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BARRIERS TO POST-STROKE REHABILITATION IN RURAL AREAS: A CASE REPORT OF NEGLECTED RIGHT HEMIPARESIS AND DROP FOOT

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ABSTRACT

Background: Stroke is a leading cause of disability worldwide. Post-stroke rehabilitation plays a critical role in restoring motor function and improving patient's quality of life. Early and continuous rehabilitation is especially crucial during the first two years. In rural areas, limited access to healthcare, low awareness, and socioeconomic barriers often delay rehabilitation, leading to long-term disability. **Case Presentation :** This is a case report of a 63-year-old male, three years post-stroke with untreated right hemiparesis and drop foot, was managed through a structured rehabilitation program involving physiotherapy, ankle foot orthosis (AFO), and a home-based, family-supported approach. After eight weeks of intervention, the patient showed modest improvements. Muscle strength in the affected upper limb increased (from 1/5 to 2/5 strength for wrist extensors and finger flexors) and not increased in the affected lower limb (1/5 strength for ankle dorsiflexors and ankle plantarflexors). Balance scores improved (Berg Balance Scale from 22 to 29), and the Timed Up and Go (TUG) test time decreased from 32 to 28 seconds. The patient also reported increased confidence and resumed limited social engagement. **Conclusion :** This case demonstrates that delayed rehabilitation in rural stroke patients can lead to persistent disability. Early, continuous rehabilitation, community-based support, and family education are essential for improving outcomes and preventing similar cases.

BACKGROUND

Stroke is rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin.[1]

According to World Health Organization (WHO) statistics, stroke is one of the world's leading causes of death and disability. With an estimated 13.7 million new cases reported each year, stroke is a common health problem that affects people of all demographics and continents.[2]

The latest finding from the 2019 Global Burden of Disease (GBD) report, stroke remains the second most common cause of death and the third most common cause of death and disability combined, as determined by disability-adjusted life-years lost (DALYs) globally.[3]

In Indonesia, stroke is the leading cause of disability and death, accounting for 11.2% of total disabilities and 18.5% of total deaths. According to the 2023 Indonesian Health Survey, the prevalence of stroke in Indonesia reached 8.3 per 1,000 people. Stroke is also one of the catastrophic diseases with the third highest burden after heart disease and cancer, reaching IDR 5.2 trillion in 2023.[4]

Although stroke mortality is decreasing, the prevalence of people living with the effects of stroke has increased because of the growing and ageing population.[5] The global stroke death rate has decreased recently due to advancements in medical therapy of acute strokes, many survivors still suffer from severe disabilities.[6] 40% of stroke survivors have intermediate disability and 15 - 30 % have severe disabilities, according to Duncan et al.[7]

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The quality of life of those who survive form stroke is greatly impacted by the various degrees of disability they frequently endure.[8] Stroke-related disabilities include cognitive deficits, speech and language impairments, motor impairments, and psychological difficulties.[9] Many stroke survivors still rely on others to perform daily tasks. Effective specialized multidisciplinary rehabilitation services that are coordinated and integrated throughout the entire health and social care system must be available to stroke victims.[10]

Beyond the person who has had a stroke, families, caregivers, and society at large are all impacted. Families are burdened emotionally, financially, and practically by the disabilities and long-term care requirements of stroke survivors.[11,12]

In addition, the cost to society is enormous and includes medical costs, lost productivity, and the requirement for long-term support and rehabilitation services.[13] Worldwide, there are differences in the incidence, treatment, and results of strokes, which are frequently linked to socioeconomic factors.[14]

Stroke is more common in rural and underserved areas, and patient outcomes and care are also worse there. In these areas, it is difficult to deliver timely stroke care and clinical knowledge that can reduce stroke-related mortality and disability.[15] Because they have less access to medical care, diagnostics, and rehabilitation centers, low- and middle-income areas face more difficulties. In some areas, these discrepancies lead to greater mortality rates and worse recovery outcomes.[16]

Rehabilitation initiated early after a stroke has been shown to assist with reducing complications and residual post-stroke functional disabilities. For stroke survivors, a lower functional disability and a lower rate of complications lead to a higher quality of life and lower costs in potentially expensive long-term care.[6]

In order to maximize the functional independence of patients with various stroke-related disabilities, post-stroke rehabilitation is a patient-centered, goal-driven process. Helping the stroke survivor return to their premorbid functioning—or as close to it as possible—in their family, community, and, if feasible, workplace settings is the primary goal of post-stroke rehabilitation. Both inpatient and outpatient settings are available for rehabilitation services.[17]

A core multidisciplinary team with the expertise, experience, and knowledge to collaborate with stroke victims, their families, and caregivers makes up a stroke rehabilitation service. Multidisciplinary assessment, functional difficulty measurement and identification, goal-setting for treatment planning, intervention delivery (either to bring about change or assist the person in managing ongoing change), and effectiveness evaluation are important components.[10]

This case report demonstrates a 63-years-old male, three years post stroke with delayed rehabilitation in rural stroke and lead to persistent disability.

CASE PRESENTATION

A 63-year-old male was referred to the medical rehabilitation polyclinic at Tuanku Imam Bonjol Hospital with a chief complaint of chronic right hemiparesis, three years after a stroke. The initial stroke, which occurred suddenly upon waking, was treated at Rumah Sakit Otak Bukittinggi, but the patient did not attend follow-up appointments for medical rehabilitation.

The current presentation was marked by a worsening of symptoms, particularly over the past year. The patient reported frequent stumbling due to difficulty lifting his right foot and ankle while walking, which significantly hindered his daily activities. He denied dysarthria or dysphagia. Fluency and comprehension were normal. He described a sensation of "thickness" in his right hand and foot. Bowel and bladder functions were normal. His past medical history was significant for uncontrolled hypertension, diabates mellitus, and a history of smoking. His family history included hypertension and diabetes mellitus in his parents.

Before stroke, the patient worked as a village head but was no longer employed in that capacity. He currently manages a small shop in front of his home, feeling a loss of confidence due to his physical limitations. He lives with his wife and cited a lack of awareness about the importance of post-stroke rehabilitation, a sentiment echoed by his family. Both patient and family reported that they had never received adequate education about post-stroke rehabilitation. Additionally, he lives in a rural area, approximately one hour from the nearest hospital, and cited transportation and financial constraints as major barriers to seeking care. The patient's primary goals were to regain independent mobility, walk safely

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without fear of falling, and improve his social confidence.

On examination, the patient was alert and oriented. Vital signs were stable: blood pressure 150/82 mmHg, pulse rate 62 bpm, respiratory rate 16/min, and temperature afebrile. Neurological examination revealed right-sided hemiparesis. Muscle strength on the right side was graded using the Medical Research Council (MRC) scale: Upper extremity: Elbow flexors (4/5), wrist extensors (1/5), elbow extensors (4/5), finger flexors (1/5), and finger abductors (1/5). Lower extremity: Hip flexors (4/5), knee extensors (4/5), ankle dorsiflexors (1/5), long toe extensors (2/5), and ankle plantar flexors (1/5).

The patient demonstrated a stiff right ankle, preventing full dorsiflexion. Gait analysis revealed a circumduction gait of the right leg, knee hyperextension during mid-stance, and drop foot during initial contact. He also displayed a shortened stride length and an asymmetrical gait cycle. Functional assessments included a Berg Balance Scale score of 22 and a Timed Up and Go Test score of 32 seconds. He required a walking stick for ambulation and could sit-to-stand independently with walking stick.

A non-contrast brain CT scan showed chronic infarctions in the left subcortical parietal lobe, left corona radiata, left internal capsule, and left pons.

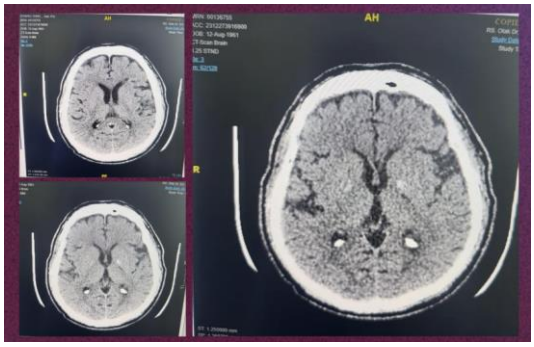

Figure 1. Brain Non-Contrast CT-Scan of The Patient.

His current medications included clopidogrel (75 mg once daily), ranitidine (150 mg twice daily), amlodipine (10 mg once daily), betahistine (6 mg once daily), metformin (850 mg twice daily), and glimepiride (2 mg once daily).

Over an eight-week period, the patient received a comprehensive outpatient rehabilitation program at Tuanku Imam Bonjol Hospital. The treatment plan included muscle strengthening exercises targeting the quadriceps, gluteal muscles, ankle plantar and dorsiflexors, biceps, wrist flexors and extensors, and finger flexors and abductors. The patient also had gait training with a walking stick to improve mobility, balance, and confidence.

Therapeutic modalities, including infrared therapy, applied to the upper and lower extremities to reduce muscle stiffness and improve circulation.

Orthotic Intervention, an Ankle-Foot Orthosis (AFO) was provided to address the persistent drop foot, providing stability and improving the gait pattern.

Extensive counseling was provided to both the patient and his family regarding the importance of continuous medical rehabilitation. They were educated on the long-term prognosis and were instructed on a home-based exercise program to be performed regularly.

RESULTS AND DISCUSSION

Following the intervention, the patient demonstrated notable but minimal improvement in muscle strength. His right-sided muscle strength was re-assessed as follows: Upper extremity: Elbow flexors (4/5), wrist extensors (2/5), elbow extensors (4/5), finger flexors (2/5), and finger abductors (2/5). Lower extremity: Hip flexors (4/5), knee extensors (4/5), ankle dorsiflexors (1/5), long toe extensors (2/5), and ankle plantar flexors (1/5).

Tabel 1. Patient Outcomes Before and After 8-Weeks Intervention.

Indicator	Before	After
Elbow flexors	4/5	4/5
Wrist extensors	1/5	2/5
Elbow extensors	4/5	4/5
Finger flexors	1/5	2/5
Finger abductors	1/5	2/5
Hip flexors	4/5	4/5
Knee extensors	4/5	4/5
Ankle dorsiflexors	1/5	1/5
Long toe extensors	1/5	1/5
Ankle plantar flexors	1/5	1/5
Berg Balance Scale	22	29
Timed Up and Go Test	32 seconds	28 seconds

The patient still required a walking stick for ambulation. However, his functional mobility and

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balance improved, as evidenced by his Berg Balance Scale score of 29 and a Timed Up and Go Test score of 28 seconds.

This case illustrates the long-term impact of delayed rehabilitation in stroke survivors from rural settings. Numerous studies have confirmed that early rehabilitation—ideally initiated within days to weeks after stroke onset—is associated with significantly better functional outcomes, faster gains in independence, and reduced complications such as contractures, spasticity, or depression.

The goal of early rehabilitation is to take advantage of the brain's increased plasticity during the acute phase, which typically starts within the first 24 to 48 hours after a stroke occurs. This method can enhance functional results and help avoid issues like joint contractures and muscle atrophy.[18]

In contrast, this patient, who did not receive structured rehabilitation for three years, presented with persistent motor impairments, low self-confidence, and poor community reintegration.

Access to comprehensive rehabilitation services remains a substantial challenge in stroke care. The challenges in rural areas are multifactorial: geographic isolation, limited transportation, financial constraints, and low health literacy all contribute to delays in care.

In this case, the absence of a permanent physiatrist in the district hospital significantly hindered access to expert rehabilitation services. The physiatrist only visits once a week, which limits continuity and individualized planning.

Although improvement was noted after intervention, the outcomes were relatively modest compared to those seen in early-rehab groups. This patient's case highlights the critical importance of long-term medical rehabilitation for post-stroke patients, even years after the initial event.

Access to specialized rehabilitation facilities and qualified medical personnel is frequently restricted by geographic disparities, particularly in rural or isolated areas. Furthermore, access to rehabilitation may be hampered by socioeconomic factors and financial limitations, especially for those with little insurance or money.[15]

Innovative strategies, like telemedicine and mobile health solutions, are needed to address these issues and provide rehabilitation services outside of conventional clinical settings.[19] Underprivileged populations may have better access to rehabilitation through tele-rehabilitation programs that use technology to deliver therapy and conduct assessments remotely.[20] In order to close the access gap and guarantee the equitable provision of stroke rehabilitation services, community-based rehabilitation initiatives and collaborations with nearby healthcare providers are essential.[21]

CONCLUSION

Delayed rehabilitation in rural stroke patients can lead to persistent disability. Early, continuous rehabilitation, telemedicine, community-based support, and family education are essential for improving outcomes and preventing similar cases.

ETHICAL APPROVAL

There is no ethical issues.

CONFLICTS OF INTEREST

The authors declare no conflict of interest. The reviewers declare no competing interest as a reviewer.

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AUTHOR CONTRIBUTIONS

Conceptualization, DW and AA; methodology, DW and AA; software, DW and AA; validation, DW, AA, and A; formal analysis, DW and AA; investigation, DW and AA; resources, DW; data curation, DW; writing—original draft preparation, DW; writing—review and editing, DW; visualization, DW; supervision, AA; project administration, DW; funding acquisition, DW.

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