

AAC Intervention for Stroke Survivors - An Anomic Aphasic Case Study

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ABSTRACT

Aphasia is an impairment of language that is a consequence of a cerebral insult or damage affecting the speech production and/or comprehension, as well as the ability to read or write. Etiology of Aphasia is multifactorial, most commonly in the form of a stroke (Cerebrovascular Accident), especially in older individuals. The type of aphasia is determined based on multiple factors such as the site of lesion, signs and symptoms and also through patient's clinical presentation. Rehabilitation for stroke survivors plays a major role in communication effectiveness. Computerized Intervention method provides a prognostic factor in the treatment for adults with aphasia. AAC devices (high-tech) are used to enhance communicative effectiveness of aphasic individuals who are less likely to use strategies/techniques that the caregiver can use to foster interactions between themselves and the aphasic individual outside the treatment setting. Other factors that determine the success of the intervention are the intensiveness and the duration of intervention. This study focuses on one such intervention of an adult Anomic Aphasia patient using a high tech AAC computerized application known as Avaz. The results showed that the client was able to perform much better in terms of the word retrieving abilities and is now able to communicate well.

Keywords: Augmentative and Alternative Communications; Anomic Aphasia; Language intervention; Avaz; High tech.

INTRODUCTION

Aphasia is a language disorder acquired subsequent to brain damage that affects production and understanding of spoken and written language in varying degrees and pattern associated with the size and site of lesion (Susan & Salis, 2016). Aphasia is usually classified as fluent and non-fluent based on the ability of an aphasic patient to express themselves. The commonly occurring non-fluent aphasia is Broca's Aphasia (National Institute on Deafness & Communication Disorders, 2017). Studies report that computerized intervention methods (high tech AAC devices and software's) have much to offer in the treatment of Broca's aphasia,

considering degree of severity, patients with mild and moderate category are also beneficial (van de Sandt-Koenderman, 2004). An Augmentative Alternative Communication (AAC) is an integrated group of components that facilitates enhancement of communication and it includes different symbols, techniques and strategies (Gormley & Light, 2019). There are now a variety of applications to treat aphasia such as Advanced Language Therapy (Tactus Therapy Solutions), Recover Brain Aphasia Therapy, etc. Avaz is an Indian Application created by Ajit Narayanan in 2007. It is a picture and text-based application that facilitates communication for individuals with speech

disabilities. It is an electronic version of picture exchange cards. It includes more than 15,000 pictures/symbols which are research based pragmatic vocabulary and empowers children and adults with a voice of their own. The application also allows for customization and personalization (Abrahamyan et al., 2017).

The main aim of the study is to assess the effectiveness of Avaz, a high tech AAC application in specific to the treatment of Anomic Aphasia.

MATERIAL AND METHOD

To treat an individual with Anomic Aphasia, a high-tech Augmentative and Alternative Communication application called 'Avaz' was used. The application was downloaded in the client's Android Phone and initially a free trial was taken before subscribing the paid version. The application was customized and personalized according to the client's profile and requirements. The client was provided with 40-minutes session at a regular interval and was trained using 'Avaz'. The progress was documented for each session. The client was instructed to express as much as possible with her family and caregivers and was also instructed to use the application periodically, during her home time which also helps her to reduce the word finding difficulty as she gets visual cues through the computerized application.

CASE STUDY

A 55-year-old, female was reported to have right hemiplegic aphasia as on 21st of July, 2018. She is a known case of hypertension and has been under medication for over 10 years for the same. Her radiological evaluations such as MRI with MRA and MRV revealed acute infarct in the left Corona Radiata-Ganglio capsular region in the MCA territory with no acute hemorrhage. Follow-up CT study done on 1st August, 2018 revealed the presence of an infarct in the left parietal region and in the left Internal Capsule extending to the Corona radiata with the size of the infarct

reduced compared to results obtained on 26th July, 2018. Cardiac evaluation done on 23rd July revealed that there was a concentric hypertrophy of LV and grade II LV diastolic dysfunction.

Speech and language evaluation was conducted by Speech Language Pathologist (SLP) on 25th July 2018 and she was diagnosed to have Broca's Aphasia.

The post morbid status of the client compared to her pre-morbid Speech and Language characteristics revealed that her comprehension was intact but her spoken language was affected. The client reported that she communicates in 5 languages prior to stroke but now is able to attempt expressing only in two languages which is her L1 and L2. Naming difficulty and perseveration was observed and her suprasegmental aspects were compromised by shortened length of utterances. In regards to literacy skills, she was able to do silent reading and her ability to write was affected due to right hemiparesis.

Formal Evaluation using Western Aphasia Battery (WAB) gave an Aphasia Quotient of 24 (Refer Table 1) confirming to the diagnosis of Broca's Aphasia.

Table 1 showing the WAB scores (Aphasia Quotient) of the client during the initial diagnosis.

Criteria (Composite Scores)	Scores
Spontaneous Speech	2
Comprehension	6
Repetition	2
Naming	2
Aphasia Quotient	24

Language therapy was given to her at her home in the languages she was comfortable with (Tamil and English) from 1st of August, 2018 along with medical management and physical medicine rehabilitation.

Re-evaluation- 1

Re-evaluation was done after three-months (30 sessions) and the results showed that there were improvements in the client's communication including syntactical and morpho-syntactical aspects. Her Mean Length of Utterances (MLU) were increased

during conversation. Her repetition skills were good but she still exhibited word retrieval difficulties for which she required phonemic and semantic cues. Metathetical errors were also observed. The formal evaluation was done using WAB and the results (Refer Table 2) showed that the client has now fallen under Anomic Aphasia from Broca's Aphasia.

Table 2 showing the WAB scores (Aphasia Quotient) of the client during the first re-evaluation.

Criteria (Composite Scores)	Scores
Spontaneous Speech	6
Comprehension	9
Repetition	8
Naming	3
Aphasia Quotient	52

At this stage, Avaz, high-tech application was introduced to her to assist her on word retrieval on 4th of December 2018. Based on client's requirements, the app was personalized and customized, for example, words that the client requires to use but is not able to retrieve (food items, materials for jewelry making, etc.) were stored in the application. The clinicians followed up with her for 10 sessions and the progress were monitored (For goals taken and progress obtained in each session, Refer Table 3).

Table 3 showing goals and the progress achieved during the treatment sessions through Avaz

S. No	Date (dd/mm/yyyy)	Goal	Progress achieved
1.	4/12/2018	Getting used with Avaz	The client felt comfortable in using this app for her communication purpose.
2.	11/12/2018	About self and family	The client was able to express about herself and family members with an accuracy of 80%
3.	18/12/2018	Lexicals of her daily essentials	The client was able to express the lexicals of her daily essentials (personal utilities) with an accuracy of 75%.
4.	25/12/2018	Lexicals of her daily essentials	The client was able to express lexicals of daily essentials (fruits, vegetables and food) with an accuracy of 85%
5.	02/01/2019	Interests & entertainment	The client was able to express words related to her interest (jewellery making) and entertainments (vocabularies related to television, making phone call and making telephonic conversations, etc.) with 70% accuracy.
6.	08/01/2019	Categorical Naming	The client was able to perform categorical naming with an accuracy of 80%.
7.	17/01/2019	Places and events of past	The client was able to express the names of places that she visited and was able to describe them and she was able to recollect and express about events of past (memorable days) appropriately with an accuracy of 75% when ample time was given.
8.	22/01/2019	Spontaneous speech about a given topic	The client was able to express using appropriate words when asked to speak on a randomly given topic (e.g., Indian independence, Teachers and students, Friendship, etc.) with an accuracy of 70% when given enough time for her to recollect the appropriate words.
9.	29/01/2019	Spontaneous speech for hypothetical topics or questions	The client was able to perform the spontaneous speech tasks as a response to a hypothetical question (like, what would you do if you meet an alien? Or What if the world is going to end tomorrow?) with an accuracy of 70%.
10.	31/01/2019	Above tasks with time constraint	The client was able to perform the above tasks when given time constraint with an accuracy of 60%.

Note: The goals and tasks which did not achieve more than 80% accuracy were trained in the following sessions apart from the new goals or tasks.

Along with the usage of Avaz, several communication strategies were taught and was implemented by the clinician, including, extending her response time so that the word may be retrieved, by describing the semantic features or information related the object which may also help in recalling its name, initially and gradually the client was made to practice retrieving the word using phonetic cueing (fading from cueing with half word till only phonetic placement is shown), confrontation naming, categorical naming etc.

Re-evaluation 2

Re-evaluation was done on February 5, 2019. The client was now able to retrieve words during normal conversation and her circumlocution was reduced. The client was able to retrieve about 6-7 words out of 10 during naming task and in description task. Mild word retrieval difficulty was observed when time constraint is given. The client had Metathetical error which was now rectified with an accuracy of 70%. The client's WAB scores improved from an Aphasic Quotient of 52 to 68 (Refer Table

4) showing evidence-based improvements while using Avaz when compared to the first re-evaluation results.

Table 4 showing the WAB scores (Aphasia Quotient) of the client during the second re-evaluation.

Criteria (Composite Scores)	Scores
Spontaneous Speech	9
Comprehension	9
Repetition	9
Naming	7
Aphasia Quotient	68

DISCUSSION

In India, AAC has now become a widely acceptable management option and one among the treatment options which was not the case earlier, due to several myths, including the assumptions that AAC will hinder the verbal communication and is suitable only for persons who are impaired of both speech and hearing. Considerable awareness has now been given and there is now a wide variety of options to choose from, according to the needs of the patients.

Evidence from previous researches states that effectiveness of treatment using AAC is larger (Dietz et al., 2018). Using an i-pad application is found to be superior, in terms of progress achieved, to communication books in clients with complex communication needs (Sreekumar et. al., 2020). Studies also state that Visual Screen Displays with personally relevant photographs and text boxes are useful for patients with chronic aphasia and several aphasia patients did not find any difficulty during retells with the help of Visual Screen Display (Dietz et al., 2014). Avaz is a high-tech AAC application that is compatible with i-pad and other android devices in which customization and personalization is available.

For our client discussed above, the modifications made to add customization and personalization included, the language, age, speed of the voice output, size of the icon, addition of picture-word icons including those of her interests (e.g., jewelry items like beads, hooks, etc.) and the stored messages and phrases in the application's memory.

Although Avaz is not an application designed specifically for Aphasic population (designed for treating speech and language disorders) and is widely used for treating children with ASD, as discussed above in the case study, the application has found to be useful for treating patient with Anomic Aphasia and the patient personally reported that the application has been really helpful and also, it boosted her confidence to have conversations with everyone, including strangers.

CONCLUSION

Usage of AAC in the treatments of various speech and language disorders such as Aphasia, Apraxia, etc. and have proved to be useful and efficient. High Tech AACs have become more preferable and various factors like visual screen displays, text to speech options and availability of personalization contributed to their superiority and faster progress achievements. But it is necessary that a suitable AAC is chosen and continuous follow up is made when treating with AAC. In this study, we emphasize that choice of speech and language training application for high-tech AAC can be anything, whether it was designed for the specific disorder or not, if it is widely fulfilling the patient's requirement and the purpose, with proper training and follow up, it will prove to be effective which was observed in this case study using Avaz. The study also encourages fellow Speech Language Pathologists to use and explore different AAC applications based on the suitability.

Conflict of Interests:

The authors have no conflict of interests.

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