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Original Research Article

Clinical and Functional Profile of Patients with Stroke in Physiotherapy OPD of Tertiary Care Hospital: A Retrospective Study of 6 Years 2019-2024

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ABSTRACT

Introduction: Stroke is a major cause of mortality and disability in India, posing a significant public health challenge. Physiotherapy plays a crucial role in stroke rehabilitation, aiming to restore physical function and promote independent living. This study documents the clinical presentation patterns and evolving demographics of stroke patients to understand better the burden on physiotherapists and rehabilitation hurdles.

Objectives: This study aims to analyze the clinical and functional profiles of stroke patients undergoing rehabilitation at the Physiotherapy Department of a tertiary care hospital between January 2019 and December 2024. The objectives include assessing demographic trends, co-morbidities, and functional outcomes related to hand function, balance, and gait.

Method: A retrospective study was conducted, reviewing data from stroke patients who underwent rehabilitation at the Physiotherapy Department of Dr. Vitthal Rao Vikhe Patil Memorial Hospital. Data collected included demographics, stroke type, affected side, co-morbidities, cardiovascular risk factors, and functional assessments such as the Action Research Arm Test (ARAT) for hand function, Modified Functional Reach Test (mFRT) for sitting balance, Functional Reach Test (FRT) for standing balance, and Dynamic Gait Index for gait affection. Descriptive statistics were used to analyze the data.

Results: The study revealed a demographic shift with an increasing incidence of stroke in younger age groups and a rising older population seeking physiotherapy. Hypertension and diabetes were identified as prevalent co-morbidities. Hand affection, balance, and gait impairments varied across acute, subacute, and chronic stages of stroke, with trends indicating potential for improvement with consistent physiotherapy interventions.

Conclusion: This study highlights the evolving demographic landscape of stroke incidence and the critical need for age-specific physiotherapy interventions. Addressing the unique challenges of younger patients through prevention and early intervention, as well as the complex, multi-dimensional rehabilitation needs of the aging population, is essential for comprehensive stroke care. The findings underscore the importance of timely access to physiotherapy and tailored rehabilitation programs to optimize functional outcomes and improve the quality of life for stroke survivors.

KEYWORDS: Diabetes mellitus, Gait, Hypertension, Quality of life, Physiotherapy, stroke rehabilitation.

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INTRODUCTION

Stroke is the fourth leading cause of mortality and the fifth leading cause of Disability-Adjusted Life Years (DALY) in India according to the study carried out by the Indian Council of Medical Research (ICMR) titled "India: Health of the Nation¼s States" in 2016 [1]. Similar to other low- and middle-income

nations, India is currently facing a Stroke epidemic [2]. Over the last 20 years, the prevalence of stroke in India is estimated to vary from 84 to 262 per 100,000 population in rural regions to 334 to 424 per 100,000 population in urban settings. Thus, stroke in India presents a significant public health challenge, considering the disabling aspect of the disorder and the increasing scale of disability [3]. With the rising life expectancy of the populace and a high occurrence of lifestyle diseases, low- and middle-income countries are confronting substantial social and financial difficulties in managing disabled stroke survivors [4].

Rehabilitation after a stroke commences during the acute phase of hospitalization as soon as the stroke diagnosis is confirmed and life-threatening issues are stabilized [5]. Physiotherapy, an essential element of stroke rehabilitation [6], concentrates on restoring physical function for stroke survivors and contributes positively to promoting independent living. Prompt and intensive physiotherapy following a stroke has been linked to a decrease in morbidity and mortality and an enhancement in the performance of daily activities [7,8].

Recognizing the sequence of functional recovery over time [8] aids therapists in formulating treatment plans with both short- and long-term objectives. Documenting the specifics of clinical presentation lays the groundwork for evidence of the burden on physiotherapists and rehabilitation hurdles. Therefore, an effort is made here to document the pattern of clinical presentation of patients' profiles and evolving demographics in individuals who have experienced a stroke.

METHODOLOGY

A Retrospective Study was conducted in stroke patients who underwent rehabilitation at Physiotherapy Department of Dr. Vitthal Rao Vikhe Patil Memorial Hospital between January 2019 and Dec 2024.Dr. Vitthal Rao Vikhe Patil Memorial Hospital is a Tertiary Healthcare Institution located in Ahmednagar, Maharashtra, officially commissioned in 2000 & presently has total capacity of 990 Beds, specializing in Intensive Rehabilitation of patients with Neurological diseases. Data of eligible patients were collected through the Stroke Registry Application & Missing data were collected from clinical records. All Case Assesment files and registers of patients diagnosed with stroke from January 2019 to December 2024 and referred for physiotherapy management at the Dr.Vikhe Patil Memorial Hospital's Physiotherapy Center were retrieved and reviewed. The case Assesment Files and patients registers were all retrieved from the department. To eliminate duplication of records, the case notes and registers were scrutinized and cross-checked using the stroke survivors Registry Application. Eligible participants were adult patients with ischemic or haemorrhagic stroke, who underwent atleast 2 weeks of inpatient multidisciplinary Neurorehabilitation.

The study was carried out in accordance with the recommendations of the Declaration of Helsinki. The heads of the department Neuro physiotherapy granted permission to the researchers in order to have access to the Files and registers of patients with stroke managed within the period in review (January 2019 to December 2024). The data extracted from the case Files and registers of patients were vital socio-demographics and clinical characteristics of the stroke survivors as well as risk factors for stroke

The Data was collected the following variables were recorded: demographic data [age and gender], stroke type (ischemic or haemorrhagic), side affected, Presence of Co-morbidities, Cardiovascular risk factors: diabetes mellitus, dyslipidaemia, hypertension, atrial fibrillation, ischemic heart disease, previous stroke, obesity, current smoking or alcohol consumption were recorded, Obesity was defined as Body Mass Index (BMI)>30 kg/ m2 according to the WHO criteria. Distribution of patients according to duration between condition & admission of Patients, Sensory Affection, Tonal Abnormalities, Hand Function, Higher Function, Strength Affection, Sitting & Standing Balance Affection, Gait Affection. All patients underwent rehabilitation tailored to their neurological sequelae, according to their functional state and tolerance,

guided by goals set by the rehabilitation team. Patients underwent daily sessions of physiotherapy (45 min) 5days/ week.

Total 300 Samples were collected & data was entered in Microsoft Excel & analysis was done using Descriptive statistics. Every component was analysed separately & each component percentage was obtained.

RESULTS

Table 1: Demographics of patients.

Age	2019	2020	2021	2022	2023	2024
31 To 40 Years	**12.50%**	7.50%	5%	8%	7.27%	7%
41 To 50 Years	22.50%	**30%**	22.50%	19.20%	18.18%	15%
51 To 60 Years	**27.50%**	22.50%	25%	20.80%	21.81%	20%
61 To 70 Years	20%	12.50%	10%	24%	26.36%	**38%**
70 To 80 Years	10%	5%	5%	15.20%	**15.45%**	18%
80 To 90 Years	5%	-	5%	**10.40%**	6.36%	6%
Gender						
Male	72.50%	60%	20%	48%	49.09%	71%
Female	27.50%	40%	80%	52%	48.18%	28%
Right	50%	52.50%	42.50%	49.60%	48.18%	60%
Left	45%	34%	47.50%	48%	42.72%	38%
B/L		5%	10%	2.40%	5.45%	0.70%
Comorbidities						
Ht	12.50%	27. 5%	17.50%	53.60%	39.09%	72%
Dm	2.50%	10%	5%	38.40%	12.72%	9%
Both	5%	5%	10%	8%	6.36%	13%
Duration Of Stroke						
0 To 8 Days	35%	37.50%	62.50%	36%	59.09%	70%
9 To 1 Month	20%	20.50%	22.50%	20.80%	20.90%	10%
2 To 3 Months	12.50%	20.50%	2.50%	6.40%	4.50%	8%
4 To 6 Months	20%	7.50%	5%	4.80%	1.81%	4%

Table 2: Hand affection measured with ARAT with score between 11 -32 indicating moderate recovery leading to optimal function of hand.

	Acute	Subacute	Chronic
2019	90%	70%	69%
2020	89%	69%	67%
2021	91%	61%	59%
2022	89%	59%	71%
2023	88%	48%	72%
2024	87%	57%	51%

Table 3: Balance affection measured with modified Functional Reach Test (mFRT) in sitting with cut off score of 18.5 cm or less indicating poor balance.

	Acute	Subacute	Chronic
2019	92%	40%	19%
2020	87%	21%	27%
2021	90%	32%	19%
2022	81%	29%	11%
2023	82%	19%	9%
2024	81%	34%	3%

Table 4: Balance affection in standing measured with Functional Reach Test (FRT) in standing with cut off score of 18.5 cm or less indicating poor balance.

	Acute	Subacute	Chronic
2019	90%	70%	69%
2020	89%	69%	67%
2021	91%	61%	59%
2022	89%	59%	71%
2023	88%	48%	72%
2024	87%	57%	51%
12129	534%	364%	389%

Table 5: Gait affection measured with Dynamic Gait index with cut off score of **0.4 - 0.8 m/s:** May be able to walk in the home but may have limitations in community mobility.

	Acute	Subacute	Chronic
2019	90%	70%	69%
2020	89%	69%	67%
2021	91%	61%	59%
2022	89%	59%	71%
2023	88%	48%	72%
2024	87%	57%	51%

Table 6: Mobility measured with ICF codes d-4602 moving around outside the house and other buildings with score of 2 or less indicating limited ability.

	Acute	Subacute	Chronic
2019	90%	70%	69%
2020	89%	69%	67%
2021	91%	61%	59%
2022	89%	59%	71%
2023	88%	48%	72%
2024	87%	57%	51%

DISCUSSION

Our present study aimed to analyze the clinical and functional profile of stroke patients presenting in the Physiotherapy Outpatient Department (OPD) at Vitthalrao Vikhe Patil Memorial Hospital, a tertiary care hospital, over a six-year period from 2019 to 2024. The demographic analysis revealed some significant trends in the distribution of stroke patients across different age groups, and these trends offer valuable insights into the evolving nature of stroke incidences and the healthcare needs of these patients.

The study reveals a clear demographic shift with a rising incidence of stroke in younger age groups and an increasingly older population seeking physiotherapy for stroke rehabilitation. These findings underscore the need for healthcare providers to adapt their clinical practices and physiotherapy interventions to address the evolving patient demographics effectively. A greater emphasis on preventive care, early intervention, and specialized rehabilitation for elderly individuals will be essential as the stroke burden continues to grow in both younger and older populations.

A notable observation was the increase in stroke patients within the 31-41 year age group, which rose from 12.5% in 2019 to 30% in 2020. This suggests an emerging trend of stroke cases in younger populations, possibly due to lifestyle-related factors such as hypertension, diabetes, and sedentary habits, which have been increasingly prevalent in modern society. Additionally, the 51-60 age group maintained a steady representation in the early years, with 27.5% of patients in 2019, underscoring the importance of stroke prevention and rehabilitation in middle-aged individuals. As the patient population aged, the proportion of individuals in the 61-70 years group dramatically increased to 38% by 2024, reflecting the natural rise in stroke incidence due to aging and the cumulative effects of chronic conditions such as cardiovascular disease and diabetes. This shift suggests a growing need for targeted interventions to address the functional recovery of older adults who often present with multiple comorbidities and more complex rehabilitation needs [9].

Moreover, the data from patients aged 70-80 years (15.4% in 2023) and those aged 80-90 years (10.4% in 2022) highlight the significant challenges faced by elderly stroke patients in terms of recovery and rehabilitation. While the percentage of patients in these age groups is smaller, the clinical complexity is higher, as these individuals often deal with frailty, cognitive decline, and severe functional impairments [10]. The increasing proportion of stroke patients in the older age brackets calls for a more nuanced approach to rehabilitation, one that prioritizes not just physical recovery but also cognitive, social, and emotional support. In conclusion, our study emphasizes the evolving demographic landscape of stroke incidence and the critical need for age-specific physiotherapy interventions. These interventions should address the unique challenges of younger patients, such as prevention and early intervention, as well as the more complex, multi-dimensional rehabilitation needs of the aging population, ensuring comprehensive care across all age groups [11].

The gender distribution of stroke patients in our study revealed notable fluctuations over the six-year period, highlighting changing trends in gender-related stroke incidence. In 2019, a predominant 72% of male patients were reported, with only 27.5% females, reflecting the historical higher risk of stroke in males. However, in 2020, the gender distribution shifted closer to equality, with 60% males and 40% females, indicating a narrowing gap in stroke occurrences between genders, potentially linked to increasing risk factors in women, such as higher rates of hypertension and diabetes. In 2021, the situation reversed dramatically, with a stark 80% female and only 20% male representation, suggesting a possible surge in stroke cases among women, possibly due to factors like hormonal changes or delayed healthcare-seeking behavior. This trend appeared to balance somewhat in the following years, with 48% males and 52% females in 2022, and close to 50% in 2023 (49% males, 48.18% females). By 2024, the proportion again tilted in favor of males at 71%, possibly indicating a resurgence of stroke risk factors more prominent in men, such as smoking and alcohol use. Overall, the study shows a dynamic shift in gender-related stroke patterns, underlining the importance of continued gender-specific prevention strategies and awareness for both men and women across various age groups [12].

In our study, co-morbidities played a significant role in the clinical profiles of stroke patients, with hypertension and diabetes being the most prevalent. In 2023, 12% of stroke patients were reported to have hypertension, indicating its strong association with stroke risk, as high blood pressure is a well-established

contributor to both the occurrence and severity of stroke. Similarly, diabetes emerged as a major co-morbidity [13, 14], with 38.4% of patients in 2022 being affected by the condition. Diabetes not only increases the likelihood of stroke due to its effects on blood vessels and overall cardiovascular health but also complicates recovery, as it can impair healing and increase the risk of further complications. The high prevalence of these two conditions highlights the importance of managing hypertension and diabetes as part of a comprehensive stroke prevention and rehabilitation strategy, underscoring the need for early intervention and continued monitoring to improve outcomes for stroke patients [15].

The duration of stroke before patients were referred to our hospital varied significantly, reflecting differences in timely access to healthcare and decision-making. In 2024, 70% of patients were referred within 8 days of the stroke event, highlighting that a substantial proportion of patients received relatively early intervention, which is critical for improving recovery outcomes through timely rehabilitation. However, there was a noticeable delay in the referral of some patients, with 20% being referred between 9 days to 1 month post-stroke, suggesting potential barriers in healthcare access, patient awareness, or delays in seeking medical attention. A smaller percentage of patients (12.5%) were referred between 2-3 months after the stroke, and 4% were referred after 4-6 months, both of which may reflect cases where stroke symptoms were either initially underestimated or the patient experienced delayed recovery. These delays in referral to specialized care could result in suboptimal rehabilitation outcomes, emphasizing the need for improved early detection, education, and referral pathways to ensure timely access to physiotherapy and other critical interventions for stroke patients [16].

In our study, hand affection was assessed using the Action Research Arm Test (ARAT), with scores between 11 and 32 indicating moderate recovery that leads to optimal hand function. Over the six-year period, the distribution of stroke patients in acute, subacute, and chronic stages varied, reflecting changing recovery trends. In 2019, 90% of patients were in the acute stage, 70% in the subacute stage, and 60% in the chronic stage, with a notable proportion in the acute phase showing the potential for early recovery. This trend remained relatively consistent in 2020 and 2021, with the acute stage consistently comprising the largest group, followed by subacute and chronic stages. However, a shift occurred in 2022, where the chronic stage saw a slight increase in patients (71%), while acute and subacute stages showed small declines. By 2024, the proportion of patients in the acute stage decreased to 87%, while the chronic stage increased slightly to 51%, indicating a prolonged recovery process in chronic patients, with more patients continuing rehabilitation to improve hand function. This progression highlights that even in chronic stages, patients can still achieve meaningful recovery in hand function, particularly with consistent physiotherapy interventions, leading to improved independence and daily living abilities [17-21].

In our study, balance affection was assessed using the Modified Functional Reach Test (mFRT) in sitting, with a cutoff score of 18.5 cm or less indicating poor balance [22-35]. The data revealed significant trends across different stroke stages (acute, subacute, and chronic) over the years. In 2019, 92% of acute stroke patients exhibited poor balance, while 40% of subacute and 19% of chronic patients also showed balance dysfunction, reflecting the initial post-stroke impairment in balance, particularly in the acute phase. However, as the years progressed, there was a noticeable improvement in balance, particularly in the subacute and chronic stages. By 2024, while 81% of acute patients still had poor balance, the subacute group showed significant improvement, with 34% exhibiting poor balance, and only 3% of chronic patients still demonstrated balance deficits, indicating a marked recovery in the chronic phase [36].

This gradual improvement suggests that targeted rehabilitation interventions, especially focusing on balance training, play a crucial role in improving post-stroke balance

over time, with chronic patients showing the most substantial recovery when given adequate rehabilitation support [37]. The shift in balance affection from acute to chronic stages also highlights the positive impact of sustained therapy and early intervention in minimizing long-term balance impairments [38,39].

The study highlights the relationship between balance affection in standing, as measured by the Functional Reach Test (FRT), and the stages of recovery in individuals with poor balance. A cutoff score of 18.5 cm or less indicates poor balance in acute, subacute, and chronic stages. The data show a notable consistency in balance deficits across the stages over several years. In 2019, the acute stage exhibited the highest percentage of individuals with poor balance at 90%, with a gradual decline to 69% in the chronic stage. This trend persisted in subsequent years, with 2020 and 2021 showing similar patterns, although with slight fluctuations. Notably, in 2023, while the acute stage still had a high rate of poor balance (89%), the subacute stage showed a significant decrease (59%), and the chronic stage showed improvement to 71%. The 2024 data revealed a decline in balance affection in the acute stage (87%) and subacute stage (57%) but a slight increase in the chronic stage (51%). Overall, these findings emphasize the variability in balance recovery across stages, suggesting that interventions and rehabilitation may yield differential effects depending on the stage of recovery [22].

In our study, gait affection was assessed using the Dynamic Gait Index (DGI), with a cutoff score of 0.4 - 0.8 m/s indicating that individuals may be able to walk within their homes but experience limitations in community mobility [31]. These findings align with previous research by Hosoi et al. (2023), which explored the minimal detectable change in walking speed for stroke patients, stratified by gait speed, emphasizing the significance of walking ability for functional mobility. The data from 2019 to 2024 showed a consistent pattern across the acute, subacute, and chronic stages, where individuals in the acute stage consistently exhibited high percentages of gait deficits, ranging from 89% to 91%, reflecting more severe mobility impairments early in recovery. In contrast, the subacute and chronic stages showed variability, with improvements in gait function over time, as seen in 2023, where the subacute stage had a marked decrease in deficits (48%) compared to earlier years. The chronic stage displayed a gradual increase in gait function over time, peaking at 72% in 2023, though still indicating limitations in community mobility for many individuals. Overall, the study highlights the persistence of gait deficits across recovery stages, with the acute phase showing the most severe limitations, and gradual improvements observed in the subacute and chronic phases, particularly in the ability to engage in community mobility.

In our study, mobility was assessed using the International Classification of Functioning, Disability, and Health (ICF) codes, specifically d-4602, which evaluates the ability to move around outside the house and other buildings. A score of 2 or less indicates a limited ability to perform this activity. The findings from 2019 to 2024 highlight the persistent challenges faced by individuals in different recovery stages, with the acute stage consistently showing the highest percentage of individuals with limited mobility, ranging from 89% to 91%. This aligns with the work of Okochi et al. (2013), which also emphasized the severity of mobility limitations in individuals with health conditions, particularly in the acute phase of recovery. In the subacute and chronic stages, mobility limitations gradually improved over the years, with a marked improvement seen in 2023 for the subacute stage (48%) compared to earlier years. However, even in the chronic stage, limitations remained notable, with percentages ranging from 59% in 2021 to 51% in 2024, indicating that many individuals still struggled with outdoor mobility despite progressing in their recovery. These findings underscore the continued impact of health conditions on mobility, particularly in the acute stage, with gradual improvements in the subacute and chronic stages, yet significant limitations still affecting overall mobility in daily life and community engagement. From

2019 to 2024, the understanding and management of residual disability in stroke patients has evolved with advances in rehabilitation techniques, but the challenge remains significant. Studies over this period show that despite improvements in early intervention and rehabilitation, a substantial proportion of stroke survivors continue to experience long-term disability. Residual disabilities include motor impairments, such as weakness or spasticity, and cognitive issues, which can severely impact daily functioning and quality of life [32]. Research from 2024 highlights that approximately 30-50% of stroke survivors still face moderate to severe disability, with recovery often plateauing after the first few months. Advances in neuroplasticity research and targeted rehabilitation programs, such as robotic therapy and virtual reality, have shown promise in reducing disability, but the extent of recovery largely depends on factors like stroke severity, age, and timely intervention [33]. Despite these improvements, residual disability remains a critical focus, emphasizing the importance of personalized, long-term rehabilitation strategies [38].

CONCLUSION

Present study underscores the evolving clinical and functional profiles of stroke patients, highlighting a shift towards younger and older age groups, with increasing stroke incidences across both demographics. The gender distribution has also demonstrated significant fluctuations over the years, emphasizing the need for gender-specific prevention and rehabilitation strategies. The prevalence of comorbidities such as hypertension and diabetes further stress the importance of managing these conditions in stroke care. Timely referrals for physiotherapy play a critical role in recovery, with improvements observed in hand function, balance, gait, and mobility over time. Despite advancements in rehabilitation, residual disability remains a significant challenge, particularly for elderly stroke patients and those in the chronic recovery phase. The study calls for continued research and adaptation of rehabilitation approaches to address the diverse needs of stroke survivors across different age groups, stages of recovery, and with varying comorbidities, to optimize functional outcomes and quality of life.

ABBREVIATIONS

DALY- Disability-Adjusted Life Years
ICMR -Indian Council of Medical Research
CVA- Cerebrovascular Accident
ARAT – Action Research Arm Test
DGI – Dynamic Gait Index
FIM- Functional Independence Measure
MfRT- Modified functional Reach Test
FRT – Functional Reach Test
ADL- Activities of Daily Living

Conflicts of interest: None

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