Vol 6Issue 4 May 2016

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

Welcome to ISRJ

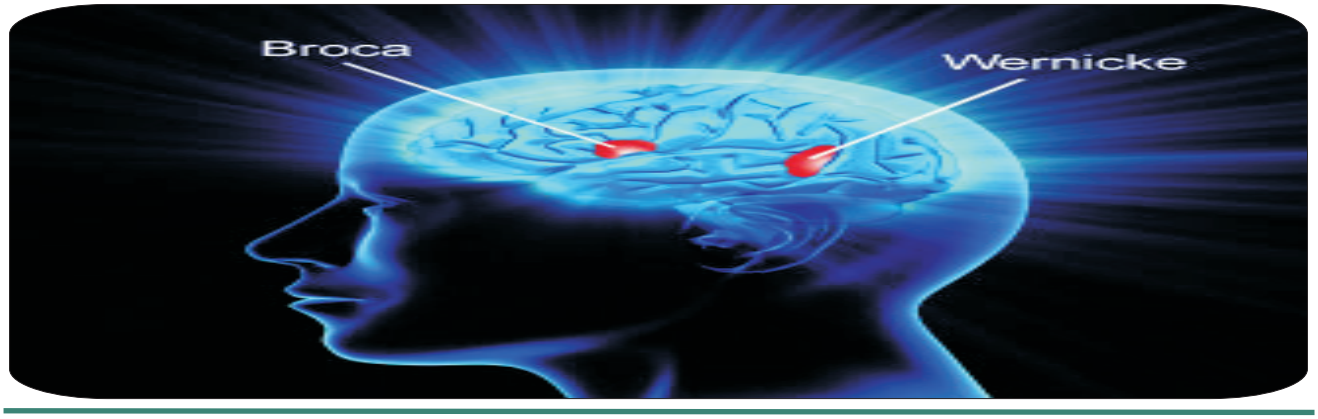
RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

ISSN: 2230-7850 Impact Factor : 4.1625(UIF) Volume - 6 | Issue - 4 | May - 2016

Indian Streams Research Journal



CLINICAL APPLICATION OF INDIGENOUS COMMUNICATION SOFTWARE FOR IMPROVING COMMUNICATION ABILITY OF PATIENTS WITH BROCA'S APHASIA

Himanshu Kumar[1] , Akanksha Kumari[2] and Bibhu Prasad Hota[3]
[1]Lecturer (speech and hearing) , Ali Yavar Jung National Institute For The Hearing Handicapped, Eastern Regional Centre, Kolkata.
[2]Post-Graduate trainee in Audiology and Speech Pathology ,Ali Yavar Jung National Institute for The Hearing Handicapped, Eastern Regional Centre, Kolkata.
[3]Lecturer (speech and hearing) , Ali Yavar Jung National Institute for The Hearing Handicapped, Eastern Regional Centre, Kolkata.

ABSTRACT

Language involves our ability to recognize and use words and sentences. Much of this capability resides in the left hemisphere of the brain. Broca's aphasia is caused due to damage in the Broca's area i.e. Brodmann area no. 44 and 45 in the left hemisphere.

As most aphasia treatment is individualized based on a patient's condition and needs as assessed by a speech language pathologist, there is a need of an alternative mode of communication for non-verbal patients which will enable them to communicate easily with family and caregivers in everyday life. AVAZ is a type of Augmentative and alternative communication (AAC) which has been developed for patients who are non-verbal or who have difficulty speaking. AVAZ uses speech generating device and has been designed with the vision of making every voice heard. AVAZ's built in vocabulary has 5000+ words and takes only seconds to personalize with new words.

In this study AVAZ Beta portable device was used for treating five patients diagnosed with Broca's aphasia having complex communication needs. AVAZ software was used to enhance the communication ability in these cases. After twenty sessions of therapy, result showed that all the participants got benefit by using AVAZ software as it enhanced the way of communication of these five

Broca's aphasia patient.

Based on the above findings, it can be concluded that AVAZ can be used to enhance confidence and functional communication of the patients with Broca's Aphasia.

KEYWORDS :Broca's aphasia, AAC, AVAZ.

INTRODUCTION

Communication is not only the essence of being human, but also a vital property of life. Communication is defined in the broadest sense as "any act by which one person gives to or receive from another person information about the person's needs, desires, perceptions, knowledge, or affective states" (National Joint Committee [NJC],1992). Language is much more than words. It involves our ability to recognize and use words, sentences or signs to express thoughts and feelings to each other. The fundamental function of every language system is to link meaning and expression- to provide verbal expression for thought and feeling. The language organ is the mind. More specifically, the language faculty seems to be located in certain areas of the left hemispheric cortex in most healthy adults. When a person has a stroke or other injury that affects the left side of the brain, it typically disrupts their ability to use language.

Expressive aphasia (non-fluent aphasia) is characterized by the loss of the ability to produce language (spoken or written). It is one subset of a larger family of disorders known collectively as aphasia caused due to damage to the left hemisphere of the brain. Intellectual and cognitive capabilities not related to speech and language may be fully preserved. In expressive aphasia comprehension is typically only mild to moderately impaired. Expressive aphasia is also known as Broca's aphasia in clinical neuropsychology and agrammatic aphasia in cognitive neuropsychology and is caused by acquired damage to the anterior regions of the brain, including (but not limited to) the left posterior inferior frontal gyrus or inferior frontal operculum, also described as Broca's area (Brodmann area no. 44 and Brodmann area no. 45). Patients have difficulty producing grammatical sentences (agrammatism) and their speech is limited mainly to short telegraphic utterances of less than four words. Producing the right sounds or finding the right words is often a laborious process. Some persons have more difficulty using verbs than using nouns. Aphasic subjects, particularly those with frontal lesions have difficulty with sustained and focused attention (Glosser and Goodglass, 1990). Very restricted short-term memory spans and difficulty in syntactic analyses of sentences in agrammatic Broca's aphasics have been shown by several authors (Caramazza and Zurif, 1976; Schwartz, Saffron and Martin, 1980s). Adults with severe Broca's aphasia can initiate and maintain topics during discourse production (Dronkers et al, 1998).

Aphasia therapy aims to improve a person's ability to communicate by helping him or her to use remaining language abilities, to restore language abilities as much as possible, to compensate for language problems, and learn other methods of communicating. Individual therapy focuses on the specific needs of the person which varies from individual to invidual. Several techniques such as Augmentative and Alternative communications (AAC) have paved their way into therapeutics of adult neurological disorders. AAC is an area of assistive technology that "attempts to compensate (either temporarily or permanently) for the impairment and disability patterns of individuals with severe expressive communication disorder (i.e. the severely speech-language and writing impaired)" (American speech Language Hearing Association, 1989). It is an inclusive term for any system that facilitates communication, which can include strategies, techniques, and/or devices that support an individual's expressive communication.

Conditions like Broca's aphasia can adversely affect the individuals to communicate during the course of daily activities. When these conditions are severe the preferred treatment in speech-language pathology is utilizing an AAC device which would provide the individuals the primary means to overcome severe speech and language impairments and thereby to communicate effectively.

Patients with comprehensive communication skills such as chronic Broca's aphasia retain a variety of communication skills (drawing gestures, limited speaking abilities and pointing to words or symbols). They can often provide scraps of information. The goals for treatment of these patients include supplementing their impaired speech. Use of digitized AAC devices for transactions in the community and to engage in specific communications can be advocated for providing intervention to these patients.

AVAZ is an affordable, tablet based communication device for people who are speech-impaired. It is a speech generating device which works by generating speech from limited muscle movements like that from the head or hand. These movements are captured by the use of a touch-screen or an external switch to allow the person to create text sentences on the device using predictive software, and this text is read out by the device. It can be used in people with speech disorders such as cerebral palsy, autism, intellectual disability, and aphasia. AVAZ is thus an artificial voice for the person. It is developed by Ajit Narayanan in the year 2010 who is acclaimed with National award for Empowerment of People with Disabilities, in the year 2011 for the invention. It is notable for being India's first successful AAC intervention tool. AVAZ has been designed with the vision of making every voice heard. It is an electronic version of picture exchange cards. AVAZ's built in vocabulary has 5000+ words, and takes only seconds to personalize with new words. It's the only AAC device with simple, practical guidance for parents and educators, helping SLPs extend AAC beyond therapy and into homes. AVAZ is recommended to be used consistently and successfully in a single, controlled environment which could be a home or a therapy clinic along with the use of short, structured learning sessions before using it in other environments.

Most aphasia treatment is individualized based on a patient's condition and needs as assessed by a speech language pathologist. There is a need of an alternative mode of communication for these kinds of patients which enables them to communicate easily with family and caregivers in everyday life. AVAZ has features that can 'grow with the user' – with appropriate application, it could potentially be useful by adults who have been temporarily or permanently impaired by accident, stroke, disease or even old age.

It is important to promote evidence-based practice about the successful use of such AAC systems so as to document the effectiveness of new established interventions which can subsequently be used to counsel family members to increase its acceptability in the society.

The study aimed at evaluating application of AVAZ software as a therapeutic tool in improving communication abilities of patients with Broca's Aphasia.

METHODOLOGY:-

Participants:

All the participants were taken from Speech and Language Diagnostics Department of A.Y.J.N.I.H.H, ERC, Kolkata.

A total of 5 Adult males diagnosed with Broca's Aphasia after a history of Cerebro Vascular Accident (CVA) under the age range of 55 to 65 years were taken for the study.

A case history was taken to gather information regarding the patient with the help of family members. All medical reports including CT scan, MRI and other neurological reports were collected

prior to diagnosis. The speech and language assessment was done with the help of well efficient Speech Language Pathologist. Western Aphasia Battery (WAB) And Boston Diagnostic Aphasia Examination (BDAE) was used to confirm the diagnosis of Broca's aphasia.

All the five cases had insufficient speech output; they expressed their needs through vocalization along with pointing. There comprehension ability was intact. Two of the total patients showed some amount of temper tantrum and emotional outburst. Family members of all the patients were very co-operative and motivated the patient throughout the assessment procedure.

Tools:

Western Aphasia Battery (WAB) is a standard test given by Kertesz and Poole (1974; 1979; & 1982) to assess the language ability and classify the participants into different types of aphasia. The test consists of different tasks to check spontaneous speech, auditory verbal comprehension, repetition and naming abilities.

Boston Diagnostic Aphasia Examination (BDAE) created by Goodglass and Kaplan (1972) is a neuropsychological battery used to evaluate adults with aphasia. It is a comprehensive test battery which evaluates language skills, processing functions and response modalities.

AVAZ Beta device launched in 2010, manufactured by Invention Labs Engineering Products Private Limited in assistance of TePP DSIR- IIT Madras, was used to provide therapy to the aphasic patients. It was originally made to be used for children with cerebral palsy. It consists of two main components – a wheelchair mountable speech synthesizer and text prediction software.

The speech synthesizer has the following features

- Large 7" LCD display with Touch screen
- Speakers and Audio Jack – for voice output and audio prompts
- USB port – to connect non-contact switches that get activated when they sense motion
- Mono Jack port – to connect contact switches that get activated when pressed
- Rechargeable battery (in-built)
- Wheelchair mount (optional)

Creation of sentences and speaking them out is done by the text prediction software. AVAZ has two features - learning and prediction which helps in creation of words and sentences. It is able to remember sentences and words used by a person in the past, and it accelerates the entry of commonly used templates. AVAZ currently supports nearly 10000 words in the English language, and many more can be added,

The text prediction software comes with many options to enables customization of the device such as modification of scan speed, addition of new words in the in-built dictionary and creation of templates for frequently used sentences for quick retrieval,

PROCEDURE:

The present study was conducted in three phases- Phase-I: Pre therapeutic Phase, Phase-II: Therapeutic phase, Phase-III: Post therapeutic evaluation.

Phase-I: All the data regarding the patients was gathered with the help of family members and friends. Formal and informal test were conducted and results were gathered to know about the present linguistic and functional status of the patients.

In phase-II, therapy was provided through AVAZ Beta device. The patient was made to select an option

by pressing anywhere on the touch screen or by using any contact or non-contact switch that is connected to the speech synthesizer. Ten core vocabulary words depending on the day to day needs of each patient were introduced to them. Use of the stimuli was explained to all five Broca's aphasia patients one by one in an individual therapeutic setting which was accompanied by their family members. A total of twenty therapy sessions were provided to each patient during whom they were made to use the stimulus from AVAZ in order to enhance their day-to-day communication by expressing themselves through the device, along with their family & friends. Family members were also counseled to encourage and motivate the patient.

In the last phase of the study, Phase-III, the post therapeutic performance of each patient after twenty sessions were evaluated by considering how much they were able to communicate and use the device. Feedback of their family members was also acquired to ascertain the progress through therapy.

RESULT AND DISCUSSION:

The study aimed at evaluating the application of computer based AVAZ software in improving communication abilities of patients with Broca's Aphasia. It included 5 Broca's Aphasia patients with severe communication problems. Their improvement in communication abilities by providing therapy through use of AVAZ was evaluated.

Result showed that all the participants got assistance by using AVAZ software. This therapy enhanced the way of communicating for these five Broca's aphasia patient as seen from their post-therapeutic status of communication skills. After taking twenty therapy sessions out of ten stimuli, patient 1 was able to use five stimuli efficiently for communication purpose, Patient 2 was able to use six stimuli out of ten for communication purpose, Patient 3 & 4 were able to use seven stimuli out of ten for communicating their needs, and patient 5 was able to use eight stimuli out of ten for communicating his/her basic needs. The use of these stimuli was consistent during the later therapeutic sessions.

An increase in number of communication turns was observed during the therapy sessions which were reduced prior to the therapy. The patients could effectively communicate their basic needs by answering appropriately through AVAZ Beta device.

All patients displayed more confidence and showed increased communication intent. Feedbacks obtained from the family members were very positive. All of them were very happy to see their loved ones communicating their basic needs with them. Both the patients as well as family members were motivated to accept the use of AAC for communication.

Communication is a very integral part of human life without which a human being is not able to lead normal life .Some medical conditions may lead to disruption in this part, Broca's aphasia being one of them. Computer based software is one of the best way to enhance the communication skills in these patients. This alternative mode made the patients to communicate their basic needs to their family members & friends which otherwise was found difficult to do.

Effectiveness of AAC strategies and devices in aphasic patients have been shown by many researches (Fox & Fried-Oken,1996; Garrett & Beukelman, 1998), use of high-tech AAC devices have also been documented.

Decrease in communication breakdown and an increase in number of successful communication turns have been documented by use of multi-component AAC system in individuals with Broca's aphasia (Garrett, Beukelman, and Low, 1989). Improvements in conversational abilities using computer based communication system have been revealed in nonfluent aphasia. Researchers concluded that such systems have the potential to augment the communication abilities of some nonfluent adults with aphasia (Waller, Dennis, Brodie, and Cairns, 1998)

Outcomes of AAC intervention for adults with severe nonfluent aphasia were evaluated by Fox, Sohlberg, & Fried-Oken in the year 1999. The results showed that the aphasic subjects used their conversational communication aids increasingly well over time in a clinical environment.

SUMMARY & CONCLUSION

The present study shows that AVAZ software is very much useful for any age group patients. It can be used in different speech disorders like autism and adult non-fluent aphasia. There is a need to extend the use of this software for providing therapy to other group of disorders where expressive language is affected. The study also focuses on the use of multidisciplinary team approach of efficient professionals and support of family members as the two most important pillars for rehabilitating the patient condition.

AVAZ helps the patients to express them and to become independent. The implication of this study is the importance of client-oriented, innovative and collaborative intervention approaches among team members. However, the use of AVAZ could not be generalized as the device was employed only during therapy sessions.

Further research should be directed at defining the utility of AVAZ in patients with different types of aphasia and generalizing the use of the device in different communication settings.

REFERENCES:-

1.American Speech-Language-Hearing Association (1989) Competencies for Speech-Language Pathologists Providing Services in Augmentative Communication, Asha 31 (Supp. 2), 1-2

2.Caramazza, A., & Zurif, E.B. (1976). Dissociation of algorithmic and heuristic processes in language comprehension: evidence from aphasia. Brain and Language, 3, 572–582

3."Chennai: IIT engineer gives cerebral palsy patients a voice". Ibnlive. Retrieved 20 May 2013

4.Dronkers, N.F., Shapiro, J.K., Redfern, B., & Knight, R.T. (1992). The role of Broca's area in Broca's aphasia. Journal of Clinical and Experimental Neuropsychology, 14, 52–53.

5.Fox, L.E., & Fried-Oken, M. (1996) AAC Aphasiology: Partnership for future research. Augmentative and Alternative Communication, 12, 257-271.

6.Fox, L., Sohlberg, M., & Fried-Oken, M. (in press). Meaningful communication roles for adults In D. R. Beukelman, K. M. Yorkston, & J. Reichle (Eds.), Augmentative Communication for Adults with Neurologic Disabilities. Baltimore: Paul H. Brookes

7.Garrett, K. L., & Beukelman, D. R. (1998) Adults with severe aphasia. In Beukelman, D. L., & Mirenda, P. (Eds.) Augmentative and alternative communication: Management of Severe Communication Disorders in Children and Adults. Baltimore: Paul H. Brookes Publishing Co.

8.Garrett, K. L., Beukelman, D. L., & Low-Morrow, D. (1989). A comprehensive augmentative system for an adult with Broca's aphasia. AAC: Augmentative and Alternative Communication, 5, 55-61

9.Goodglass, H., & Kaplan, E. (1983). The assessment of aphasia and related disorders. Philadelphia: Lea & Febiger

10.Kertesz, A. (1982). Western Aphasia Battery. Orlando, FL: Grune & Stratton, Inc

National Joint Committee for the Communication Needs of Persons with Severe Disabilities. (1992, March).

11.Sehgal, Sunaina (February 2011). "Avaz, Invention Labs". Inc. India. Retrieved 15 May 2013.

12.Waller, A., Dennis, F. Brodie, J, & Cairns, A.V. (1998). Evaluating the use of TalksBac, a predictive communication device for nonfluent adults with aphasia. International Journal of Language and Communication Disorders. 33(1): 45-70.

Publish Research Article
International Level Multidisciplinary Research Journal
For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication,you will be pleased to know that our journals are

Associated and Indexed,India

- International Scientific Journal Consortium
- OPEN J-GATE

Associated and Indexed,USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Databse
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.org