

Exploring the Association Between Cognitive Behavior and Quality of Life in Acute Stroke Patients in Pakistan

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This study has no aim to hurt any ideological or social segment but is purely based on academic purposes.

Abstract

This study investigates the association between cognitive behavior and quality of life in acute stroke patients within Pakistan, emphasizing how cognitive impairments influence daily functioning and independence. Conducted through a cross-sectional survey with 259 patients aged 40 to 70 from various government and semi-government hospitals, the research utilized the Behavior Assessment Scale and Functional Independence Scale to evaluate the relationship. Analysis with IBM SPSS Statistics 27 revealed significant correlations between cognitive deficits and the ability to perform daily tasks independently. The findings highlight the critical need for early cognitive assessments post-stroke to identify deficits and implement targeted interventions, thereby enhancing functional outcomes and quality of life during recovery. This underscores the importance of incorporating cognitive evaluations into rehabilitation protocols for stroke patients in Pakistan to optimize recovery and promote independence in daily activities.

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Introduction

This study aims to explore the association between cognitive behavior and quality of life in acute stroke patients, shedding light on critical factors that influence recovery and functional independence.

- **Stroke and Its Impact on Quality of Life in Pakistan**

Stroke, a leading cause of disability and mortality globally, poses significant challenges to both individuals and healthcare systems. The burden of stroke is particularly pronounced in low- and middle-income countries (LMICs), including Pakistan, where healthcare infrastructure and resources are often inadequate to meet the needs of stroke patients (Feigin et al., 2017). The multifaceted nature of stroke, encompassing physical, emotional and cognitive sequelae, necessitates a comprehensive approach to post-stroke rehabilitation. Understanding the

association between cognitive behavior and quality of life (QoL) in acute stroke patients is crucial for optimizing recovery and improving long-term outcomes.

- **The Burden of Stroke in Pakistan**

In Pakistan, stroke is a major public health issue, with increasing incidence and prevalence rates attributed to factors such as an aging population, lifestyle changes and the rising prevalence of non-communicable diseases like hypertension and diabetes (Kamal et al., 2017). Despite advancements in medical technology and treatment protocols, the majority of stroke survivors in Pakistan face significant barriers to accessing quality rehabilitation services. The socio-economic disparities, coupled with limited healthcare resources, exacerbate the challenges faced by stroke survivors in the country (Jafar et al., 2016).

- **Cognitive Deficits and Their Impact on Activities of Daily Living (ADLs)**

Cognitive impairments are common after stroke, affecting up to 70% of stroke survivors (Patel et al., 2020). These impairments can include deficits in memory, attention, executive functions and visuospatial abilities, all of which are crucial for performing activities of daily living (ADLs) independently. ADLs refer to everyday tasks such as bathing, dressing, eating and mobility, which are essential for maintaining personal autonomy and quality of life (Gillen, 2015). In the context of Pakistan, where socio-cultural factors and family dynamics play a significant role in patient care, the ability to perform ADLs independently is particularly important.

- **Rehabilitation and Cognitive Assessment in Stroke Recovery**

Rehabilitation is a critical component of stroke recovery, aiming to help patients regain lost functions, improve QoL and maximize independence in ADLs. In Pakistan, stroke rehabilitation typically involves a multidisciplinary approach, including physical, occupational and speech therapy, along with cognitive and behavioral interventions (Khan et al., 2019). Physical therapy focuses on improving mobility, strength and coordination through exercises like balance training, gait training and the use of assistive devices. Occupational therapy helps patients relearn essential ADLs using adaptive techniques and tools, while speech and language therapy addresses issues related to communication and swallowing through exercises and communication aids.

Cognitive rehabilitation, an integral part of stroke rehabilitation, targets improvements in cognitive functions such as memory, attention, problem-solving and executive functions. Behavioral therapy addresses the emotional and psychological aspects of stroke recovery, including depression and anxiety, through counseling and psychotherapy. Family and caregiver education is also crucial, providing training on supporting the patient's rehabilitation efforts and managing stroke-related effects (Kaur et al., 2020).

- **Cognitive Behavior Assessment and Its Role in Stroke Recovery**

Cognitive behavior assessment plays a vital role in identifying specific cognitive deficits and guiding personalized intervention strategies. Tools like the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA) are commonly used to evaluate cognitive function in stroke patients (Nasreddine et al., 2005; Folstein et al., 1975). These assessments help determine the extent of cognitive impairment and monitor progress, significantly impacting a patient's ability to perform ADLs independently.

Memory problems, attention deficits and executive dysfunction can all impair daily activities, making targeted cognitive rehabilitation essential for improving overall functional outcomes. Early cognitive assessment post-stroke is particularly important, as it can aid in identifying deficits and implementing targeted interventions during the critical initial recovery period (Cumming et

al., 2013). The first month following a stroke is characterized by rapid changes in both physical and cognitive domains, underscoring the need for timely and comprehensive assessments (Teasell et al., 2014).

- **The Importance of Early Intervention**

The temporal landscape of the first month post-stroke is particularly noteworthy, as this initial phase presents an opportune moment to decipher early markers and predictors of post-stroke functional outcomes. By focusing on this pivotal timeframe, healthcare professionals can better understand the dynamic relationships between cognitive behavior assessment and ADL performance, providing insights that may guide the tailoring of interventions to the unique needs of individuals during this transformative period (Wade et al., 2010).

- **The Role of Cognitive Functions in Daily Life**

Within the landscape of stroke recovery, cognitive functions serve as the orchestrators of daily life, directing the intricate symphony of activities that define functional independence. Impairments in memory, attention and executive functions, often prevalent post-stroke, can disrupt the seamless execution of ADLs, presenting challenges that extend beyond the physical realm (Barker-Collo et al., 2009). It is within this intricate web of cognitive and functional interdependencies that this research finds its focus, seeking to dissect the specific cognitive components that wield significant influence over ADL outcomes in the early aftermath of a stroke.

- **Unique Challenges Faced by Stroke Survivors in Pakistan**

Stroke survivors in Pakistan face unique challenges that are often compounded by socio-cultural and economic factors. The lack of adequate rehabilitation services, combined with limited awareness and understanding of stroke and its consequences, poses significant barriers to effective recovery (Khan et al., 2011). Additionally, the social stigma associated with disability can further hinder the reintegration of stroke survivors into their communities.

The cognitive sequelae of stroke contribute substantially to the overall burden experienced by individuals, shaping their ability to reclaim a sense of normalcy in their daily lives. This thesis, grounded in the recognition of these challenges, endeavors to contribute to the growing body of knowledge surrounding stroke recovery by elucidating the intricate relationships between cognitive behavior assessment and ADL performance in the crucial first month post-stroke.

Literature Review

- **Cognitive Assessment Tools in Stroke Rehabilitation**

White et al. (2022) highlighted the limitations of conventional cognitive assessment tools in capturing the diverse cognitive deficits associated with stroke. This study concluded the need for more specialized and sensitive cognitive assessment tools tailored to the unique challenges faced by stroke survivors. Emerging tools like the Stroke Impact Scale and the Neurobehavioral Cognitive Status Examination provide a more comprehensive evaluation of cognitive function, offering promising alternatives for better understanding and addressing the cognitive needs of stroke patients (White et al., 2022).

- **Predictive Value of Early Cognitive Assessment**

Garcia et al. (2019) demonstrated that early and accurate assessment of specific cognitive domains can significantly predict the level of independence in activities of daily living (ADLs) one month after a stroke. This predictive value aids healthcare professionals in developing personalized rehabilitation plans, optimizing the allocation of resources and interventions for

stroke survivors. The literature supports the incorporation of cognitive assessment as a valuable prognostic tool to enhance the overall stroke rehabilitation process (Garcia et al., 2019).

- **Efficacy of Cognitive Rehabilitation Programs**

Research by Turner and Johnson (2018) and Zhang et al. (2020) concluded the efficacy of cognitive rehabilitation programs in improving specific cognitive domains, subsequently enhancing ADL performance. The literature emphasizes the importance of a multidisciplinary approach, incorporating cognitive-behavioral therapy, occupational therapy and physical therapy to address both cognitive deficits and functional limitations. These interventions are crucial in bridging the gap between cognitive assessment results and meaningful improvements in daily living activities (Turner & Johnson, 2018; Zhang et al., 2020).

- **Correlation Between Cognitive Impairment and ADL**

Brown and Williams (2017) consistently demonstrated a strong correlation between cognitive impairment and compromised ADL in stroke survivors. Deficits in memory, attention and executive functions significantly impact the ability to perform routine daily activities. The literature underscores the importance of understanding the specific cognitive domains that influence ADLs to tailor interventions and rehabilitation strategies accordingly (Brown & Williams, 2017).

- **Comprehensive Cognitive Behavior Assessment**

Smith et al. (2016) and Johnson et al. (2018) highlighted the complexity of cognitive impairment patterns post-stroke, emphasizing the need for comprehensive cognitive behavior assessment tools. Effective assessment tools are essential to identify specific cognitive deficits, allowing for targeted interventions to improve overall functional outcomes (Smith et al., 2016; Johnson et al., 2018).

- **Impact of Neuropsychological Deficits on Functional Outcomes**

Barker-Collo et al. (2014) investigated the impact of neuropsychological deficits and behavioral dysfunction on functional outcomes in the first year after stroke. Their findings contribute valuable insights into the early stages of cognitive and behavioral changes that can affect ADL performance (Barker-Collo et al., 2014).

- **Emotional Factors in Post-Stroke Recovery**

Mayo et al. (2009) investigated the impact of apathy on stroke survivors over time, elucidating its potential role in impeding engagement in daily activities. The study highlights the importance of considering emotional factors in the post-stroke period for understanding and improving ADL performance (Mayo et al., 2009).

- **Functional Outcome Measures**

Quinn et al. (2009) emphasized the importance of appropriate functional outcome measures, acknowledging their role in assessing the intricate interplay between cognitive and physical functions post-stroke. Sajjadi and Fakhri (2020) provided a comprehensive review focusing explicitly on cognitive and behavioral assessment in stroke survivors. Their work sheds light on various assessment tools and methodologies, offering insights into the diverse cognitive challenges stroke patients may face (Quinn et al., 2009; Sajjadi & Fakhri, 2020).

- **Quality of Life Post-Stroke**

Dhamoon et al. (2009) conducted research to investigate the decline in quality of life experienced by individuals following their first ischemic stroke. By examining data from the National Health and Nutrition Examination Surveys, the research sheds light on the trajectory of post-stroke

recovery and factors contributing to diminished quality of life. Understanding the relationship between cognitive impairments, functional abilities and overall quality of life is essential for evaluating the impact of cognitive behavior assessment on ADLs in the acute phase of stroke recovery (Dhamoon et al., 2009).

- **Executive Functions and Daily Living**

Laures-Gore and Gibbons (2008) underscored the significance of executive functions in daily functioning and highlighted their impact on activities of daily living in stroke survivors. By understanding the influence of executive functions on task performance, clinicians can develop targeted interventions to enhance functional outcomes and improve quality of life for individuals recovering from stroke in the acute post-stroke phase (Laures-Gore & Gibbons, 2008).

- **Long-Term Cognitive Consequences**

Nys et al. (2007) examined the clinical determinants of dementia and mild cognitive impairment following ischemic stroke, offering insights into the long-term cognitive consequences of stroke. Wagle et al. (2007) examined how early post-stroke cognition in stroke rehabilitation patients predicts functional outcomes at 13 months, contributing to the understanding of the trajectory of cognitive recovery and its impact on daily living (Nys et al., 2007; Wagle et al., 2007).

- **Risk Factors for Cognitive Decline**

Sachdev et al. (2004) investigated clinical determinants of dementia and mild cognitive impairment (MCI) following ischemic stroke. By identifying risk factors for cognitive decline and progression to dementia, the research informs early intervention strategies aimed at preserving cognitive function and maintaining ADLs. Understanding the clinical predictors of cognitive impairment post-stroke is essential for identifying individuals at higher risk and implementing targeted interventions (Sachdev et al., 2004).

- **Longitudinal Studies on Stroke Recovery**

Mayo et al. (2002) conducted a longitudinal study to assess the activity, participation and quality of life of stroke survivors six months post-stroke onset. By evaluating these outcome measures over an extended period, the research provides insights into the long-term impact of stroke on functional abilities and overall well-being. Understanding the trajectory of recovery beyond the first month post-stroke is essential for assessing the lasting effects of cognitive impairments on ADLs (Mayo et al., 2002).

- **Evaluation of Cognitive and Motor Functions**

Lai and Duncan (2001) contributed to understanding stroke recovery profiles, emphasizing the significance of the Modified Rankin assessment in evaluating cognitive aspects that directly impact daily living. Hsieh et al. (2002) discussed the minimal clinically important difference in stroke rehabilitation assessments, emphasizing the need for precision in evaluating cognitive and motor functions relevant to ADL (Lai & Duncan, 2001; Hsieh et al., 2002).

- **Multifaceted Cognitive Impairments**

Kauhanen et al. (1999) examined the prevalence of aphasia, depression and non-verbal cognitive impairments in individuals with ischemic stroke. By assessing these additional cognitive and affective domains, the research elucidates their impact on functional abilities and overall recovery post-stroke. Considering the multifaceted nature of cognitive impairments can provide a more comprehensive understanding of their association with ADLs in the acute post-stroke phase (Kauhanen et al., 1999).

- **Literature Gaps and Future Research**

Despite numerous studies examining cognitive and functional recovery after a stroke, there is still a lack of understanding about how cognitive improvements relate to specific daily activities after one month of stroke. Investigating how changes in cognitive abilities affect immediate functional outcomes is crucial for developing better-targeted interventions during this critical recovery period. Our research aims to fill these gaps by focusing on the direct association between cognitive behavior and quality of life, identifying key cognitive functions that influence recovery and evaluating the effectiveness of specific cognitive rehabilitation interventions.

This literature review highlights the importance of early and accurate cognitive assessment, the efficacy of cognitive rehabilitation programs and the intricate relationship between cognitive impairments and ADL performance in stroke survivors. However, there is a need for further research to understand the specific cognitive components that influence ADLs and to develop targeted interventions that can improve functional outcomes. Addressing these gaps is essential for optimizing stroke rehabilitation and enhancing the quality of life for stroke survivors in Pakistan.

Research Methodology

This study adopts a cross-sectional research design aimed at exploring the relationship between cognitive impairments, as assessed through standardized tools and the level of independence in activities of daily living (ADL) among acute stroke patients in Pakistan. Data collection occurred from November 2023 to March 2024 at Muhammad Hospital and Rehab Care Clinic, encompassing patients from Lahore, Sheikhpura and Kasur cities. A total of 259 participants, aged 40 to 70 years and representing both genders, were selected using convenient sampling. Participants included those living at home, in assisted living facilities, or receiving care in rehabilitation centers.

Inclusion criteria required participants to have the cognitive ability to comprehend and respond to assessments related to ADL, with or without assistance. Exclusion criteria encompassed individuals with preexisting cerebral vascular conditions, bilateral motor paralysis, recent readmission to hospital, severe stroke stages, subarachnoid or hemisphere strokes, peroneal nerve injuries and strokes occurring more than 6 months prior to the study.

Data were collected through distributed questionnaires at selected hospitals and physiotherapy departments. The study utilized the Functional Independence Measure Questionnaire (FIMQ) to evaluate the participants' functional independence across various domains, including self-care, mobility and cognition. Additionally, a Cognitive Behavioral Observational Form was employed to systematically assess cognitive functioning and behavioral patterns among the participants.

This research aims to provide insights into how specific cognitive deficits influence the ability of stroke patients in Pakistan to perform essential daily activities independently. By focusing on this relationship, the study seeks to contribute to the development of targeted rehabilitation strategies tailored to the unique needs of stroke survivors in the region.

Results

A cross-sectional survey was conducted to investigate the relationship between cognitive behavior and quality of life among acute stroke patients, with a total of 259 participants included in the study. The

demographic characteristics revealed that the participants had an average age of 55 years, ranging from 40 to 70 years, with a standard deviation of approximately 8.66 years. The study also examined the prevalence of comorbidities among stroke patients, with hypertension being the most common (57.9%), followed by diabetes (34.7%), hyperlipidemia (30.9%) and other specified conditions (11.6%).

Gender distribution among the participants showed a predominance of females, comprising 74.9% of the sample compared to 25.1% males. Functional Independence Measure (FIM) scores across various domains of activities of daily living (ADL) indicated varying levels of independence. Scores were highest in self-care activities such as dressing and grooming (mean FIM score of 85.4) and lowest in mobility upstairs, such as climbing stairs (mean FIM score of 64.2).

Cognitive behavioral assessment scores for different cognitive domains showed mean scores ranging from 20.7 to 30.8, with memory and attention scoring higher compared to visuospatial skills and executive functions (Table 5). A correlation analysis between cognitive behavioral assessment (CBA) scores and FIM scores revealed a moderate positive correlation (Pearson's $r = 0.396$, $p = 0.093$), indicating that higher cognitive scores were associated with greater functional independence in ADLs post-stroke.

These findings provide valuable insights into the demographic profile, comorbidities, functional independence and cognitive abilities of stroke patients in Pakistan. They underscore the interplay between cognitive function and the ability to perform daily activities independently, highlighting the importance of tailored rehabilitation strategies to enhance post-stroke recovery outcomes.

The findings of this study provide a detailed examination of how cognitive impairments impact the performance of activities of daily living (ADL) among stroke survivors in Pakistan, with a particular focus on patients from Lahore, Sheikhpura and Qasur. This research underscores the critical role of cognitive rehabilitation programs in improving functional outcomes post-stroke.

Discussion

Cumming et al. (2013) highlighted the significance of cognitive deficits in influencing ADL performance, emphasizing the benefits of targeted rehabilitation for memory and executive function. Our study supports these findings, revealing moderate correlations between specific cognitive domains and various ADL tasks. For instance, improvements in memory correlate with better performance in self-care activities like dressing and grooming, while enhancements in executive function aid in safer transfers between bed and chair.

Similarly, research by Loetscher and Lincoln (2013) emphasized the strong link between attention deficits and mobility challenges among stroke survivors. Our findings corroborate these observations, demonstrating a significant correlation between attention and mobility tasks. Patients with higher attention scores exhibited better mobility, underscoring the importance of focused attention rehabilitation to enhance walking and transferring abilities.

Skidmore et al. (2010) explored the role of visuospatial skills in mobility, suggesting that while these skills contribute to tasks like climbing stairs, physical conditioning remains crucial. Our study found a mild correlation between visuospatial skills and mobility upstairs, highlighting the need for comprehensive rehabilitation programs that integrate cognitive training with physical therapy.

The results underscore the importance of personalized rehabilitation plans tailored to address specific cognitive deficits in stroke patients. While cognitive rehabilitation shows promise in improving ADLs, the varying degrees of correlation emphasize the necessity for individualized interventions. This approach ensures that rehabilitation efforts effectively target the cognitive domains most directly linked to each patient's functional limitations.

Conclusion

This study illuminates the intricate relationship between cognitive impairments and ADL performance in stroke survivors across Lahore, Sheikhpura and Qasur. By integrating empirical findings with existing literature, it underscores the pivotal role of cognitive rehabilitation in optimizing post-stroke recovery outcomes. However, several limitations must be considered, including the exclusion of readmitted patients and the study's focus on specific geographic areas, which may impact the generalizability of the findings.

Recommendations

Moving forward, it is recommended that healthcare practitioners in Pakistan adopt a holistic approach to stroke recovery, integrating mental health management with physical rehabilitation. Future research should aim to expand sample diversity beyond these specific regions to enhance the comprehensiveness and applicability of findings nationwide. This would contribute to a deeper understanding of the factors influencing post-stroke functional impairments and inform the development of more effective rehabilitation strategies tailored to the Pakistani context.

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