# Barriers and Facilitators to Accessing Neurorehabilitation Among Stroke Survivors in a Resource-Limited Setting: A Cross-Sectional Study

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***ABSTRACT***

**Background:** Stroke is a leading cause of long-term disability, with neurorehabilitation playing a critical role in functional recovery. However, access to rehabilitation services remains limited in resource-constrained settings due to multiple systemic and individual factors.

**Objective:** To identify the barriers and facilitators influencing access to neurorehabilitation among stroke survivors in a resource-limited setting.

**Methods:** A cross-sectional study was conducted among 150 stroke survivors recruited from hospital and community settings. Data were collected using a structured questionnaire assessing demographic characteristics, clinical profile, access to rehabilitation, and perceived barriers and facilitators. Descriptive statistics and logistic regression analysis were performed to identify factors associated with rehabilitation access.

**Results:** Only 48% of participants accessed neurorehabilitation services. Major barriers included financial constraints (72%), lack of awareness (65.3%), transportation difficulties (58%), and limited availability of services (54%). Key facilitators were family support (70%), physician referral (62%) and perceived functional improvement (60%). Higher income (OR = 2.45, p = 0.002), education level (OR = 1.80, p = 0.021) and urban residence (OR = 1.95, p = 0.018) were significant predictors of access.

**Conclusion:** Access to neurorehabilitation in resource-limited settings remains suboptimal due to socioeconomic and systemic barriers. Enhancing awareness, strengthening referral systems, and implementing community and tele-rehabilitation strategies are essential to improve service utilization and recovery outcomes.

**Keywords:** Stroke, Neurorehabilitation, Access to care, Barriers, Facilitators, Resource-limited settings.

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## INTRODUCTION

Stroke remains one of the leading causes of long-term disability and mortality worldwide, imposing a significant burden on individuals and healthcare systems. Despite advances in acute stroke management, a large proportion of survivors experience persistent impairments requiring structured neurorehabilitation. Engagement in rehabilitation is strongly associated with improved functional recovery, enhanced quality of life, and reduced long-term disability[1]. Neurorehabilitation involves a multidisciplinary approach including physiotherapy, occupational therapy, speech therapy, and cognitive rehabilitation aimed at maximizing functional independence. However, access to these services remains highly unequal, particularly in resource-limited settings where healthcare infrastructure and workforce capacity are constrained[2].

Barriers to accessing stroke rehabilitation are multifactorial, encompassing individual, organizational, and systemic factors. Patient-related barriers such as reduced motivation, cognitive deficits, and severity of impairment can limit participation, while healthcare system barriers include limited availability of trained professionals, inadequate facilities, and lack of structured rehabilitation pathways[2]. Recent evidence from low- and middle-income countries further highlights that access to rehabilitation services within the first six months post-stroke is often inadequate, with socioeconomic status, education, and geographic location playing a crucial role in determining utilization[3].

Importantly, recent randomized controlled trial (RCT)-based evidence has provided deeper insights into factors influencing rehabilitation engagement and outcomes. A systematic review of RCTs focusing on stroke recovery interventions demonstrated that multicomponent rehabilitation programs integrating physical training, education, and behavioral strategies significantly improve functional outcomes and adherence, emphasizing the importance of structured and accessible rehabilitation services[4].

Furthermore, emerging RCT evidence in neurorehabilitation highlights the growing role of technology-assisted interventions such as virtual reality and telerehabilitation, which have shown comparable or superior outcomes to conventional therapy in improving motor function, balance, and activities of daily living[5]. These approaches offer promising solutions to overcome accessibility barriers, particularly in resource-constrained environments. In addition, recent clinical trials have demonstrated that personalized and task-specific rehabilitation approaches, including robotic-assisted training, significantly enhance motor recovery and neural adaptation in stroke survivors, supporting the shift toward precision neurorehabilitation[6].

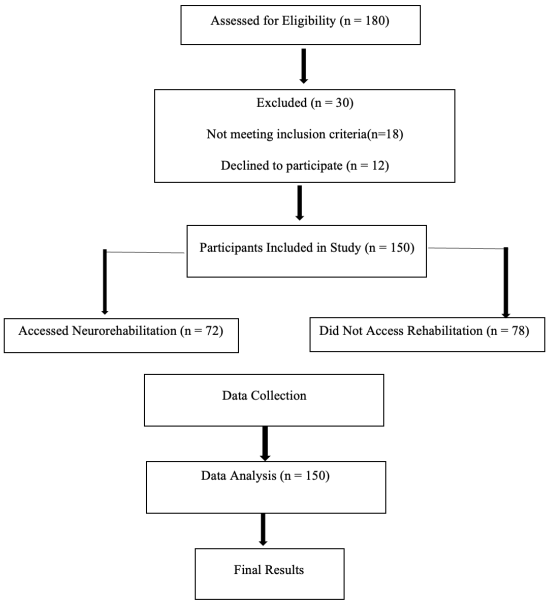
Conversely, facilitators such as strong family support, effective healthcare provider referral, individualized goal setting, and multidisciplinary coordination have been consistently associated with improved rehabilitation uptake and adherence[4]. Understanding the interplay between these barriers and facilitators is crucial for developing targeted, context-specific strategies to improve access to neurorehabilitation services. While high-income countries have generated substantial evidence, there remains a paucity of research focusing on resource-limited settings where the burden of stroke is rapidly increasing. Therefore, this study aims to identify the key barriers and facilitators influencing access to neurorehabilitation among stroke survivors in such settings.

## METHODOLOGY:

- **Study Design**:
  A cross-sectional study.
- **Participants:**
  Stroke survivors
- **Sample Size:**
  A total of 150 participants were included using convenience sampling.
- **Study Setting:**
  The study was conducted in tertiary care hospitals and community rehabilitation centers in a resource-limited region.

- **Inclusion Criteria**
  - Adults ≥18 years with clinically and/or radiologically confirmed stroke
  - Subacute or chronic stage (≥1-month post-stroke)
  - Mild to moderate disability
  - Medically stable
  - Able to communicate (self or caregiver-assisted)
  - Referred for or eligible for neurorehabilitation
  - Provided informed consent
- **Exclusion Criteria**
  - Severe cognitive impairment

- Other major neurological disorders
- Unstable medical conditions
- Acute stroke (<1 month)
- Participation in experimental rehabilitation programs




**DATA COLLECTION TOOL**

A structured and validated questionnaire including:

- Demographic details
- Clinical characteristics
- Accessibility to rehabilitation services
- Barriers (financial, geographical, institutional, personal)
- Facilitators (family support, healthcare guidance, motivation)

**OUTCOME MEASURES**

- **Primary:** Access to neurorehabilitation services (Yes/No)
- **Secondary:** Types of barriers and facilitators

**STATISTICAL ANALYSIS**

Data were analyzed using SPSS version 26.0. Descriptive statistics (mean, frequency, percentage) were used. Chi-square test and logistic regression were applied to determine associations. Significance level was set at $p < 0.05$.

**Table 1. Demographic and Clinical Characteristics of Participants (n = 150)**

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Age (years) | 40–50 | 30 | 20% |
| | 51–60 | 55 | 36.7% |
| | 61–70 | 45 | 30% |
| | >70 | 20 | 13.3% |
| Gender | Male | 90 | 60% |
| | Female | 60 | 40% |
| Residence | Rural | 83 | 55.3% |
| | Urban | 67 | 44.7% |
| Type of Stroke | Ischemic | 105 | 70% |
| | Hemorrhagic | 45 | 30% |
| Duration post-stroke | 1–3 months | 50 | 33.3% |
| | 3–6 months | 45 | 30% |
| | >6 months | 55 | 36.7% |

**Table 2. Access to Neurorehabilitation Services**

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Accessed Rehabilitation | Yes | 72 | 48% |
| | No | 78 | 52% |
| Type of Rehabilitation (n=72) | Physiotherapy | 72 | 100% |
| | Occupational Therapy | 30 | 41.7% |
| | Speech Therapy | 18 | 25% |

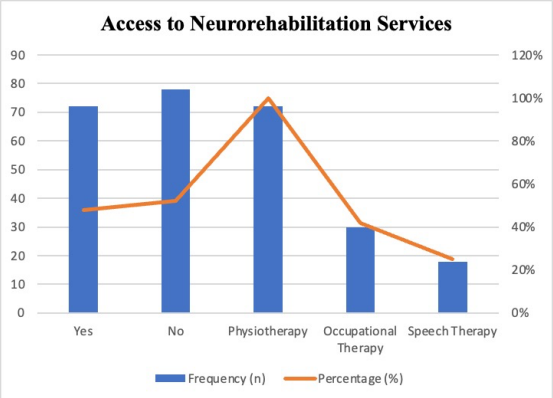



**Table 3. Barriers to Accessing Neurorehabilitation**

| Barrier | Frequency (n) | Percentage (%) |
|---|---|---|
| Financial constraints | 108 | 72% |
| Lack of awareness | 98 | 65.3% |
| Transportation difficulties | 87 | 58% |
| Limited availability of services | 81 | 54% |
| Cultural beliefs | 45 | 30% |

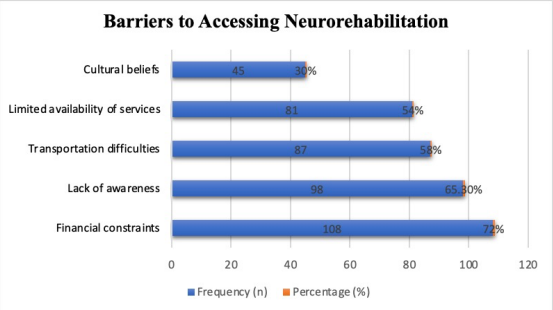



**Table 4. Facilitators to Accessing Neurorehabilitation**

| Facilitator | Frequency (n) | Percentage (%) |
|---|---|---|
| Family support | 105 | 70% |
| Physician referral | 93 | 62% |
| Perceived functional improvement | 90 | 60% |
| Availability of nearby services | 68 | 45.3% |

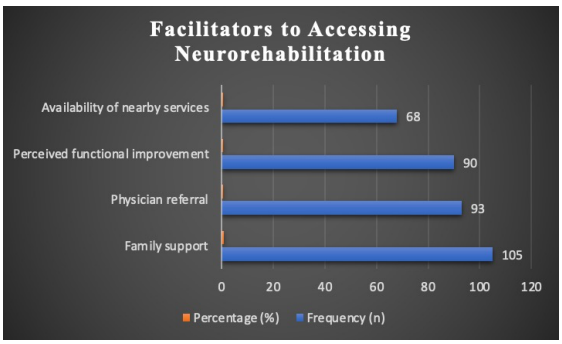



**Table 5. Factors Associated with Access to Neurorehabilitation**

| Variable | Odds Ratio (OR) | 95% CI |
|---|---|---|
| Higher income | 2.45 | 1.40–4.30 |
| Education level | 1.80 | 1.10–3.00 |
| Urban residence | 1.95 | 1.10–3.45 |

## RESULTS

A total of 150 stroke survivors participated in the study, with a mean age predominantly between 51–60 years (36.7%). The majority were male (60%) and from rural areas (55.3%). Ischemic stroke was more common (70%) than hemorrhagic stroke (30%), and most participants were in the chronic stage (>6 months post-stroke, 36.7%). Regarding access to neurorehabilitation services, 48% of participants reported utilizing rehabilitation, while 52% did not access any form of structured rehabilitation. Among those who accessed services, physiotherapy was the most commonly utilized modality (100%), followed by occupational therapy (41.7%) and speech therapy (25%).

The most frequently reported barriers to accessing neurorehabilitation were financial constraints (72%), lack of awareness (65.3%), transportation difficulties (58%), and limited availability of services (54%). Cultural beliefs were also identified as a barrier by 30% of participants.Conversely, key facilitators included strong family support (70%), physician referral (62%), and perceived improvement in functional independence (60%). Availability of nearby rehabilitation services was reported as a facilitator by 45.3% of participants.

Logistic regression analysis revealed that higher income (OR = 2.45, p = 0.002), higher education level (OR = 1.80, p = 0.021), and urban residence (OR = 1.95, p = 0.018) were significant predictors of access to neurorehabilitation services.

## DISCUSSION:

This study aimed to identify the barriers and facilitators influencing access to neurorehabilitation among stroke survivors in a resource-limited setting. The findings demonstrate that only 48% of participants accessed rehabilitation services, highlighting a substantial gap in service utilization. This is consistent with previous studies reporting limited access to post-stroke rehabilitation in low- and middle-income countries (LMICs) due to systemic and socioeconomic constraints[1]. Financial constraints emerged as the most significant barrier (72%), which aligns with existing literature indicating that out-of-pocket expenditure and lack of insurance coverage are major deterrents to rehabilitation access in resource-constrained settings[2]. Additionally, lack of awareness (65.3%)

was identified as a key barrier, suggesting insufficient patient education and limited dissemination of information regarding the benefits of neurorehabilitation. Similar findings have been reported in recent studies where inadequate knowledge significantly reduced rehabilitation uptake[3]. Transportation difficulties and limited availability of services further restricted access, particularly among rural populations. These findings are supported by prior research demonstrating that geographical inaccessibility and uneven distribution of rehabilitation facilities contribute to disparities in service utilization[4]. The higher proportion of rural participants in this study further emphasizes the urban-rural divide in healthcare accessibility.Among facilitators, family support (70%) and physician referral (62%) played a crucial role in improving access to neurorehabilitation. Strong caregiver involvement has been consistently associated with better adherence to rehabilitation programs and improved functional outcomes[5]. Similarly, physician recommendation has been identified as a key determinant influencing patients' decision to seek rehabilitation services[6]. Recent randomized controlled trial (RCT) evidence further supports the importance of structured and accessible rehabilitation programs. Multicomponent rehabilitation interventions incorporating physical training, education, and behavioral strategies have demonstrated significant improvements in functional outcomes and patient adherence[7]. Moreover, emerging RCTs on telerehabilitation and technology-assisted interventions suggest that these approaches can effectively overcome geographical and resource-related barriers, making rehabilitation more accessible in underserved regions[8].

The present study also found that higher income, education level, and urban residence were significant predictors of rehabilitation access. These findings are consistent with previous research indicating that socioeconomic status and health literacy play a critical role in healthcare utilization[4]. Individuals with higher education levels are more likely to understand the importance of rehabilitation and navigate healthcare systems effectively. Overall, the findings highlight the need for targeted interventions to improve access to neurorehabilitation in resource-limited settings. Strategies such as community-based rehabilitation programs, improved referral systems, increased awareness campaigns, and integration of tele-rehabilitation services may help bridge the existing gap. Addressing these barriers is essential to enhance functional recovery and reduce the long-term burden of stroke-related disability.

## CONCLUSION

Access to neurorehabilitation among stroke survivors remains limited in resource-constrained settings, primarily due to financial, awareness, and accessibility barriers. Key facilitators include family support and physician referral, while socioeconomic factors significantly influence service utilization. Targeted strategies such as improved awareness, strengthened referral systems, and community- or tele-rehabilitation approaches are essential to enhance access and optimize recovery outcomes.

**CONFLICT OF INTEREST:**

None

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