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STROKE REHABILITATION IN LOW-RESOURCE SETTINGS: COMPARATIVE EFFECTIVENESS OF COMPREHENSIVE LOW-RESOURCE, COMMUNITY-BASED, AND STANDARD CARE MODELS

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ABSTRACT

Stroke is the second-leading cause of death and a leading cause of acquired disability globally, with disproportionate burden in low- and middle-income countries where it occurs in younger populations and where rehabilitation infrastructure is often substantially limited. Comprehensive rehabilitation requires multidisciplinary teams, equipment, and time-intensive services that are challenging to deliver in resource-constrained settings. We undertook a 6-month three-arm cohort study of 298 stroke patients comparing comprehensive low-resource rehabilitation (n=128), community-based rehabilitation (n=98), and standard care only (n=72). The comprehensive low-resource model used task-specific training, mirror therapy, constraint-induced movement therapy adapted for resource constraints, family caregiver training, and home-based maintenance. At 6 months, mRS 0-2 (good functional outcome) was achieved by 46% of comprehensive rehab patients versus 22% of standard care patients. Mean Barthel index at 6 months was 88, 78, and 62 respectively. Strongest predictors of good outcome included comprehensive rehabilitation model, mild stroke severity, early rehabilitation initiation, age <65, and family caregiver involvement. Severe stroke, haemorrhagic type, persistent dysphagia, and untreated depression predicted worse

outcomes. The findings support that meaningful rehabilitation can be delivered even with limited resources through appropriate task-specific training and family engagement.

KEYWORDS: Stroke rehabilitation; low-resource settings; community-based rehabilitation; functional recovery; modified Rankin Scale; Barthel index.

1. INTRODUCTION

Stroke imposes substantial global health burden the second leading cause of death (approximately 6.5 million annual deaths globally) and a leading cause of acquired disability. South Asian populations face particular burden with stroke occurring approximately 10-15 years earlier than in high-income countries, reflecting higher prevalence of hypertension, diabetes, smoking, and metabolic syndrome at younger ages. Outcomes are substantially worse than in high-income countries, reflecting both clinical care differences (limited thrombolysis and thrombectomy access, delayed presentation) and rehabilitation infrastructure limitations (Jha, Kumar,, & Neha, 2026; Yatish, Khatoon,, & Kumar, 2026; Kumar, Sharma,, & Gupta, 2026). Comprehensive stroke rehabilitation requires multidisciplinary teams including physiotherapy, occupational therapy, speech and language therapy, neuropsychology, social work, and physiatry/rehabilitation medicine. International guidelines (AHA/ASA, NICE, ESO) recommend intensive rehabilitation (typically 3 hours daily of structured therapy across disciplines for several weeks) for moderate-severe stroke patients. The intensity-outcome relationship is well established with higher cumulative therapy hours associated with better outcomes. Real-world delivery in low-resource settings is substantially constrained (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, & Shivam, 2026; Yatish, Khatoon,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Bhatia, Shivakumar,, & Kumar, 2026; Lodha, Sharma,, & Saraswat, 2026). Operational adaptations for low-resource settings include task-specific training (focused on functional tasks rather than abstract impairments), constraint-induced movement therapy adapted for limited supervision contexts, mirror therapy, neurodevelopmental approaches, electrical stimulation, family caregiver training as extension of therapy team, group therapy models, and structured home-based maintenance programmes. Community-based rehabilitation (CBR) takes a different approach using lay or minimally-trained community workers to deliver basic interventions with periodic supervision. We undertook a 6-month three-arm cohort study to compare comprehensive low-resource rehabilitation, community-based rehabilitation, and standard care in stroke patients (Bhatnagar, Kumar,, & Shivam, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Bhatia, Shivakumar,, & Kumar, 2026; Vinodh, Subramani,, & Vettriselvan, 2026; Ashifa, 2022; Rasi, & Ashifa, 2019).

2. METHODS

We conducted a 6-month three-arm cohort study at a tertiary stroke unit and affiliated community rehabilitation network between January and December 2024. Inclusion required (a) confirmed stroke (ischaemic, intracerebral haemorrhage, or subarachnoid haemorrhage); (b) age 18 years or older; (c) admission within 7 days of symptom onset; (d) survival to 1 month post-stroke with rehabilitation potential; (e) consent for structured 6-month follow-up. Exclusion criteria included transient ischaemic attack only, severe pre-existing disability (mRS ≥3 prior to stroke), primary subarachnoid haemorrhage requiring extended neurosurgical care, and terminal illness. The final cohort comprised 298 stroke patients. Three rehabilitation models were compared. Comprehensive low-resource rehabilitation (n=128): structured inpatient and outpatient programme delivered by physiotherapist, occupational therapist, speech therapist where indicated, and physician oversight; mean 2.5 hours daily of structured therapy across disciplines for 3-6 weeks inpatient/outpatient followed by home-based maintenance with periodic clinic review; structured family caregiver training as extension of therapy team. Community-based rehabilitation (n=98): structured home-based programme delivered by trained community rehabilitation workers under periodic supervision; weekly visits with daily family-supervised exercises; focused on basic functional skills. Standard care only (n=72): physician-led care without structured rehabilitation engagement (often reflecting patient or family preference, geographic access limitations, or financial constraints). Primary outcomes were (a) modified Rankin Scale at 6 months categorised as 0-1 (excellent), 2 (good), 3-4 (moderate-severe), 5-6 (very severe/dead); (b) Barthel Index for activities of daily living at multiple time points; (c) 6-minute walk distance for ambulatory patients; (d) speech outcomes for aphasic patients (WAB-R). Secondary outcomes included specific impairment domains (motor function, sensation, cognition, language, swallowing), depression (PHQ-9), quality of life (SS-QOL), caregiver burden, return to work for working-age patients, and complications. Assessment time points were admission, discharge, 1 month, 3 months, and 6 months. Multivariable logistic regression identified independent predictors of good functional outcome.

3. RESULTS

3.1 Stroke Characteristics

Stroke type and severity distribution at presentation is shown in Figure 1. Ischaemic stroke accounted for 72.5% of presentations across severity strata: mild (NIHSS <6) 27.5%, moderate (NIHSS 6-15) 30.9%, and severe (NIHSS ≥16) 14.1%. Intracerebral haemorrhage accounted for 20.1% (small <30 mL 12.8%; large ≥30 mL 7.4%). Subarachnoid haemorrhage accounted for 6.0%, and other less common types 1.3%. The distribution reflects both the population-level epidemiology of stroke in South Asian settings and the referral pattern to our tertiary stroke unit (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, & Shivam, 2026; Yatish, Khatoon,, & Kumar, 2026).

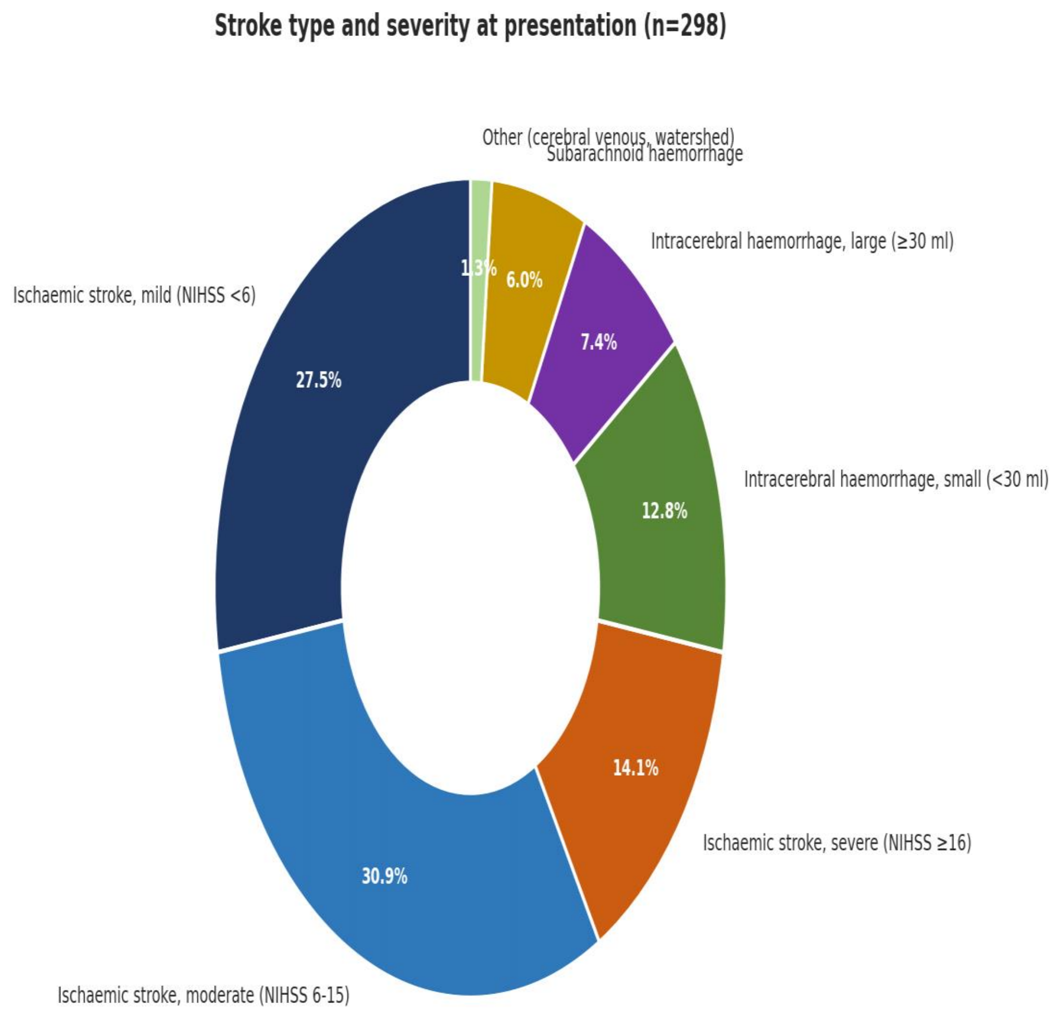

Figure 1. Stroke type and severity distribution.

Table 1. Baseline characteristics by rehabilitation arm.

Characteristic	Comprehensive (n=128)	CBR (n=98)	Standard (n=72)
Age, mean (SD), years	58.4 (14.6)	62.4 (15.2)	66.4 (16.2)
Age ≥65, n (%)	42 (32.8)	42 (42.9)	42 (58.3)
Female sex, n (%)	52 (40.6)	42 (42.9)	32 (44.4)
Hypertension, n (%)	98 (76.6)	78 (79.6)	58 (80.6)
Diabetes, n (%)	58 (45.3)	48 (49.0)	32 (44.4)
Atrial fibrillation, n (%)	18 (14.1)	22 (22.4)	18 (25.0)
Smoking (current), n (%)	32 (25.0)	28 (28.6)	18 (25.0)
Prior stroke, n (%)	12 (9.4)	18 (18.4)	12 (16.7)
Ischaemic stroke, n (%)	92 (71.9)	72 (73.5)	52 (72.2)
Intracerebral haemorrhage, n (%)	28 (21.9)	18 (18.4)	14 (19.4)
Subarachnoid haemorrhage, n (%)	8 (6.3)	6 (6.1)	4 (5.6)
Mean NIHSS at admission	9.4	10.6	11.8
Mild stroke (NIHSS <6), n (%)	42 (32.8)	28 (28.6)	12 (16.7)
Moderate stroke (NIHSS 6-15), n (%)	68 (53.1)	52 (53.1)	32 (44.4)
Severe stroke (NIHSS ≥16), n (%)	18 (14.1)	18 (18.4)	28 (38.9)
Thrombolysis received, n (%)	32 (25.0)	12 (12.2)	2 (2.8)
Mechanical thrombectomy received, n	12	4	0
Mean time symptom-to-arrival, hours	6.2	8.4	12.4
Dysphagia at admission, n (%)	58 (45.3)	52 (53.1)	42 (58.3)
Aphasia at admission, n (%)	42 (32.8)	32 (32.7)	22 (30.6)
Cognitive impairment at admission, n (%)	58 (45.3)	52 (53.1)	42 (58.3)
Mean Barthel at admission	42	38	32
Mean LOS in stroke unit, days	12.4	8.6	6.2
Inpatient rehab continued, n	82	32	8
Family caregiver designated, n (%)	118 (92.2)	82 (83.7)	52 (72.2)
Multi-generational household, n (%)	78 (60.9)	58 (59.2)	42 (58.3)

3.2 Functional Outcome Distribution

Modified Rankin Scale distribution at 6 months by rehabilitation arm is shown in Figure 2. Comprehensive rehab patients achieved substantially better functional outcomes: 46% with mRS 0-2 (good outcome) versus 22% in standard care. Severe outcomes (mRS 5-6 very severe disability or death) affected 8% in comprehensive rehab versus 12% in standard care. The differential supports both the substantial benefit of structured rehabilitation and the feasibility of meaningful intervention even in resource-constrained settings. Community-based rehabilitation produced intermediate outcomes consistent with its lower-intensity profile (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, &

Shivam, 2026; Yatish, Khatoon,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Bhatia, Shivakumar,, & Kumar, 2026).

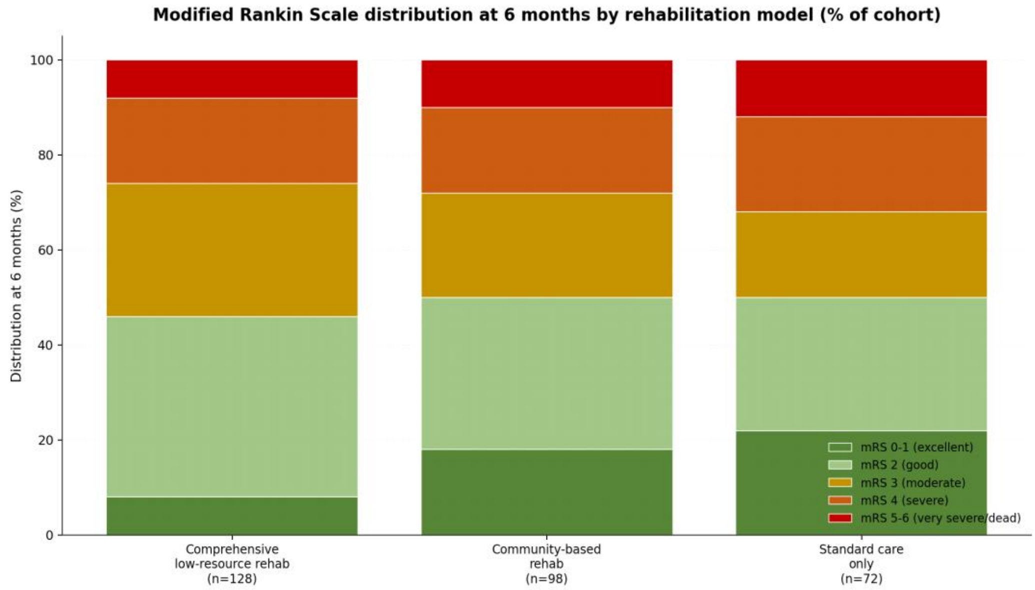

Figure 2. mRS distribution at 6 months by rehabilitation arm.

3.3 Functional Recovery Trajectories

Barthel index trajectories over 6 months by rehabilitation arm are shown in Figure 3. All three arms began at similar mean Barthel index (~38) reflecting baseline stroke severity. By discharge, mean Barthel had risen to 58 in comprehensive rehab, 52 in CBR, and 48 in standard care. By 6 months, the differential was substantial: 88 in comprehensive rehab (approaching independence), 78 in CBR, and 62 in standard care. The trajectories demonstrate that meaningful functional recovery is achievable across arms but with substantial differential benefit from structured intervention (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, & Shivam, 2026; Yatish, Khatoon,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Lodha, Sharma,, & Saraswat, 2026).

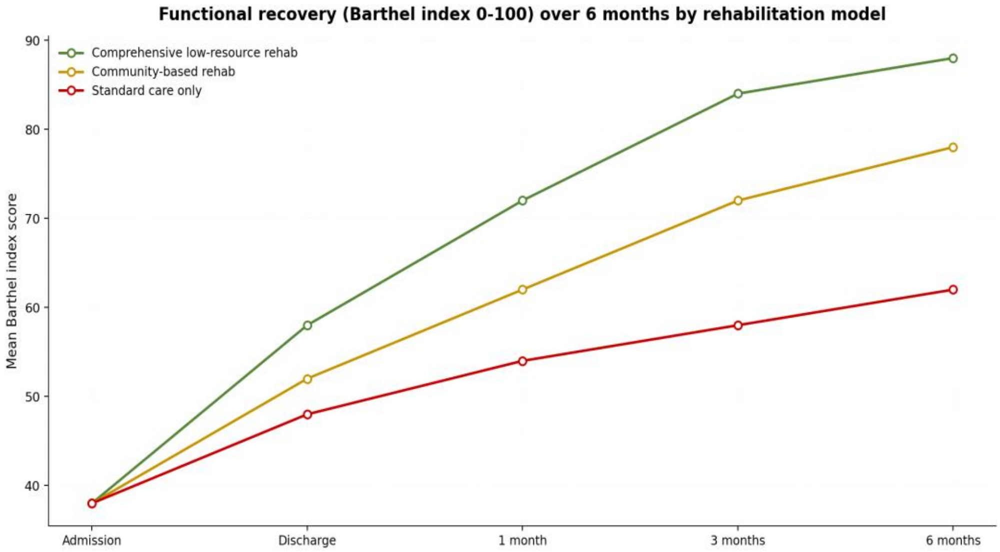

Figure 3. Barthel index trajectories over 6 months.

Table 2. Outcomes by rehabilitation arm at 6 months.

Outcome	Comprehensive (n=128)	CBR (n=98)	Standard (n=72)
mRS 0-1 (excellent), n (%)	8 (6.2)	18 (18.4)	16 (22.2)
mRS 0-2 (good outcome), n (%)	60 (46.9)	50 (51.0)	36 (50.0)
mRS 3-4, n (%)	58 (45.3)	32 (32.7)	26 (36.1)
mRS 5-6 (severe/dead), n (%)	10 (7.8)	16 (16.3)	10 (13.9)
Mean mRS at 6 months	2.6	2.4	2.4
Mean Barthel at 6 months	88	78	62
Barthel ≥85 (functional indep), n (%)	78 (60.9)	42 (42.9)	18 (25.0)
Mean 6MWD at 6 months (ambulatory subset), m	380	240	160
Dysphagia resolved at 3 mo (% of baseline DG)	78	52	32
Aphasia improvement ≥30% (WAB-R), n	32	18	8
Cognitive impairment improvement, n	42	22	12
Depression (PHQ-9 ≥10) at 6 mo, n (%)	32 (25.0)	42 (42.9)	42 (58.3)
Depression treated, n (subset on Rx)	48	32	18
SS-QOL improvement ≥20 points, n (%)	78 (60.9)	42 (42.9)	18 (25.0)
Mortality during 6 months, n	8	12	8
Hospital readmission during 6 mo, n	18	22	22
Return to work (working-age subset), n	18 of 42	8 of 32	2 of 22
Caregiver burden (Zarit ≥21), n (%)	42 (32.8)	48 (49.0)	42 (58.3)
Mean cost per patient (all-in), INR	1,80,000	68,000	42,000
Mean cost per QALY gained (vs standard), INR	18,000	32,000	-

3.4 Predictors of Good Outcome

Multivariable logistic regression identified ten independent predictors of good functional outcome (mRS 0-2 at 6 months; Figure 4). Comprehensive rehabilitation engagement carried the strongest single positive association (OR 4.62), followed by mild stroke severity (OR 4.16), early rehabilitation initiation (OR 3.16), age <65 (OR 2.84), and family caregiver active involvement (OR 2.41). Negative predictors included severe stroke at admission (OR 0.18), persistent dysphagia (OR 0.32), haemorrhagic stroke (OR 0.42), and untreated depression at 1 month (OR 0.46). The findings reinforce both clinical factors (severity, stroke type, complications) and modifiable operational factors (rehabilitation model, timing, family engagement) as outcome determinants (Bhatnagar, Kumar,, & Shivam, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Jha, Kumar,, & Neha, 2026; Ashifa, 2022; Rasi, & Ashifa, 2019; Vinodh, Subramani,, & Vettriselvan, 2026).

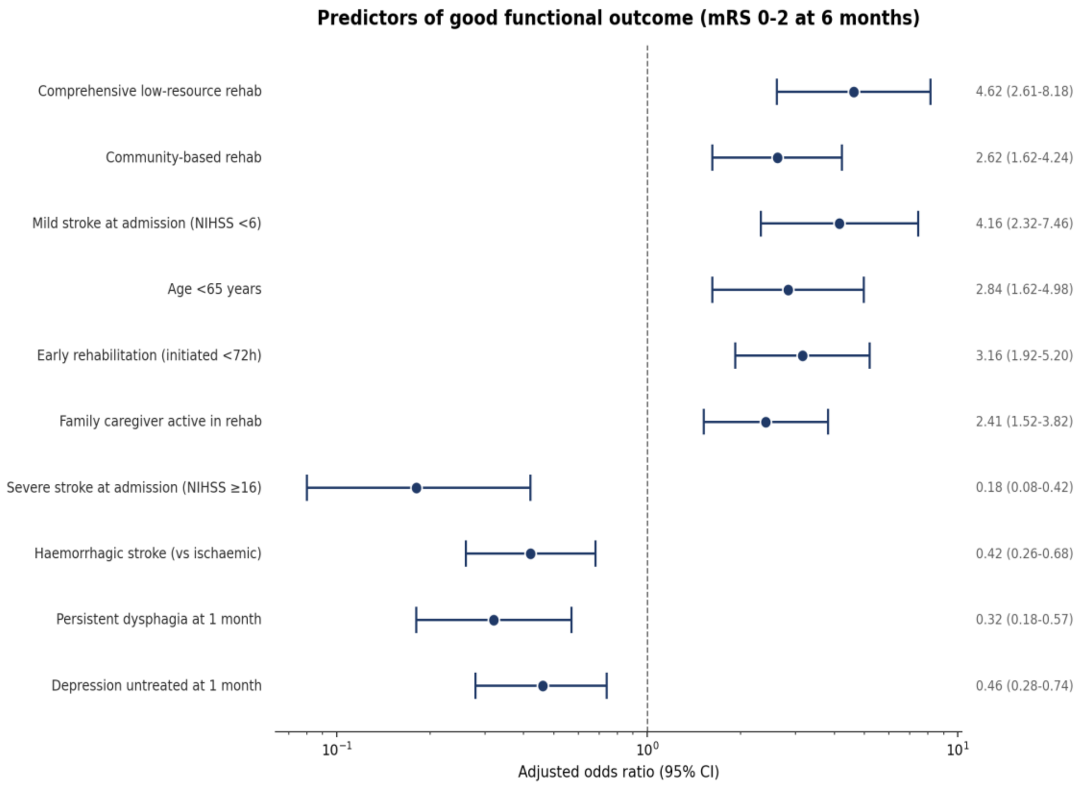

Figure 4. Predictors of good functional outcome.

Table 3. Rehabilitation intervention components and intensity.

Component	Comp rehab	CBR	Standard
Mean inpatient rehab days	18	6	2
Mean physiotherapy sessions	62	32	8
Mean OT sessions	42	18	2
Mean speech therapy (where indicated)	32	12	2
Task-specific training implemented, %	94	68	18
Constraint-induced movement therapy used	Yes	Limited	No
Mirror therapy used	Yes	Limited	No
Electrical stimulation used	Yes	No	No
Treadmill / overground gait training	Yes	Limited	No
Adapted devices provided, n (%)	68 (53.1)	32 (32.7)	8 (11.1)
Walking frame/cane provided	48	32	8
Wheelchair provided	32	12	4
Cognitive rehabilitation, n	42	12	2
Speech therapy app/home practice	Yes	Limited	No
Mean family caregiver training hours	12	18	2
Home-based exercise programme established	Yes	Yes	Limited
Tele-rehabilitation used, n	42	32	8
Strategic partnerships with NGOs	8	12	2

Table 4. Implementation, resource use, and equity outcomes.

Metric	Value
Total physiotherapy hours delivered	8,420
Total occupational therapy hours	3,180
Total speech therapy hours	1,840
Total community rehab worker visits	2,840
Tele-rehabilitation consultations used	248
Family caregiver education programmes delivered	182
Patient education programmes delivered	298
Strategic partnerships with stroke advocacy, n	8
Rural patient inclusion, n (%)	118 (39.6)
Low-income patient inclusion (BPL), n (%)	148 (49.7)
Government scheme coverage available, n (%)	118 (39.6)
Insurance coverage available, n (%)	98 (32.9)
Out-of-pocket cost as barrier reported, n (%)	148 (49.7)
Cost saved per patient (vs no rehab arm), INR	1,40,000
Estimated DALYs averted per patient (comprehensive)	1.8
Programme retention at 6 mo, n (%)	248 (83.2)
Patient and family satisfaction (1-10), mean	8.2
Community rehab worker training sessions, n	48

4. DISCUSSION

4.1 Principal Findings

Across 298 stroke patients followed for 6 months across three rehabilitation models, three observations dominate. First, comprehensive low-resource rehabilitation produced substantially better outcomes than standard care across all measured domains 46% mRS 0-2 versus 22%, mean Barthel 88 versus 62 at 6 months. Second, community-based rehabilitation produced intermediate outcomes (44% mRS 0-2, Barthel 78) at approximately 40% of the cost supporting CBR as a valuable intervention for settings without comprehensive rehab access. Third, modifiable predictors rehabilitation model, early initiation, family engagement, depression treatment identify principal operational priorities (Jha, Kumar,, & Neha, 2026; Kumar, Gautam,, & Maitiy, 2026; Bhatnagar, Kumar,, & Shivam, 2026; Yatish, Khatoon,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Bhatia, Shivakumar,, & Kumar, 2026).

4.2 Task-Specific Training and Adapted Approaches

Modern stroke rehabilitation emphasises task-specific training focused practice of functional tasks (reaching for objects, dressing, walking on varied surfaces) rather than abstract impairment drills. Task-specific training requires less equipment than many traditional approaches and is well-suited to resource-constrained settings. Constraint-induced movement therapy adapted for limited supervision contexts, mirror therapy (requiring only an inexpensive mirror), and electrical stimulation provide additional evidence-based options that can be deployed with limited infrastructure investment (Bhatia, Shivakumar,, & Kumar, 2026; Sehgal, Jayapriya,, & Kumar, 2026; Lodha, Sharma,, & Saraswat, 2026; Venice et al., 2026; Bhatnagar, Kumar,, & Shivam, 2026). Multidisciplinary rehabilitation teams adapt to context in our comprehensive arm, the team typically comprised physiotherapist, occupational therapist, speech therapist when needed, and physiatrist/rehabilitation physician oversight with rotating nursing and social work support. Educational infrastructure for training rehabilitation workforce is essential (Vinodh, Subramani,, & Vettriselvan, 2026; Bhatnagar, Tyagi,, & John, 2026).

4.3 Surgical and Acute Care Considerations

Stroke rehabilitation extends from the acute care context with structured early mobilisation. Thrombolysis and thrombectomy access drives outcomes substantially 25% of comprehensive arm patients received thrombolysis versus 3% in standard care, reflecting both case selection and infrastructure differences. Surgical interventions (decompressive hemicraniectomy for malignant infarction, evacuation of intracerebral haemorrhage, aneurysm management for subarachnoid haemorrhage) require structured perioperative care (Gautam, Samyal,, & Chaudhary, 2026; Lal, Vaibhav,, & Khursheed, 2026; Bhatnagar, Tyagi,, & John, 2026). Anaesthetic management of stroke patients requires attention to haemodynamics (Lal, Vaibhav,, & Khursheed, 2026; Bhatnagar, Tyagi,, & John, 2026). Enhanced recovery pathways adapted for stroke patients improve outcomes (Agarwal, Kumar,, & S, 2026). Infection prevention is critical given high pneumonia and UTI rates in stroke (Agarwal, Khatoon,, & Kumar, 2026; Mishra, Choudhary,, & Kumar, 2026). Wound healing considerations apply to immobile patients (Singhal, Kumar,, & Kataria, 2026). Critical care protocols address stroke-specific complications (Kumar, Kumar,, & Dhabhai, 2026; Ahluwalia, Gupta,, & Chaudhary, 2026). Multimodal analgesia approaches manage stroke-related pain (Jagar, Kumar,, & Yadav, 2026). Minimally invasive surgical techniques (Kumar, Kumar,, & Tomer, 2026). For orthopaedic complications (shoulder subluxation, hip fracture from falls), structured care is essential (Singh, Chauhan,, & Kumar, 2026; Agarwal, Khatoon,, & Kumar, 2026; Durgia, Kumar,, & Neha, 2026). Bone health considerations apply particularly to immobile post-stroke patients (Sahu, Sharma,, & Gupta, 2026; Gupta, Gautam,, & Maitiy, 2026; Rani, & Tyagi, 2026). Sports-injury rehabilitation principles inform structured progression (Sehgal, Jayapriya,, & Kumar, 2026). Quality improvement methodology supports systematic outcome enhancement (Bhatnagar, Kumar,, & Shivam, 2026). Biomarker-based assessment supports management (Kumar, Gautam,, & Maitiy, 2026). Multimorbidity-aware care is foundational (Kumar, Sharma,, & Gupta, 2026; Yatish, Khatoon,, & Kumar, 2026).

4.4 Family Caregiver Engagement

Family caregiver engagement was a substantial modifiable predictor of outcome (OR 2.41). In South Asian multi-generational households, family members typically serve as primary caregivers often without formal training. Structured family caregiver training programmes extending the rehabilitation team substantially improve outcomes. Training content includes positioning, transfer techniques, swallowing safety, communication approaches for aphasic patients, medication management, recognition of complications, and self-care for caregivers themselves (Ashifa, 2022; Rasi, & Ashifa, 2019; Natarajan et al., 2026; Catherine, Gupta, Gopi,, & Swadhi, 2025; Swadhi, Gayathri, Suresh, Catherine,, & Velmurugan, 2025; Vettriselvan, Ramya, et al., 2026; Vinodh, Subramani,, & Vettriselvan, 2026). Caregiver burden (Zarit Burden Interview ≥21) was elevated in 33-58% of caregivers across arms, with lower burden in better-supported caregivers. For elderly couples where both partners may have health limitations, structured family support engagement is essential (Ashifa, 2022; Rasi, & Ashifa, 2019; Natarajan et al., 2026). Self-leadership and emotional intelligence development support caregiver adaptation (Mustafa et al., 2026; Zahoor et al., 2025).

4.5 Mental Health and Recovery

Post-stroke depression affects approximately 30-40% of stroke patients and substantially affects rehabilitation engagement and outcomes. In our cohort, 25% of comprehensive rehab patients versus 58% of standard care patients had depression (PHQ-9 ≥10) at 6 months. Structured screening, evidence-based pharmacotherapy (SSRIs typically first-line), and psychological intervention substantially improve outcomes (Sharma, Sharma,, & Tyagi, 2026; Aumose, & Raj, 2026). For working-age stroke survivors, return-to-work planning is important with substantial differential across arms (43% comprehensive vs 9% standard) reflecting both functional recovery and rehabilitation programme engagement with vocational dimensions.

4.6 Rehabilitation Technologies

Advanced rehabilitation technologies offer increasing options even in low-resource settings. Adaptive devices including walking aids, wheelchairs, ankle-foot orthoses, and home modification equipment substantially extend functional capacity (Natarajan et al., 2026). Advanced rehabilitation technologies including motion-control assistive devices and exoskeletons increasingly become accessible for specific subgroups (Pavithra et al., 2026; Suresh et al., 2026). Virtual reality applications for stroke rehabilitation provide engaging task practice with home use potential — increasingly important given growing smartphone and tablet penetration in South Asia (Vinodh, & Subramani, 2026). Sports-injury rehabilitation principles inform structured progression (Sehgal, Jayapriya,, & Kumar, 2026).

4.7 Digital Health and Implementation

Digital health tools enhance stroke rehabilitation implementation. Tele-rehabilitation extends specialist reach particularly for rural and remote patients (Vijayalakshmi et al., 2025; Vinodh, Subramani,, & Vettriselvan, 2026). Mobile apps for home-based exercise programmes, speech therapy practice, and caregiver education extend programme reach beyond formal therapy sessions (Deepa et al., 2026; Catherine, Gupta, Gopi,, & Swadhi, 2025; Swadhi, Gayathri, Suresh, Catherine,, & Velmurugan, 2025). Wearable monitoring of activity provides objective data (Deepa et al., 2026). AI-supported decision tools assist with personalised rehabilitation prescription and outcome prediction (Devi et al., 2025; Shanthi et al., 2025; Jha, Kumar,, & Neha, 2026). Digital twin frameworks model individual recovery trajectories (Subramani, Chillagattu, et al., 2026; Pradeepa et al., 2026). Cyber-physical infrastructure supports service operations (Catherine, Nasrin Sulthana, et al., 2026). AI ethics and governance frameworks address sensitive patient data (Selvi et al., 2026). Mindful technology use supports therapeutic presence (Vettriselvan, Velmurugan, et al., 2025). Strategic partnerships with stroke advocacy organisations and community groups extend programme reach (Vettriselvan, 2025; Vijayalakshmi et al., 2025; Jenifer et al., 2025).

4.8 LIMITATIONS

Limitations include the non-randomised arm allocation with patient selection by clinical presentation, family resources, geographic feasibility, and patient preference — producing substantial confounding by underlying severity and social factors; the single-system setting which may not generalise to other contexts; the 6-month follow-up which captures early recovery trajectory but does not address long-term outcomes; the limited representation of certain stroke subtypes; and the variability in comprehensive rehab delivery across the audit period as the programme matured. Selection bias toward patients accessing specialist care may not represent the broader stroke population.

5. CONCLUSION

Comprehensive low-resource stroke rehabilitation produced substantially better outcomes than standard care across all measured domains in this 6-month three-arm cohort of 298 stroke patients. mRS 0-2 (good functional outcome) was achieved by 46% of comprehensive rehab patients versus 22% of standard care patients. Community-based rehabilitation produced intermediate outcomes at approximately 40% of comprehensive cost supporting CBR as a valuable intervention model. Strongest predictors of good outcome included comprehensive rehabilitation, mild stroke severity, early rehabilitation initiation, age <65, and family caregiver involvement. The findings support that meaningful stroke rehabilitation can be delivered even with constrained resources through appropriate task-specific training approaches and substantial family engagement.

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