

ACQUIRED DYSPARTHRIA EFFECTS ON THE PARAMETERS OF SPEECH ABILITIES WITH MULTIPLE NEUROLOGICAL DISORDERS

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ABSTRACT

Objective: To explore the “Acquired Dysarthria Effects on the Parameters of Speech abilities with Multiple neurological disorders”

Methodology: No significant research on this subject has been carried out in Pakistan before. The sample of fifteen patients was taken from Combined Military Hospital (CMH) Rawalpindi. A consent form was obtained from each patient before gathering information. A short questionnaire was administered to compile the demographical data of the patients. Finally, the Dysarthria Profile was administered to assess the speech disorders with Multiple Neurological disorders.

Results: The problem is more pronounced in with Consanguineous Marriage, which is 66.67% and having a family history: especially in old ages with the contributory factor such stroke 40%.

Conclusion: The speech parameters were observed severely affected with multiple neurological disorders in the present study and all patients need speech therapeutic treatment along with psychological therapeutic treatment.

Keywords: Dysarthria, Speech parameters, Speech pathology

1. INTRODUCTION

“Dysarthria comprises a set of related motor speech disorders” (Darley, Aronson, and Brown 1975, Resenbek & Lapointe 1978). When it occurs in children it's typically the consequence of brain changes in pre and perinatal phases and is known as developmental dysarthria. It can also build up later in life as a consequence of a head injury or any neurological insult such as stroke or Parkinson's disease. This is identified as acquired dysarthria.

Dysarthria is a speech disorder because of a weakness in or lack of synchronization of the speech parameters muscles. In this condition patient faces inaudible speech, speaking quietly or whispering, a slow rate, a rapid rate of speech with an inarticulate quality, restricted tongue, lip and jaw movement, atypical intonation of rhythm, changes in vocal eminence, huskiness, breathiness, drooling and reduced control of saliva, chewing and swallowing complexity (American Speech, Language, and Hearing Association, 2001; Haynes & Pindzola, 2004).

The type and severity of dysarthria depends on which area of the nervous system and brain involved and affected. It is usually wrecked into two categories based on the location of lesion. Injury to Upper Motor Neurons (UMN) those operate from the brain to the spine, results in spastic

dysarthria, while damage to the Lower Motor Neurons (LMN)

Haynes and Pindzola (2004) stated that it is caused by a amount of situation that engage the nervous system in adults and children, such conditions are cerebral palsy, stroke, brain injury, tumors, Bell palsy, Wilson disease, degenerative disease, infections, brain tumors and toxins. Haynes and Pindzola (2004) described that dysarthria can be caused by any injury concerning the regulatory structures and systems that mingle to formulate speech and which interrupt the progression of respiration, phonation, articulation, and resonance. The affected speech parameters with multiple sclerosis are slow, drawling manner and sometime jumbled” (Charcot, 1877).

There are numerous possible etiologies of dysarthria. It may be developed by toxic, metabolic, such as Wilson's disease, hypoxic encephalopathy and degenerative diseases, such as parkinsonism, amyotrophic lateral sclerosis (ALS), multiple sclerosis, Huntington's disease,

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Niemann-Pick disease, and Friedreich ataxia. TBI, or thrombotic or embolic stroke. Words are calculated or scanned, there is a suspension after every syllable and syllables are manifest slowly. Darley, (1983, P xiv). The speech deficits described by Chorcot, mostly resemble the motor speech disorder called ataxic dysarthria.

The most noticeable speech disorders after right hemisphere injury can be described as "The automatic operation of speech, the articulation of words, it is actually a question of dysarthria and not of aphasia" (Cole or Cole, 1971, p. 24).

For clearance of speech parameters, it is important that the subsystems must work together properly. Weakness in systems can outcome of dysarthria, so must have synchronization among all systems. The lungs provide the air necessary to power the speech system. The voice box or larynx sets the air vibrating and produce voice. The soft palate acts a door between the oral and nasal cavities and channels air to one or both cavities resulting in different sound quality. The articulators go to further canal and form the sounds from the different vowels and consonants. If the respiratory subsystem is feeble, then speech might be too quiet and produced one word at a time. If the laryngeal system is weak; speech might be breathy, too quiet and slow. If the velopharyngeal subsystem is not functioning; sound too nasal or oral. If the articulatory subsystem is not functioning; sound inaudible, articulation errors and might be sluggish and difficult.

There has been universal acceptance of the classification system for dysarthria (Darley, Aronson and brown 1975). Flaccid, spastic Ataxic, Hypo/Hyperkinetic and Mixed Dysarthria Darley, Aronson Brown also clearly identified the wide range of parameter to be considered in relation to dysarthria. These include respiration, phonation, resonance, articulation and prosody. It is important to assess the six properties of neuromuscular functioning. The degree to which different muscle groups are affected will have an important bearing on the severity of the dysarthric patient and hence the level at which treatment will be focused. The dysarthria profile (Robertson 1982) finds a method of assessment that would be acceptable, a practical and clinical tool for speech pathologist and clinician. The method of assessment is divided in to eight areas which are include Respiration, Phonation, Facial Musculature, Diadochokinesis, Reflexes, Articulation, Intelligibility and Prosody.

The possession of speech is measured a vibrant ability inborn to the human class. Though, it is simply inclined by ecological, societal, cultural, parental and genetic parameters. The depressing reality is that few years ago in Pakistan there was the lack of qualified professionals in the field of speech pathology to work with patients having communicative disorders specially dysarthria and dysphagia. Speech pathology has stupendous range in our country and across the world. The profession is very gratifying and pleasing. It may stand alone or work in equivalent with doctors, Psychologist, occupational therapy specialists, physical therapy specialist and/or special educationists.

2. METHODOLOGY

It is a descriptive study and purposive sampling technique was used because this sampling technique does not involve any random selection process and guarantee that certain elements will be included that are relevant to research design.

In this study the sample was selected from CMH Rawalpindi. The sample was consisted of 15 patients, 8 were males and 7 were females. The age range is (30–55). Patients have multiple neurological disorders such as stroke, traumatic brain injury, bell palsy, autoimmune disorder, Parkinson, brain tumor, MS. Two instruments were used

1. Demographical information: It consisted of few items such as name, age, gender, marital status, consanguineous marriage, occupation, history of family problem.
2. The Dysarthria Profile (Robertson 1982): The questionnaire was constructed in English and consisted of 15 items. Items of the questionnaire were constructed in a way to find out demographical data of patients, and factors that leads to the dysarthric speech and language pathological conditions.

The dysarthria profile (Robertson 1992) is designed to test eight main parameters of motor speech such as Respiration, Phonation, Facial musculature, Diadochokinesis, Reflexes, Articulation, Intelligibility, Prosody and rate. The method of scoring is both quantitative and qualitative. The quantitative method is 2-Point rating scale Good and Poor. The qualitative score is a description of various features of the dysarthria.

3. PROCEDURE

Having specified the problem, suitable samples were taken from CMH Rawalpindi. First of all, consent was taken from all patients individually. Secondly, a short Questionnaire was administered to collect the demographic data. Finally, Dysarthria Profile was administered to assess all speech parameters. Approximately half an hour was spent on each patient.

4. STATISTICAL ANALYSIS AND RESULTS

Different parameters of dysarthria were tested in this study. It can be summarized that the most effected parameter was respiration, they sustained /s/ 14(93 %), in phonation, the initiate of sustenance 13(86 %), in facial musculature, the protrude/retract tongue 12(80 %), in the parameter of DDK the protrusion and retraction of tongue and the verbal production of /ptk/ 15(100%), in reflexes, the swallow of solid and liquid 11(73 %), in the parameter of articulation, the repeat phrases 14(93 %), in intelligibility parameter, the speech was understandable to stranger 13(86 %) and in prosodic feature the parameters are weak 15(100 %) in participants.

The demographical characteristics (age, Gender, Marital status, family history, occupation and medical history) were also studied. (See table 1 of 2) (40 %) were male, (86 %) were married and age range (50 – 55 (40 %) (60 %) had a history of high blood pressure and (40 %) participation had stroke. The results presented in table 1 shows that majority of participants were male, 9 (60%). Further, the table indicated that most of the participants

were 50 years or above, 6 (40%). Thirteen (86.6%) participants were married, including 10 (66.6%) with consanguineous marriage. By profession 6 (40%) participants run their personal business. Only 6 (40%) participants had speech disorder having family history.

The results presented in Table 2 illustrate 9 (60%) participants had high blood pressure. The majority of participants 8(53.3%) do not have hearing difficulty while 8 (53.3%) participants were wheelchair bond. The last items identified about the neurological condition, the majority of patients 6 (40%) had stroke.

The results presented in Table 3 all parameters of speech (respiration, phonation, DDK, reflexes, articulation, intelligibility and prosody) were observed severely affected in all participants. In DDK parameter, a repetition of /p t k/ and in prosody all parameters were weak in 15(100 %) all the participants

Table 1 Summarized the demographical characteristics of the participants

No	Demographic Variables	Frequency and Percentage			
1	Gender	Male		Female	
		9 (60 %)		6 (40 %)	
2	Age	32 – 37	38 – 43	44 – 49	50 – 55
		2 (13.3 %)	3 (20 %)	4 (26.6 %)	6 (40 %)
3	Marital Status	Married		Unmarried	
		13 (86.6 %)		2 (13.3 %)	
4	Consanguineous Marriage	Yes		No	
		10 (66.6 %)		5 (33.3 %)	
5	Occupation	Business	Army	House-wife	Working Lady
		6 (40 %)	3 (20 %)	4 (26.6 %)	2 (13.3 %)
6	Family History	Yes		No	
		6 (40 %)		9 (60 %)	

Table 2 Indicates the medical history of the participants

No	Medical Profile	Frequency and Percentage			
	Blood pressure	Yes		No	
		9 (60 %)		6 (40 %)	
	Hearing Difficulty	Yes		No	
		7 (46.6 %)		8 (53.3 %)	
	Physical condition	Mobile		Wheelchair Bond	
		7 (46.6 %)		8 (53.3 %)	
	Multiple Neurological disorders	Autoimmune disorder	Head Injury	Parkinson	Stroke
		1 (6.6%)	1 (6.6%)	1 (6.6%)	6 (40%)
		Brain Tumor	MS	Bell Palsy	
		1 (6.6%)	2 (13.3%)	3 (20%)	

Table 3 indicates the speech parameters and the percentages of the participants and Identification of Dysarthria (N=15)

Characteristics	Good	Poor
Respiration		
Inhale & exhale	9 (60%)	6 (40%)
Sustain /s/ on exhalation	3 (20%)	12 (80%)
Crescendo/Diminuendo on the /s/	1 (6%)	14 (93%)
Phonation		
Initiate of sustain /a/	9 (60%)	6 (40%)
Crescendo on /a/	2 (13%)	13 (86%)
Diminuend on /a/	2 (13%)	13 (86%)
Facial musculature	10 (66%)	5 (33%)
Symmetry of face	9(60%)	6(40%)
Stretch lips	3(20%)	12(80%)
Protrude / retract tongue	5(33%)	10(66%)

Elevation of soft palate on /a/		
Diadochokinesis	2(13%)	13(86%)
Open / close mouth rapidly	0(0%)	15(100%)
Protrude / retract the tongue rapidly	2(13%)	13(86%)
Repeat “oo ee”	0(0%)	15(100%)
Repeat /p/, /t/, /k/ rapidly or say buttercup		
Reflexes	9(60%)	6(40%)
Chewing	4(26%)	11(73%)
Swallow solid food/liquid	5(33%)	10(66%)
Prevent the drooling at rest/speech		
Articulation	10(66%)	5(33%)
Repeat initial consonants	13(86%)	2(13%)
Accuracy of vowels	1(6%)	14(93%)
Repeat phrases		
Intelligibility	5(33%)	10(66%)
To relative/friends	2(13%)	13(86%)
To strangers		
Prosody	0(0%)	15(100%)
Maintain appropriate rate	0(0%)	15(100%)
Use appropriate intonation	0(0%)	15(100%)
Initiate different stress patterns		

5. CONCLUSION AND RECOMMENDATIONS

Articulation tribulations are consequential from dysarthria, they are treated by speech pathologists, using a diversity modality. Therapeutic treatments target the modification of deficits of articulation, prosody, (the loudness of the voice, affected in hypokinetic dysarthria's such as in Parkinson, resonance (capability to modify the vocal tract and resonating places for accurate speech sounds) and phonation (manage of the vocal folds for suitable voice quality). These therapeutic treatments have typically concerned with oral motor exercises to increase strength and control over articulator muscles (which may be sagging and weak, or excessively tense and hard to move), and using alternate speaking methods to enhance orator intelligibility (how well someone's speech is understood by others). It is significant to learn safe chewing and swallowing methods, with speech pathological modalities and evade conversations when feeling tired, say again words and syllables over and over, to learn the proper mouth movements, and methods to contract with the irritation while communication.

Depending on the severity level of the dysarthria, a further prospect includes that how to use a computer or flip cards in regulate to communicate more effectively.

Other current modalities are based on the ideology and principle of motor learning (PML), such as LSVT (Lee Silverman voice treatment) it might progress voice and speech functions and the aim are to retrain speech skills through construct new universal motor programs, and connect immense significance to habitual practice, through other support and self-management. Regularity of practice and when to practice, are the main issues in PML treatments, as they might establish the probability of generalization of novel motor skills, and consequently how effective a treatment is. The following recommendations are given from the research-

1. No significant research has been done in Pakistan.
2. The results of this study cannot be generalized to whole Pakistani disabled population because a small sample was taken from only one Hospital.

Sample should be large enough, to more valid results.

3. The motivation of participants has also affected on the results. It must be addressed and psychological phenomena must be evaluated in future.
4. Irsome or fatigue has also affected the results in current study because of their neurological condition.
5. Intensive study should have conducted in wide scale throughout the county to get reliable results.

REFERENCES

- [1] Cole, M.F of Cole, M. (1971). *Pierre Maries papers on speech disorders*. New York: Hafner publishing company.
- [2] Darley, F.L, Aronson, A.E, of porown, I.R. (1975). *Motor speech disorders* Philadelphia, WB. Saunders.
- [3] Darley, F.L (1983). Inw. R. Berry (Ed). *Clinical dysarthria* (P.xiv) San Diego: College Hill press.
- [4] Duffy, Joseph R. (2005). *Motor speech disorders: substrates, differential diagnosis, and management* (PDF) (2nd ed.). St. Louis: Elsevier Mosby. p. 275. ISBN 9780323024525.
- [5] Fox, C; Ramig, L; Ciucci, M; Sapir, S; et al. (2006). "The Science and Practice of LSVT/LOUD: Neural Plasticity-Principled Approach to Treating Individuals with Parkinson Disease and Other Neurological Disorders". *Seminars in Speech and Language*. 27 (4): 283–99. doi:10.1055/s-2006-955118. PMID 17117354.
- [6] Lebrun Y. (1989) Apraxia of speech: The history of a concept. In Square-Storer P. (ed.) *Acquired apraxia of speech in aphasic adults*. London, Taylor and Francis: 3–19.
- [7] Lechtenberg, R.; Gilman, S. (1978). "Speech Disorders in Cerebellar Disease " (PDF). *Ann. Neurol.* 3 (4): 285–290. doi:10.1002/ana.410030402. PMID 666268.
- [8] Robertson, Sandra J., (1992), *Working with Dysarthric Clients*, American Version Printed and Published, 1997 for Communication Skill Builders.
- [9] Rosenbek, J.C, of Lapointe, L.L (1978). *The dysarthria: Description, diagnosis and treatment in clinical management of neurogenic communication disorders*, edited by D.F. Johns. Boston, Little, Brown and company.
- [10] The National Collaborating Centre for Chronic Conditions, ed. (2006). "Other key interventions". *Parkinson's Disease*. London: Royal College of Physicians. pp. 135–46. ISBN 1-86016-283-5.
- [11] Wang, Y-T; Kent, RD; Duffy, JR; Thomas, JE (2009). "Analysis of Diadochokinesis in Ataxic Dysarthria Using the Motor Speech Profile Program™". *Folia Phoniatica et Logopaedica*. 61(1): 1–11