

# OUTCOMES OF STROKE SURVIVORS USING STROKE IMPACT SCALE FOR THE PATIENTS AT RAFSAN NEURO-REHAB CENTER

*Original Research*

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## ABSTRACT

**Background:** Stroke is a leading global cause of morbidity and mortality, significantly affecting survivors' quality of life (QOL) due to physical and psychological disabilities. These disabilities often result in long-term functional impairments, limiting independence and daily activities. Aging and gender are critical factors influencing stroke recovery, with physical domains particularly impacted in the elderly. Addressing modifiable risk factors is essential to minimize the adverse effects of stroke and improve the quality of life for survivors.

**Objective:** To assess the outcomes of stroke survivors using the Stroke Impact Scale (SIS) at Rafsan Neuro-Rehab Center.

**Methods:** A cross-sectional survey was conducted at Rafsan Neuro-Rehab Center from April to September 2024. A total of 118 stroke survivors aged 40–65 years, who experienced a stroke within the last 2–12 months, were included through convenience sampling. Patients with cognitive deficits or other neurological conditions were excluded. The Stroke Impact Scale was used to assess eight QOL domains, and SPSS 22 was employed for data analysis. Statistical significance was set at  $p < 0.05$ , and descriptive and inferential statistics were used to interpret the data.

**Results:** The mean age of participants was  $57.36 \pm 6.65$  years, with 44.1% aged 45–55 years and 55.9% aged 56–70 years. Physical function (Domain 1) significantly correlated with age group ( $p = 0.014$ ), stroke onset ( $p = 0.001$ ), and stroke type ( $p = 0.002$ ). The average stroke recovery score was  $29.06 \pm 16.99$ , with 23.7% achieving 10% recovery and 28% achieving 20% recovery. Other domains, including mood and emotions and community reintegration, were notably impacted, with significant disparities observed between genders.

**Conclusion:** Stroke profoundly impacts the quality of life, with the psychological and physical domains being most affected. Addressing modifiable risk factors and implementing age- and gender-sensitive rehabilitation strategies is crucial for improving recovery outcomes and overall QOL for stroke survivors.

**Keywords:** Cerebrovascular Accident, Disability, Physical Function, Psychological Domains, Quality of Life, Rehabilitation, Stroke.

## INTRODUCTION

Stroke remains one of the most significant chronic health conditions that healthcare systems worldwide will face in the coming years, largely due to its sudden onset and the lack of preparedness among caregivers to handle its aftermath (1, 2). It continues to be the leading cause of severe, long-lasting neurologic deficits and intentional disability, profoundly disrupting all aspects of a person's life (3, 4). Survivors of stroke often endure unexpected and distressing consequences, necessitating dramatic changes to their lifestyle, psychological well-being, and overall functional abilities (5, 6).

The Stroke Impact Scale (SIS) was developed in 1999 to comprehensively evaluate the multifaceted outcomes of stroke on survivors, taking into account patient-reported perceptions across eight key domains, including memory, social participation, hand function, and activities of daily living (ADL) (7, 8). The inclusion of a wide array of functional and health-related parameters makes SIS an invaluable tool for assessing the impact of stroke from the patient's perspective (1). Strokes, as defined by the American Stroke Association in 2012, occur when a clot bursts or obstructs a blood vessel, leading to irreversible damage to nervous system cells that are unable to regenerate (Stroke's Impact, 2002). This neurological assault profoundly alters the lives of those affected, with many struggling to accept their impairments, which often results in psychological distress, unwarranted optimism, or emotional exhaustion. These challenges are compounded by the significantly higher energy demands placed on stroke survivors during once-automatic movements, such as walking or reaching for objects (9).

Daily activities like dressing, bathing, and using the restroom become immensely challenging for stroke survivors, with functional outcomes varying based on the severity and location of the brain injury, as well as the individual's pre-existing condition (9). The effects of stroke also extend to motor and language functions, with many patients experiencing stiffness, spasticity, receptive aphasia, or dysarthria, which hinder their ability to communicate effectively or perform coordinated movements (10).

Stroke rehabilitation aims to enable survivors to regain as much independence as possible by retraining and restoring their ability to perform ADLs. A multidisciplinary team—comprising nurses, occupational therapists, physical therapists, speech and language pathologists, prosthetics specialists, psychologists, and social workers—works collaboratively to address the complex needs of stroke survivors (11). Rehabilitation efforts often include techniques like constraint-induced movement therapy to promote motor learning and strengthen the affected side of the body, helping patients re-learn functional tasks and adapt to their limitations (12, 13). These daily strategies are designed to permanently transform the lives of survivors by fostering improved functionality and better quality of life. However, stroke care remains underdeveloped and insufficiently addressed in many Asian countries, including Pakistan, highlighting a pressing need for comprehensive research to optimize care strategies (14).

The current study was conducted to evaluate the outcomes of stroke survivors at Rafsan Neuro-Rehab Center using the Stroke Impact Scale. The objective was to gain critical insights into the multifaceted challenges faced by these patients and to provide data-driven recommendations for improving post-stroke care techniques, ultimately enhancing recovery and satisfaction.

## METHODS

This cross-sectional study was conducted using a convenience sampling technique at Rafsan Neuro-Rehab Center. The study was carried out over six months, from April 2024 to September 2024. A sample size of 118 participants was determined using the OPENEPI platform, calculated with a confidence interval (CI) of 95%, an estimated improvement of 26.7%, and an absolute precision of 8% (15). Stroke patients were included if they met the inclusion criteria: they were aged between 40 and 65 years, had suffered a stroke within two to twelve months prior to enrollment, and had completed at least two months of a comprehensive physical therapy regimen. Both male and female participants were included.

Patients with other neurological disorders, lower limb deformities, contractures, or surgical conditions were excluded to ensure homogeneity in the assessment of stroke-related outcomes. Ethical approval for the study was obtained from Khyber Medical University's ethical committee and ASR&B, along with permission from the relevant departmental authorities. Data collection commenced following these approvals.

The sample size calculation, estimating a 26.7% improvement, was based on prior research and standard references available through the OPENEPI platform; however, this assumption should be further justified with explicit evidence or literature supporting this improvement percentage to enhance methodological rigor. Additionally, the inclusion criteria specifying a recovery window of 2 to 12 months post-stroke were chosen to ensure a focus on patients in the subacute to early chronic phase of recovery, where rehabilitation interventions are most impactful. This timeframe, while clinically relevant, may limit the applicability of the findings to patients outside this period and warrants consideration in the interpretation of results.

The Stroke Impact Scale (SIS) was utilized as the primary assessment tool to evaluate the outcomes of stroke survivors. This validated tool measures multiple dimensions of stroke impact, including physical, emotional, and social domains, to provide a comprehensive evaluation of the patient’s functional status (16). Data were systematically collected and entered into SPSS version 22 for statistical analysis. Descriptive and inferential statistical methods were employed to analyze the data, ensuring the findings were both robust and reliable.

## RESULTS

The study enrolled 118 participants, with an average age of 57.36±6.65 years. The majority (55.9%) were between 56-70 years, while 44.1% were aged 45-55 years. Males comprised 83.9% of the participants, with females representing 16.1%. Regarding stroke type, 80.5% of patients had hemorrhagic strokes, whereas 19.5% had ischemic strokes. The right side of the body was affected in 55.1% of participants, while the left side was affected in 44.9%. The onset of stroke varied significantly, with 41.5% reporting strokes occurring 12 months prior, followed by 11% at two months, and smaller percentages for intermediate durations.

Analysis of the Stroke Impact Scale (SIS) scores showed varied results across domains. Physical problems scored a mean of 38.02±27.21, with scores ranging from 0 to 87.5, while memory and thinking had the highest mean score of 71.39±33.28, with a range of 0 to 100. Mood and emotions averaged 56.14±14.72, with scores ranging from 13.89 to 88.89. Communication scored a mean of 64.10±34.97, while daily life activities, mobility, and hand function had mean scores of 35.21±26.15, 46.63±27.89, and 25.55±32.06, respectively. Community reintegration was notably low, with a mean score of 22.13±22.73. When comparing mean domain scores between age groups, physical problems showed a significant difference (p=0.014), while other domains, including memory, mood, and mobility, showed no significant correlation with age group. Gender analysis revealed males had significantly higher scores in memory and thinking (p=0.006), mood and emotions (p=0.003), daily life activities (p=0.005), mobility (p=0.000), and community reintegration (p=0.001).

Stroke onset significantly correlated with physical problems (p=0.001), mood and emotions (p=0.001), communication (p=0.003), daily life activities (p=0.001), mobility (p=0.000), and community reintegration (p=0.008). Recovery percentages revealed that 28% achieved 20% recovery, while only 5.9% attained 70% recovery. The average recovery score was 29.06±16.99, highlighting limited functional improvement across participants.

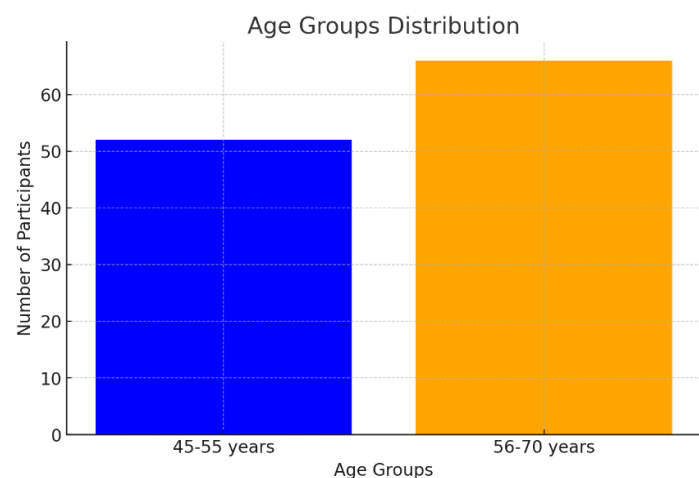


Figure 2 Age Groups Distribution

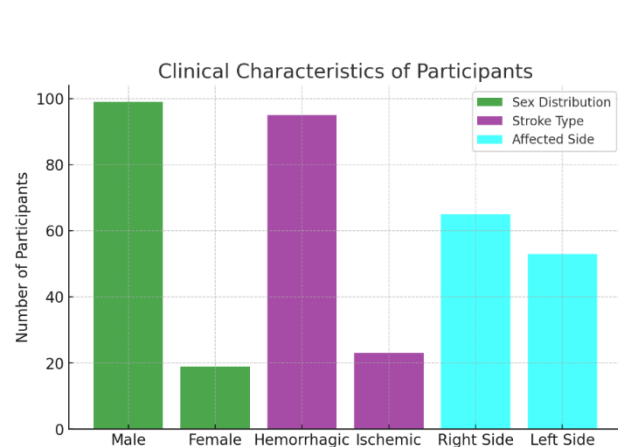


Figure 1 Clinical Characteristics of Participants

participants' average age was 57.36±6.65 years. 16.1% were female while the rest 99 (83.9%) were male. 19.5% patients had ischemic stroke and (80.5% had hemorrhagic stroke. There were 55.1% stroke patients with the right side and 44.9% with the left side.

**Table 1: Onset of stroke**

Onset of stroke in months	Frequency	Percent
2	13	11.0
3	8	6.8
4	6	5.1
5	8	6.8
6	9	7.6
7	5	4.2
8	6	5.1
9	7	5.9
10	4	3.4
11	3	2.5
12	49	41.5
Total	118	100.0

Of the participants 11% reported having had a stroke within the last two months 6.8% reported having had one within the last three months 5.1% reported having one within the last four months 6.8% and 2.5% reported having a stroke within the last eleven months.

**Table 2: Stroke Impact Scale (Sis) Transform Score**

	Mean± Standard Deviation	Minimum	Maximum
Physical problems	38.02±27.21	0	87.5
Memory & Thinking	71.39 ±33.28	0	100
Mood & Emotions	56.14 ±14.72	13.89	88.89
Communication with people	64.10±34.97	0	117.86
Daily life activities	35.21±26.15	0	95
Mobility in home & community	46.63±27.89	0	94.44
Hand Function	25.55±32.06	0	100
Community Re-Integration	22.13±22.73	0	87.5

Domain 1 (issues with the body) With a minimum score of 0.00 and a maximum score of 87.50 the mean score was  $38.03 \pm 27.22$ . Domain 2: Thinking and Memory With a minimum score of 0.00 and a maximum score of 100 the mean score was  $71.39 \pm 33.28$ . Domain 3: Emotions and Mode The average score was  $56.14 \pm 14.72$  the lowest was 13.89 and the highest was 88.89. Domain 4 (Interpersonal Communication Understanding and Hearing in Conversation) With a minimum score of 0.00 and a maximum score of 11.86 the mean score was  $64.10 \pm 34.97$ . Domain 5: Activities of Daily Life With a minimum score of 0.00 and a maximum score of 95.00 the mean score was  $35.21 \pm 26.15$ . Domain 6: Home and Community Mobility With a minimum score of 0.00 and a maximum score of 94.44 the mean score was  $46.63 \pm 27.89$ . Domain 7: Function of the hand The mean score was  $25.55 \pm 32.06$ ; the lowest and maximum scores were 0.00 and 100.00 respectively. Domain 8: Reintegration with the Community With a minimum score of 0.00 and a maximum score of 87.50 the mean score was  $22.13 \pm 22.73$ .

**Table 3: Comparison of mean score of 8 domains between age group**

Domains	Age group 1n=[52] (45-55 years)	Age group 2n=66 (56-70 years)	p-value
Physical problems	31.13±24.89	43.47±27.91	0.014
Memory and Thinking	68.68±35.06	73.54±31.91	0.434
Mood and Emotions	55.29±16.30	56.81±13.44	0.578
Communication	65.31±34.98	63.15±35.21	0.740
Daily life activities	30.86±25.64	38.63±26.23	0.109
Mobility at home & Community	45.14±28.07	47.81±27.90	0.607
Hand function	21.63±33.29	28.64±30.96	0.241
Community Reintegration	23.02±27.97	21.45±17.76	0.712

Comparison of mean score of 8 domains between Male and Female

Domains	Male	Female	p-value
	Mean± SD	Mean± SD	
Physical Problems	39.96±27.44	27.96±24.24	0.78
Memory and thinking	75.07±31.78	52.26±35.22	0.006
Mood and Emotions	57.88±13.43	47.08±18.01	0.003
Communication	66.63±35.45	50.94±29.85	0.073
Daily life activities	38.16±26.71	19.87±16.30	0.005
Mobility at home	50.65±27.02	25.73±23.09	0.000
Hand function	28.03±33.07	12.63±22.75	0.055
Community Reintegration	25.03±23.28	7.07±11.16	0.001

Domain 1 and age group are significantly correlated ( $p=0.014$ ). Domain 2 and age group do not significantly correlate ( $p=0.434$ ). Domain 3 and age group do not significantly correlate ( $p=0.578$ ). Domain 4 and age group do not significantly correlate ( $p=0.740$ ). Domain 5 and age group do not significantly correlate ( $p=0.109$ ). Domain 6 and age group do not significantly correlate ( $p=0.607$ ). Domain 7 and age group do not significantly correlate ( $p=0.241$ ). Domain 8 and age group do not significantly correlate ( $p=0.712$ ). With the exception of area 1 (physical issues) none of the domains showed a significant correlation with age group ( $P\text{-value}<0.05$ ).

When all the domains and participant gender were analyzed domains 1 4 and 7 showed no significant correlation (p value <0.05) while domains 2 3 5 6 and 8 showed significant association (p value >0.05) with gender with males doing better than females.

**Table 4: Comparison of mean score among Onset of stroke**

	Onset groups		P-value
	2-6 Months	7-12 Months	
Domain	Mean±SD	Mean±SD	
Physical Problems	27.70±26.70	44.17±25.79	0.001
Memory and Thinking	64.53±36.15	75.48±30.99	0.084
Mood and Emotions	50.63±15.54	59.42±13.27	0.001
Communication	51.95±34.11	71.33±33.66	0.003
Daily life activities	24.89±22.11	41.35±26.56	0.001
Communication	34.47±28.37	53.87±25.11	0.000
Hand function	22.39±29.04	27.43±33.78	0.411
Community Reintegration	14.99±23.06	26.39±21.59	0.008

Domain 1 and stroke onset are significantly correlated (p=0.001). There is no significant correlation between Domain 2 and the onset of stroke (p=0.084). Domain 3 and the onset of stroke are significantly correlated (p=0.001). Domain 4 and the onset of stroke are significantly correlated (p=0.003). Domain 5 and the onset of stroke are significantly correlated (p=0.001). Domain 6 and stroke onset are significantly correlated (p=0.000). There is no significant correlation between Domain 7 and the onset of stroke (p=0.411). Domain 8 and the onset of stroke are significantly correlated (p=0.008).

**Table 5: Percentage wise stroke recovery among participants**

Stroke Recovery		
Valid	Frequency	Percent
10	28	23.7
20	33	28.0
30	16	13.6
40	18	15.3
50	16	13.6
70	7	5.9
Total	118	100.0

The average score for stroke recovery was  $29.06 \pm 16.99$ . Twenty-eight (23.7%) thirty-three (28%) sixteen (13.6%) sixteen (13.6%) sixteen (13.6%) and seven (5.9%) participants experienced a stroke recovery of 70% twenty-eight (23.7%) thirty-three (28%) sixteen (13.6%) forty percent fifty percent and seven (5.7%).

## DISCUSSION

The findings of the current study align with previous research, which suggests that stroke predominantly affects older individuals, with a higher incidence among males compared to females (17-19). This study observed that the majority of participants experienced hemorrhagic strokes, a trend reflective of the clinical practice in Pakistan, where hemorrhagic cases are more frequent than ischemic strokes. This contrasts with global data, which often reports ischemic strokes as more prevalent (20-22). The disparity may stem from regional differences in risk factors such as uncontrolled hypertension and limited access to preventive care.

The study demonstrated that stroke adversely impacts all eight domains of the Stroke Impact Scale (SIS), confirming findings reported by Richardson et al. (23). Among these domains, physical function was found to be significantly more impaired in older participants (ages 56–70) compared to younger participants (ages 45–55), aligning with evidence that physical abilities tend to decline with age (24). In contrast, other domains such as mood, memory, and social reintegration did not exhibit significant age-related differences, suggesting that age-specific interventions should prioritize physical rehabilitation.

Gender-based analysis revealed significant disparities across most SIS domains, except for physical function, with males demonstrating better outcomes compared to females. This gender-based variation may be influenced by cultural and societal factors in the Pakistani context. Pashtoon women, due to cultural and religious beliefs, face barriers to accessing male therapists, limiting their rehabilitation options. The Rafsan Neuro-Rehab Center addressed these challenges by providing separate female wards and therapy facilities. Nonetheless, these cultural constraints likely impacted female participants' recovery and quality-of-life outcomes. Such findings emphasize the need for culturally tailored rehabilitation strategies to ensure equitable care for female patients.

The study also revealed no significant differences in the impact of right- versus left-sided strokes across most domains, nor between ischemic and hemorrhagic stroke types. This suggests that the functional and psychosocial impact of stroke is multifaceted and influenced by factors beyond the type or location of the stroke (28). While these results provide valuable insights, the study's limitations, including a small sample size, lack of follow-up, and the inclusion of participants from a single rehabilitation center, restrict its generalizability. Future studies with larger sample sizes and multi-center designs are recommended to further elucidate the comprehensive effects of stroke on survivors' quality of life and to develop targeted interventions to optimize recovery outcomes.

A comparative study conducted by Zahra et al. (2021) evaluated gender-based differences in stroke rehabilitation outcomes across various domains using the Stroke Impact Scale (SIS) in a cohort of 150 patients. The study, which was performed at two tertiary care hospitals in Iran, found that male participants consistently scored higher in memory and thinking, mobility, and community reintegration domains compared to females. These findings align with the current study, emphasizing the role of cultural and societal factors influencing gender disparities in stroke recovery. Zahra et al. attributed these differences to better access to physical therapy services and social support systems for males, while female participants faced limitations due to cultural norms and caregiving responsibilities. Interestingly, both studies highlighted no significant differences in physical function between genders, underscoring the potential universality of motor impairments post-stroke. This comparative evidence further reinforces the need for gender-sensitive rehabilitation strategies, particularly in regions with cultural constraints (29).

This study's strength lies in its holistic assessment of stroke outcomes using the SIS, providing a comprehensive understanding of the functional, emotional, and social dimensions affected by stroke. However, addressing the highlighted limitations is crucial for advancing knowledge and improving post-stroke care practices.

## CONCLUSION

Stroke significantly impacts the quality of life of survivors, with aging contributing to greater impairment in physical aspects, particularly in elderly individuals. Gender differences influence various non-physical aspects of quality of life, but physical domains remain universally affected across all groups. The findings highlight the importance of addressing modifiable risk factors to minimize the long-term impact of stroke and improve the overall quality of life for survivors. Tailored interventions focusing on age, gender, and culturally sensitive rehabilitation approaches are essential to optimize recovery and ensure holistic care for stroke patients.

## AUTHOR CONTRIBUTIONS

Author	Contribution
Gohar Rehman	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Muhammad Asif Tuseef	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Muhammad Zeshan Ahmad	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Hifza Riaz	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Nazir Ahmed	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Rabia Kanwal	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Muhammad Ilyas	Contributed to study concept and Data collection Has given Final Approval of the version to be published
Rafia Imtiaz*	Writing - Review & Editing, Assistance with Data Curation

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