

INDIAN JOURNAL OF COMMUNICATION SCIENCES

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Published by:



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Editorial

Communication Science has evolved into professional discipline to deal primarily with disorders, delays and dysfunctions in human communications including voice, fluency, articulation and overall linguistic competency. Importance of normal communication has grown with stage performance of celebrities linked entertainment. The digital technology has opened up an entirely different domain with speech synthesis and machine learning. Whether the eating and feeding issues or swallowing disorders are responsibility of a Speech Language Pathologist. The accent issues or the literacy issue, the SLPs are to have a solution. Thus, an entire continuum of abnormal, normal and super normal communication imposes a lot of responsibility. This profession in a country like India that accommodates 20% of human population and 20% of human languages of the world is of great importance. A lot of research, innovation and materials development is required to respond to the needs of the country. Indian Journal of Communication Sciences is a humble contribution to act as a platform for professionals to perform and showcase their achievements. I hope the Journal will be well received by the fraternity for its objectives and continue to serve the profession and the nation in the future.

Prof. Satya Mahapatra
Chief Editor



Editor's Message

Dear Readers

On behalf of **Indian Journal of Communication Sciences** I would like to thank to all the authors for their interest and sharing of their scientific data. The most evolved human activity is learning, teaching and sharing of knowledge. Content of all the scientific research data and studies has been explained their own method of knowledge enlighten. I am very thankful to **Institute of Health Sciences and family** especially I am deeply indebted to **Prof Satya Mahapatra** sir for giving me a new assignment and such a cherished work which I would fulfill to the best of my abilities. It is such a pleasure to be a part of these scientific and learning journals. I shall assure all our readers, young upcoming learners and students of speech and hearing sciences, cycle publication of this scientific journal will be more aimed and tool to gather and bringing out all new happenings in this communication science. Standing on this spirit of ongoing improvement, all form of support, scientific data and constructive research work inputs for this process are most welcome.

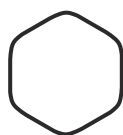
I am very thankful to all the members for their support and effort to get this journal and the scientific even success. I am grateful to Ms. Subhasmita Sahoo for keeping continuous update in time.

Wishing this volume to be a highlighting issue.

Dr. Rajanikanta Pradhan
Editor

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Scientific Section

DIAGNOSTIC SPEECH AND LANGUAGE PROFILE IN A YOUNG PATIENT WITH MOYA-MOYA DISEASE

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ABSTRACT

Moya-Moya disease is a condition associated with progressive occlusion of the blood arteries. The condition can be seen in clients of any age. However, there is evidence that suggests that the condition can be seen in children or young adults and is often seen in males than females. The symptoms of Moya-Moya disease is directly dependent on the arteries which may be occluded. The current case study is about a young patient who was 15 years old. The client had weakness and was not able to speak anything after stroke. The client reported to a premiere institute of Speech and Hearing with the complaint of effortful speech. Though there was oro-motor weakness in the client, the symptom had resolved. Western Aphasia Battery suggested Broca's aphasia and therapy was provided 25 sessions showing that the client recovered during the course of therapy.

Key words: Occlusion, effortful speak, young client

INTRODUCTION

Moya-Moya disease is described as a progressive intracranial arteriopathy associated with bilateral stenosis of the carotid artery. As a consequence of narrowing of blood vessels, there would be reduction in the blood flow (Kronenburg, Kees Braun Van der Zwan & Catharina & Klijn, 2013). If the proximal anterior and middle cerebral arteries get invaded, it may result in Aphasia. The pathogenesis of Moya-Moya disease remains unclear till date; however, a strong genetic trait has been associated with Moya-Moya disease. The speech and language deficits have been documented through case studies (Suzuki & Takaku, 1989). Dysarthria also has reported in this population (Cho Etal, 2013).

As far as the cause for Moya-Moya disease is considered, it is idiopathic disease where the cause is obscure. The disease presents with a progressive nature and other salient characteristic is that the disorder is progressive nature leading to recurrent stroke. The recurrent stroke is assumed to be caused due to occlusion of the terminal internal carotid arteries. There are some studies which may report genetic cause leading to Moya-Moya Disease but the findings lack empirical evidence.

Lesion: The lesion of the Moya-Moya disease is quite unclear. The symptoms are directly dependent on the lesion. The ophthalmic artery, the posterior and anterior ethmoidal arteries and the external carotid arteries is assumed to be vulnerable for developing an occlusion.

Clinical characteristics: The data on the general characteristics has been based on the 100 published cases seen between 1961 and 1980, The age of onset is considered to vary across the studies. Most of these studies show the incidence is usually the second to fourth decade. The lowest age reported in the published studies is 7. The condition is assumed to occur more in males than females. Most of the cases are found to be symptomatic and the symptoms are directly dependent on the lesion. Fine involuntary movements of the extremities and slowly progressive mental impairment have also been observed. The speech and language symptoms include dysarthria, aphasia, confusion, intelligibility issues etc.

Treatment & Management: Revascularization surgery is often considered as a management option and this surgery is taken up when there is symptoms of stroke. The surgery deals with the process of augmenting intracranial blood flow using an external carotid system. This is done by bypassing the occluded blood artery. The bypass further can be intracranial or extra cranial. In particular, surgical revascularization to prevent ischemic stroke is an effective treatment for patients with MMD with an ischemic presentation. The current case study provides details on a client who developed aphasia as a consequence of Moya-Moya disease

METHODOLOGY

The client reported with his parents to a premiere institute of speech and hearing before the outbreak of pandemic. He was 15 years at the time of reporting and was a native speaker of Kannada (a language spoken in South India: Karnataka). The main complaint was that the client was not able to speak clearly after suffering a stroke. It was 20 days since stroke. The other problems observed during clinical observation include reduced mean length of utterance, word finding difficulty, poor intelligibility. The MRI carried out at the time of stroke revealed acute infarct in left insular cortex, perisylvian frontal lobe (MCA territory). Moya Moya disease was the diagnostic label given by the neurologists as there was reduction in the diameter of blood vessels leading to stroke at a relatively younger age. The diagnosis was based on digital subtraction angiography. The left insular cortex and frontal lobe also was affected. There was left facial deviation and weakness on the side of the body. After explaining about the nature of the disease, associated risks and complications of the neuro surgical procedure the client underwent left mini temporal craniotomy and encephalo–duro-myelo-arterio-synangiosis- under GA (global anaesthesia). After the surgery the complaints pertaining to Speech and language skills included reduced intelligibility, effortful speech and poor memory skills since stroke. Detailed Speech and Language was carried out.

RESULTS AND DISCUSSION

The medical diagnosis of Moya-Moya disease was done by an experienced neurologist. The diagnosis was made on basis of diminished blood flow in the internal carotid artery and the middle and anterior cerebral arteries determined by radiological investigations. There was no genetic inheritance. The client had poor clarity of speech and his understanding also was affected to a marked extent and the Western Aphasia Battery-Kannada was administered on the client and the results revealed that client had a score of 3 and 2 on information content and fluency (maximum being 10 for each of the domain). The score had a score 164 (out of 200 AQ 8.2) on comprehension. The client had a score of 14 (maximum being 100 and AQ 1.4) for repetition. The score on naming domain was 32 (maximum being 100 and AQ of 3.2). The client was diagnosed to have Broca's aphasia. As the client did not have slurring of speech or weakness in the articulators, Frenchey Dysarthria Assessment was not carried out as the symptoms of motor weakness was reduced at the time of reporting. The poor scores on expression, repetition and naming domains provided an indication to incorporate these goals during therapy.

Therapeutic Intervention: Total 25 sessions of speech and language therapy was done. The goals considered for therapy use of language for verbalization of thoughts, increasing intelligibility improve repetition. In addition to these goals, goals related to reading, writing and calculation were also considered Speech Language therapy was provided speech language pathologist. The client was trained using phonemic cues. Emphasis was provided on self-cuing where the client was asked to

retrieve the first sound of a given word himself on confrontation. In the initial stages of therapy, the client found it difficult to use the cues with practice he was able to produce words on using these phonemic cues. The repetition was improved gradually by considering words of short length and complexity. Gradually the length and complexity of utterance was improved. Where ever there was breakdown in repetition, the client was asked to use phonemic cues. There were frequent misarticulations reducing the intelligibility of speech. Oral placement cues were provided to the client for improving the articulation. The sounds of various permutation and combination were tried during therapy. The client was able to use the cues related to oral placement. In addition to this, the client was able to self-monitor his mistakes and where ever there was mistake he was able to stop at that juncture and he tried correcting the error. Though therapy was provided across 25 sessions and reading, writing was trained during this tenure it was not possible to improve reading and writing completely. The client had difficulties related to reading where he was not able to combine sounds and form words. He was not able to use punctuations while reading and found it difficult to recognize some letters. While writing also, he faced difficulty as there was weakness in the right hand. He tried gesturing when there was a communication breakdown. The family members were counseled to reciprocate his needs only on request. The parents were informed to provide cues like the ones provided during therapy session. Following this WAB has to be re administered on the client to document his difficulties now. A reevaluation would also help in coining new goals in addition the known deficits in reading and writing has to be targeted in the eventual sessions. From the medical line of management, the client should be reported for a neurological follow up for administration of medicine.

In summary, it was not clear about the cause of Moya-Moya disease in this case, the case developed symptoms like head ache and dizziness when he was 12 years old. There was weakness in the whole body. Once the client suffered stroke, he was totally non-verbal. The client showed spontaneous recovery. The present study tends to document the clinical deficits and therapy induced recovery.

CONCLUSION

Moya-Moya disease can be seen in individuals of any age. The condition can affect children also. The early onset of Moya-Moya disease can be seen in individuals between 7-15 years. The current case illustrates a case with Moya-Moya disease with only language symptoms and no symptoms of oro-motor weakness or dysarthria. The detailed language evaluation showed the condition resembled Broca's aphasia and the evaluation also helped in addressing goals for Speech and Language therapy.

REFERENCES

1. Cho WS, Kim JE, Kim CH, Ban SP, Kang HS, Son YJ, et al. (2014) Long-term outcomes after combined revascularization surgery in adult moyamoya disease. *Stroke* 45:3025-3031
2. Kronenburg, A., van den Berg, E., van Schooneveld, M. M., Braun, K., Calviere, L., van der Zwan, A., & Klijn, C. (2018). Cognitive Functions in Children and Adults with Moyamoya
3. Suzuki J, Takaku A: Cerebral vascular "Moyamoya" disease (1969) A disease showing abnormal net-like vessels in base of brain. *Arch Neurol* 20: 288-299.
4. Vasculopathy: A Systematic Review and Meta-Analysis. *Journal of stroke*, 20(3), 332–341. <https://doi.org/10.5853/jos.2018.01550>

CAN VOICE THERAPY TECHNIQUES TREAT STUTTERING?

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Key Words: Resonant Voice Therapy, Chant talk, Relaxation exercises, stuttering.

INTRODUCTION

When individuals want to share an idea verbally, they transform their thoughts into something physical (speech) that can be sent across space to the listener. Speech production is a fast-moving, highly coordinated process involving the simultaneous use of hundreds of muscles, nerves, tendons, bones, and various other structures (Perkins and Kent, 1986). These structures are organized into various subsystems including the respiratory system (breath support), the phonatory system (voice), and the articulatory system (speech sounds). These subsystems are highly interactive and have the potential to affect each other. The final output involves interaction between all these sub-systems.

There is constant innovation in the assessment and management plans of these sub-systems, by categorizing them into various disorder-specific techniques. Clinicians tend to follow the tried and tested methods and evidence-based techniques/approaches at all times. However, the commonality between these sub-systems leads to speculation, that the techniques used to manage the various disorders might exhibit some overlap as well. Voice disorders have a variety of causes, but for a significant number of people, the problem is in how they use the vocal mechanism. For these individuals, the main focus of therapy is on helping them learn a more normal use of the vocal mechanism and in many cases, resolving emotional or psychological issues related to their voice problems. Most stuttering therapy approaches also pay considerable attention to both physical and psychological aspects of communication. Many approaches encourage relaxed voicing; focus on breath control, and easy voice onset. Some even make voice the centerpiece of treatment (Weiner, 1984). This paper looks at the interactive nature of the speech subsystems and examines the common ground between voice therapy and stuttering therapy.

NEED FOR THE STUDY

Adams (1974) reported that respiratory mistiming intrudes on the phonatory and articulatory processes. Perkins (1976) also reported stuttering as the disorder of discoordination in articulation, phonation and breathing. Various studies have investigated the integrated therapy approaches for stuttering interventions. Evidence for voice techniques' effectiveness in stuttering intervention isn't explored

extensively. Thus, this research study aims at finding the commonality between stuttering and voice pathologies and see the efficacy of a few voice techniques on persons with stuttering. Below mentioned techniques have been chosen based on the most commonly seen complaints among the PWS, of muscle tension, hard glottal attacks and fast rate of speech. The rationale of the most commonly used approaches for treating PWS were then matched with the voice techniques used for similar voice pathologies. The rationale are as mentioned below:

SOFT CONTACT PRINCIPLES

- Relaxation - In people who stutter, behaviors range from late onset of voice (relative to the onset of airflow) to hard glottal attack, in which the vocal folds are firmly closed before the onset of airflow (Williams and Brutten, 1994; Weiner, 1984). When a speaker uses a hard glottal attack to initiate the voice, he/she inspires air and then holds the breath before initiating the utterance.

PROLONGATION PRINCIPLES

- RVT (Lessac, 1994; Verdolini-Marston et al., 1995) - This approach may also be of value in stuttering therapy because of its capacity to divert attention away from the larynx while helping to produce a stronger voice without increasing laryngeal effort.

ANALOGY PRINCIPLE – Rate of Speech

- Chant Talk – Hard glottal attack occurs mostly on words that begin with a vowel sound. Speakers must remain alert to the sensation of a depleting air supply and pause in an appropriate place for another breath and thus maintain adequate rate of speech as well.

The current study explored the effectiveness of voice techniques, such as Resonant Voice Therapy (RVT) and Chant Talk in the management of fluency disorders, which have some common rationale concerning conventional fluency therapy approaches, such as prolongation and soft contact.

AIM AND OBJECTIVES

The present study aimed to find the impact of RVT and Chant Talk along with relaxation in the management of mild to moderate stuttering. Stuttering severity, rate of speech, speech naturalness, acoustic parameters and self-perception of stuttering were compared across pre and post-therapy conditions.

METHODOLOGY :

Participants

A total of 6 persons with stuttering (3 males and 3 females) were enrolled for the study, of which four had mild to moderate and two had moderate stuttering, ranging from 21 years to 53 years. A duly filled consent form was obtained from each participant.

Procedure

For baseline assessment, Stuttering Severity Instrument-4 (SSI-4), acoustic parameters using PRAAT Software along with a self-rating scale, OASES were administered. The clients were then assigned for a combination of RVT with relaxation exercises or Chant talk with relaxation techniques randomly. Intensive therapy was provided by a trained clinician through teletherapy mode. Each session was carried out for 45min for two months, accounting for an average of 56 sessions, as shown in figure 1.

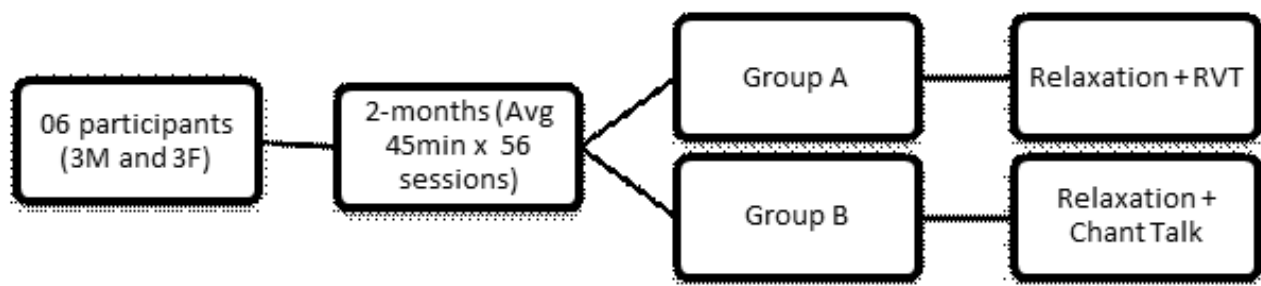


Figure 1: Figure depicting distribution of participants and type of therapy provided

RESULTS AND DISCUSSION

The descriptive statistics analysis of mean and standard deviation was obtained for the data, using the statistical software SPSS. Shapiro Wilk test was administered to check for normality of the small sample size. The results revealed that the data follows a normal distribution (i.e., $p > 0.05$). Therefore, the parametric paired sample t-

test for small samples was carried out, with a 0.05 or 0.01 level of significance to see the effectiveness of therapy in all the parameters.

Paired t-test findings revealed that the mean scores of frequencies of stuttering utterances reduced from 14.66 to 8.33, physical concomitance score changed from 5.83 to 3.00 and overall stuttering severity rating decreased significantly ($p < 0.05$) from 23.5 to 14.00. However, despite the remarkable change in the duration of stuttering instances from 3.33 to 2.66, speech naturalness from 2.16 to 2.33 and rate of speech from 140.33 words per minute to 134.16 words per minute no statistically significant changes were observed. The VOT value of three participants out of six improved from abnormal to normal. Pre and post comparison of OASES scores of 5 participants out of 6 showed reductions in self-perception of severity.

The outcome of this study suggested that voice therapy techniques especially RVT and Chant Talk can trigger the therapeutic outcome in fluency disorders. The rationale of these voice therapy approaches works fundamentally by re-establishing the laryngeal approximation. Various relaxation approaches can enhance the coordination of intrinsic and extrinsic laryngeal muscles, which are pre-requisite for fluent speech. Relaxation based approaches can also help in reducing the stress induced by various non-fluent movements. Based on these rationales it can be hypothesized that voice therapy techniques especially RVT, Chant Talk along with relaxation exercises can be useful in the clinical management of fluency disorders.

SUMMARY AND CONCLUSION

The present study shows that there is a significant improvement in the fluency of speech with Resonant Voice Technique and Chant Talk alongside relaxation techniques. The findings of this study provide sufficient evidence to explore the possibility of various other voice therapy approaches in the management of stuttering. A larger sample size using controlled experimental conditions can help in the external validation of this approach.

TAXONOMIC AND THEMATIC RELATIONSHIP BETWEEN THE LEXICAL ITEMS IN TYPICALLY DEVELOPING CHILDREN

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ABSTRACT

The items in the lexicon are assumed to be arranged in a particular fashion. It is assumed that the words from a lexical category are arranged together. This is the basis for taxonomic arrangement. The other view is that the words which share a common semantic relationship are stored together and this kind of arrangement is called as thematic organisation. The study was carried out with aim of comparing reaction time and accuracy scores for taxonomically related block, thematic related block and unrelated blocks. It was found the reaction time was less and accuracy was better for related blocks compared to unrelated blocks suggestive of facilitation. Taxonomically related items elicited facilitation while the magnitude of facilitation was lesser for thematically related items compared to taxonomically related items.

Key words: *Facilitation, Inhibition, Reaction Time, Accuracy*

INTRODUCTION

The lexicon of a language is a collection of all words in a given language. In psycholinguistics, the mental lexicon is defined as a systematically organized mental dictionary. It contains information regarding a word's form and meaning. This is in terms of its pronunciation, syntactic and semantic features. Hence, the mental lexicon of an individual can be described as internalized knowledge of the properties of words.

Each word known to an individual is represented in the mental lexicon as a lexical entry. Appropriate selection of lexical entries is necessary for successful language production. The activation and retrieval of these lexical entries is termed as lexical access. In order to investigate the patterns of lexical access, naming paradigms have been predominantly employed. Of these paradigms, picture naming tasks are most commonly used. The responses obtained could be influenced by a number of variables. These variables can be classified as patient and stimulus variables. Patient variables include age, attention, motivation, and education to state a few. The stimulus variables include factors such as relatedness or frequency of occurrence of the target items. These parameters determine the thresholds of activation for the target items. Items with lower thresholds of activation are accessed faster than those of higher thresholds of activation. Hence, the patterns of lexical semantic activation could follow two trends: facilitation or inhibition (Levelt, 1989).

Retrieval of appropriate word from the lexicon is crucial for the accurate naming and in language formulation process. During the process of retrieval, apart from the target word selection, other lexical lodes will be simultaneously activated and would offer competition. This process is explained using lexical semantic activation model (Dell & O Senogada, 1992) according to this model, words in the

lexicon are represented using lemma nodes. Each node here is connected to other nodes which shares the common semantic features. When a node is stimulated, that node activates (primes) the other related nodes. The activation link between the connecting nodes to the origin nodes depends on the strength of the link, how frequently the individual pairs the two nodes and strong semantic relation between them (Crowther& Martin, 2014).

The words in the lexicon are arranged based on thematic and taxonomic relations. Thematic relations are about event schemas of nouns and Taxonomic relations deals with the hierarchical category membership. Researchers have used many tasks to measure the lexical semantic organisation in children and adults. To name a few, word association tasks, category-generation task, free and cued recall task and blocked cyclic naming task. Blocked cyclic naming task has evoked a specific interest among researchers in this arena (Morton, 1992). This task involves naming of semantic related and unrelated items in a cyclic fashion (several repetitions), which helps to delineate between semantic facilitation and semantic interference effect which takes place during the process of lexical item naming Navarrete, del Prato, Peressotti, and Mahon (2010, 2012).

NEED FOR THE STUDY

When an individual tries to name a picture, along with the target word other lexical competitors will get activated. Based on the strength of activation link and rich semantic relations, the target word is retrieved. But the process involved in this act at the representational levels of semantic organization is a topic of debate. The facilitation or suppression of the lexical items due to the influence exerted by the competitors is not often studied for taxonomic and thematically related items. These factors necessitated the current study.

AIM:

The present study aimed at investigating the pattern of lexical semantic activation for taxonomically and thematically related items by employing blocked naming task

OBJECTIVES:

To compare the reaction time and accuracy scores for taxonomically related and unrelated blocks To compare the reaction time and accuracy scores for thematically related and unrelated blocks

METHODOLOGY:

Participant details: A total number of 32 participants were considered in the study. The study was carried out in Malayalam and the native language of the participants was Malayalam and they were residents of Kerala. The participants (children) were divided into two subgroups. The first group comprised of 15 children in the age of range of 6-8 years and the second group comprised of 15 children in the age range of 8-10 years. Blocked naming task was administered on the participants.

STIMULUS AND PROCEDURE:

The participants were asked to name pictures. The pictures were presented in three blocks. The first

block comprised of 10 taxonomically related items, where the pictures belonged to the same lexical category (common objects) in this case. The second block consisted of 10 thematically related items, where the objects were the pictures shared a common theme (shape round) in this case and third block consisted of 10 pictures belonging to different lexical items thus making the set, unrelated. The pictures were presented as separate blocks by using DMDX version 6.1.6. Testing was carried out in Malayalam. The task of the participants was to name the pictures.

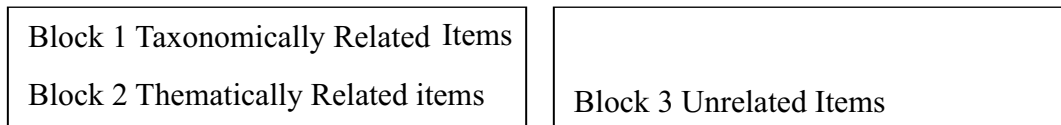


Figure 1: Schematic representation of the three blocks

Analysis: The reaction time and accuracy for the four blocks was derived and compared.

RESULTS AND DISCUSSION

The reaction time and accuracy scores for group 1 and group 2 on the taxonomically related, thematically related and unrelated blocks were computed. For group 1, the reaction time for the three blocks (as mentioned in the schematic representation) was 1317.22 milliseconds, 1712.22 milliseconds and 2010.48 milliseconds. The accuracy scores for the corresponding scores were 95%, 94% and 89% respectively.

For group 2, the reaction time was 1236.29 milliseconds, 1398 milliseconds and 1767.67 milliseconds, while the accuracy scores were 98%, 98% and 95% respectively. The median scores for the two groups on the reaction time, accuracy scores of the three blocks were computed. The median scores also followed the same pattern as the mean for reaction time and accuracy. The standard deviation was more taxonomically related block followed by unrelated and thematically related block.

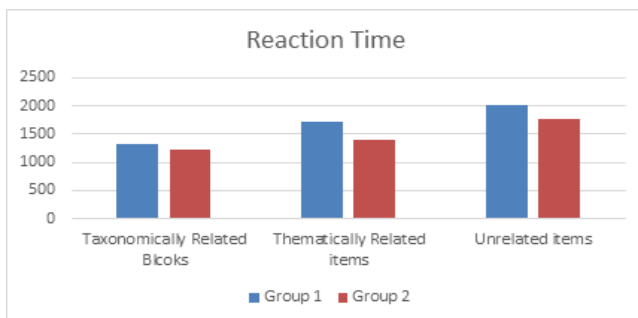


Figure 1: Reaction Time Comparison

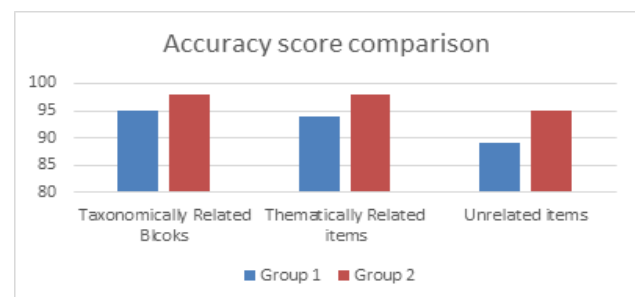


Figure 2: Accuracy score comparison

To summaries, in reaction time studies, lesser the reaction time the better is the performance. The reaction time was lesser and accuracy score was better for taxonomically related block, followed by thematically related block and unrelated blocks for both the groups.

Statistical analysis was carried to verify if there was any significant difference between the two groups on the three blocks. Statistical analysis was carie out for reaction time only as accuracy scores showed no/minimal difference between the blocks/groups. Mann Whiney U test, a non parametric test was used to verify if there was any difference between the groups. The Z scores obtained on comparison was 1.92, 2.85 and 1.86 and corresponding p values showed significant difference only for thematically related blocks.

In order to verify if there was any significant difference between the three blocks, (within each group) Friedman's test revealed significant difference. Further Wilcoxon's signed rank test was used. For group 1, the Z scores obtained on comparing taxonomic blocks, with thematic blocks was 2.38, while the Z score obtained on comparing the taxonomically related blocks with unrelated blocks was 3.14 and the Z score obtained on comparing the reaction time of thematically related block with unrelated block was 1.97 and the corresponding p value for all the first two comparisons.

For group 2, the Z scores obtained on comparing taxonomic blocks, with thematic blocks was 2.02, the Z score obtained on comparing the taxonomic blocks with unrelated blocks was 2.72 and the Z score obtained on comparing the reaction time of thematically related block with unrelated block was 1.24 and the corresponding p value showed significant difference for the first two comparisons only.

The results showed that the performance was better for taxonomically related blocks compared to thematically related blocks and unrelated blocks. The results were suggestive of facilitation as the reaction time was better for related compared to unrelated blocks. The thematically related blocks did not facilitate the performance as the statistically significant difference was not seen between the thematically related blocks and unrelated indicating that the participants may not have detected the trend behind these blocks or implicitly the block did not evoke any facilitation.

CONCLUSION:

The study was carried out with the aim of investigating the pattern of lexical semantic activation for taxonomically and thematically related items by employing blocked naming task. Participants were in the age range of 6-10 years and were divided into two sub groups based on age. Blocked naming task was administered on the participants where taxonomically related items, thematically related items and unrelated items were presented. The reaction time and accuracy scores were better for taxonomically related block followed by thematically related and unrelated blocked suggesting that this block evoked facilitation.

REFERENCES

1. Crowther, J. E., & Martin, R. C. (2014). Lexical selection in the semantically blocked cyclic naming task: The role of cognitive control and learning. *Frontiers in Human Neuroscience*, 8. doi:10.3389/fnhum.2014.00009
2. Dell, G. S., & Oseaghdha, P. G. (1992). Stages of lexical access in language production. *Cognition*, 42(1-3), 287-314. doi:10.1016/0010-0277(92)90046-k
3. Levelt, W. J. (1989). Working Models of Perception; Five General Issues. *Working Models of Human Perception*, 489-503. doi:10.1016/b978-0-12-238050-1.50028-7
4. Navarrete, E., Prato, P. D., Peressotti, F., & Mahon, B. Z. (2014). Lexical selection is not by competition: Evidence from the blocked naming paradigm. *Journal of Memory and Language*, 76, 253-272. doi:10.1016/j.jml.2014.05.003
5. Morton, J. (1969). Interaction of information in word recognition. *Psychological Review*, 76(2), 165-178.

A RETROSPECTIVE STUDY ON-CORRELATION OF BREATHING PATTERN AND PITCH RANGE IN PROFESSIONAL SINGERS.

(Diaphragm breathing vs skeletal / thoracic breathing variation correlation to pitch range of voice).

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INTRODUCTION

In professional singers, the wider pitch range plays more power in singing notes. Singer needs energy for singing from breathing. The different singers use different type of breathing patterns / respiratory kinematics (1.Elevation of rib cage- known as skeletal breathing and /or 2.Elevation of abdomen-known as abdominal breathing). The use of specific breathing kinematics results the pitch power / pitch range of singers. The pitch range of the voice of professional singers depends upon the vital capacity is always not correct. Some way it depends upon the usefulness of breathing patterns. Diaphragmatic breathing is more efficient to elevate pitch range than skeletal / thoracic breathing or other used patterns.

AIM:

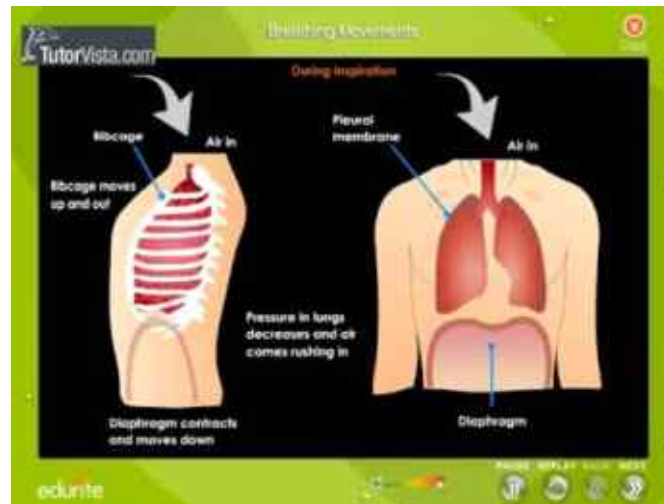
To study the correlation of use of different breathing pattern with power and range of pitch in singing voice. To review the use of diaphragmatic / abdominal breathing rather than thoracic breathing (regardless PFT measures; vital capacity and tidal volume), empower the pitch range (regardless scale of singing)

MATERIALS AND METHODOLOGY

The study was conducted in different voice clinics under supervision of Team of Laryngologist, chest physician and Speech Language Pathologists. Total number of 50 professional singers without any vocal pathology has been taken into study, have complain of difficult to reach higher notes as well difficult in sustaining of pitch in desired. Out of 60 professional singers, 33 males and 27 females age limit of 29 to 48 years.

We have used PRAAT software to record and analyze the acoustical parameters of voice as well as pitch range pre and post therapy. All of them had a unstable / low range of pitch. Sustained pitch range was insufficient to the desired notes. Voice was strained (GRABS-Scale)

PFT measures include Vital capacity (VC), expiratory reserve volume (ERV), Inspiratory volume capacity (IVC) and forced vital capacity (FVC). All these findings are more or less within normal limits.



Breathing pattern / kinematics measures- difference in elevation of rib cage in thoracic breathing and expansion of abdomen in diaphragmatic breathing- most of them had thoracic breathing patterns rather than abdominal breathing in singing.

Video Laryngo-Stroboscopy for structural and functional evaluation of vocal folds. They all had structurally and functionally normal vocal folds and normal mucosal waves on phonation.

We conducted four weeks training program / therapy for all singers to convert diaphragmatic breathing from thoracic breathing pattern use in speaking as well in singing from the habit of using thoracic breathing. Used self feedback and postural corrections using mirror, auditory feedback and breathing kinematics. To keep chest and should relaxed during inhalation and exhalation and pressure should be on abdomen, abdominal muscle to active during breathing. Step-1 to practice only abdominal breathing, step-2 to practice steady phonation with abdominal breathing and step-3 to practice pitch training / elevation of range with abdominal breathing. Then shifted to singing practice. They all are benefited to get their pitch range corrected to desired notes in singing.

PPI was continued for a stipulated period to reduce LPRD features as a support. LPRD and inter arytenoids pachydermia also stands against the full closure of vocal folds.

FLOW Chart of Methods

Step 1- Gather the singers who come to Voice Clinic with complaint of -"difficult to reach high notes in singing"

Step 2- Postural observation of breathing pattern and history taking

Step 3- Voice recording and acoustical analysis of voice by "PRAAT" Software

Step 4- Laryngeal examination by video Laryngo-stroboscopy

Step 5- PFT measures

Step 6 -Compute the data- tabulating the lowest and highest pitch (pitch range) in thoracic breathing

Step 7- To start counseling and medication along with voice therapy (to change kinematics / postural correction with help of visual feedback / mirror to change from thoracic breathing to abdominal breathing.

Step 8-To start use abdominal breathing with normal phonation and then to singing

Step 9-Compute the data – tabulating the lowest and highest pitch (pitch range) in abdominal breathing

Step- 10 -Interpretation of result

RESULTS

The vital capacity of singer may not be a vital factor for singing to widen the range of pitch. Diaphragmatic breathing pressure promote efficient generation of subglottal pressure under control during phonation than the thoracic breathing due to the air pressure flow is upward and straight , acts directly to tense more the vocalis muscles. Inspiratory volume capacity (IVC) increases in diaphragmatic breathing because needs less energy to push down the soft area of lower abdomen then to lift whole rib cage.

Study design- Observational study

Study Populations- Professional singers

Inclusive criteria- no structural vocal pathology, all are professional and trained singers, has same type of complaint / difficulty in pitch range in singing.

Exclusive criteria- Habit of smoking, vocal fold pathology, use of inhaler, asthma or any form of breathing complications.

Sample size- 50

Study technique- Time bound cross sectional study,

Term used- Pitch, breathing pattern, abdominal, thoracic singing notes.

CONCLUSION

There is significant improvement of pitch range (upto 98-113 Hz) in singing of singers with diaphragm / abdominal breathing with modification of expiratory reserve volume (ERV) and Inspiratory volume capacity (IVC) then the singer uses thoracic breathing in singing regardless the amount of vital capacity.

REFERENCE

1. Griffin B, Woo P, Colton R, Casper J, Brewer D. Physiological characteristics of the supported singing voice. A preliminary study. *J Voice*. 1995. March;9(1):45–56. [PubMed]
2. Thorpe CW, Cala SJ, Chapman J, Davis PJ. Patterns of breath support in projection of the singing voice. *J Voice*. Elsevier; 2001;15(1):86–104. [PubMed]
3. Prisk GK, Hammer J, Newth CJL. Techniques for measurement of thoracoabdominal asynchrony. *Pediatr Pulmonol*. 2002. November 6;34(6):462–72. [PubMed]
4. Watson PJ, Hixon TJ. Respiratory kinematics in classical (opera) singers. *J Speech Hear Res*. 1985. March;28(1):104–22. [PubMed].

EFFICACY OF TELEREHABILITATION FOR COMMUNICATION DISORDERS: AN INSTITUTIONAL EXPERIENCE

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Keywords: *Telerehabilitation Speech-Language outcomes, Speech and Language Disorders, Treatment efficacy*

INTRODUCTION

There is constant innovation in the assessment and management of communication disorders on regular basis. Evidence-based practices are highly sought after in clinical practice. Speech and Language disorders as a field has thrived on face-to-face interactions with patients till 2019. Interacting in person helps the clinician know their patients better during formal interviews, by analyzing their verbal and non-verbal behavior. However, the unprecedented hit by the pandemic in 2020 led to a paradigm shift in assessment and management procedures. As a result of technological evolution, a large number of healthcare providers are employing telepractices.

NEED

Modification of cognitive-linguistic skills in persons with communication disorders is a longitudinal process, requiring relentless and persistent monitoring during an intervention. Access to rehabilitation services varies hugely within and across countries. Even during the pre-COVID-19 era, clients'/caregivers' commitments would limit the general visit for therapy to two to three sessions per week, irrespective of the nature and severity of the communication disorder. The onset of COVID-19 in January 2020 has increased the need for telerehabilitation in the field of speech and hearing disorders. There are numerous telerehabilitation modules and guidelines available addressing speech and hearing disorders. However, there is no standard protocol or outcome-based study on telerehabilitation services for communication disorders. India's socio-cultural and regional variability further fosters the need to study the outcome efficacy of telerehabilitation services offered to persons with communication disorders.

AIM AND OBJECTIVE

The present study was aimed to investigate the outcome achieved during four months of telerehabilitation services provided at the Department of Audiology and Speech-Language Pathology, Amity University Haryana, under two domains a) Language Disorders which includes Children with Autism, Hearing Impairment, Intellectual Disability, Cerebral Palsy and Adults with Aphasia; and b)

Speech Disorders constitutes of children and adults with Speech Sound Disorder, Stuttering, Voice Disorder and Dysarthria.

METHODOLOGY

A total of 43 individuals in the age range of 2 years to 65 years with speech and language disorders who received telerehabilitation services offered at the Department of Audiology and Speech-Language Pathology, Amity University Haryana, were enrolled in the study. The therapeutic outcome efficacy of telerehabilitation was measured and compared with the offline mode of therapy for the duration of four months, i.e., outcome data from July 2021 to October 2021 was compared with the data from July 2019 to October 2019.

The individuals were grouped according to the diagnosis and severity of the problem as shown in the figure below. The sessions were taken by well-trained III Year/Intern BASLP students along with the Faculty/Clinical Supervisors, who had an average clinical experience of 7-8 years. The therapeutic plan was designed based on the baseline assessment, suitable home environment, availability of the theme-based material and technical equipment at home and interest and adaptability of the clients and caregivers. The duration of the session was of 45-min and the frequency of the session was three days a week. Tele-rehabilitation sessions were designed based on the clinical interview conducted and video sample received from the caregivers- client interaction in the home setting. Feedback for each session was obtained from caregivers/clients and issues were addressed in real-time. E.g., a 7-year-old child with Autism had an apt for learning a new word in the context of pizza. Thus, various lexical items targeted for this child was planned by incorporating a target image inside the pizza, presented digitally. Visual and auditory digital reinforcements such as balloons, stars and claps gifs were used.

On average, each client received 32 telerehabilitation sessions. The progress of each client was indexed using traditional clinical methods at an interval of 12-16 sessions, following which, the therapy plan was re-designed.

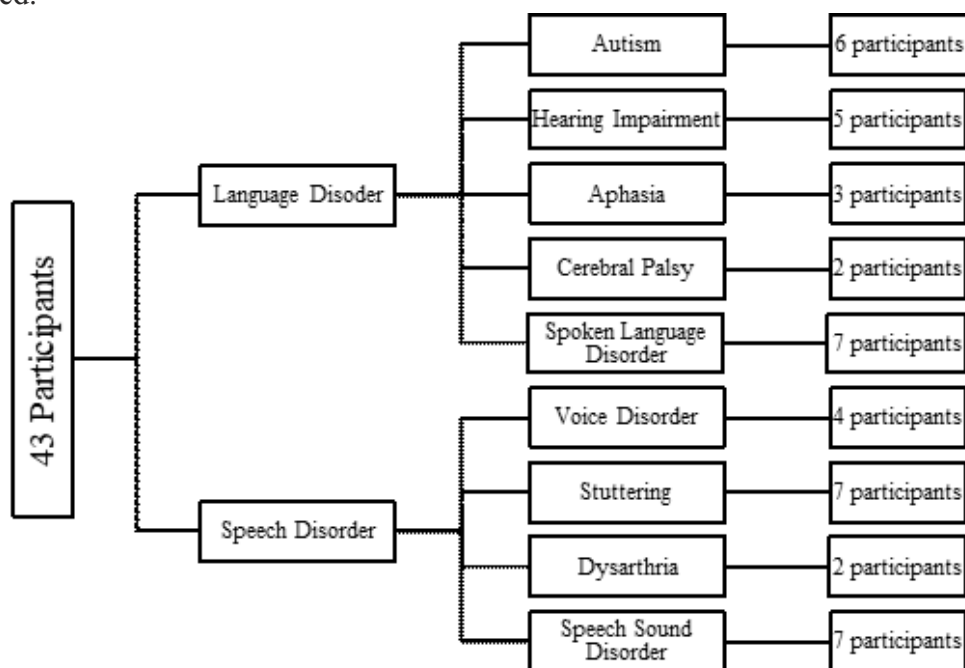


Figure 1: Number of clients enrolled for telerehabilitation having speech and language disorders

RESULTS AND DISCUSSION

Type of Disorder		Total number of cases	Average number of sessions	Number of cases continuing session (after 4 months)	Number of cases discharged (within 4 months)
Speech Disorders	Speech Sound Disorder	07	32	02	05
	Stuttering	07	48	01	05
	Voice Disorder	04	22	01	04
	Dysarthria	02	48	02	02
Total		20	150	06	16
Language Disorders	Autism Spectrum Disorder	06	37	06	00
	Hearing Impairment	05	48	05	00
	Cerebral Palsy	02	48	02	00
	Spoken Language Disorder	07	42	06	01
	Aphasia	03	38	02	01
Total		23	213	21	02

Table 1: *Telerehabilitation case profile data of speech and language disorders.*

Based on the re-assessment and case profile data as depicted in the above table, it was observed that 14 out of 20 cases under speech disorders were discharged and 02 out of 23 cases were discharged from language disorders. Speech sound disorders, dysarthria, stuttering and voice disorders were under the speech category and aphasia under the language category were successfully discharged. 37% of the 43 cases who underwent telerehabilitation were successfully discharged within an average of 30 sessions. In other words, 70% of speech cases and 9% of language cases were discharged. The average number of sessions for fluency was 48, articulation 32, the voice was 22 sessions. For 91% of language disorder cases, i.e., 21 out of 23 cases, more than 80% of goals were achieved within 30 sessions.

Therapeutic outcomes observed during telerehabilitation sessions were compared across the

outcome observed during offline therapy of four months, from July 2019 to October 2019. The overall speech disorder discharge cases were 70% in online mode compared to 76% offline mode. Similarly, in language disorder cases, there were 91% cases for whom primary goals were achieved compared to 94% cases who received offline therapy. A chi-square test was performed to check the efficacy of treatment across these two modalities and it was observed that there was no significant difference between the two, $\chi^2 (1, 43) = 0.56, p = 0.45$. Based on these findings, it could be inferred that the telerehabilitation mode of speech and language therapy was as effective as offline therapy. The optimum efficacy of teletherapy mode can be attributed to qualitative task selection, customization in therapeutic delivery and real-time feedback obtained and resolved during therapy sessions. E.g., a case with Broca's aphasia was facing difficulty in finding a therapist for offline therapy. The caregivers were reluctant to telerehabilitation services. Once they were counseled and trial therapy was provided, they continued attending 38 telerehabilitation sessions till the client improved and was discharged with satisfactory results. Based on these experiences a broader protocol on telerehabilitation mode of therapy is recommended to optimize the outcome of therapy.

SUMMARY AND CONCLUSION

The objective of the present study was to investigate the outcome of telerehabilitation of 43 participants, achieved during four months of telerehabilitation for various speech and language disorders registered at Amity University Haryana. The outcome was compared across offline mode of therapy for a similar duration. The results indicated that improvements documented across the two modalities were not distinct, which indicates that telerehabilitation mode of speech and language service delivery could be equally effective as offline mode of therapy. Customized goal setting, flexibility in therapeutic approach selection and real-time client/ caregiver feedback can ensure the success of telerehabilitation. Present findings also provide sufficient evidence to formulate the scope of a hybrid approach in service delivery for effective, acceptable and feasible speech and language intervention.

EFFECTIVENESS OF NMES ON NEUROLOGICAL DYSPHAGIA REHABILITATIONS

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INTRODUCTION

Neuro Muscular Electrical Stimulation (NMES) -is transcutaneous galvanic stimulation in small amounts of the motor nerve endings that innervate muscles beneath the skin.

Neuro muscular electrical stimulations (NMES) in dysphagia rehabilitation is a tool used for strengthening and coordinating the swallowing muscles on individuals with reduced muscular strength / flaccidity of muscle. The contraction and relaxation of supra-hyoid muscles acts involuntarily on application of galvanic current and gradually the individual learns to coordinate voluntarily. NMES (Vitalstim) is incorporated for treating muscular dysfunction causing dysphagia.

KEY WORDS: *Dysphagia deglutition, muscular atrophy, NMES, PAS Scale, diet up gradation, FEES/VFS and Surface EMG*

AIMS AND OBJECTIVES

This study was done to find out the effectiveness of NMES over anterior neck muscles strengthening, primarily over the supra hyoid muscles for better laryngeal elevation which vitally helps in deglutition.

METHODOLOGY

We have taken subjects with dysphagia of age range of 40 to 60 years old, with acute and or chronic neurological origin were included for the study in Department of Neurology and neuro Rehabilitation and Investigation FEES and VFS were performed instrumentally at dept. of Laryngology, AMRI Hospitals, Mukundapur, Kolkata for Pre-assessment and Post-assessment after 1 week of NMES (Vitalstim) therapy with double channel surface electrode placement on supra hyoid muscle and surface of thyroid cartilage with just above the threshold of current level (threshold + 5mA) according to subjective response of patient. Placement of electrode should not be over carotid sinus. Penetration Aspiration Scale (PAS) scoring was evaluated from objective investigations (FEES / VFS) to find the Penetration Aspiration Score. NMES therapy was applied on the individuals for the duration of 45-60 minutes / day for 10 days. Target Surface EMG was recorded to find the level / degree of muscular activity facilitate to compensate for adduction and abduction of glottal structure as well as laryngeal elevation (contraction and relaxation of supra hyoid muscles) in Pre and Post NMES therapy. Final measurements were done on 15th days (after 1 week).

Principle of NMES

- Simulates CNS stimulation, Quick re-education of CNS by stimulating the sensory pathways.
- Involuntary muscle contraction in patients with CNS abnormalities but intact peripheral nerve function and keeps muscle function intact & recruits more muscle fibers.
- Strengthens muscles & prevents atrophy
- Can be applied on Neurological Dysphagia, Post CVA, Degenerative disease, Geriatric Patients, Post RT fibrous, Head & Neck Surgery with reconstruction, Facial Palsy, Vocal fold Palsy.

- Non invasive method, decreases recovery time, faster improvement in laryngeal elevation increases swallow safety, combined with traditional swallow therapy speed up recovery.
- Contraindication for- Active Neoplasm, Implantable Electronic Device, patients with history of Seizures, active infection/ secretions/ bleeding areas, during RT/ CT, Pregnancy, patients on ventilators and metal tracheostomy tubes.

RESULT AND DISCUSSION

The Result showed

1. Improvement of PAS scoring.
2. Up gradation of texture of diet.
3. The physiological improvement was also observed in FEES and VFS study recorded post NMES therapy.
4. Level of surface EMG (S-EMG) level has been increased indicative of gaining of muscle strength and better compensation of internal glottal structure.
5. Current level decreased indicative of better contraction and relaxation of supra-hyoid muscles voluntarily.
6. More effective in case of neural and surgical cases rather than progressive or degenerative disease like Parkinsonism, bulbar palsy,

CONCLUSION

Hence it can be summarized that NMES can be a highlighted and clinically relevant tool in dysphagia rehabilitation and management like laryngeal elevation, internal compensation mechanism, systematic sequential coordination of muscle and fibers for smooth movement of bolus and diet up gradation for better quality of life. There is a clinical viability to apply NMES for neurological dysphagia.

FUTURE ASPECTS

Further research can be carried out with the same to see advantages and importance of mounting of electrodes in different positions and also can be compared with effectiveness of manual therapy with and without NMES.

REFERENCES

1. American Speech-Language-Hearing Association. (2009). *2009 Membership Survey summary report: Number and type of responses*. Rockville, MD: Author.
2. Bulow, M., Speyer, R., Baijens, L., Woisard, V., & Ekberg, O. (2008). Neuromuscular electrical stimulation (NMES) in stroke patients with oral and pharyngeal dysfunction. *Dysphagia*, 23,302–309.
3. Campbell, J. M. (n.d.). *General considerations in the clinical application of electrical stimulation*. Retrieved from http://www.ifess.org/cedu_generalconsiderations.
4. Carnaby-Mann, G. D., & Crary, M. A. (2007). Examining the evidence on neuromuscular electrical stimulation for swallowing: A meta-analysis. *Archives of Otolaryngology—Head and Neck Surgery*, 133(6), 564–571.

CLINICAL FINDINGS OF HEARING AND COMMUNICATION DISORDERS IN LAURENCE MOON-BARDET BIEDEL SYNDROME – TWIN CASE STUDIES

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ABSTRACT :

Laurence Moon-Bardet Biedel Syndrome (LMBBS) is a rare autosomal recessive multisystem disorder caused by defects in PNPLA6 gene encoding for proteins that localize to the primary cilium/basal body complex usually occur as Laurence Moon syndrome (LMS) or with Bardet Biedel Syndrome (BBS) with pentad symptoms of retinitis pigmentosa, polydactyl, obesity, hypogonadism and mental retardation. The occurrence of this condition is rare and can be seen 1 in 160000 and seen in siblings of a single family with similar or different clinical characteristics. Some of the research studies have reported the presence of speech, language and hearing problems in LMBBS. Hence this twin case studies with identical clinical symptoms aims to interpret the clinical findings of speech, language and audiological investigations that influence overall communication ability.

CASE DESCRIPTION:

Two siblings, elder one 7 years female and the younger sibling 5 years male diagnosed with LMBBS visited our institute with the complaint of limited speech output and reduced hearing sensitivity in both ears. Detailed history revealed consanguineous marriage and positive family history of intellectual disability. The other department findings reported visual problems, obesity, renal issues, polydactyl in both children and micro penis with hypogonadism were also seen in male child. On oral peripheral mechanism examination the presence of moon like face with mirogenia, high arched palate with broad alveolar ridge were observed. Both children undergone detailed speech, language and hearing evaluation. Detailed speech, language evaluation carried out using receptive, Expressive emergent language scales, 3 dimensional language acquisition test and communication developmental eclectic approach to language learning revealed delay in both comprehension and expression abilities with altered intellectual functioning and adaptive skills. Wherein, detailed audiological evaluation carried out using electrophysiological tests like Immittance audiometry, Oto acoustic emission and auditory brainstem response revealed the presence of conductive hearing loss in both children.

CONCLUSION:

The presence of such abnormalities and the clinical findings in two cases with identical symptoms demands immediate attention for rehabilitation as it adversely affects the child's communication abilities and social life. Often individuals with LMBBS exhibit delay in speech, language milestones. Hence, early identification and early intervention would ensure the better quality of life in individuals with LMBBS.

Keywords: *Laurence moon syndrome, Moon Bardet Biedel syndrome, communication disorders.*

INTRODUCTION:

Laurence Moon-Bardet Biedel Syndrome (LMBBS) is a rare autosomal recessive (AR) human genetic disorder which can be defined as ciliopathic, pleiotropic autosomal recessive defect occurs in children born from consanguinity with evident symptoms in the first decade of the life ^[1]. Laurence-Moon syndrome (LMS) and or Bardet-Biedl syndrome (BBS) are commonly referred to as a single syndrome but these two are distinctive in which they are genetically inherited and AR. However, LMS has retinitis pigmentosa, along with hypogonadism, mental retardation and neurological problems associated with spastic paraplegia, wherein BBS exhibits polydactyl or obesity with congenital heart diseases and renal issues ^[2].

LMBBS is caused by defects in PNPLA6 gene encoding for proteins that localize to the primary cilium/basal body complex and results in multi system disorder ^{[3], [4], [5]}. The occurrence of LMBBS condition is considered to be rare and often seen female predominance than males. The prevalence of this rare syndrome in India is reported to be less than 15 cases and estimated to be 1 in 1, 60,000 ^[6]. The higher incidence is seen in some geographically isolated population and consanguineous marriages and reports 1 in 17,000 live births in the isolated populations of Newfoundland and Kuwait, while in North America and Europe 1 in 140000 to 1 in 160000 respectively was reported ^[7].

Some of the research studies have reported that the syndrome can be seen in siblings or within the same family with identical or different clinical characteristics. The epidemiological findings suggested that more than fifty percent of diagnosed cases with LMBBS were common in females, and reported that the morphological and functional abnormalities were observed in nearly 90% of individuals with renal abnormalities causing mortality in this syndrome ^{[6],[7]}.

The clinical diagnosis of the syndrome was based on the presence of primary features like Cone-rod dystrophy, polydactyl, obesity, learning disabilities, hypogonadism and renal anomalies whereas secondary features includes speech disorders, brachydactyly, developmental delay, polyuria, ataxia, diabetes mellitus, left ventricular hypertrophy, hepatic problems, spasticity, and reduced hearing sensitivity additionally, with short stature, dental crowding, lax joints and osteoarthritis in most of the diagnosed individuals ^{[3],[4]}.

As most of the research studies reported the presence of speech, language and hearing problems in this clinically rare condition the documentation of this in Indian context is minimal thus, considering its

peripheral mechanism examination the presence of moon like face with microgenia, high arched palate with broad alveolar ridge were observed in both the clients. The receptive, expressive language and cognitive skills were examined using Receptive expressive emergent language scales (REELS), Receptive expressive language test (RELT), 3 dimensional language acquisition test (3D-LAT), and Communication Developmental Eclectic Approach to Language Learning (COMDEALL) and the results obtained were tabulated in table 2.

Table 2: *Speech, Language and Cognition assessment findings of both the clients.*

DISCUSSION

LMBBS as a consequence of consanguineous marriage unlike other AR conditions that runs through families and also reported that diagnosis within nine years of life (8). Several studies have reported that occasionally speech, language, and hearing problems have been observed in this syndrome. Among speech, language and hearing characteristics present in this syndrome were reported to be delay or inadequate speech and language abilities (Serejski, 1929), scanning speech (Roth, 1947), slow speech (Ciccarelli and Vesell, 1961) and Language delay with or without hearing loss or intellectual disability (Rieger and Trauner, 1929). Children with LMBBS also exhibits Oral-facial structural anomalies with high-arched palate (Blumel and Knicker, 1959), and dental crowding, microgenia with moon like face (Gordon, 1907) were to be found evident with debatable presence of intellectual disability (6). The review of literature on actual occurrence of hearing loss in LMBBS is unknown. However some studies reported the presence of predominant conductive hearing loss with rare sensorineural hearing loss [10]. Some of the researchers have also reported that individuals with this syndrome encounter congenital deaf mutism and or congenital nerve deafness (Burn).

The present clients diagnosed with LMBBS clinically presented aforementioned clinical features like moon face with microgenia, high arched palate, reduced intellectual functioning with delay in speech and language skills with conductive hearing loss which is in accordance to earlier studies. This syndrome is a multi symptom condition which demands multi disciplinary assessment and rehabilitation for ensuring better quality of life.

CONCLUSION

The individuals with LMBBS exhibit delay in speech, language milestones with reported progressive hearing loss, highlights the role of hearing care professionals in frequent monitoring and intensive speech and language therapy to promote communication abilities. The presence of such abnormalities and the clinical findings in two cases with identical symptoms demands immediate attention for rehabilitation as it adversely affects the child's communication abilities and social life.

REFERENCES

1. Abbasi A, Butt N, Sultan B, Munir SM: Hypokalemic paralysis and megaloblastic anaemia in Laurence-Moon-Bardet-Biedl syndrome. J Coll Physicians Surg Pak. 2009, 19:186-88.
2. Khan PA, Nishaat J, Noor S, Fatima N: Laurence Moon Bardet Biedl Syndrome: a rare case report in

relevance the authors report two case reports of LMBBS in siblings of a family. This case report aims to highlight the clinical outcome of logopaedic evaluation in LMBBS that could impact overall development in children. .

CASE DESCRIPTION:

Two siblings, elder one 7 years female and the younger sibling 5 years male diagnosed with LMBBS visited our institute with the complaint of limited speech output and reduced hearing sensitivity in both ears. Detailed background information was obtained from mother, history revealed consanguineous marriage and positive family history of intellectual disability. The presence of visual problems, polydactyl, moon like face with mirogenia, renal issues, short stature and obesity in both children in addition micro penis and hypogonadism were also seen in male child who confirms the diagnosis of LMBBS. Following the collection of detailed information and observation both the children were subjected to detailed audiological and speech-language evaluation.

Figure 1: *Siblings diagnosed with LMBBS*

HEARING ASSESSMENT

Clinically, LMBBS provide a unique opportunity for hearing care professionals and children with LMBBS often reported conductive hearing loss. Clients visited to our department also reported reduced hearing sensitivity since childhood. On Otoscope examination bilateral normal external auditory canal and tympanic membrane was visible with absent cone of light in both the children. On Immitance audiometry evaluation bilateral B type tympanogram was noticed in both the children indicating middle ear pathology with absent distortion product Oto acoustic emissions due to middle ear dysfunction.

Both the children had problem in understanding instructions and fails to respond for conventional pure tone audiometry and thus could not be performed successfully. Ultimately, the electrophysiological tool to identify the residual cochlear function using auditory brainstem responses (ABR) was performed using two channels diagnostic equipment advocating standardized ABR threshold estimation protocol and the results indicated left ear with minimal hearing loss and right ear with mild conductive hearing loss for the elder child (case 1). Similarly, the second child (case 2) was diagnosed with left ear minimal hearing loss and Right ear hearing sensitivity within normal limits as depicted in Figure 2 and Table 1.

Figure 2: *ABR waveforms of client 1.*

Figure 3: *ABR waveforms of client 2.*

Table 1: *V peak absolute latencies of Client 1 and Client 2.*

SPEECH AND LANGUAGE EVALUATION

The rationale of the speech and language assessment is to investigate the child's communication abilities. Behavioral observation of the child, parental reporting, background information and Standardized assessment tools were carried out to determine the speech and language problem. On oral

- a tertiary care teaching hospital, Hyderabad, Telangana, India. *Int J Med Sci Public Health*. 2017, 7:68-71. 10.5530/ijmedph.2017.1.13
3. Hufnagel RB, Amo G, Hein ND, Hersheson J, Prasad M, Anderson Y, et al.. Neuropathy target esterase impairments cause Oliver-McFarlane and Laurence-Moon syndromes. *JMedGeet*. February, 2015; 52(2):8594. <https://www.ncbi.nlm.nih.gov/pubmed/25480986>.
 4. LAURENCEMOONSYNDROME. *OMIM*. March 2015; <http://www.omim.org/entry/245800>.
 5. Matthis Synofzik, MD, Robert Hufnagel, MD, PhD, and Stephan Züchner, MD, PhD. PNPLA6-Related Disorders. *GeneReviews*. June 2015; <https://www.ncbi.nlm.nih.gov/books/NBK247161/>.
 6. Kumar S, Mahajan BB, Mittal J. Bardet-Biedl syndrome: A rare case report from North India. *Indian J Dermatol Venereol Leprol* 2012; 78:228
 7. Klein D, Ammann F. The syndrome of Laurence-Moon- Bardet-Biedl and allied diseases in Switzerland. Clinical, genetic and epidemiological studies. *J Neurol Sci* 1969; 9:479-513.
 8. New criteria for improved diagnosis of Bardet-Biedl syndrome: results of a population survey. Beales PL, Elcioglu N, Woolf AS, Parker D, Flinter FA. *J Med Genet*. 1999; 36:437-446. [PMC free article] [PubMed] [Google Scholar]
 9. Clinical and genetic epidemiology of Bardet-Biedl syndrome in Newfoundland: a 22-year prospective, population-based, cohort study. Moore SJ, Green JS, Fan Y, et al. *Am J Med Genet A*. 2005; 132:352-360. [PMC free article] [PubMed] [Google Scholar]
 10. Beales PL, Elcioglu N, Woolf AS, Parker D, Flinter FA. New criteria for improved diagnosis of Bardet-Biedl Syndrome: results of a population survey. *J Med Genet*. 1999; 36:437-46. [PMC free article] [PubMed] [Google Scholar]

IMAGES AND TABLES

CLIENT 1

CLIENT 2



Figure 1: Siblings diagnosed with LMBBS

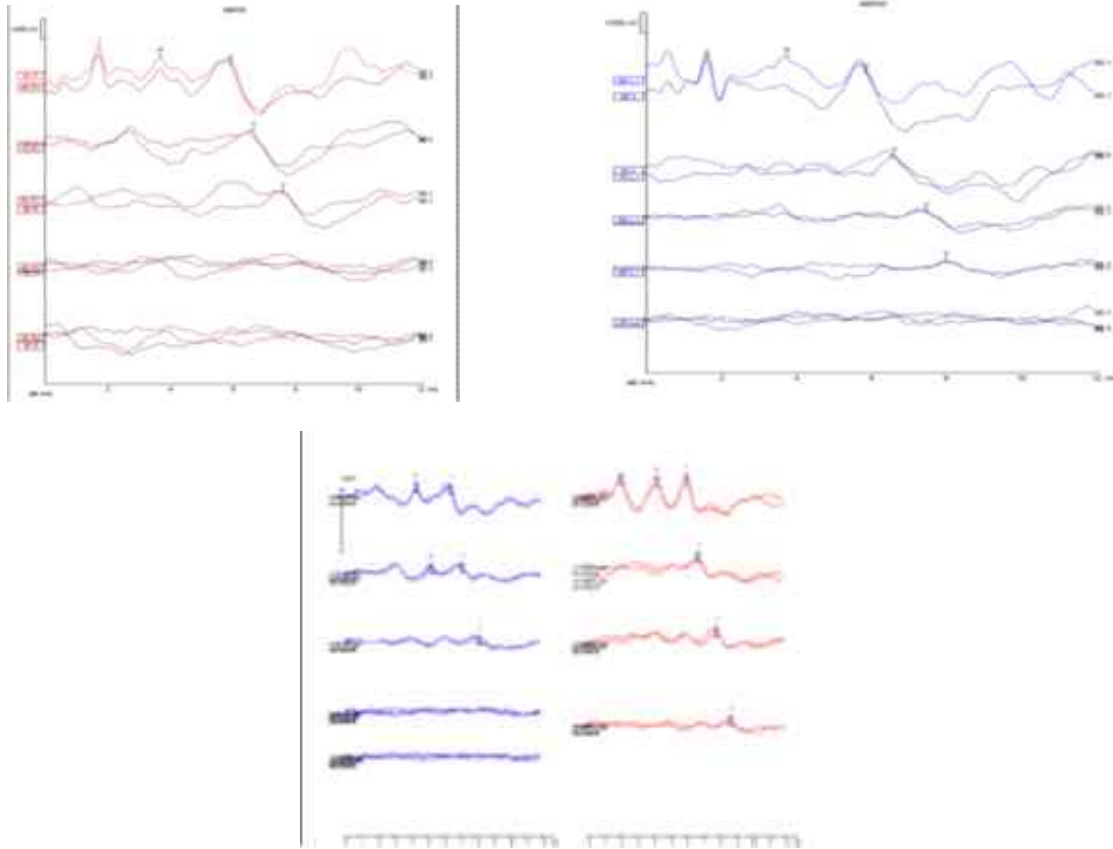


Figure 2: ABR waveforms of Client 1. **Figure 3:** ABR waveforms of Client 2

Assessment Tools	Case 1	Case 2
REELS/RELT	RLA : 20 – 22months (delayed by 5 years) ELA : 12 – 18 months (delayed by 5.5 years)	RLA : 14-16 months (delayed by 3.6 years) ELA : 10-11 months (delayed by 4 years)
3D-LAT	Reception: 21-23 months (delayed by 5 years) expression: 15- 17 months (delayed by 5.5 years) Cognition: 12-18 months (delayed by 5.5 years)	Reception: 15- 17 months (delayed by 3.6 years) expression: 9-11 months (delayed by 4 years) Cognition: less than 9 months
COMDEALL	Cognition :0-6 months (delayed by 6.5 years)	Cognition :0-6 months (delayed by 4.5 years)

Table 2: Speech, Language and Cognition assessment findings of both the clients

Right Ear (msec)	Intensity (dBnHL)	Left Ear (msec)
Client 1		
5.93	90 dBnHL	5.87
6.67	70 dBnHL	6.60
7.60	50 dBnHL	7.47
No Response	40 dBnHL	8.0
No Response	35 dBnHL	No Response
Client 2		
6.00	90 dBnHL	6.25
6.58	70 dBnHL	6.70
7.78	50 dBnHL	7.85
-	40 dBnHL	No Response
8.58	35 dBnHL	No Response

Table 1: *V peak absolute latencies of Client 1 and Client 2*

ESTABLISHMENT OF A CLINICAL PROTOCOL FOR MOTOR NEURON DISEASE (ALS) PATIENT FOR DYSPHAGIA ASSESSMENT AND MANAGEMENT OUTCOME MEASUREMENTS

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INTRODUCTION:

MND is a group of condition that causes the nerves in the spine & brain to lose function over time. It's a severe form of neuro-degenerative disease. The most common type of MND is ALS (Amyotrophic Lateral Sclerosis). The symptoms appear after the age of 40 & it generally affects men more than woman. 92% patients with motor neuron disease have been assessed clinically & radiologically for evidence of swallowing problems. About 100% of ALS variant MND patients have severe dysphagia eventually causing aspiration pneumonia, weight loss & finally death. Patients with more severe swallowing symptoms appear more likely to have abnormal findings on video fluoroscopy overall. The terminal issue faced by most of the patients & their clinician's like the neurologist & the SLP's are swallowing & respiratory issues.

AIM:

To establish a clinical protocol in MND patients for selection of NG/PEG feed to avoid aspiration pneumonia, death & malnutrition.

PURPOSE:

In this study we have tried to form a clinical protocol of assessment & management with which we can delay & / prolong the ill effects of the disease. The aim of this case control study was to evaluate the impact of establishing a clinical protocol for selection of NG/PEG feed in MND patients to avoid death, aspiration pneumonia, death & malnutrition.

METHODOLOGY:

23 clinically & neurologically confirmed ALS variant of MND patients were taken for the study, among which 9 participants were taken up before the protocol was established. Participants were divided into 2 groups, 'one pre protocol' & the other as the 'post protocol group'. These patients were referred to the speech & swallow department for assessment & management of speech & swallowing issues. For swallow assessment, subjectively, MMSA (Manipal Manual for Swallow Assessment tool) was used & for instrumental assessment VFS was used. Patients found to have high risk of aspiration were referred for non-oral feeding (PEG/NGT/Swallow therapy). Patients who were at minimal risk of aspiration were recommended to have diet modification & swallow therapy. Predictable decline in ALS makes unplanned gastrostomy (PEG & Tracheostomy) avoidable. We determined whether PEG/NG insertion during OPD follow-up was associated with patient outcome in terms of nutrition, aspiration

pneumonia & mortality. We performed a retrospective analysis of incidence of malnutrition (BMI) & aspiration pneumonia (vitals & chest x- ray) in ALS /MND patients in AMRI Hospitals Kolkata.

RESULTS:

Twenty-five patients were retrospectively studied for a time span of 1.5 years. The participants were divided into two groups, Pre-Protocol (9 participants) & Post Protocol (16 participants). The incidence of aspiration pneumonia in MND patients was noted to be 37.5 % Post Protocol, whereas the same was found to be 78% Pre-Protocol. The incidence of death in MND patients was noted to be 25 % Post Protocol, whereas the same was found to be 33.3 % Pre-Protocol from the time of diagnosis. The occurrence of malnutrition in MND patients was found to be 18.8% Post Protocol, whereas the same was found to be 78 % Pre-Protocol.

CONCLUSION:

With the establishment of this clinical protocol in MND patients primarily of ALS variant, showed a significant result in patient outcome in terms of aspiration pneumonia, death & malnutrition. This clearly implies the need of standardized clinical protocol for betterment of the clinical outcomes in critical diseases like MND. The limitation of this study was less number of participants.

REFERENCES

1. "A case of amyotrophic lateral sclerosis presented as oropharyngeal Dysphagia". *Journal of Neurogastroenterology and Motility*. 16 (3): 319–22. doi:10.5056/jnm.2010.16.3.319. PMC 2912126. PMID 20680172.
2. Patient with amyotrophic lateral sclerosis (ALS) (case | Open-I". openi.nlm.nih.gov
3. "Swallowing Disorders - Symptoms of Dysphagia". New York University School of Medicine. Archived from the original on 2007-11-14. Retrieved 2008-02-24

KNOWLEDGE OF NEURODEVELOPMENTAL DISORDERS IN DSM-5 AMONG HEALTHCARE PROFESSIONAL STUDENTS

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ABSTRACT:

The Diagnostic and Statistical Manual of Disorders, DSM is a standard guide enabling effective and accurate diagnosis of mental disorders. Neurodevelopmental disorders such as intellectual disability, autism spectrum disorder and ADHD, motor disorders, specific learning disorders and motor disorders fall within the purview of DSM. The current study was carried out with the aim of testing the knowledge of neurodevelopmental disorders among Health Care professional students. 99 participants pursuing courses related to health care were included. It was observed that SLP's were more aware of the disorders they specialise in. Psychology students had considerably good knowledge about ASD and ADHD. The occupational therapy students had good knowledge about Motor disorders. The findings showed that exposure would play an important role in determining knowledge about terminologies, assessment and treatment. Most of the professionals had limited knowledge about Intellectual disability. The results highlight the importance of sensitizing the professionals about DSM V for good clinical practice.

Keywords: Neurodevelopmental disorders, clinical exposure, Expertise

INTRODUCTION :

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is the standard guide for accurately diagnosing mental disorders used by healthcare professionals. The DSM includes descriptions, symptoms, and other diagnostic criteria for mental illnesses. It provides a concerning consistent and a trustworthy diagnosis that may be utilised in mental disorder research to improve patient outcomes and gives a common terminology for physicians to talk about their patients. DSM can be regarded as a clinical handbook; it is excessively used in the United States of America and is published by the American Psychiatric Association. The ICD is considered as a potential substitute for DSM. All the mental disorders seen in children, as well as adults, come within the purview of DSM (Vahia, 2013).

The DSM contains information regarding a condition in a detailed manner, the signs and symptoms of the disorder are also explained. The additional salient characteristic of DSM is that it also provides statistical information about the age of onset, gender which is more salient to develop a condition. The treatment approaches and the effect of treatment are also explained in the DSM.

The premise of DSM is to facilitate an accurate diagnosis. An accurate diagnosis is a basis for effective treatment hence the DSM can be regarded as a tool providing insight into effective treatment. Some of the psychiatric and mental health conditions also come within the purview of insurance hence it would become a prime responsibility of the clinician to accurately diagnose, yet again DSM would act as a guide (Buckley, 2014). This knowledge assists clinicians in estimating future clinical care requirements and potential consequences. It also assists them in distinguishing between disorder and non-disorder in order to determine who might benefit from disorder-based treatments.[1]

Neurodevelopment disorders that come within the purview of DSM - V.

Neurodevelopment disorders are a group of conditions whose onset coincides with the developmental period. The disorders are usually seen between 3-8 years. This period ranges from the pre-school period to the early years of elementary school. These impairments can impact social, cognitive and personal development. The quantum of the problem can differ across children with some children exhibiting mild impairment and some children exhibiting severe impairments. This can impose limitations on the activities of daily living. It can further cause problems in learning at school and developing social skills for communicating and reciprocating to social needs. Conditions such as intellectual disability which can hamper the adaptive functions, autism which can affect social communication and ADHD which can affect the overall behaviour and academic performance come within this domain.

a) **Intellectual disability** (intellectual developmental disorder) is a disorder that affects both intellectual and adaptive functioning in the conceptual, social, and practical domains that begins during the developmental period. The three criteria listed below must be met.

Both clinical evaluation and personalised, standardised intelligence tests should demonstrate deficits in intellectual skills such as reasoning, problem-solving, planning, abstract thinking, judgement, academic learning, and learning from experience.

- Failure to satisfy developmental and sociocultural norms for personal independence and social responsibility due to deficiencies in adaptive functioning.
- During the developmental stage, the onset of intellectual and adaptive shortcomings.[4]

b) Deficits in language, speech, and communication are all examples of **communication disorders**. Language disorder, speech sound disorder, childhood-onset fluency disorder (stuttering), social (pragmatic) communication disorder, and other identified and nonspecific communication disorders are all included in the diagnostic category of communication disorders.[4]

c) Deficits in social-emotional reciprocity, deficits in nonverbal communicative behaviours needed for social interaction, or deficits in creating, sustaining, and comprehending relationships are all symptoms of **Autism Spectrum Disorder**. Social communication difficulties and constrained, repetitive patterns of behaviour are used to determine severity. Symptoms must be evident during the early stages of development. Clinically substantial impairment in social, vocational, or other crucial areas of current functioning is caused by the symptoms.[4]

d) **Attention-Deficit/Hyperactivity Disorder** is characterised by a pattern of inattention and/or hyperactivity-impulsivity that obstructs functioning or development. It can be diagnosed as predominantly inattentive type, predominantly hyperactive-impulsive type, or combined type when 6 or more symptoms of inattention/hyperactivity-impulsivity or at least 5 symptoms in older adolescents and adults (aged 17 or higher) last for more than 6 months and to an extent that is not consistent with the developmental level, as described in DSM-V. These symptoms must appear before the age of 12 in at least two or more circumstances.[4]

e) Issues acquiring and applying academic abilities, as evidenced by the presence of at least one of the following symptoms that have persisted for at least 6 months despite the availability of treatments to address such difficulties, characterise **Specific Learning Disorder**. Inaccurate or laborious word reading, difficulty understanding what is read, difficulties with spelling, difficulties with written expression, difficulties acquiring number sense, number facts, or computation, and difficulties with mathematical thinking are some of the symptoms.[4]

f) Disorders like developmental coordination disorder, stereotypic movement disorder, dystonia, tic disorders which can cause problems pertaining to the motor domain are classified under **motor disorders**.

NEED:

The DSM is a document that reflects the current consensus of the field's finest academicians, clinicians, and researchers.[2] Neurodevelopment disorders are diagnosed and treated by a wide range of health professionals in a multitude of settings. It thus becomes critical that we check the knowledge of DSM in professional students as good clinical practice necessitates a thorough understanding of certain diagnostic categories.[1]

AIM AND OBJECTIVES:

This study aims to determine the level of awareness and understanding of neurodevelopmental disorders as defined by the DSM-5, as well as the continuing education experience offered to healthcare professional students. The proficiency of several professional students in the neurodevelopmental disorders mentioned in the DSM is compared in this study.

METHODS:

Participants: The research included 99 students presently enrolled in health care professional courses. A questionnaire for the neurodevelopmental disorders included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), was developed. The disorders included were: Intellectual disabilities, Communication Disorders, Autism Spectrum Disorder, Attention-Deficit/Hyperactivity Disorder, Specific Learning Disorder and Motor disorders. The questions mainly focused on the diagnostic criteria, diagnostic features, development and course, risk and prognostic factors and differential diagnosis of these disorders. The questions were validated by professors of Speech-Language Pathology.

The questionnaire was circulated amongst students pursuing a degree in Psychology (19), Audiology and Speech-Language Pathology (67), Medicine (10) and Occupational Therapy (3). The relevant data was gathered and analysed cross-sectionally to identify the knowledge of the neurodevelopmental disorders included in the DSM-5 in these health care professional students. There were questions on Intellectual disabilities, Communication Disorders, Autism Spectrum Disorder, Attention-Deficit/Hyperactivity Disorder, Specific Learning Disorder and Motor disorders.

PROCEDURE:

The questions were circulated in a google form. The form required the participants to mention their name, gender, age, email ID details of the course they had enrolled in as essential fields. After entering these details, the questions were displayed to the participant. The questions were in multiple-choice format, only after entering the answer for a question, was the access for the next question provided.

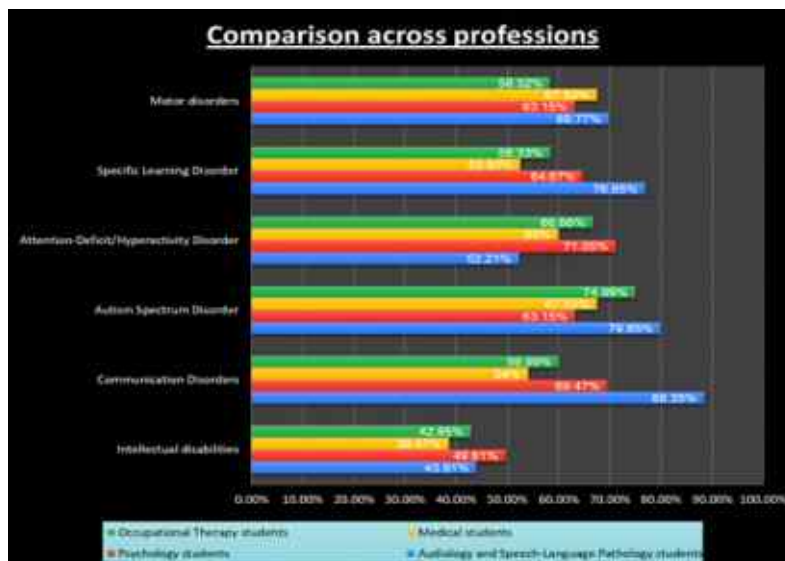
RESULTS AND DISCUSSION:

The DSM is still evolving, and its proponents have made tremendous progress in reaching out to a wide range of professionals.[1] The percentage of students who responded correctly to the questions with respect to the various neurodevelopmental disorders are represented in the table below

Table: Trend of responses

Disorder	Audiology and Speech-Language Pathology students	Psychology students	Medical students	Occupational Therapy students
Intellectual disabilities	43.91%	49.61%	38.57%	42.85%
Communication Disorders	88.35%	69.47%	54%	59.99
Autism Spectrum Disorder	79.845%	63.15%	67.5%	74.99%
Attention-Deficit/Hyperactivity Disorder	52.21%	71.05%	60%	66.66%
Specific Learning Disorder	76.85%	64.67%	52.5%	58.33%
Motor disorders	69.77%	63.15%	67.5%	58.32%

Figure 1: Comparison of performance across groups



Audiology and Speech-Language Pathology students: As expected the speech-language pathology students responded better to the questions on communication disorders. They responded considerably well on questions related to autism spectrum disorder, motor disorders and specific learning disorders. They confronted slight difficulty in responding to questions on ADHD and intellectual disorders.

Psychology students also responded well on communication disorders probably because of the exposure factor. They could answer questions related to autism and specific learning disorders as these disorders come within the purview of their clinical practice. Surprisingly, they erred more on questions related to intellectual disability even though they are exposed to this condition in clinical practice.

Medical students: The medical students could answer the questions on motor disorders well compared to the other domains. They had considerably good knowledge about ADHD and ASD than expected despite limited clinical exposure. They faced difficulty in responding to questions on communication disorders and intellectual disabilities.

Occupation therapy students: Students with a background in occupational therapy performed better on questions related to Autism and ADHD. This can be attributed to clinical exposure again since they render services for this population there could be a possibility that they could have answered better pertaining to these disorders. They responded well to questions on communication disorders, specific learning disorders. It was noticed that they had more difficulty in responding to questions on intellectual disability.

From the results, it was clear that the students from all the domains had reasonably good knowledge about communication disorders and ASD. Knowledge of motor disorders and specific learning disorders showed variability. Most of the participants regardless of their academic background faced difficulty in responding to questions on intellectual disability. Clinical exposure played a major role as a determinant of performance. Though the participants were able to respond to questions, scores ranged from 55% to 70% only showing there were lacunae. This raises a need to sensitize the booming professionals about DSM as it helps in labelling the disorders and configuring therapy plans effectively.

CONCLUSION:

Despite the fact that professionals have a great deal of knowledge about specific neurodevelopmental disorders, more evidence-based training would not only allow for more effective support for people with neurodevelopmental disorders, but it would also better equip professionals and increase their confidence in meeting these people's needs (Herwegen, Ashworth, Palikara, 2019) The study has clinical implications, and it advocates that healthcare practitioners from all disciplines continue to learn about neurodevelopmental disorders.

BIBLIOGRAPHY

1. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). <https://doi-org.ezproxy.frederick.edu/.1176/appi.books.9780890425596> . Buckley, M.R. (2014).
2. Back to Basics: Using the DSM-5 to Benefit Clients. *The Professional Counselor*, 4, 159-165. Herwegen, Jo & Ashworth, Maria & Palikara, Olympia. (2019).
3. Views of professionals about the educational needs of children with neurodevelopmental disorders. *Research in developmental disabilities*. 91. 1. 10.1016/j.ridd.2019.05.001.
4. Vahia V. N. (2013). Diagnostic and statistical manual of mental disorders 5: A quick glance. *Indian journal of psychiatry*, 55(3), 220–223. <https://doi.org/10.4103/0019-5545.117131>

OUTCOMES OF VOICE THERAPY ALONG WITH APPLICATION OF ULTRA SOUNDS THERAPY IN MUSCLE TENSION DYSPHONIA

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INTRODUCTION

Muscle tension dysphonia (MTD) is a common behavioral voice problem manifested by excessive tension in the intrinsic and extrinsic laryngeal muscles and its surroundings. Approximately 10–32% of voice disordered patients have MTD (primary and secondary). The primary pathology in this condition is undue tension and tightness of the muscles and incoordination between the agonist and antagonist muscles. Treatment is usually multimodality, in the form of voice therapy and laryngeal manipulation etc. But some patients are refractory to this treatment due to excessive stiffness or even spasm of the extrinsic muscles. Ultrasonic therapy is used in all other forms of muscle spasm and tension elsewhere in the body. Bridger (1983), Sama et al (2001) and Roy (2003) explored the possibility of using ultrasonic waves over extrinsic laryngeal muscle in management of muscle tension dysphonia.

AIM AND OBJECTIVE:

The purpose of this study is to review the effect of application of ultrasonic waves in voice therapy to reduce muscle tension / rigidity / stiffness in vocal structure along with traditional voice therapy in case of muscle tension dysphonia (MTD).

METHODS:

The study was performed at an urban multispecialty hospital under supervision of ENT surgeon, Speech language pathologist, Radiologist and Physiotherapist, where 46 adult patients (26 male and 20 female) of MTD were selected from voice clinic. Patients underwent laryngostroboscopy and the degree of MTD was recorded according to Morrison Classification (1983); Acoustic voice analysis was done and their symptoms were rated on Voice Handicap Index (VHI 10) before therapy.

The ultra sonic therapy was started along with traditional modalities of voice therapy for MTD. Frequency of ultrasound therapy was once daily for 10 (6+4) minutes with a gap of in alternate week for 2 weeks. The intensity of therapeutic ultrasound stimulation was started from 0.5 mHz initially and finally reached to 1.2 mHz (maximum range was 3 mHz for maximum stiffness / type-III MTD). The SCM was stimulating in transverse movement with continuous mode of stimulation and floor of mouth (submental triangle area) was stimulated in circular motion with pulse stimulation mode. The therapeutic ultrasonic wave is a very high frequency (800,000Hz to 2,000,000Hz) penetrates up to 5" below the surface of skin can stimulate very small molecules / cells of muscle, causes them to move (relaxation). The lower frequency waves go dipper penetration and moves the molecules wider then higher frequency waves. Higher intensity of sound means more energy transferred into the muscle. The selection of frequency and intensity of ultra sound is to decide on which muscle to be applied i. e the size and length of muscle. This phenomenon is known as phonophoretic properties. Therapeutic procedures start with lower intensity and mid frequencies. Frequency of the therapy session depends upon the severity of problem and vocal demand. Ultrasound therapy increases blood flow in the treated area

which speeds the healing process, reduces stiffness, rigidity, swelling, edema and pain, and gives gently massage and molecular vibration to muscles, tendons and ligaments in the treated area. This enhances the recovery rate of damaged tissue, relief muscle strain, stiffness and softens them which facilitate in contraction and relaxation of vocal muscle during production of wide fundamental pitch on demand talking or singing.

Application of UST reduces stiffness in neck muscles; patient with dysphonia can feel this lack of tight compensation of muscles in voice production involuntarily. The patient needs to be trained to use this muscle action in voluntary control without effort in voice production and as well as sustain of voice in speech flow.

RESULTS

After 1 week of UST and traditional therapy we have recorded periodical feedback from clients (VHI 10), laryngostroboscopy as well voice recording and acoustical analysis. All acoustical voice parameters (MPT and HNR) were improved gradually and significantly, achievement of wider pitch range, reduced noise components (better HNR). Effort of production of voice was gradually gone down. Hoarseness level gradually steps down. Secondary muscle pain reduced gradually. Patient feedback was satisfactory in VHI 10. Laryngostroboscopy finding reviewed reduces grade of supra glottis muscle tension as compares to pre therapy findings.

CONCLUSION

The application of ultrasonic therapy along with traditional voice therapy for MTD to overcome the over smoothing problems in change of voice / voice production. Our experimental results demonstrate that application of ultrasonic waves on external larynx and neck muscles (anterior and lateral) along with traditional modality of voice therapy enhances;

1. The acoustic power of larynx (True vocal folds) desirably.
2. Reduces tightness / involuntary spasm of laryngeal and surrounding muscles.
3. Smooth compensation rather than jerky and tight contraction of muscles in voice production as well as sustain of voice.
4. Enhances acoustic features of voice desirably.
5. Reduces desired therapy session to achievement and stabilization of voice.

REFERENCES

1. Sama, P. N. Carding, S. Price, P. Kelly, and J. A. Wilson, "The clinical features of functional dysphonia," *Laryngoscope*, vol. 111, no. 3, pp. 458–463, 2001. View at Google Scholar · View at Scopus
2. M. W. M. Bridger and R. Epstein, "Functional voice disorders. A review of 109 patients," *Journal of Laryngology and Otology*, vol. 97, no. 12, pp. 1145–1148, 1983. View at Google Scholar · View at Scopus.
3. N. Roy, "Functional dysphonia," *Current Opinion in Otolaryngology and Head and Neck Surgery*, vol. 11, no. 3, pp. 144–148, 2003. View at Publisher · View at Google Scholar