Exploring the Use of Communication Supports Inventory- Children and Youth (CSI-CY) - to Identify Barriers and Facilitators in Implementing Augmentative and Alternative Communication in India: Preliminary Evidence from Two Case Reports

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ABSTRACT

Purpose: *Augmentative and Alternative Communication (AAC) systems are very often abandoned by the users and caregivers due to potential challenges in implementation. This study aimed at exploring the use of Communication Supports Inventory-Children and Youth (CSI-CY), based on the International Classification of Functioning, Disability, and Health-Children and Youth (ICF-CY), as a potential tool for identifying barriers and facilitators in AAC implementation in the southern part of India.*

Method: *The CSI-CY was administered to the parents of a child with cerebral palsy and a child with autism spectrum disorder, respectively. Environmental facilitators and barriers that affect communication were rated. A semi-structured interview was also conducted to identify additional barriers and facilitators as identified by parents.*

Results: *Barriers related to services and policies, people and assistive technology, were identified for both cases. Additionally, the semi-structured interview identified barriers related to myths, clinicians, child, AAC use, economy and society.*

Conclusion: *CSI-CY is a potential tool for clinicians to systematically identify and document barriers and facilitators to implement AAC. It can further assist them in setting goals and defining the necessary intervention for each child*

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with disability. Early use of AAC contributes to better therapeutic outcomes. Training should be given to professionals, special need educators and school teachers about different AACs and the appropriate techniques to be used. Counselling and evidence from earlier successful AAC interventions can dispel existing myths. Awareness programmes, group discussions and training on AAC can be done to eliminate barriers that may exist among rehabilitation professionals in India.

__Key words:__ AAC, Communication Supports Inventory- Children and Youth (CSI-CY), barriers, South India

INTRODUCTION

Augmentative and Alternative Communication (AAC) includes methods and technologies used to compensate for an individual's reduced communication competence (Light, 1989), which can either be temporary or permanent (American Speech and Hearing Association, n.d.). It uses techniques and strategies to either augment or alternate speech, and can be as simple as a shrug of the shoulders or as complex as speech generating devices. AAC can provide the means for persons to interact with other members of the community independently and become integrated into society. Communicative competence through such interactions can increase confidence levels and feelings of acceptance among AAC users (Beck et al, 2000). AAC promotes independence and enhances educational opportunities (Johnston et al, 2004).

Among individuals with developmental delays, AAC offers significant benefits regarding enhancing communicative competence and promoting language development (Millar et al, 2006). However, when and how to use AAC is still subject to debate. Myths and misconceptions regarding the use of AAC appear to be still existent in and across many societies around the world (Cress & Marvin, 2003; Romski & Sevcik, 2005; Singh et al, 2020). Most of the speech-language pathologists (SLPs) or the caretakers of individuals with complex communication needs, usually postpone opting for AAC based on a "wait and see" strategy, until there is a considerable delay in verbal communication, and this can be detrimental to a child's speech and language development in the long term (Cress & Marvin, 2003). The misconceptions, both in AAC theory and practice, affect its clinical implementation and later result in abandonment of AAC. Other factors responsible for abandonment are: the lack of support from professionals, family members, or significant others; personal issues such as lack of motivation,

lack of acceptability; the mismatch between the abilities of the individual and the features of the device; and technology-related issues such as difficulty in use and functionality of the device. In addition, lack of training among AAC users, communication partners and SLPs regarding AAC strategies, device programming and manipulation, lack of ongoing adjustments or fine-tuning of devices, and lack of opportunities to use AAC, are among other sets of hurdles (Johnson et al, 2006).

To reduce abandonment and enable successful use of AAC, assessment of barriers and facilitators is crucial. It should be a part of pre-therapy assessment and outcome measurement; however, existing AAC assessment tools such as the Test of Aided communication Symbol Performance or TASP (Bruno, 2011), or Augmentative and Alternative Communication profile (Kovach, 2009) do not include this as a part of their assessment protocol. The Communication Supports Inventory-Children and Youth (CSI-CY) is an instrument based on the International Classification of Functioning, Disability and Health-Children and Youth (ICF-CY), which helps in profiling the needs and strengths related to communication in an individual using AAC. It enables planning and documentation of individualised intervention goals for children and youth who use AAC. Even though CSI-CY is not an assessment tool, it aids in gathering information regarding communication limitations, restrictions in participation caused by the communication limitations, impairments in body functions that limit communication, and environmental factors that serve as barriers or facilitators for communication in a structured and organised pattern (Rowland et al, 2012). It characterises students who use AAC based on the following four categories which include (1) restrictions in participation caused by communication limitations, which is further divided into two subgroups: (a) school-related activities, and (b) interpersonal interaction and relationships; (2) communication limitations, with 7 subgroups which are: (a) receptive language and literacy, (b) expressive language and literacy, (c) functions of communication, (d) rules of social interaction in conversation, (e) augmentative and alternative communication - receptive strategies, (f) augmentative and alternative communication - expressive modes and strategies, (g) augmentative and alternative communication - motor access; (3) impairments in body functions that limit communication; (4) environmental factors that serve as barriers or facilitators for communication with four subcategories which are: (a) physical environment assistive technology,(b) assistive technology, (c) people, (d) services and policies.

Objective

It is important to identify, at an early stage, the potential barriers and facilitators in using AAC. This should be part of assessment, which will then enable clinicians to set goals in the initial phases of intervention and work towards better therapeutic outcomes. Hence, the current study aimed at exploring the use of CSI-CY as a tool in identifying barriers and facilitators in implementing AAC in a south-western state of India.

METHOD

Study Design

This study discusses the use of CSI-CY using two case studies which are described in detail below.

Case Report 1

The case under consideration will be discussed using the pseudonym 'Susan' to maintain anonymity.

Susan was a 6-and-a-half-year old girl when she was brought to the institute, for a detailed evaluation of her communication skills and for further treatment. She had already received a diagnosis of spastic triplegia and, apart from being given physiotherapy for a couple of years elsewhere, she had not received any other form of intervention or education as per parental reporting. Her language evaluation was done using the Receptive-Expressive Emergent Language Scale-2 or REELS-2 (Bzoch & League, 1991). It showed that Susan had a receptive language age-matched to a typically developing child of 4.5 - 5 years. However, her expressive language age was less than that of a 1-year-old typically developing child. This could be attributed to her minimal verbal repertoire and, possibly, because her primary mode of communication was with the use of gestures and pointing. Her oro-motor structures were adequate but lacked in function. Her tongue movements was restricted in its range of motion, and she had severe drooling. Her speech was limited to vocalisations.

After a comprehensive assessment, Susan received a diagnosis of spoken language disorder associated with cerebral palsy. She was then directly referred to the Augmentative and Alternative Communication intervention unit at the institute. A direct referral was made due to the following reasons: (a) There was an urgent

need to find a potential communicative medium as the child exhibited frustration when unable to communicate her wants and needs to her mother through the use of gestures and pointing, (b) she had relatively intact language comprehension skills, and (c) no previous attempts had been made to improve speech, language or communication.

Case Report 2

The case under consideration will be discussed using the pseudonym 'Anna' to maintain anonymity.

Anna, a 5-and-a-half-year old girl, was brought to the institute for a detailed re-evaluation of her communication skills and for further treatment. She had undergone a speech and language evaluation at 2-and-a-half years of age, and her receptive and expressive language age, based on REELS-2, was 12 - 14 months. She had poor eye contact, attention, sitting behaviour and verbal imitation. Her peer group and social interaction were also found to be poor. She had difficulty comprehending simple commands and expressed herself largely by using gestures along with 2 or 3 true words. Her communicative intent was also found to be poor.

Anna was diagnosed as having autism spectrum disorder by a team of specialists consisting of a speech-language pathologist, a psychologist, and a neurologist. She received early intervention after this. At the time of discharge, after 1 year of intervention, her receptive language age on REELS was 27 - 30 months, while her expressive language age on REELS was 14 - 16 months. Her ability to give and maintain eye contact improved, along with motor and verbal imitation. She could comprehend simple auditory commands and recognised many common lexical items. Her expressive vocabulary improved to a set of 10 meaningful words. Her peer group interaction improved and she could engage in taking turns while playing.

Anna had received speech and language therapy for over 3 years at different institutes and hospitals in her home town. Eventually she was referred to the particular institute where the current study was conducted, in order to explore the possibility of using an alternate medium for communication as (a) she had not improved in verbal expressive skills even after 3 years of speech therapy, and (b) she was able to communicate only basic needs, and parents at times had difficulty in understanding her needs. A re-evaluation of language skills

at 5.5 years, based on REELS-2, showed that Anna had a receptive language age equivalent to a 3-year-old typically developing child, while her expressive language age was equivalent to a 1-year-old typically developing child. She lacked communicative intent and often used a few functional words along with a few gestures (e.g., no, more), which she had gained during her early intervention period, to communicate basic needs.

## AAC Assessment and Intervention of Case 1 and Case 2

A baseline AAC assessment was carried out for both Susan and Anna, using Augmentative Communication Assessment Protocol for Symbolic Augmentative Systems (Gamel-McCormick & Dymond, 1994) and the Communication matrix (Rowland et al, 2010) as part of the routinely conducted AAC assessment protocol at the institute. The Augmentative Communication Assessment Protocol for Symbolic Augmentative Systems helps in identifying a child's expressive and receptive language skills, cognitive, motor, visual and auditory skills through a series of questions. It also allows for the collection of details on communication settings, probable content of communication, specific vocabulary to be used along with a list of communication partners, and the type of communication the child using AAC is expected to have with each of them. Tactile, visual, positional, interactional and communication preferences of students, along with any other preferences that might influence the use of an AAC system, can also be identified using the protocol. In addition, family and caregiver preferences for communication modes/methods can also be obtained. The Communication matrix assessment tool is designed to evaluate any type of communicative behaviour, including different forms of AAC such as picture systems, electronic devices, sign language and 3-dimensional symbols, pre-symbolic communication such as gestures, body movements, sounds, eye gaze and facial expressions, as well as the typical forms of communication such as speech and writing (Rowland & Fried-Oken, 2010). It allows organisation of observed communication behaviour into 7 levels, such as pre-intentional behaviour (level 1), intentional behaviour (level 2), unconventional pre-symbolic communication (level 3), conventional pre-symbolic communication (level 4), concrete symbols (level 5), abstract symbols (level 6), and language (level 7). Thus, the AAC assessment tools used allowed a comprehensive evaluation of the child's language, sensory-motor and communication skills, communication needs, communication environment, communication partner skills, symbolic abilities using objects and Picture Communication Symbols (PCS) (Johnson, 1981), and feature matching.

The assessment sessions were successful in identifying the communication needs, environments and partners, along with the AAC devices, for both Susan and Anna.

The primary communication partner for Susan was her mother. Susan's mother was initially reluctant to use AAC, as she firmly believed that if her child used a device to communicate, it would restrict her ability to speak. She was counselled over several sessions and was enrolled for a trial AAC therapy session after obtaining informed consent to conform to the ethical guidelines of the institute. An iOS-based AAC application for communication, Avaz, was selected for the AAC intervention after feature matching and having 3 or 4 trial therapy sessions involving a communication book, 7-level communicator and the Avaz app. Susan preferred using Avaz to communicate during the trial sessions. She was provided AAC therapy for 45 minutes, once a week, for three months. As Susan's family could not afford the AAC system due to their low socio-economic background, she was provided with a communication book with the printed picture symbols, for use at home and at school (the other major communication environments). Communication partner training was provided to the mother during the intervention sessions and she was given the responsibility to train other family members. After an intervention period of three months, Susan was able to communicate her needs, ask and answer questions, greet others, protest, and express her feelings using Avaz. Her communication profile after three months of intervention is provided in Figure 1.

Figure 1: Communication Profile of Susan after three months of AAC Intervention
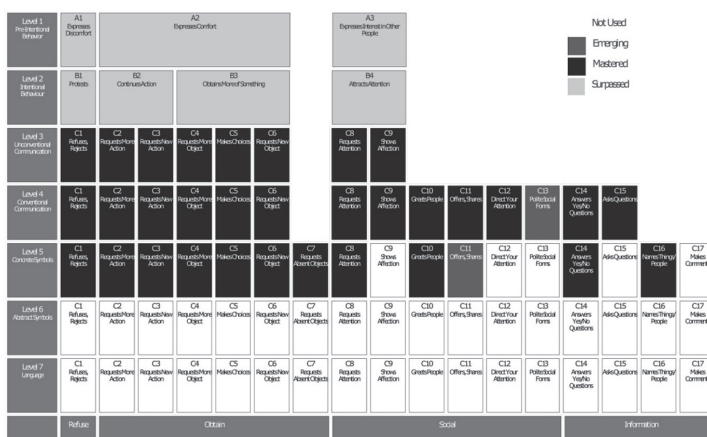
When improvements in communication became quite evident, Susan's mother was convinced that AAC would be beneficial for her child. She was even quite hopeful that along with AAC intervention, traditional speech-language therapy would enable Susan to start using speech for communication. Susan's mother also had concerns about AAC usage, such as getting her own device for home use, training other family members to use AAC, providing opportunities and training to use AAC at home, and using it in other social environments such as school. Thus, it became necessary to address the mother's concerns for further planning of intervention goals after the initial success with AAC.

CSI-CY was administered to Susan's parents to systematically identify barriers and facilitators for using AAC in Susan's environment. In the CSI-CY, 28 environmental factors included were either rated as a barrier or facilitator, or as not applicable. In addition to CSI-CY, a semi-structured interview was conducted to obtain additional qualitative information on barriers and facilitators as percieved by the parents. The interview was audio-recorded, and was later transcribed and analysed by two of the primary authors.

Anna enrolled for AAC intervention after a baseline AAC assessment, and informed consent was obtained conforming to the ethical guidelines of the institute. Since she had already been introduced to a communication book using Picture Communication Symbols (PCS) by her parents before the AAC assessment, it was decided that she could be taught to communicate using the same symbols, utilising the underlying principle of Picture Exchange Communication System (PECS). Within the first month of her therapy, she could select and combine symbols to produce short sentences or phrases with minimal prompt. In a span of four months, she showed an improvement in her vocabulary, language, and communication skills. Her improvement in communication skills, as documented using the Communication matrix, is provided in Figure 2. With training, she was able to identify her communication partners, differentiate pictures in a picture array, navigate from one page to another while building a sentence, and point fingers at individual pictures during Sentence Strip exchange. She had achieved phases I to IV on PECS level; however, when the PECS book could no longer support her vocabulary needs, Anna was shifted to an iPad-based application, Avaz, following the guidelines provided by Pyramid Educational Consultants for transitioning from PECS to a speech-generating device. Refining her communication book based on her changing vocabulary needs was a tiresome and time-consuming process, especially for the parents. The parents did not have access to picture symbols and often had to wait for the clinician to provide them.

This prevented them from interacting with her on "here and now" incidents. A high-tech AAC system was chosen, not only based on her skills but also because the in-built digital library would enable parents as well as clinicians to easily include any vocabulary as and when the need arose during communication interactions. The economic capability of Anna's family to afford an iOS-based app was an added factor for selecting the same.

During the three-month intervention period, even though there was a steady growth in Anna's language skills, as evidenced by the increase in the receptive repertoire of words and ability to combine words to form simple phrases and sentences on her AAC system, her communicative attempts lacked spontaneity most of the time. Communication partner training was part of the intervention, wherein Anna's parents and a shadow teacher - a teaching assistant who supports an individual child with his/her special needs in the classroom (Malik, 2017) - were trained to provide aided language stimulation as well as various strategies to provide and fade prompts as and when required. It was noted and informed that her parents were unable to fade the verbal prompts that they used with her at home. This resulted in Anna waiting for some form of verbal confirmation before initiating communication using Avaz. As in the case of Susan's mother, Anna's parents also had concerns regarding how to provide her with opportunities to use AAC, acceptance of the device among other extended family members such as grandparents, and usage of the device in other social environments, especially in school. This triggered the need to identify barriers and facilitators for AAC use in Anna's environment. Hence CSI-CY and a semi-structured interview were used, and the same procedure used with Susan was followed to obtain information.

Figure 2: Communication Profile of Anna after three months of AAC Intervention

RESULTS

For both Susan and Anna, many common barriers were identified under the domains of assistive technology, services and policies, and people-related barriers (Table 1). In assistive technology, the first barrier identified was imposed by limitations towards using general products and technology for communication. Susan and Anna, as well as some of their immediate communication partners, were not skilled enough in using technological devices (computers and smartphones) that could support their communication skills. Another barrier identified for Susan was related to assistive products and technology for education (for the acquisition of knowledge, expertise, or skills). From anecdotal reports, it is worth noting that there is a dearth of learning apps or technology-related learning programmes to meet the educational needs of children with complex communication needs, belonging to diverse cultural and linguistic backgrounds within the country. The third barrier identified was the lack of assistive products and technology for mobility and transportation. It was noted that the special schools which Susan and Anna attended had neither any provision for wheelchairs nor any other assistive products for mobility and transportation or anything for communication or learning.

Table 1: Summary of the Barriers identified using CSI-CY

for Cases 1 and 2

CSI-CY Domains and Sub-domains	Case 1 (Susan)	Case 2 (Anna)
Physical Environment		
Sound intensity and/or sound quality	x	x
Light intensity or quality	x	x
The arrangement of physical space	x	x
Level of surrounding activity	x	x
Others	x	x
Assistive Technology		
Adapted or specially designed HIGH tech products/technology	x	x
Adapted or specially designed LOW tech products/technology	x	x
General products and technology for communication	√	√

Assistive products and technology for education	√	√
Assistive products and technology for mobility and transportation	x	x
Assistive products and technology for generalised use in school	√	x
Others	x	x
People		
Providing physical support at school	x	x
Providing emotional support at school	√	√
Having skills needed to support communication in school	√	√
Providing physical support at home	x	x
Providing emotional support at home	x	x
Having skills needed to support communication at home	√	√
Others		
Services and Policies		
Special education services	√	√
Regular education services	√	√
School transportation services	√	√
School food services	√	√
School social services	√	√
Before- and after-school care services	√	√
School-based health services	√	√
Special education policies	√	√
Others	x	x

Note: '√' indicates the barrier identified; 'x' indicates that the particular domain was not a barrier

Lack of policies and services such as special education services, regular education services, school transportation services, school food services, school social services, before- and after-school care services, school-based health services and special education policies to accommodate AAC at school and other community areas, were identified as some of the significant environmental barriers. Moreover, their poor socio-economic status prevented Susan's parents from accessing private services requiring payment, which proved a barrier in implementing AAC for

Susan. People-related barriers such as lack of emotional support from teachers at school, and lack of skills among parents and educators to support communication at home and school, respectively, were also identified. In addition to CSI-CY, other barriers associated with the implementation of AAC, as identified through a semi-structured interview with caregivers (parents) of both children under consideration, are provided in Table 2.

Table 2: Summary of the Barriers identified in both Cases by using Semi-Structured Interview

Case 1 (Susan)		Case 2 (Anna)	
Myth-related Barriers	False beliefs that caregivers held about the use of AAC	**Clinician-related Barriers**	Late introduction of AAC after the failure of traditional speech-language therapy
Child-related Barriers	Motor impairment induced by triplegia	**Child-related Barriers**	The lack of spontaneity in using AAC
AAC use- related Barriers	Symbols used are not culturally adapted	**AAC use-related Barriers**	Symbols used are not culturally adapted
Economical Barriers	Poor socio-economic status	**Societal Attitudes**	Negative societal attitudes related to AAC use

DISCUSSION

The communication competence of an individual using AAC is decided by the intrinsic factors such as linguistic, operational, social, strategic, and psychosocial skills of that individual, as well as by extrinsic factors related to policy, practice, attitudes, knowledge, skill, and support systems from the environment (Light & McNaughton, 2014). Identifying the potential challenges or barriers in achieving communication competence by using AAC systematically, allows SLPs and early interventionists to set goals to overcome the challenges and obtain better intervention outcomes.

Some of the already identified and documented barriers in implementing AAC across literature include: (a) the misconception that AAC could limit the ability to learn speech (Light & Drager, 2007; Light & McNaughton, 2012; Huisman, 2014), (b) lack of knowledge and confidence to use the system by families depending on the support provided to them (Saito, 2007), (c) lack of adequate training for professionals in the area of AAC (Mukhopadhyay & Nwaogu, 2009; Light &

McNaughton, 2012; Beukelman & Mirenda, 2013; Huisman, 2014; Douglas, 2020), (d) lack of accessibility to service (Trembath et al, 2010; Light & McNaughton, 2012; Beukelman & Mirenda, 2013; Huisman, 2014; Donato et al, 2018), and (e) lack of funding (Trembath et al, 2010; Donato et al, 2018).

Need for Identifying Culturally Specific Barriers

Environmental factors that act as a barrier for one AAC user do not necessarily create the same impact on another individual belonging to the same cultural and linguistic background, more so when two individuals have different cultural backgrounds. India is a culturally diverse country and extensive exploration is required of environmental factors that may act as barriers in implementing AAC. Results from the aforementioned two case studies have clearly identified a number of barriers for implementation of AAC; these will be discussed in further detail.

Physical Environment

For any AAC intervention to be effective, the physical environment of the individual under consideration should be motivating and less distracting. The physical environment includes the arrangement of the physical space, quality, and intensity of environmental sound and light, and the level of surrounding activity. While AAC therapy for both the cases under consideration was carried out in a controlled environment, it proved to be less of a barrier. However, school environments were not found to be conducive to AAC use for both cases. Susan, who used a communication book in her classroom, was required to point to the picture symbols to communicate. This prevented her from interacting with her peers who were physically distant. For Anna, the physical environment at school was thought to be less conducive as the mainstream classrooms were not equipped to accommodate a child using a high-technology communication device. The speech generated from the device was often not heard above the background noise in the class. The physical distance between the mainstream teacher and the child often prevented one-to-one interactions. The novelty of using a device focused overwhelming attention on the child from her peers; this was another reason that made her hesitate to use it all the time.

Assistive Technology

In India, even though assistive technology is slowly gaining popularity, its inaccessibility and high cost is a major hindrance among the potential users

(Manjula, 2004). Many low technology AAC systems that include simple battery-operated devices (such as BIGmack, LITTLEmack communicators, iTalk 2 communicator, 7-level communication builder, GoTalk devices) as well as dedicated high-technology AAC devices (such as Tobii Dynavox's speech generating devices with eye tracking technology, Unity language system from Prentke Romich Company) are developed in western countries and have to be imported for use. Most of the popular and top-rated AAC applications (such as Proloquo2Go, TouchChat HD) are based on iOS operating system and can be found expensive by the end users. Lack of awareness regarding the AAC devices (for e.g., Voice output Communication Aid such as GUPSHUP and KATHAMALA), assistive switches (e.g., ADITI), and android-based AAC apps (Jellow, KAVI-PTS) developed and available in India, limits popularity and usage. Moreover, these devices are not always suitable for all the potential users who require AAC for communication.

Susan and Anna had difficulty in using general products and technology for communication, assistive products and technology for education, and for generalised use in school. This could be because of a lack of exposure and training to use general technology such as mobile phones and/or computers for communication. Parents' lack of awareness on this aspect, in both cases, along with financial issues in Susan's case, would have prevented the children from getting familiar with these products in general. Moreover, the availability of assistive products and technology for education and generalised use in schools are limited in both regular as well as special schools in India. Most of the special schools lack the infrastructure to provide an adequate number of products and technology for each child with a disability. The infrastructure and economic support required for implementing assistive technology is as relevant a concern as the inability to access whatever facilities are available in the country.

The inception of 'The Rights of Persons with Disabilities Act' (2016) and the 'Assistance to disabled persons scheme' - ADIP (2014) for purchase/fitting of aids and appliances, have marked the birth of policies and schemes favouring the use of AAC in India. It took more than two decades for the concept of AAC use to materialise at the level of policymaking in the country. Even so, such policies are a definite advantage for individuals with communication difficulties.

'The Revised Persons with Disability (RPWD) Act' in 2016 states that "the appropriate government and local authorities shall promote the use of appropriate augmentative and alternative modes including means and formats of

communication, Braille and sign language to supplement the use of one's speech to fulfil the daily communication needs of persons with speech, communication or language disabilities and enable them to participate and contribute to their community and society" (The Gazette of India Extraordinary, 2016). Under the ADIP scheme, there are various communication supports, such as visual schedules, tactile books, and Android Tablets made available to individuals with different disabilities.

However, a large number of stakeholders are still unaware of such policies. Empowering parents and caregivers, as well as educating special educators and school managements on existing policies and the advantages of AAC, could be a preliminary step towards achieving the goal of removing barriers due to lack of accessibility to assistive technology. Moreover, the specifications of service providers or guidelines on available products in the country, which the individuals with disabilities might make use of, are not readily available. Experts in the field and/or rehabilitation institutions at the national level (in the area of AAC) need to be continually updated on available and appropriate technologies, and should contribute to providing reliable information about these to any individual with disability.

People

Communication partners play a vital role in making the individual with disability use and accept AAC. Communication partners range from immediate family members, school teachers and neighbours, to many others in the local community. According to the Circle of Communication partners (Blackstone, 1999), the most significant and frequent communication partners include family (spouse, siblings, children, grandparents), followed by friends, neighbours, colleagues or acquaintances in the community, professionals (such as doctors, rehabilitation professionals, teachers) and unfamiliar partners (such as taxi drivers, waiters at a restaurant, shopkeepers, etc.). The last category includes individuals who become communication partners incidentally, or when the individual is trying to accomplish certain tasks such as ordering food in a restaurant or calling a taxi (Blackstone, 1999).

In the case of a child with disability of school-going age, the most significant communication partners after the parents would be teachers or educators. In both the reported cases, lack of communication and emotional support by teachers at school was identified as a barrier towards the successful implementation of

AAC. The majority of the special educators in India are not trained to use AAC (Srinivasan et al, 2010), and hence, this might lead them to be less motivated towards working with a child who uses AAC. In order to encourage and motivate children to use AAC, teachers must be made aware of different AACs, as well as be equipped with strategies and techniques for their use. In Anna's case, this barrier was partially addressed by the presence of a shadow teacher (educational assistant) who used to be present in her classroom during school hours as well as during AAC therapy sessions.

Training all significant communication partners to use the child's AAC system is as important as training the child himself/ herself. In the case of both Susan and Anna, lack of training of caregivers was identified as a barrier for using AAC at home. However, caregivers of both the children were willing to learn about the AAC system of their child and to acquire strategies to teach language concepts and support them to communicate. They were allowed to manipulate the device and were even provided with the opportunity to teach concepts under guidance during the AAC intervention sessions. In India, a large number of children with special needs and their parents belong to the lower socio-economic stratum, which prevents them from being aware of or exposed to AAC systems. This will remain a barrier unless steps are taken by each AAC interventionist to integrate communication partner training into their intervention plan.

Policies and Services

Barriers related to services and policies were found to have an influence on the effective implementation of AAC for both Susan and Anna. The regular and special schools lack the option to facilitate the use of AAC, not only in classrooms but also in services related to transportation, canteen, or even before- and after-school care. For example, a person who serves the food or manages the transportation facility is neither accustomed nor patient enough to communicate with the child with a disability using AAC.

This barrier should and can be addressed by proposing and implementing new policies and schemes that provide opportunities for using AAC in conjunction with different provided services. For instance, by targeting spontaneity in communication during therapy sessions, Anna was helped to improve her communication competency. Children should be given opportunities to learn communication strategies by providing proper feedback and prompting the correct form of expected responses (Cress & Marvin, 2003).

It is also important for an AAC user to get accepted by individuals surrounding him or her to reinforce assertiveness in communication (Light & McNaughton, 2014). Moreover, solving barriers related to societal attitudes plays a vital role in successfully implementing AAC (Light & McNaughton, 2014; Moorcroft et al, 2018). In Anna's case, societal attitudes were solved to a large extent by counselling and allowing participation of extended family members (such as grandparents) in AAC therapy sessions and at home.

CSI-CY as a Potential Tool for Identifying Barriers in Implementing AAC

CSI-CY is a code set based on ICF-CY for profiling AAC related skills of school-aged children. This tool is developed in order to provide content and guidance for professionals to develop goals of individualised education plan (IEP) for children who use AAC (Rowland et al, 2012). Administering CSI-CY prior to the planning of AAC intervention and goals would help in better implementation of these services by trying to resolve the issues at the beginning. Barriers and facilitators tend to change as the child courses through his or her life, and CSI-CY can be used to track barriers during the course of the developmental age as well as to predict the prognosis of children using AAC.

CSI-CY was successful in identifying 13 and 12 barriers related to different aspects of AAC use for Susan and Anna, respectively, of which 12 were common to both of them. The tool essentially helps in identifying major barriers related to assistive technology, people, and services and policies. Seven among the 12 commonly identified barriers belonged to the category of services and policies. Administering CSI-CY to a larger population of children using AAC across different states in India would provide an insight into how services and policies are affecting the effective implementation of AAC. Data from such research studies can lay the foundation for improvising existing policies and services or for developing new ones. The barriers related to the policies for purchase and maintenance of AAC devices is a matter of serious concern which needs to be addressed immediately in order to prevent AAC abandonment by the current and potential users.

With the help of appropriate policies and services, the availability of technology and products for general communication, education, generalised use in school, mobility, and transportation, can be improved. A major portion of AAC devices and software are manufactured in the US and some in the UK, which necessitates importing them and hence makes them less accessible. A few Indian institutes

have taken up the challenge of developing voice output communication aids, picture symbol software, and Android-based mobile as well as Tablet AAC applications for individuals with various communication disorders. Even then, the paucity of original research that adds positive evidence regarding the efficacy of these indigenous products in improving communication interactions, limits their popularity. Moreover, purchasing and maintaining these foreign-built products places a considerable economic burden on the parents or caregivers of children who use these devices. CSI-CY can be used as a tool to identify barriers related to 'adapted to or specially designed high/low tech products/technology developed for the purpose of improving communication' in different parts of the country. CSI-CY also points out the importance of identifying barriers related to the people, which include lack of emotional support at school, and lack of skills required to support communication using AAC at school as well as at home.

The present study has found that a semi-structured interview can prove to be beneficial in identifying additional barriers to the successful implementation of AAC. Nine additional barriers were identified using the semi-structured interview. Moreover, throughout the course of administering CSI-CY, the authors found that a cultural and linguistic adaptation of the tool is inevitable because the nature of the progress of AAC interventions in a culturally and linguistically diverse India is different from other developed countries. Furthermore, due to the lack of awareness about AAC services, the existence of myths and misconceptions, attitudinal barriers and lack of accessible assistive technology, specific services and policies specific to AAC, the tool requires to be adapted in order to have a better understanding of barriers towards AAC implementation in different parts of the country.

Limitations

Although the CSI-CY proved useful in identifying factors that served as barriers in implementing AAC and in classifying them under different sub-categories, there are however several limitations to this study. First, the findings of the study are based on two case studies and hence, it will be difficult to generalise the use of the tool to a larger population. Second, the CSI-CY was not culturally and linguistically adapted to be used for the population under study; instead, the required information was obtained by the researchers on translating the statements and questions. Adaptation would have ensured that the instrument was equivalent to the original tool to enable comparisons of responses across culturally and linguistically diverse populations.

CONCLUSION

Even though AAC has made advances in recent years and its effect on improving communication has been proven, there are still factors that inhibit individuals from using AACs and also prevent AAC users from taking full advantage of the system. Practitioners should be aware of these factors affecting the successful implementation of AAC and of possible solutions available. Professionals are required to have updated knowledge regarding current technologies, services, and policies that may help in overcoming many barriers.

The two case studies that were discussed provide evidence for using CSI-CY to identify barriers more systematically when gathering information related to the implementation of AAC. Even though in both cases CSI-CY was used after the initial intervention, it would have been helpful if it had been used before initiating the intervention. However, it may have to be used frequently as a part of a dynamic AAC assessment, as barriers and facilitators may change periodically. The findings of the study can help clinicians in two ways: (a) It assures beginners that barriers are a part of the implementation process of AAC and require to be documented and tackled systematically, and (b) CSI-CY can be used as a guidance tool.

Since AAC is a field with immense potential for research, future studies could look into culturally validating CSI-CY and administering it to a larger population to study the efficiency of the tool in identifying barriers in AAC implementation. As more research about barriers becomes available, professionals and policy-makers would be able to join hands to resolve these issues. Future research on overcoming barriers would empower service providers with the knowledge and skill to provide AAC to any individuals with a communication disorder so that they can achieve full participation in mainstream society.

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