploma (p<0.001), underscoring the early-career and entry-level nature of most clinicians in this cohort (Table 1).

Table 1. Demographic characteristics of participating Speech-Language Pathologists (SLPs) (n=127)

Variable	Category	n (%)	p-value
Gender	Male	32 (25.2)	0.001*
	Female	95 (74.8)	
Work Experience	1–3 years	80 (63.0)	<0.001*
	3–6 years	40 (31.5)	
	>6 years	7 (5.5)	
Academic Qualification	BS SLP	102 (80.3)	<0.001*
	MS SLP	20 (15.8)	

	PGD SLP	5 (3.9)

*Chi-square test showing significant skew toward female gender and early-career professionals.

Experience specifically with children diagnosed with ASD reflected a similar trend. A large majority (102, 80.3%) had only 0–5 years of direct experience, while 23 (18.1%) reported 6–10 years and just 2 (1.6%) had 11–15 years ($p<0.001$). Weekly caseloads were generally low, with 102 SLPs (80.3%) working with 1–5 children, 23 (18.1%) engaging with 6–10 children, and 2 (1.6%) handling 10–15 children weekly ($p<0.001$). Odds ratios indicated that clinicians with higher experience or larger caseloads were significantly less common, with an OR of 0.28 (95% CI: 0.11–0.69) for those with 6–10 years' experience relative to the 0–5 years group, and OR 0.09 (95% CI: 0.02–0.45) for those exceeding 10 years (Table 2).

Table 2. Professional experience with children diagnosed with ASD (n=127)

Variable	Category	n (%)	Odds Ratio (95% CI)	p-value
Years working with ASD	0–5 years	102 (80.3)	Reference	<0.001*
	6–10 years	23 (18.1)	0.28 (0.11–0.69)	
	11–15 years	2 (1.6)	0.09 (0.02–0.45)	
Weekly ASD caseload	1–5 children	102 (80.3)	Reference	<0.001*
	6–10 children	23 (18.1)	0.28 (0.12–0.66)	
	10–15 children	2 (1.6)	0.09 (0.02–0.42)	

*Majority of SLPs reported ≤5 years' experience and weekly caseload of ≤5 children, with statistically significant skew.

Perceptions of AAC effectiveness were strongly positive. A total of 110 respondents (86.6%) believed augmentative systems were effective for children with ASD, while 17 (13.4%) were uncertain ($p<0.001$). Similarly, 113 (89.3%) acknowledged benefits, and only 14 (10.7%) were hesitant ($p<0.001$). On the other hand, the cons held some complexity in understanding: 45 (36.6%) identified actual cons, 58 (47.1%) answered hesitantly, 17 (13.8%) answered in terms of lack of knowledge, but interestingly, only 7 (2.4%) denied any cons ($p=0.02$). For the effectiveness in terms of influence of the treatment on the development of languages, there was an equal split, with 65 (51.2%) showing considerable improvement and 62 (48.8%) showing moderate improvement ($p=0$ (Table 4).

Table 3. Utilization and preferences of augmentative and alternative communication (AAC) systems (n=127)

Variable	Category	n (%)	Odds Ratio (95% CI)	p-value
AAC system use	10–15% of practice	102 (80.3)	Reference	<0.001*
	16–30%	22 (17.3)	0.30 (0.14–0.65)	
	≥31%	3 (2.4)	0.09 (0.02–0.37)	
Preferred AAC system	PECS	119 (93.7)	Reference	<0.001*
	VOCAs	8 (6.3)	0.05 (0.02–0.14)	
Most effective AAC	PECS	120 (94.5)	Reference	<0.001*
	VOCAs	7 (5.5)	0.06 (0.02–0.16)	

*Clear preference for Picture Exchange Communication System (PECS) over Voice Output Communication Aids (VOCAs).

Table 4. Perceived effectiveness, benefits, and drawbacks of AAC systems (n=127)

Variable	Category	n (%)	p-value
AAC effectiveness	Yes	110 (86.6)	<0.001*
	Maybe	17 (13.4)	
Benefits recognized	Yes	113 (89.3)	<0.001*
	Maybe	14 (10.7)	
Drawbacks identified	Yes	45 (36.6)	0.02*
	Maybe	58 (47.1)	
	I don't know	17 (13.8)	
	No	7 (2.4)	
Language development	Significant improvement	65 (51.2)	0.62
	Moderate improvement	62 (48.8)	

Patterns of AAC usage revealed a striking concentration at the lower end of clinical practice.

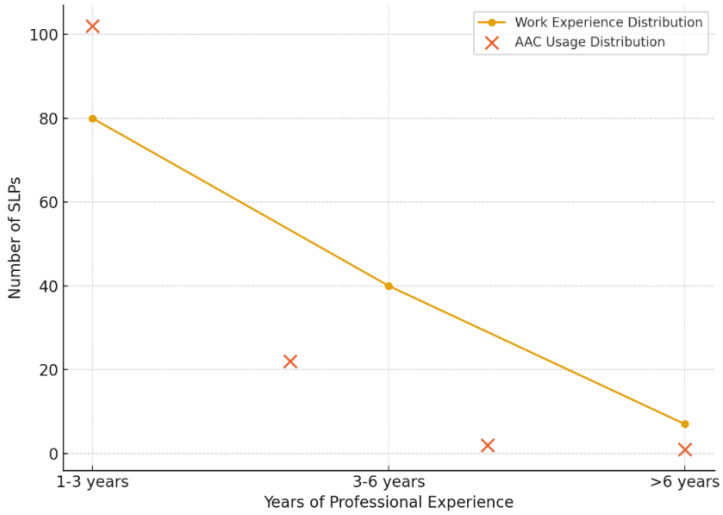

Figure 1 Professional Experience vs AAC Usage Patterns among SLPs

Respondents' perceptions related to the adoption level of AAC systems in practice demonstrated that all but 5 (4.9%) of the 102 (80.3%) who responded reported AAC being in use in less than 10% to 15% of their practice activity, whereas 22 (17.3%) reported AAC being in use in 16% to 30% of practice activity, and only 3 (2.4%) exceed 31% ($p < 0.001$). In terms of personal preference regarding AAC system type, the Picture Exchange Communication System (PECS) emerged prominently, being preferred by 119 (93.7%) compared with the 8 (6.3%) who preferred Voice Output Communication Aids (VOCAs). In addition, there was no significant difference in personal preference in terms of most preferred AAC system when the most effective AAC was considered, with 120 (94.5%) supporting PECS compared with 7 (5.5%) who preferred VOCAs ($p < 0$. The combined graph in Figure 1 illustrates how the majority of the SLPs surveyed fall into the range of 1-3 years of experience (n=80), with a drastic decline in representation after six years of experience (n=7). The scatter plot indicates that there is a similar representation of AAC utilization in the same range of frequency, with 102 practitioners using AAC in only 10-15% of cases. It can further be observed that with increased levels of experience, there is both a reduction in the number of practitioners as well as in the level of AAC utilization. It can thus be said that there is an indication towards the dominance of early-career practitioners who make less use of AAC in practical cases.

DISCUSSION

The current research yields significant information regarding the attitudes and habits of Speech-Language Pathologists in Lahore, Pakistan, in using Augmentative and Alternative Communication (AAC) Systems in children with autism spectrum disorder (ASD). Three themes emerged from the research: the first was the characterological outline of the SLPs that took part in the research, the second was the strong support exhibited by the SLPs in using low-tech AAC Systems like the Picture Exchange Communication System (PECS), and the third was the favorable attitude towards AAC despite the doubts about the possible demerits.

Demographically, the sample comprised mostly of early-career female practitioners. Not unexpectedly, these characteristics are in line with global speech-language pathology gender and age demographics, in which the majority of practicing speech-language pathologists are female and tend to begin practicing at a relatively young age (23,24). Although such gender discrepancy might not influence treatment outcomes, it appears that most practitioners in the current sample are early-career practitioners, suggesting that all but a few in the sample have limited experience working with AAC strategies. It has already been suggested that practitioner experience exerts significant influence in AAC adoption and adaptation, in which less-experienced practitioners tend towards using structurally based low-tech AAC strategies such as PECS, in contrast to experienced practitioners who can avail themselves of other AAC strategies such as speech-generating devices (25,26).

The overriding preference for PECS in the current study, with over 93% of SLPs rating it as both preferred and most effective, confirms other studies pointing out the simplicity, cost-effectiveness, and robust evidence base for the effectiveness of initiation of communication in children with ASD using PECS (27, 28). Indeed, the effectiveness of PECS has regularly emerged in low-resourced settings where there are constraints in terms of appropriate supportive technology and cost in using high-tech communication aids such as VOCAs and tablet devices relative to voice output communication aids and other applications (29). Conversely, low rates of VOCAs use (6.3%) reveal hindrances in terms of cost, support, and availability of technology and related training. These tendencies have also emerged in other developing countries where use of high-tech AAC devices has remained low despite strong evidence in support of effectiveness (30).

Notably, most SLPs (86.6%) found AAC systems to be effective in children with ASD in terms of communication enhancement, in line with the global evidence about AAC in facilitating functional communication, as well as social participation and academic engagement activities (31, 32). In addition, close to 90% identified the benefits of AAC in terms of reducing behaviorally challenging issues and facilitating interactions with peers. However, in excess of a third admitted to there being demerits, and close to half remained uncertain. These observations imply that although these SLPs appreciate the effectiveness of AAC, there might not be sufficient expertise in using AAC effectively in overcoming issues such as dependency, generalization, and appropriateness in ASD children. Inadequate expertise in AAC has already emerged as an important factor in the under-optimal utilization of AAC, especially when resources are considered (33, 34).

The data also underscores the fact that AAC is being underutilized in real-world settings, where most of the practitioner's reported inclusion in only 10-15% of cases. Notably, the ever-increasing prevalence of ASD coupled with the need for early and sustained AAC exposure being critical in ameliorating development deficits makes such underutilization alarming (35,36). Perceived institutional constraints in the form of lack of institutional support, availability of devices, and inter-professional collaboration could potentially contribute towards such underutilization. Inter-

professional care settings in collaboration with SLP practitioners, psychologists, occupational therapists, and teachers have already demonstrated benefits in AAC utilization and effectiveness (37,38), but such services are underdeveloped in Pakistan.

The balanced perspective of the outcomes of language development, where half of the professionals perceived significant improvements and the other half perceived moderate improvements, implies that although AAC has generally positive influences, the impacts are perceived as progressive rather than dramatic by the professionals. It can safely be assumed that since most of the professionals are early in their careers, they might not have witnessed the long-term impacts of AAC. Longitudinal evidence shows that regular use of AAC yields progressive outcomes regarding language development, societal interactions, and quality of life, especially when tailored interventions are focused (39, 40).

Collectively, these results underscore both the strengths and challenges of AAC in Pakistan. On the positive side, there is strong knowledge and preference for AAC and evidence-based communication systems like PECS in the Pakistani SLP population. Conversely, there appears to be weakness in the utilization of hi-tech AAC devices as well as low inclusion in therapy, and ambiguity in specifying any disadvantages. These factors can easily be overcome with modifications in advanced trainees' course curriculum and AAC materials facilitated through cultural congruence. This would help in bringing about remarkable change in children with ASD in Pakistan.

CONCLUSION

The current research indicates that the Picture Exchange Communication System (PECS) is overwhelmingly preferred by the majority of the Speech-Language Pathologists (SLPs) in Lahore, Pakistan, followed by the Voice Output Communication Aids (VOCAs) in children with autism spectrum disorder (ASD). Although most SLP practitioners believe that Alternative and Augmentative Communication (AAC) methods are effective and useful, there appears to be little utilization and concerns about the potential adverse effects. The fact that the majority of SLP practitioners are early-career professionals in the AAC service set points towards the need for further education and exposure to AAC devices. In addition, increased AAC-related training and promotions regarding the utilization of high-tech devices where accessible can help in ameliorating the current situation. In any case, AAC-related research relevant to local settings needs to emerge to optimize AAC service in children with ASD in Pakistan. In conclusion, increased expertise in the utilization of AAC in SLP practitioners could help in ameliorating communication, social participation, and the global quality of life in children suffering from ASD.

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