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CEREBROVASCULAR ACCIDENT ASSOCIATED HEMIPARESIS AND HEMIPLEGIA: COPING STRATEGIES AND SUPPORT

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ABSTRACT: Background: Cerebrovascular Accident (CVA) ranks as the third leading cause of mortality globally and contributes significantly to chronic adult disabilities. Hemiparesis, the most prevalent post-stroke mobility impairment, affects approximately 75% of stroke survivors, substantially reducing their quality of life. This study aims to investigate CVA-associated Hemiparesis and Hemiplegia, focusing on management strategies to improve functional outcomes. **Methods:** A prospective observational study was conducted over six months include CVA patients aged > 30 years with CVA associated Hemiparesis or Hemiplegia, comprising both hospitalized and follow-up outpatient cases. Data were collected from patient case records and structured questionnaires, covering demographic details, type of stroke, drug therapy, type of physiotherapy received, adherence to post-discharge physiotherapy, and its impact on recovery. After completion of the study, the data were systematically analyzed and results were interpreted. **Results:** Hypertension was identified as the most common risk factor (39%), and statins were the most frequently prescribed pharmacological treatment (31%). Constraint-induced movement Therapy (CIMT) was implemented in 54% of cases, and regular post-discharge physiotherapy was undertaken by 84% of patients. Outcomes revealed that 82% of patients demonstrated significant improvements in motor function, while 18% showed no notable recovery. Integrated management combining pharmacological interventions and physiotherapy was crucial in enhancing neuroplasticity and mobility. **Conclusion:** A holistic approach, including timely intervention, targeted drug therapy, and structured rehabilitation, is vital for managing CVA-associated Hemiparesis and Hemiplegia. This multidisciplinary strategy improves functional abilities and overall quality of life, emphasizing the importance of early and sustained rehabilitation in stroke care.

INTRODUCTION: Cerebrovascular accident (CVA), commonly referred to as a stroke or brain attack, poses a significant global health challenge, trailing behind cardiovascular disorders and malignant tumors in prevalence.

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According to the World Health Organization's (WHO) definition from 1976, a stroke is a clinical syndrome marked by the rapid onset of focal (and occasionally global) disturbances in cerebral function.

These disturbances persist for more than 24 hours or lead to death, with no apparent cause other than of vascular origin. In developed nations, CVA ranks as the third most common cause of mortality, and it stands as a primary contributor to persistent and acquired disabilities in adults across the globe [1]. Initial admission may result in a mortality rate of

up to 15%, with the majority of patients eventually returning to their baseline condition. However, a substantial portion, up to 30%, may experience significant long-term morbidities [2].

Stroke is broadly classified into two types: ischemic Stroke and hemorrhagic Stroke.

Ischemic Stroke is characterized by a period of neurological dysfunction arising from a focal infarction in the cerebral, spinal, or retinal regions. It accounts for roughly 85% of fatalities associated with strokes [3]. Constituting approximately 15% of all stroke incidents, hemorrhagic Stroke occurs when blood vessels rupture, leading to bleeding within the brain. While less prevalent than ischemic Stroke, its heightened mortality and morbidity rates underscore its substantial impact on public health [4].

Among Stroke patients, approximately 75% experience limitations in walking, with post-stroke Hemiparesis being the most common walking impairment. The National Stroke Association reports that 9 out of 10 stroke survivors have paralysis immediately following the Stroke [5].

Hemiparesis refers to weakness on one side of the body, while Hemiplegia indicates complete paralysis of one side. Hemiparesis usually results from mild to moderate nerve or brain damage, while Hemiplegia is associated with moderate to severe nerve or brain damage [6].

Furthermore, the same injury can produce both symptoms at different times, as the specific location of weakness depends on the site of the Stroke in the brain. If the left side of the brain, responsible for language and speech control, is injured, it can lead to right-sided weakness. Conversely, injury to the right side of the brain, which governs non-verbal communication and central behavior, may result in left-side weakness in the early stages of a stroke. The central nervous system can heal itself through the phenomenon of neuroplasticity. Neuroplasticity is the brain's ability to reorganize and form new neural pathways influenced by repeated task practice. Everyday activities, such as combing hair or tying shoes, become second nature due to the strengthening of neural pathways through frequent repetition. In the case of Hemiparesis, neuroplasticity plays a crucial role in establishing and fortifying new pathways that govern movement, leading to improved coordination and strength on the affected side [7].

Physiotherapy is a kind of therapy that focuses on neuroplasticity and is crucial for helping survivors regain movement. This is important to regain independence and helps accomplish daily activities. This form of treatment requires a sustained and repetitive approach, recognizing that neuroplasticity changes don't happen overnight. Physiotherapists design exercises to challenge and stimulate the affected limbs, facilitating optimal restoration of functioning. Repetitive exercises are fundamental in retraining affected limbs, as increased movement on the weakened side prompts neuroplasticity. This process enables individuals to regain independence in daily activities such as eating, dressing, and bathing. Functional training, involving tasks like holding utensils, enhances motor skills. Physiotherapists also teach compensation techniques, providing shortcuts for challenging tasks and aiding in adapting to new circumstances [8].

Consistency is paramount in neuroplasticity, and massed practice of repeatedly engaging in skilled movements with the weakened side is essential for Hemiparesis recovery. Home exercise programs complement physiotherapy by allowing individuals to continue practicing outside formal sessions, thereby optimizing neuroplasticity and functional recovery.

Constraint-Induced Movement Therapy (CIMT) represents a more intensive approach involving restricting the unaffected side while exercising the affected side for consecutive weekdays. This aggressive therapy, commonly applied to affected arms and hands, has shown significant improvement in motor skills, making it a valuable component of Hemiparesis rehabilitation.

The recovery and rehabilitation process following a stroke is often complex and demanding. It typically involves physical therapy, occupational therapy, and other supportive measures to aid individuals in regaining lost functions and improving their quality of life. Preventing cerebrovascular disease plays a crucial role in mitigating its impact. Early recognition of stroke symptoms and seeking immediate medical attention are also vital in

improving the chances of a favorable outcome after a stroke [9].

Treatment Modalities: The treatment approach for Strokes depends on whether the Stroke is ischemic or hemorrhagic, the duration of symptoms, underlying causative factors, and other comorbid conditions associated with Stroke [10].

Physiotherapy holds significant importance in managing muscle spasticity and facilitating the development of strength and coordinated movement in cases of paresis and plegia. It serves as a cornerstone in the rehabilitation process to enhance the overall functional ability of the affected individual [11].

Speech therapy helps if Hemiparesis affects the face and mouth muscles. It helps in improving communication and swallowing difficulties [12].

Occupational therapy focuses on helping individuals regain the ability to perform daily activities and tasks. It aims to promote independence and enhance overall quality of life.

Assistive devices such as braces, splints, canes, or walkers aid in performing daily activities.

Functional electrical stimulation (FES) is a technique that uses electric current to stimulate weakened muscles and improve muscle function.

Constraint-induced movement therapy (CIMT) involves restricting the use of the unaffected limb to encourage the use and improvement of the affected limb [13].

MATERIALS AND METHODS:

Study Protocol: At the beginning of this project, a study protocol was drafted following the approval from the Institutional Review Board (IRB) in CMR College of Pharmacy CMRCP/IEC/2023-24/0.

Study Type: A prospective observational study.

Data Collection and Design: The study was conducted in the in-patient department of general medicine and outpatient department of physiotherapy, at Gandhi Hospital, Hyderabad, Telangana state. The duration of the study was 6 months (July 2023-December 2023). The cases were selected based on the inclusion criteria. The data obtained on various required parameters and final data were analyzed to obtain the results. All CVA patients with Hemiparesis or Hemiplegia of age >30 years admitted to the hospital were included in the study along with follow-up patients in the outpatient physiotherapy department. The data were collected from the case records of each patient such as age, gender, type of stroke, drug therapy, type of physiotherapy, patient's status of receiving physiotherapy after discharge, and impact of physiotherapy were collected through a questionnaire regarding receiving physiotherapy over 1-3 months.

Statistical Analysis: All study data were examined using SPSS software (Statistical Package for Social Sciences for Windows) version 29.0.2.0, Between-group comparisons for nominal variables (cross-tables) were performed using chi-square and Fisher's exact tests and the statistical level of significance was set at p=0.05.

RESULTS: Out of 115 patients, Upon analysis of different age groups between 30 to above 80 years of CVA patients, it is observed that the age group of 61-70 (24%), mean age (59.5±14.88) are more prone to CVA associated Hemiparesis or Hemiplegia were diagnosed with CVA-associated Hemiparesis, and males (64%) and females (36%) were diagnosed with CVA-associated Hemiplegia. This shows that males are more prone to develop both CVA associated Hemiparesis and Hemiplegia than females.

Following a specific duration of physiotherapy sessions, patients demonstrated enhanced mobility in the affected area. Pearson chi-square Analysis shows that there is statistical significance between physiotherapy and recovery status (p = 0.01).

TABLE 1: SHOWS THE PEARSON CHI-SQUARE TEST BETWEEN PHYSIOTHERAPY AND RECOVERY STATUS OF THE CVA ASSOCIATED HEMIPARESIS OR HEMIPLEGIA PATIENTS

Status of physiotherapy after discharge	Number of patients	Percentage (%)	Impact of physiotherapy	Number of patients	Percentage (%)	Chi square value
Received Physiotherapy	97	84%	Shown	80	82%	

Consistently			Improvement			48.778
			No Improvement	17	18%	
Not Received Physiotherapy Consistently Or Discontinued	18	16%	-	-	-	

χ^2_{cal} = 48.778{ at 95% confidence limit, with degree of freedom = 1} $\chi^2_{tab=}$ 3.841. $\chi^2_{cal} > \chi^2_{tab}$ {48.778 > 3.841} at 5% level of significance.

Here the chi-square calculated value is more than the tabulated values which shows that there is a significance between physiotherapy and recovery of the CVA associated Hemiparesis or Hemiplegia patients.

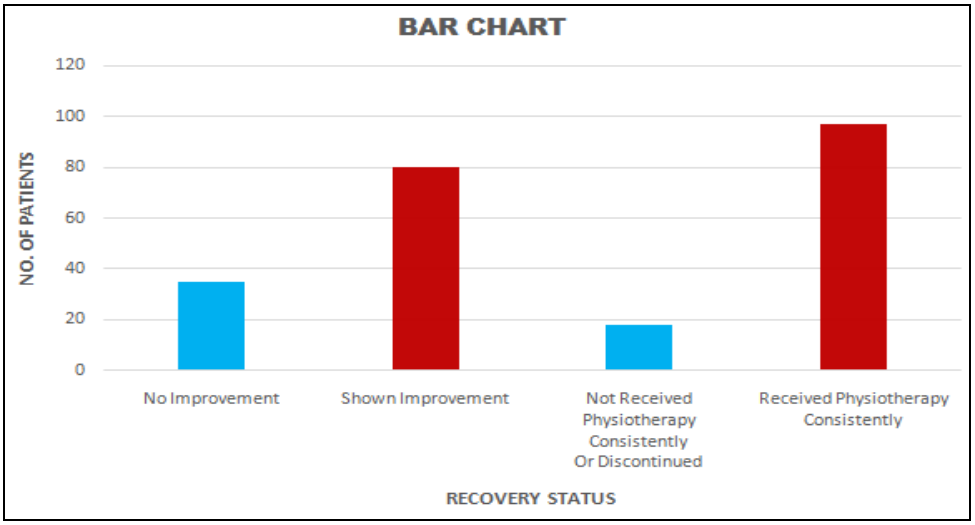

FIG. 1: THE GRAPH SHOWS THAT THE PATIENTS WHO RECEIVED PHYSIOTHERAPY HAVE SHOWN IMPROVEMENT, WHEREAS THE PATIENTS WHO HAVE NOT RECEIVED PHYSIOTHERAPY CONSISTENTLY OR DISCONTINUED PHYSIOTHERAPY HAVE SHOWN NO IMPROVEMENT

DISCUSSION: A prospective observational study was conducted among the cases collected from the general medicine department with a sample size of 115 based on the inclusion criteria. Assessment of type of Stroke, age, gender, risk factors, treatment, and resulting disability were taken into consideration. Upon analysis of different age groups between 30 to above 80 years of CVA patients, it is observed that the age group of 61-70 (24%), mean age (59.5±14.88) are more prone to CVA associated Hemiparesis or Hemiplegia followed by 51-60(22%),41-50(17%),30-40(14%), above 80 (13%) and71-80 (10%). Gender is considered one of the risk factors for developing CVA [14]. The analysis was done, and the study findings show that males (50%) and females (30%) were diagnosed with CVA-associated Hemiparesis, and males (64%) and females (36%) were diagnosed with CVA-associated Hemiplegia. This shows that males are more prone to develop both CVA-associated Hemiparesis and Hemiplegia than females. The analysis of modifiable risk factors and comorbidities among CVA patients with Hemiparesis and Hemiplegia revealed essential insights into the contributing factors to cerebrovascular accidents [15]. Hypertension emerged as a prominent risk factor (39%) of the cases in the study. This underscores the significance of blood pressure management in preventing and managing CVA related complications. Additionally, alcohol consumption was prevalent in (28%) of cases, emphasizing the role of lifestyle factors in CVA occurrence. Notably, diabetes mellitus (12%), recurrent CVA (7%), and smoking (13%) are also contributing factors. The study findings show that ischemic strokes constituted the majority of cases associated with Hemiparesis (74%), and this prevalence was markedly higher compared to Hemiparesis associated with hemorrhagic Stroke (22%) and hemorrhagic transformation (4%). In contrast, hemorrhagic Stroke constituted the majority of the cases associated with Hemiplegia (41%) compared to hemorrhagic transformation (38%) and

Hemiplegia associated with ischemic Stroke (21%). The Pearson chi-square test analysis shows that there is a statistical relationship between Hemiparesis or Hemiplegia and CVA (p =0.01).

The analysis of drug therapy in CVA patients presenting with Hemiparesis or Hemiplegia unveils noteworthy patterns in prescription practices. Among the pharmacological interventions, statins emerged as the most commonly prescribed drugs, constituting 31% of the cases; antihypertensive medications were administered in 24% of cases, underscoring the importance of blood pressure management in this patient population. Antiplatelet agents, diuretics, and anti-diabetic drugs were also employed, though with varying frequencies of 24%, 19%, and 3%, respectively.

The research results indicate that CIMT is the most frequently utilized physiotherapy method, accounting for 54% of cases, followed by passive therapy at 33%, and speech therapy. Following a specific duration of physiotherapy sessions, patients demonstrated enhanced mobility in the affected area. Pearson chi-square Analysis shows that there is statistical significance between physiotherapy and recovery status (p = 0.01).

The research study involved 115 patients who presented to the hospital with complaints of CVA accompanied by Hemiparesis or Hemiplegia, a combined approach of drug therapy and physiotherapy was administered. Following discharge, 97 patients (84%) consistently received post-discharge physiotherapy. Among these, 80 patients (82%) demonstrated enhanced mobility in the affected part, while 17 patients (18%) exhibited no improvement. The lack of improvement in some cases could be attributed to various factors, including non-compliance, the severity of the condition, ineffective communication, or recent hospital admission. This demonstrates that maintaining a regular physical therapy routine is crucial in recovering and restoring mobility. Engaging in consistent physical therapy sessions has been proven effective in enhancing and regaining the ability to move efficiently.

CONCLUSION: To commence our investigation, we focused on instances of Hemiparesis or Hemiplegia following CVA. Based on several evidence-based discoveries, we have determined that post-stroke Hemiparesis or Hemiplegia is the most prevalent disability. Our analysis found that Medication therapy and physical therapy are crucial in the management of Hemiparesis or Hemiplegia in CVA patients. Neuroplasticity is facilitated by early intervention, which eventually results in functional benefits. Mobility, strength, and quality of life are enhanced by this integrated approach, highlighting the significance of a thorough and ongoing rehabilitation plan for the best possible results.

The study reflects a unique perspective by emphasizing the combined importance of early pharmacological interventions and structured physiotherapy in stroke rehabilitation, particularly for Hemiparesis and Hemiplegia. Furthermore, the study highlights real-world data from a prospective study, showcasing statistical correlations between physiotherapy compliance and recovery outcomes, thereby contributing evidence-based recommendations for integrated stroke management.

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