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Usage of Augmentative Alternative Communication Devices for Treatment of Speech Language disorders

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ABSTRACT

Background: AAC (Augmentative Alternative Communications') is any strategy that helps a child/Adult to participate and communicate better with the listener. In Ancient times, AAC was used in deaf patients in 1950s by professionals with disabilities who struggled to communicate with it. With the passage of time AAC devices grew day by day. Now there are variety of devices which are used in different settings by SLP,s among huge variety of normal and disordered patients like CP, Autism, MR ,Language delay and ALS for their better off life.

Objective: To explore the knowledge of speech and language pathologist regarding their implicitly Usage of AAC devices in management of speech disorders.

Methodology: Fifty speech and language pathologist of Lahore were surveyed and were asked about their knowledge and implementation about AAC devices in their clinical or academic settings whom they ever used during treatment to improve communication disorder. A valid Questionnaire was used to gather their basic information like age qualification and clinical settings along with their implicitly usage of AAC devices. Variety of barriers were discusses how they face through it when they were recommended AAC devices

Results: Out of 50 participants majority of the Speech and Language Pathologists had knowledge of AAC devices and about 70% of the pathologists are using them during their treatment sessions.About 78% of

respondents work with schooler children. Out of 50 participants, 24 (48%) of participants said that they use low tech devices, 14 (28%) used mid tech & 12 (24%) used high tech devices most. Commonly 56% of respondents used AAC technology for autism. Most of them were found agreed that seminars and workshops should be arranged for proper implicitly usage of AAC devices.

Conclusion: AAC devices are found to be used by majority of the pathologists for better and effective improvement towards communication disorders.

Keywords: AAC (Augmentative and Alternative Communication) Devices, SLP (Speech and Language Pathology), ALS (Amyotrophic Lateral Sclerosis), CP (Cerebral Palsy), MR (Mental Retardation).

Introduction: Augmentative and alternative communication (AAC) includes all forms of communication (other than oral speech) that is used to express thoughts, needs, wants, and ideas. We all use AAC when we make facial expressions or gestures, use symbols or pictures, or write.In simple terms AAC devices are communication tools that help people with speech impairment to communicate and express themselves as any other person(ASHA, 2016).

Main purpose of AAC is to enable the person to meet all of his/her varied communication requirements as intelligibly, specifically, efficiently, independently and in as socially valued a manner as possible.Individuals with complex communication needs have the same requirements; need to communicate for all the same varied purposes as their speaking peers (Burkhart, 2012).

AAC devices are designed for people who find difficulty in communication or speech due to Aphasia, Autism Spectrum, Attention deficit hyperactivity disorder, Acquired Physical Disabilities (ALS, Multiple Sclerosis, and Parkinson's disease), Brain Injuries, Cerebral Palsy, Dysarthria, Dyslexia, Intellectual Impairments, Strokes, Neurological Disorders, Neck and Throat Cancer (barrierbreak).It is the position of the American Speech-Language-Hearing Association (ASHA) that communication is the essence of human life and that all people have the right to communicate to the fullest extent possible. No individuals should be denied this right, irrespective of the type and/or severity of communication, linguistic, social, cognitive, motor, sensory, perceptual, and other disability they may present (Speech-Language-Hearing, 2005).

The speech-language pathologist (SLP) who is practicing within the area of AAC shall recognize and hold paramount the needs and interests of individuals who may benefit from AAC and assist them to communicate in ways they desire, Implement a multimodal approach to enhance effective communication that is culturally and linguistically appropriate, Acquire and maintain the knowledge and skills that are necessary to provide quality professional services, Integrate perspectives, knowledge and skills of team members, especially those individuals who have AAC needs, their families, and significant others in developing functional and meaningful goals and objectives, Assess, intervene, and evaluate progress and outcomes associated with AAC interventions using principles of evidence-based practice, Facilitate individuals' uses of AAC to promote and maintain their quality of life.Advocate with and for individuals who can or already do benefit from AAC, their families, and significant others to address communication needs and ensuring rights to full communication access.(Rockville, 2001)

Types of the AAC Devices that can enable an individual with his daily communication needs are Unaided and Aided.

Unaided AAC systems refer to any type of communication that occurs naturally, without the use of an aid. Unaided communication can include body movements and facial expressions include frowning, smiling and simpleactions such as reaching. Gestures are referred to as a type of "unaided" communication and are readily used in combination with other AAC techniquesand are either conventionalized or non-conventionalized. If gestures are not conventionalized, it may be difficult for unfamiliar conversation partners to understand the message of the AAC user (ACN,

2000).Vocalizations are type of “unaided” communication often used by individuals who have difficulty with speech. These may include involuntary sounds that symbolize physical state (e.g., sneezing, coughing, hiccupping, and snoring), voluntary vocalizations that symbolize emotional state (e.g., laughing, crying, moaning, and yelling), and intentional vocalizations that substitute for speech (e.g., "uh-huh" for yes or "uh-uh" for no). Vocalizations may be idiosyncratic. If vocalizations are not idiosyncratic it may be difficult for unfamiliar conversation partners to understand the message of the AAC user (MSU, 2016).Other unaided AAC strategies include,behaviour's (e.g., taking a person’s hand and leading them to the door), eye contact / eye gaze (within an environment), pointing, touch cues and tactile singing.

Aided AAC systems refer to any type of communication that is aided by the use of some sort of tool. Aided communication can include high tech that requires a power source and extensive training to competently program and maintain the device.When considering High Technology AAC there are two broad areas, dedicated communication devices and General computerized devices with communication apps or programs often called “mainstream” devices such as tablets or hand held devices, Tango which is a AAC (Augmentative and Alternative Communication) device for people who have communication-related impairments with pre-loaded phrases (Artoni, 2013).

The Cyrano Communicator is a device designed to aid individuals with speech impairments to communicate through customized images, text, sound and synthesized speech. Cyrano is built on the same HP iPAQ model as Photo Talk and allows users to use the built in camera to take personalized images. Cyrano is designed specifically for people with a range of speech impairments (Meghan, 2007).

The Eye gaze is an eye-operated communication system that enables person with disabilities to communicate and interact with the world. By looking at control keys or cells displayed on a screen, a user can generate speech either by typing a message or selecting pre-programmed phrases (EyeGaze, 2017).

Low-tech communication aids are defined as those that do not need batteries, electricity or electronics to meet the user's communication needs. Here are few low tech devices.The Picture Exchange Communication System allows people with little or no communication abilities to communicate using pictures. People using PECS are taught to approach another person and give them a picture of a desired item in exchange for that item. By doing so, the person is able to initiate communication. PECS enables a child to communicate effectively with other people. It is particularly useful for children who are non-verbal have limited or unclear speech. PECS has been successful with individuals of all ages demonstrating a variety of communicative and physical difficulties (Pasco, 2010).

Communication boards usually contain the letters of the alphabet, common words or phrases and pictures of common items or actions. Individuals with limited or no verbal communication skills simply point to the letters to spell words or to the pictures to express an idea or desire.Picture-based communication aids and visual cues enable communication and comprehension for children’s, adults and elderly who experience speech or cognitive loss due to stroke, traumatic brain injury, Alzheimer's disease, autism and other developmental disabilities (Morrisey, 2015).

Using an AAC device alleviates the pressure of having to speak, allowing the person to focus on communication, and that the decrease in psychological stress makes speech production easier. Others theorize that on account of speech generating devices, the model of spoken output promotes to an increase in speech production (Marvin, 2003)

Language is the common thread underlying speaking, listening, reading, and writing. For children who use augmentative and alternative communication (AAC), a solid foundation in language and communication is essential to active literacy learning across grades.(Erickson, 2009).

Children whose disabilities require AAC often experience developmental delays in language skills such as vocabulary knowledge, length of sentences, syntax, and impaired pragmatic skills. These delays may be due in part to the fact that expressive language is limited by more than the children's own language knowledge.(Sally, 2004).

Cognitive, language and learning delays contribute to difficulty with literacy development. Literate AAC users having access to abundant reading and writing material at home as well as in school during childhood. Children who use AAC with explicit reading instruction can develop good literacy skills.(Hammer, 2004).

According to a 2010 U.S. Census Bureau report less than 26% of severely disabled individuals were employed. (US Census Bureau, 2016)

Despite the various barriers to employment, some AAC users achieve success in educational endeavors' and employment, though often in lower paying jobs. Factors that have been found to be related to employment are a strong work ethic and access to AAC technology, the support of family and friends, education, and work skills. (Bryen, 2007).

Several studies of young adults who had used AAC since childhood report a generally good quality of life, though few lived independently, or were in paid employment. The young adults used multiple modes of communication including aided and unaided AAC approaches. (Mirenda, 2009)

Positive quality of life outcomes often correlated with better quality of communication and interaction, as well as personal characteristics, family and community support, and excellent AAC services. Poor outcomes were related to lack of access to appropriate AAC supports and resources, problems with technology and negative attitudes.(Light, 2009).

Method: The study employed a cross-sectional research design to investigate the utilization and implementation of Augmentative and Alternative Communication (AAC) devices among Speech and Language Pathologists/Therapists in various departments of FMH, Nur International University, Halcyon Clinic, and Riphah International University in Lahore. The study targeted Speech and Language Pathologists (SLPs) working in Lahore, Pakistan, who were employed in various settings such as academic institutions, general hospitals, and special education facilities. The research was conducted at the Department of Speech and Language Pathology, Fatima Memorial Hospital of Medicine & Dentistry, located in Shadman, Lahore. This well-respected institution provided a centralized location for coordinating the study and accessing a broad spectrum of SLPs working in different clinical and educational settings throughout the city. The study spanned three months, from November 2016 to January 2017, allowing sufficient time for data collection and ensuring a comprehensive and representative sample of SLPs.

A total of 50 SLPs participated in the study. This sample size was determined based on references to previous studies, such as those by Sutherland, Gillon, & Yoder (2005) and Ghyas Khan, Butt, Qurrat-ul-Ain, Sikander, &Ghyas (2015), which provided a basis for understanding the appropriate scale of the sample. A purposive sampling technique was employed, focusing on including SLPs from a range of settings to ensure diverse and comprehensive data. The study utilized an observational exploratory design, chosen to gather both qualitative and quantitative data, providing a thorough understanding of the usage of AAC devices among SLPs in Lahore. The exploratory nature of the study aimed at identifying patterns, practices, and perceptions without manipulating any variables.

Participants were included based on the following criteria: they had to be practicing SLPs in Lahore, working in academic, general hospital, or special education settings, and willing to participate in the study. This broad inclusion criterion ensured that the study captured a wide range of perspectives on AAC device usage. The self-designed questionnaire was the primary tool for data collection, crafted based on expert input and a thorough review of the existing literature to

ensure its relevance and comprehensiveness. It included both closed and open-ended questions, allowing for the collection of detailed and nuanced data on various aspects of AAC device usage.

Augmentative Alternative Communication (AAC) referred to all forms of communication other than oral speech used to express thoughts, needs, wants, and ideas. It was a clinical practice area aimed at compensating for the communication impairments of individuals with severe expressive communication disorders, either on a temporary or permanent basis, as defined by the American Speech-Language-Hearing Association (ASHA). Data was gathered using the self-designed questionnaire administered to SLPs in different settings across Lahore over three months, from November 2016 to January 2017. The questionnaire addressed various aspects of AAC device usage, including types of devices used, frequency of use, perceived effectiveness, and challenges faced by SLPs. This method allowed for a detailed collection of data from the 50 participating SLPs, providing a robust foundation for the study's findings.

Since this study was observational and not experimental, it did not present any ethical issues. Participation was voluntary, and the anonymity and confidentiality of all respondents were strictly maintained throughout the study. The collected data was entered and analyzed using SPSS version 21 (IBM Inc., USA). Continuous variables were expressed as Mean ± SD, while categorical variables were presented as frequencies and percentages. Data visualization was achieved through bar charts, which effectively illustrated the key findings of the study.

Results: The demographic profile of the sampled Speech and Language Pathologists (SLPs) is presented in Table 1, revealing a predominantly female representation, with 92 % of participants being female and 8 % male. The age distribution among male SLPs ranged from 25 to 32 years, with a mean age of 28.5 and a standard deviation of 2.5. Female SLPs, on the other hand, exhibited an age range of 23 to 35 years, with a mean age of 26.8 and a standard deviation of 3.1. Table 2 delves into the educational qualifications of the SLPs, showcasing that a majority held a BS (Hons) in Speech and Language Pathology (53.6%), followed by those with an MS in Speech and Language Pathology (36.9%). A smaller percentage had a PhD (1.2%), and a couple possessed an MBBS (2.4%). These findings shed light on the diverse academic backgrounds within the field, providing valuable insights into the composition of the sampled professionals.

Table 1: Gender and Age Distribution of Speech and Language Pathologists (SLP)

Gender	No. of SLPs	Percentage	Minimum age	Maximum age	Mean age	Standard Deviation
Male	4	8%	25	32	28.5	2.5
Female	46	92%	23	35	26.8	3.1

Table 2: Qualification of Speech and Language Pathologists (SLP)

Qualification	**Number of SLPs**	**Percentage**
BS (Hons) in SLP	45	53.6%
MS in SLP	31	36.9%
PhD	1	1.2%
MBBS	2	2.4%
Total	84	100%

The results of the study provided valuable insights into the demographic characteristics, experiences, and perspectives of Speech and Language Pathologists (SLPs) regarding Augmentative and Alternative Communication (AAC) devices. The sample included 50 SLPs from Lahore, with 10% being male and 90% female. Regarding their knowledge of AAC devices, an overwhelming 96% had heard of AAC devices, demonstrating high awareness among SLPs in the region.

In terms of usage, 94% of the SLPs reported using AAC devices for 1-5 years, while 6% had used them for 6-10 years. This indicates that most participants had relatively recent experience with AAC devices. When examining the patients with complex communication needs, 38% of the SLPs were dealing with 60% of such patients, while others reported different proportions, reflecting a varied patient load.

SLPs served a diverse range of clients, with 78% working with school-aged children, 42% with preschoolers, 22% with adolescents, and 18% with adults. This diversity in client age groups underscores the versatility of SLPs in catering to different populations. The most commonly used devices in clinical settings were low-tech devices, reported by 48% of the participants, followed by mid-tech (28%) and high-tech devices (24%).

Regarding the disorders where AAC devices were used, 56% of SLPs used them for Autism, 42% for Mental Retardation (MR), 24% for Cerebral Palsy (CP), and 24% for language delay. The majority (94%) of SLPs believed that AAC devices enabled clients to develop skills required for independence, highlighting the perceived effectiveness of these devices.

When asked about the usability of AAC devices, 32% of SLPs felt 60% comfortable with their use, while 28% rated the usability at 80%. This indicates that most SLPs found AAC devices relatively easy to use. The effectiveness of AAC devices was rated highly, with 32% finding them 60% effective and 30% rating them 80% effective.

Barriers to the use of AAC devices included the cost of devices (34%), unavailability (28%), lack of knowledge (24%), and lack of training (14%). This highlights the need for better accessibility and education regarding AAC devices.

Finally, regarding the frequency of seminars or workshops for AAC devices, 48% of SLPs felt they should be held very often, 26% often, and 20% sometimes. This suggests a strong demand for continuous professional development in AAC device usage.

The study provided a comprehensive overview of the experiences, practices, and perceptions of SLPs regarding AAC devices in Lahore. The findings shed light on their demographics, work settings, knowledge, usage patterns, and perspectives on client outcomes and device effectiveness, as shown in Table No.2.

Table.No.2: Summary of Results

Category	Subcategory	Frequency	Percent
Gender	Male	5	10%
	Female	45	90%
Knowledge of AAC Devices	Yes	48	96%
	No	2	4%
Usage of AAC Devices	1-5 years	47	94%
	6-10 years	3	6%
Patients with Complex Communication	20%	11	22%
	40%	11	22%
	60%	19	38%

Category	Subcategory	Frequency	Percent
	80%	8	16%
	100%	1	2%
Range of Clients	Pre schooler	21	42%
	Schooler	39	78%
	Adolescent	11	22%
	Adult age	9	18%
Most Commonly Used Devices in Clinical Setting	Low Tech	24	48%
	Mid Tech	14	28%
	High Tech	12	24%
Disorders where AAC Devices are Used	CP	17	24%
	Autism	28	56%
	MR	21	42%
	Language delay	12	24%
Client Independence Performance	Yes	47	94%
	No	3	6%
Usability of AAC Devices	20%	8	16%
	40%	11	22%
	60%	16	32%
	80%	14	28%
	100%	1	2%
Effectiveness of AAC Devices	20%	9	18%
	40%	9	18%
	60%	16	32%
	80%	15	30%
	100%	1	2%
Barriers to Use of AAC Devices	Unavailability	14	28%
	Lack of Knowledge	12	24%
	Reliability	8	16%
	Costly Devices	17	34%
	Lack of Training	7	14%
Seminars on	Very Often	24	48%

Category	Subcategory	Frequency	Percent
SLP's for AAC Devices	Often	13	26%
	Sometimes	10	20%
	Rarely	3	6%

Discussion:The implementation of AAC devices for speech and language pathologist is inevitable. The obtained results show most of pathologists who participated in this study have relative knowledge about AAC devices. Students aged 5-10 years received the most AAC intervention. Cerebral palsy, mental retardation, Speech and Language delayed and autism spectrum disorders were the most commonly reported etiologies of the students who used AAC. A total of 98% of the respondents indicated a desire for further AAC information or training. In a previous study, (Binger, 2006) found that high tech tools were used infrequently with preschool-aged children (12%) who required AAC. They suggested that one reason for this finding may have been a lack of knowledge and experience with higher tech AAC systems. In the present study, we examined SLP's use of different types of AAC tools with preschoolers. Results showed that on assessment or intervention provided by SLP's use many different tools for each client. However, low tech systems (48%) (e.g. communication boards, pictures, simple digitized voice output devices) were used more often than high tech tools (24%) (Computer software, high end voice output devices). This finding was particularly interesting given that the SLP's had AAC technology available as well as knowledge and skills in the use of that technology. 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 their practice. This finding suggests that sophisticated technology is not necessary to initiate early AAC interventions with young children. Researchers have suggested that AAC systems should be re-designed to improve usability (Janice Light, 2007), (Drager, 2004), which in turn would make them more appropriate for young children. By providing state-of-the-art AAC technology and training, SLPs in integrated practice may be able to provide more expertly AAC services to young children with complex communication needs.

Conclusion: The purpose of the study was to explore the knowledge of speech and language pathologist regarding Usage of AAC devices in management of speech disorders.On the basis of obtained findings it is concluded that this study most of the speech pathologist using AAC devices for treatment but it should be promoted for betterment and patient care .Seminars and workshop should be arranged for the exploration of knowledge regarding AAC and other advance devices.Training should be raised for proper implicitly usage of AAC devices. Fundamentally, here is need to establish lawfully availability of proper funding from Government and there should be some policy wheresoever do children and adults can benefit from it

Recommendations:

It is strongly recommended that seminars and workshops be organized to provide ongoing training on AAC device usage. These initiatives should focus on updating therapists with the latest advancements and best practices in the field.

Limitations:

The primary limitation of this research is the constraint imposed by time. Due to time limitations, the study may not have been able to explore certain aspects in greater detail. Future research endeavors should consider allocating more time to comprehensively investigate and address various dimensions related to the perceptions and practices of Speech and Language Pathologists in using AAC devices for communication disorders..

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