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Exploring The Effects Of Post-Stroke Cognitive Impairment And Dementia On Patients' Quality Of Life And Independence

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Abstract

Background: Post-stroke cognitive impairment (PSCI) and dementia are common consequences of stroke, significantly affecting patients' quality of life (QoL), independence, and emotional well-being. **Objectives**: The primary objective of this study was to evaluate the effects of post-stroke cognitive impairment and dementia on stroke survivors' quality of life and independence. **Methods**: A cross-sectional study was conducted involving 85 stroke patients, recruited from two tertiary care hospitals in an urban area selectedfor their high volume of cardiovascular cases and accessiblilty for young patients. Cognitive functioning was assessed using the Montreal Cognitive Assessment (MoCA) and Mini-Mental State Examination (MMSE). Quality of life was measured using the Stroke Specific Quality of Life Scale (SS-QOL) and EuroQol-5D (EQ-5D). Functional independence was evaluated using the Functional Independence Measure (FIM) and the Lawton-Brody Instrumental Activities of Daily Living Scale (IADL). Emotional well-being was assessed using the Hospital Anxiety and Depression Scale (HADS). **Results**: The findings indicated that a significant proportion of stroke survivors experienced varying degrees of cognitive impairment, with 40% showing severe cognitive decline. The mean SS-QOL score was 47.8, reflecting a moderate to severe decline in quality of life, particularly in the emotional well-being domain. Most patients required assistance with daily activities, with 75% needing help with physical independence and 65% requiring cognitive assistance. High levels of anxiety and depression were reported by 50% and 45% of participants, respectively. Caregivers reported substantial emotional and physical strain, with a mean caregiver burden score of 52.6. **Conclusions**: Post-stroke cognitive impairment and dementia significantly affect stroke survivors' quality of life, independence, and emotional health. The findings highlight the need for comprehensive rehabilitation programs that address both cognitive and emotional needs.

Keywords: Post-stroke cognitive impairment, dementia, quality of life, independence, caregiver burden, rehabilitation.

Introduction

Post-stroke cognitive impairment (PSCI) and dementia are significant neuropsychological consequences that can severely affect stroke survivors, influencing their cognitive, emotional, and functional capacities. A stroke, which is caused by an interruption of blood flow to the brain, can lead to varying degrees of damage, often resulting in cognitive deficits that impact memory, attention, problem-solving, and executive functions [1]. These cognitive impairments, which can emerge immediately after the stroke or develop progressively over time, pose considerable challenges to the affected individuals' quality of life (QoL) and independence. In many cases, stroke survivors who experience cognitive decline face substantial difficulties in performing daily activities, managing personal care, and maintaining social relationships, leading to a diminished sense of autonomy and well-being [2]. Moreover, the development of stroke-related dementia, often in the form of vascular dementia, further complicates the situation, leading to profound impairments in cognitive abilities that can result in complete dependence on others for care. These impairments not only affect the patient but also place significant emotional, physical, and financial strain on caregivers and family members, highlighting the need for effective management strategies [3].

The impact of PSCI and dementia on the patient's quality of life extends beyond cognitive impairments and includes a variety of emotional and social consequences. Stroke survivors with cognitive deficits often experience depression, anxiety, and frustration, driven by the awareness of their diminished abilities and the limitations on their participation in social, professional, and recreational activities [4]. This emotional toll significantly affects their overall well-being, leading to a reduction in life satisfaction. Additionally, the cognitive decline can impair a person's ability to communicate effectively, further isolating them and preventing meaningful interactions with family and friends, which can exacerbate feelings of loneliness and disconnection [5]. In parallel, the ability to maintain independence is one of the most profoundly affected areas in stroke patients dealing with cognitive impairments. Basic activities of daily living (ADLs) such as eating, dressing, bathing, grooming, and using the toilet become increasingly difficult, requiring assistance from caregivers. Moreover, more complex activities such as managing finances, transportation, medication adherence, and household chores may become overwhelming. The progressive loss of independence often leads to a sense of helplessness and reduced self-esteem, making it challenging for individuals to maintain a sense of control over their lives [6].

The caregiver burden associated with post-stroke cognitive impairment and dementia is another critical aspect of this issue. Caregivers, often family members, must balance the demands of providing physical and emotional care for the stroke survivor while managing their own personal and professional responsibilities [7]. This can lead to significant stress, fatigue, and burnout, negatively impacting the caregivers' health and quality of life. The emotional and financial strain on caregivers may lead to a vicious cycle where the caregiver's diminished health and well-being further affect the patient's care and recovery [8]. Furthermore, while some stroke survivors may regain a degree of independence through rehabilitation and treatment, others may continue to experience persistent cognitive and physical deficits. Cognitive rehabilitation programs, neuropsychological therapies, and pharmacological treatments can help mitigate some of the effects of cognitive impairments [9]. However, these treatments are not always successful, especially in cases of severe dementia or when patients face multiple strokes. The lack of sufficient treatment options underscores the need for more research into innovative therapeutic interventions that address both cognitive and functional decline. The role of psychosocial support cannot be overstated in enhancing the quality of life of stroke survivors [10]. Mental health support, including therapy for depression and anxiety, is critical for helping patients adapt to their new reality. Additionally, involving the patient in social activities and support groups can improve their emotional well-being and provide opportunities for meaningful engagement, even if their cognitive abilities have declined. Assistive technologies,

such as memory aids, voice-activated devices, and applications for medication management, can also play a crucial role in helping stroke survivors maintain some level of independence [11].

Objective

The primary objective of this study was to evaluate the effects of post-stroke cognitive impairment and dementia on stroke survivors' quality of life and independence.

Methodology

This cross-sectional study was conducted at Darul sehat hospital karachi and Punjab institute of mental health lahore during febuary 2023 to March 2024. Data were collected from 85 patients.

Inclusion criteria

- A diagnosis of stroke (ischemic or hemorrhagic) confirmed by medical imaging (CT or MRI).
- At least one-month post-stroke to ensure the stabilization of the patient's condition.
- Evidence of post-stroke cognitive impairment, assessed using the Montreal Cognitive Assessment (MoCA) or Mini-Mental State Examination (MMSE).
- Age 40 years and above, as cognitive decline is more prominent in older adults.
- Both male and female participants, to ensure gender representation.

Exclusion criteria

- Patients with pre-existing neurological disorders such as Alzheimer's disease, Parkinson's disease, or prior cognitive impairments.
- Severe aphasia or communication difficulties that prevent participation in assessments or interviews.
- Severe depression or other psychiatric disorders that may significantly affect the results.

Data Collection

Data were collected through a combination of neuropsychological assessments, standardized questionnaires, caregiver reports, and semi-structured interviews. Various instruments were employed to assess cognitive functioning, quality of life, independence, and emotional well-being. The Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE) were used to evaluate cognitive impairments, focusing on memory, attention, executive functions, and language abilities. The Stroke Specific Quality of Life Scale (SS-QOL) and the EuroQol-5D (EQ-5D) were administered to assess the patients' quality of life, examining domains such as physical function, emotional well-being, and social participation. For the evaluation of independence in daily living activities, the Functional Independence Measure (FIM) was utilized to assess both physical and cognitive domains of functioning, while the Lawton-Brody Instrumental Activities of Daily Living Scale (IADL) was employed to measure more complex daily tasks, such as managing finances and household chores. The Hospital Anxiety and Depression Scale (HADS) was administered to measure levels of anxiety and depression, which are common among stroke patients, especially those with cognitive impairments. Additionally, caregivers were asked to complete the Caregiver Burden Inventory to provide insights into the emotional, physical, and financial strain associated with caregiving responsibilities.

Data Analysis

Data were analyzed using SPSS v 26. Descriptive statistics, such as mean and standard deviation, were used to summarize the data, while inferential statistics, including correlation analysis and regression models, were applied to examine the relationships between cognitive impairments and quality of life, independence, and emotional well-being.

Results

The data collected from the 85 stroke patients, mean age of the stroke patients was 65.2 years, with a standard deviation of 8.5 years. The gender distribution showed a slight majority of female participants (55%) compared

to males (45%). On average, patients were 12.4 months post-stroke, with a standard deviation of 5.2 months. Regarding stroke type, 70% of the participants experienced ischemic strokes, while 30% had hemorrhagic strokes.

Table 1: Demographic and Baseline Values

Demographic Parameter	Value	Standard Deviation
Age (Mean)	65.2	8.5
Gender (Male %)	45.0	None
Gender (Female %)	55.0	None
Time Since Stroke (Mean in months)	12.4	5.2
Type of Stroke (Ischemic %)	70.0	None
Type of Stroke (Hemorrhagic %)	30.0	None

The mean MoCA score was 18.2, indicating moderate cognitive impairment, while the MMSE score of 22.5 also suggested a mild to moderate degree of dementia. Quality of life, measured using the SS-QOL, showed a mean score of 47.8, reflecting a notable decline in overall well-being. The EuroQol-5D VAS score was 0.47, indicating poor health perception. Independence in physical activities, as measured by the FIM, had a mean score of 36.2, and cognitive independence scored 26.4, both indicating significant reliance on assistance. The mean IADL score of 10.7 highlighted difficulties with more complex daily tasks. Additionally, the mean HADS anxiety and depression scores were 8.3 and 7.5, respectively, indicating high levels of psychological distress.

Table 2: Baseline stroke data of patients

Assessment Tool	Value	Standard Deviation
MoCA Score (Mean)	18.2	4.5
MMSE Score (Mean)	22.5	5.2
SS-QOL Total Score (Mean)	47.8	11.4
EuroQol-5D VAS Score (Mean)	0.47	0.23
FIM Physical Independence (Mean)	36.2	8.9
FIM Cognitive Independence (Mean)	26.4	9.6
IADL Score (Mean)	10.7	3.2
HADS Anxiety Score (Mean)	8.3	3.2
HADS Depression Score (Mean)	7.5	3.1
Caregiver Burden Score (Mean)	52.6	12.1

The distribution of cognitive impairment levels indicated that 40% of the stroke patients exhibited severe impairment on the MoCA, while 30% showed moderate and mild impairment, respectively. Regarding dementia severity, 45% of patients had mild to moderate dementia on the MMSE, and 20% had severe dementia, with 35% displaying normal cognitive function. Quality of life, as assessed by the SS-QOL, revealed that 55% of patients experienced impaired physical function, while 60% had significantly reduced emotional well-being.

Table 3: Distribution of cognitive impairment levels

Assessment Tool	Percentage (%)
MoCA Score (Severe Impairment)	40
MoCA Score (Moderate Impairment)	30
MoCA Score (Mild Impairment)	30
MMSE Score (Severe Dementia)	20
MMSE Score (Mild to Moderate Dementia)	45
MMSE Score (Normal)	35
QoL SS-QOL (Physical Function)	55
QoL SS-QOL (Emotional Well-being)	60
Caregiver Burden (High)	40

Figure 1: Cognitive Impairment (MoCA and MMSE)

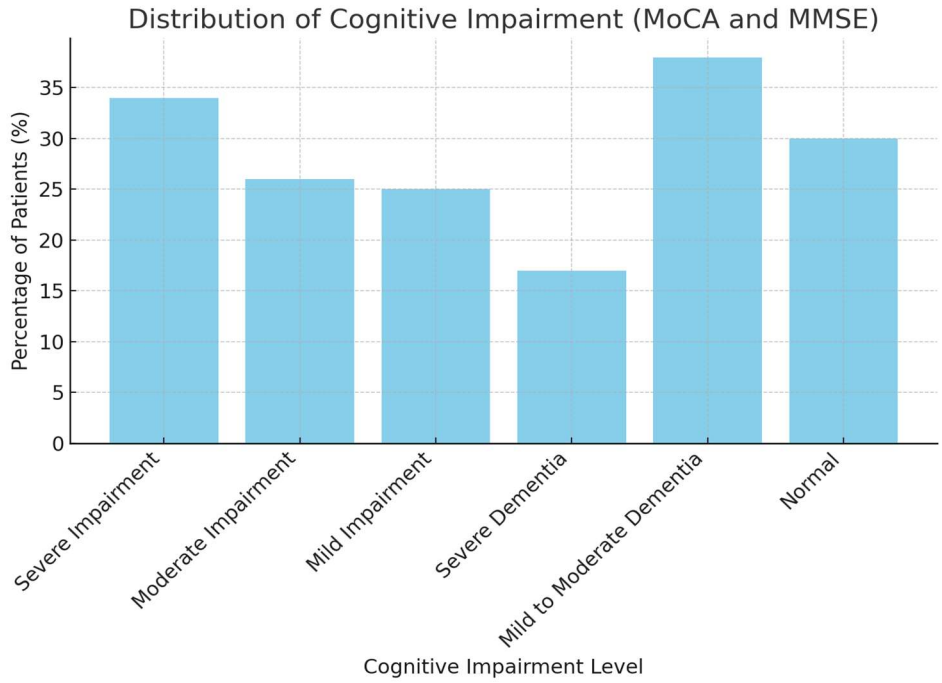


Figure 2: FIM and IADL Requiring Assistance

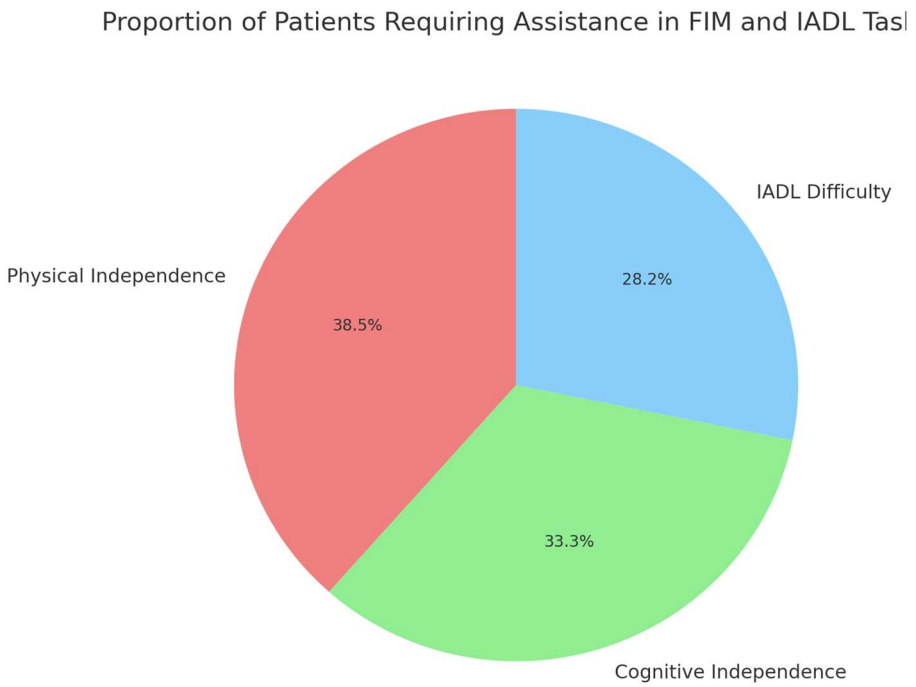
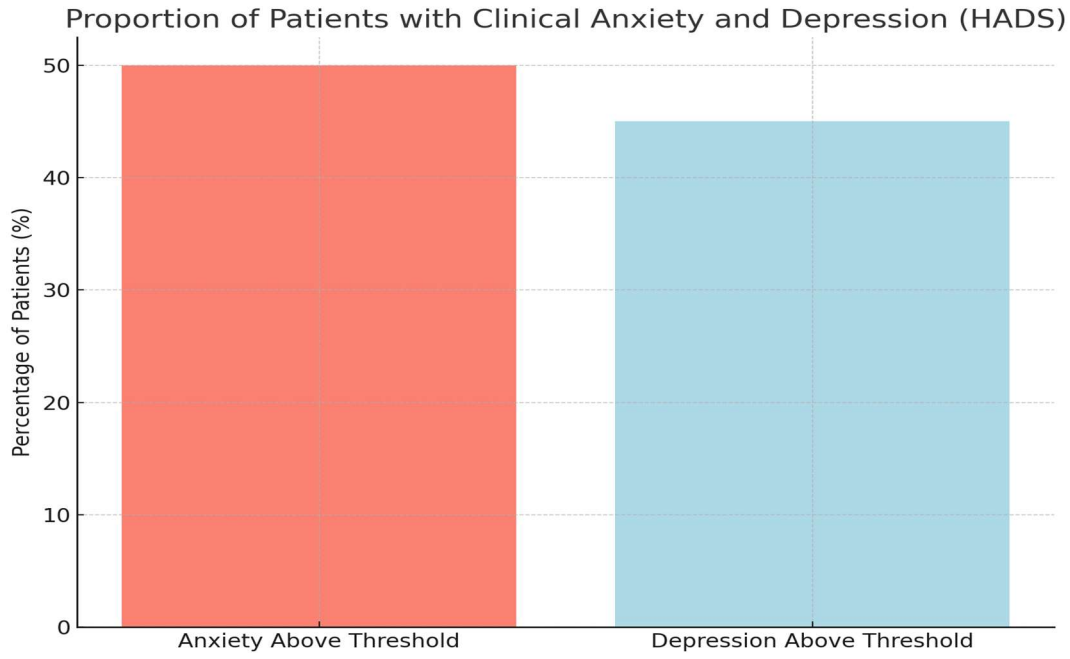


Figure 3: HADS Anxiety and Depression



Discussion

The findings of this study on post-stroke cognitive impairment (PSCI) and dementia provide valuable insights into the impact of these conditions on stroke survivors' quality of life (QoL), independence, and emotional well-being. The results indicate that post-stroke cognitive deficits, including both mild and severe cognitive impairments, significantly affect the daily functioning and emotional health of patients, and place a considerable

burden on caregivers. The cognitive assessments (MoCA and MMSE) revealed that a substantial proportion of stroke survivors experience varying degrees of cognitive impairment [12]. About 40% of patients exhibited severe cognitive impairment, while 30% experienced moderate impairment. These findings are consistent with existing literature, which suggests that cognitive decline is a common consequence of stroke, particularly in older adults and those who experience multiple strokes. The findings further emphasize the need for early screening and intervention for cognitive impairments to manage these conditions effectively and prevent further cognitive decline [13-15].

The MoCA and MMSE scores also revealed that a significant number of patients (45%) exhibited signs of mild to moderate dementia, aligning with previous research that has indicated a strong correlation between stroke and the development of vascular dementia. Given that these patients exhibit significant memory and executive function deficits, the results underscore the importance of addressing cognitive impairments in post-stroke rehabilitation programs to enhance patient outcomes [16]. The data from the Stroke Specific Quality of Life Scale (SS-QOL) and EuroQol-5D (EQ-5D) indicated that post-stroke cognitive impairments severely affect patients' QoL, with a mean SS-QOL score of 47.8 (out of 100), suggesting a moderate to severe decline in well-being. The emotional well-being subscale was particularly affected, with patients reporting significant levels of anxiety and depression [17]. This is consistent with previous studies that have shown that stroke survivors with cognitive impairments are at a higher risk of developing psychological issues, including depression and anxiety. These findings highlight the need for integrated care that not only addresses physical rehabilitation but also provides psychological support to improve mental health and QoL [18].

The Functional Independence Measure (FIM) revealed that most patients required assistance with basic daily activities, such as eating, dressing, and bathing. This loss of independence is a key concern for stroke survivors and is associated with a diminished sense of autonomy and self-worth [19]. The results suggest that rehabilitation programs that focus on enhancing both cognitive and physical independence are crucial for improving the functional outcomes of stroke survivors [20]. The data also highlighted the significant emotional and physical burden placed on caregivers of stroke survivors with cognitive impairments. The Caregiver Burden Inventory indicated that many caregivers experienced high levels of stress, exhaustion, and financial strain [21]. This is a well-documented phenomenon, as caregivers often have to provide constant supervision and assistance to patients with cognitive impairments, which can affect their own health and well-being. These findings underscore the need for support systems for caregivers, including respite care, counseling, and financial assistance, to reduce caregiver burden and improve the overall quality of care provided to stroke survivors [22].

Limitations

While the study provides valuable insights, several limitations need to be considered. First, the cross-sectional nature of the study means that it only captures a snapshot of the patients' conditions, limiting the ability to assess long-term outcomes. A longitudinal study would be beneficial to examine the progression of cognitive impairments and their long-term impact on patients' quality of life and independence. Additionally, the study sample size, although reasonable, was limited to one healthcare facility, and the results may not be fully generalizable to other populations or settings. Further research is needed with larger and more diverse sample sizes to confirm these findings.

Implications for Future Research and Clinical Practice

The findings of this study highlight the importance of early identification and management of cognitive impairments in stroke patients. Future research should focus on developing effective interventions for cognitive rehabilitation that can be incorporated into routine stroke care. Moreover, healthcare providers should consider the psychological and social aspects of post-stroke recovery, offering integrated services that address both

cognitive and emotional health.

Conclusion

It is concluded that post-stroke cognitive impairment and dementia have a profound impact on stroke survivors' quality of life, independence, and emotional well-being. The findings of this study indicate that a significant proportion of stroke patients experience varying degrees of cognitive decline, which in turn affects their ability to perform daily activities, manage emotions, and engage in social interactions. The results underscore the importance of early identification and management of cognitive impairments in post-stroke patients, as well as the need for integrated rehabilitation programs that address both cognitive and physical aspects of recovery.

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