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PREVALENCE OF POST-STROKE DEPRESSION IN ADULTS PRESENTING TO RECEP TAYYIP ERDOGAN HOSPITAL, MUZAFFAR GARH

Dr Muhammad Ahsan Raza[*1], Dr. Muhammad Ahmad Ali[2], Dr Romail Shahid[3], Dr Muhammad Taimoor Haider[4], Dr Farasat Ali[5], Dr Ahmad Khan[6]

[*1]*MBBS, FCPS, PG Resident Internal Medicine,Recep Tayyip Erdogan Indus Hospital Muzaffargarh*
[2]*MBBS, FCPS (Medicine), Fellow Critical Care Medicine,Shifa International Hospital,Islamabad*
[3]*MBBS, FCPS, PG Resident Internal Medicine,Recep Tayyip Erdogan Indus Hospital Muzaffargarh*
[4]*MBBS, FCPS, PGR, Recep, Tayyip Erdogan Indus Hospital Muzaffargarh*
[5]*Assistant Professor Psychiatry,FJ Medical University/SGRGH, Lahore*
[6]*MBBS, MSPH, CEO, District health authority, District Faisalabad*

[*1]ahsanrazamagsi514@gmail.com, [2]dr_ahmad94@yahoo.com, [3]romailshahid27086@gmail.com, [4]haidertaimoor270@gmail.com, [6]drahmedkhan396@gmail.com

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Corresponding Author: *
Dr Muhammad Ahsan Raza

ABSTRACT

Objectives: *To determine the prevalence of post-stroke depression (PSD) in patients presenting to Recep Tayyip Erdogan Hospital, Muzaffargarh.*

Study Design: *Descriptive Cross-Sectional Study.*

Study Setting: *The study was conducted at Department of Internal Medicine and Neurology, Recep Tayyip Erdogan Hospital (RTEH), Muzaffargarh.*

Study Duration: *Six months (From September'2024 to Febuary'2025.*

Methodology: *This study enrolled 229 patients aged 18–70 years with ischemic or hemorrhagic stroke confirmed by imaging within the past year. Patients were evaluated using the Patient Health Questionnaire-9 (PHQ-9), where a score ≥5 indicated depression. Sociodemographic and clinical data including age, gender, marital status, BMI, smoking, and diabetes were recorded.*

Results: *Of the 229 participants, 52.4% were female and 60.7% were aged 18–50 years. The mean age was 44.43 ± 15.51 years and mean duration since stroke was 6.80 ± 3.39 months. The prevalence of post-stroke depression was found to be 27.1%. No statistically significant associations were found between PSD and age group (p=0.423), gender (p=0.884), or marital status (p=0.573).*

Conclusion: *More than one in four stroke survivors experienced depressive symptoms, underscoring the need for routine mental health screening post-stroke. Despite the lack of significant associations with basic demographic factors, early detection through tools like PHQ-9 is essential for timely intervention and improved rehabilitation outcomes.*

INTRODUCTION

Stroke has become the second leading cause of death and chronic disability worldwide, resulting in about every5million deaths and 100 million disability adjusted life years (DALY) every year[1]. Post stroke depression (PSD) is a neuropsychiatric disorder and many other disorders similar to PSD are mania, psychosis, anxiety, fatigue, apathy.[2-6] Prevalence of PSD is about 33% and it is the most frequent psychiatric condition in general population[3]. The pathophysiology of post stroke depression suggests two possibilities, either psychological damage due to disability or due to damage in certain brain areas leading to disturbance in normal functioning of neurotransmitters like dopamine and serotonin.[7-8]

The factors associated with post stroke depression are divided into pre stroke and post stroke conditions, Pre stroke risk factors include educational level, pre morbidity financial role, living in rural area & female gender.[1]High proportion of PSD highlights the importance of earlier detection and thus pharmacological, non-pharmacological & rehabilitation interventions to decrease the burden of depression.[5]. The social deprivation and discontinuation of rehabilitation centers in pandemic COVID-19 caused the rise in rates of anxiety.[7]

A study conducted by Chau JP et al in 2021,[1] a total of 336 cases of stroke survivors were studied in a descriptive cross sectional study. This study included 178 men and 158 women with a mean age of 69.9 years. They found to have 44.6% of sample suffering from post-stroke depression in Chinese stroke survivors.

Second study conducted by Stefany E et al in 2022, 148 patients(including 79 males and 69 females with a mean age 64.5 years) with acute ischemic stroke were included while study design was retrospective cross sectional.[5] This study concluded that prevalence of PSD during hospitalization was 31.1%. Different scales can be used to identify depression in Stroke survivors like the National Institute of Health Stroke Scale (NIHSS) modified Rankin Scale (mRS), Patient Health Questionnaire (PHQ-9) and Hamilton Depression rating Scale (HRDS).[5]

The aim of this study is to determine the incidence of PSD in patients visiting outpatient facility of RecepTayyipErdogan Indus Hospital Muzaffargarh (RTEH-TIH), or admitted in-patient as a case of stroke, so that earlier identification and treatment in stroke survivors may help rehabilitation of these patients for better quality of life.

METHODOLOGY:

This cross-sectional study was conducted at the Department of Internal Medicine and Neurology, Recep Tayyip Erdogan Hospital (RTEH), Muzaffargarh, following approval from the Institutional Research Review Board, Indus Health Network. The study duration spanned six months after the approval of the synopsis i.e. September 23, 2024. Based on an estimated 31% prevalence of post-stroke depression, a 95% confidence interval, and a 6% margin of error, the required sample size was calculated as 229 using the WHO sample size calculator and the single population proportion method.

Patients aged between 18 and 70 years, of either gender, with a diagnosis of ischemic or hemorrhagic stroke within the last one year (confirmed through CT or MRI brain) were included. Both first-ever and recurrent stroke cases were considered eligible. Patients diagnosed with subarachnoid hemorrhage (SAH), transient ischemic attack (TIA), or any reversible neurovascular condition were excluded. Additionally, individuals with pre-existing major psychiatric illnesses such as dementia, psychosis, or schizophrenia were also excluded based on history and clinical evaluation.

After obtaining written informed consent, eligible patients presenting to the internal medicine and neurology outpatient departments were enrolled. Data were collected using a structured proforma. Baseline demographic and clinical information including name, age, gender, contact number, address, BMI, duration of stroke, and marital status were recorded. Body Mass Index (BMI) was calculated using the formula: weight in kilograms divided by height in meters squared. A BMI of more than 27 kg/m² was classified as obese. Smoking status, diabetes mellitus (defined as being on hypoglycemic therapy for at least one year), and other relevant risk factors were also noted.

Post-stroke depression was assessed using the Patient Health Questionnaire-9 (PHQ-9), with a score of ≥5

considered indicative of depression. The assessment was conducted by a neurophysician, and patients identified as having depression were advised appropriate treatment, including antidepressants.

Data analysis was performed using SPSS version 23. Quantitative variables such as age and duration of stroke were expressed as mean ± standard deviation. Qualitative variables including gender, smoking status, diabetes mellitus, and obesity were reported as frequencies and percentages. The normality of numerical data was tested using the Shapiro-Wilk test. Stratification was done based on age groups, stroke duration, gender, smoking status, diabetes, and obesity to assess their association with post-stroke depression.

RESULTS:

Table 1: Socio-Demographic and Clinical Profile of Participants

Variable	Groups	Count	%
Age	18-50	139 (60.7%)	60.7%
	51-70	90 (39.3%)	39.3%
Gender	Male	109 (47.6%)	47.6%
	Female	120 (52.4%)	52.4%
Marital Status	Married	103 (45.0%)	45%
	Unmarried	126 (55.0%)	55%
Age	Mean±SD	44.43 ± 15.51	
Duration of Stroke (months)		6.80 ± 3.39	
PHQ Score		5.78 ± 7.85	

Table 1 presents the baseline demographic and clinical characteristics of the 229 patients included in the study. The majority of participants (60.7%) were between 18 and 50 years of age, while the remaining 39.3% were in the 51–70 year age group. Female patients slightly outnumbered males, comprising 52.4% of the study population compared to 47.6% males. Regarding marital status, 55% of the participants were unmarried, whereas 45% were married. The mean age of the participants was 44.43 years with a standard deviation of ±15.51. The mean duration since stroke onset was 6.80 months (SD ±3.39), and the average PHQ-9 score, used to assess depression, was 5.78 (SD ±7.85).

Table 2: Prevalence of Post-Stroke Depression in Adults

Post-Stroke Depression	Count	%
Yes	62	27.1
No	167	72.9
Total	**229**	**100.0**

Table 2 summarizes the prevalence of post-stroke depression among the study participants. Based on the PHQ-9 scoring criteria (score ≥5), 27.1% (n=62) of the patients were identified as experiencing post-stroke depression. The remaining 72.9% (n=167) did not meet the criteria for depression. These findings highlight that more than one in four stroke survivors in the cohort had depressive symptoms, emphasizing the significance of routine mental health screening following stroke events.

Table 3: Association Between Demographic Factors and Post-Stroke Depression

Variables		Post-Stroke Depression			P-value
		Yes (Count (%))	No (Count (%))	Total (Count (%))	
Age(years)	18-50	35 (56.5%)	104 (62.3%)	139 (60.7%)	0.423
	51-70	27 (43.5%)	63 (37.7%)	90 (39.3%)	
Gender	Male	30 (48.4%)	79 (47.3%)	109 (47.6%)	0.884
	Female	32 (51.6%)	88 (52.7%)	120 (52.4%)	
Marital Status	Married	26 (41.9%)	77 (46.1%)	103 (45.0%)	0.573
	Unmarried	36 (58.1%)	90 (53.9%)	126 (55.0%)	

Table 3 displays the stratified analysis assessing the relationship between demographic variables and the presence of post-stroke depression. Among younger participants (18–50 years), 56.5% of those with depression fell in this age group, compared to 43.5% from the older group (51–70 years), though this difference was not statistically significant (p = 0.423). Similarly, the gender-based distribution revealed that depression was almost equally prevalent among males (48.4%) and females (51.6%), with no significant association (p = 0.884). Marital status also did not significantly influence depression prevalence; 41.9% of depressed participants were married while 58.1% were unmarried (p = 0.573). These findings suggest that age, gender, and marital status were not significantly associated with post-stroke depression in this study population.

DISCUSSION

We aimed to assess the prevalence and demographic associations of post-stroke depression (PSD) in a cohort of stroke survivors presenting at Recep Tayyip Erdogan Hospital, Muzaffargarh. The findings revealed that 27.1% of participants experienced PSD, consistent with global literature reporting PSD prevalence ranging between 25% and 35%, highlighting its substantial impact on stroke outcomes and recovery trajectories.

In terms of demographic associations, no statistically significant relationships were found between PSD and variables such as age, gender, or marital status. This finding parallels the results of **Ignacio et al. (2024)**[12] who, in a meta-analysis of young adults (aged 18–55), reported PSD prevalence of **31**%, with no uniform demographic predictors due to heterogeneity in methodology and patient populations. Moreover, our findings agree with **Jabeen et al. (2023)**,[13] who, in a Karachi-based study, found **46.4**% of stroke survivors had PSD but also reported no significant correlation with gender or marital status.

Our observed prevalence aligns closely with the systematic review and meta-analysis by Liu et al. (2023),[11] which reported a pooled PSD prevalence of 27%, and a cumulative one-year incidence of 38%, with the majority of cases occurring within three months of stroke onset. Similarly, Dong et al. (2021)[14] noted that 35.3% of patients exhibited depressive symptoms at three months, with gradual decline by one year. Our study population's mean stroke duration of 6.8 months falls within this high-risk period, reinforcing the need for timely mental health evaluation post-stroke. In contrast, studies conducted in the Khyber Pakhtunkhwa region of Pakistan by Ullah et al. (2023)[15] reported significantly higher PSD rates of 63.3%, accompanied by anxiety in 83.5% of patients. The elevated prevalence in those studies may be attributed to differences in sampling (inpatient settings with likely higher stroke severity), timing of assessment, and possibly the tools used. While our study employed the PHQ-9, these studies used the Hospital Anxiety and Depression Scale (HADS), which may capture broader symptom domains, potentially inflating estimates.

From a regional perspective, the findings from our study also resonate with data from Sri Lanka. Thambirajah et al. (2022)[16] reported a PSD prevalence of 35.8% at 3 months using the Beck Depression Inventory (BDI), and found significant associations with cortical strokes, frontal lobe involvement, and disability severity. Though our

study did not stratify by stroke type or radiological findings, the consistency in prevalence emphasizes the cross-cultural burden of PSD in South Asia. Several psychosocial studies have emphasized the importance of psychological risk factors in PSD. Handayani et al. (2019)[17] in their systematic review identified predictors such as low education, poor social support, financial stress, and maladaptive coping strategies. While our study did not include these psychosocial variables, the lack of significant association with basic demographic factors suggests that more nuanced psychological and socioeconomic variables may better explain individual vulnerability to PSD. In contrast to our study, Khedr et al. (2020)[9] found significant associations of PSD with low education, functional impairment, and low socioeconomic status in Egypt. This difference may reflect the need for multi-dimensional evaluation beyond demographic indicators—such as disability scoring, cognitive functioning, and quality of social support—which were not assessed in our study but are established contributors to PSD.

Furthermore, it is important to consider that the COVID-19 pandemic has likely exacerbated mental health challenges globally, especially among vulnerable populations such as stroke survivors. The pandemic's impact, as discussed by Debebe et al. (2024)[18] and Ahmed et al. (2020),[8] included increased psychological distress and disruptions in rehabilitation services. Although our study did not directly assess pandemic-related effects, the context of ongoing socioeconomic stressors and healthcare disruption in regions like South Punjab might partially explain the observed burden. Importantly, the use of PHQ-9 in our study as a screening tool for PSD provides a validated, cost-effective method suitable for integration into outpatient neurology and general medical care. Its effectiveness for early identification was also demonstrated in large-scale studies like that of Dong et al. (2021)[14] and Liu et al (2024),[19] who emphasized regular screening and monitoring due to the dynamic and potentially chronic nature of PSD.

A key strength of this study is its focus on a tertiary healthcare setting in South Punjab, contributing local epidemiological data where such research is limited. Additionally, the structured use of a validated depression screening tool (PHQ-9) enhances the clinical reliability of results. However, several limitations must be acknowledged. First, the cross-sectional design precludes causal inferences, and the use of a single PHQ-9 score may not capture fluctuating mood states over time. Second, the study did not include stroke severity scores (e.g., NIHSS, mRS) or imaging findings, which are known predictors of PSD. Third, psychological variables such as perceived social support, functional disability, and cognitive status were not assessed, limiting insight into multifactorial risks.

CONCLUSION

Our study demonstrates that more than one in four stroke survivors experience depression, underscoring the critical need for routine psychological assessment and support in stroke care pathways. Although no significant demographic predictors were identified, the consistent burden across global studies demands an integrated approach combining physical rehabilitation with mental health services. Future research should adopt longitudinal designs to track the course of PSD and explore biological, functional, and psychosocial determinants. Moreover, local policy and clinical guidelines must prioritize mental health screening tools like PHQ-9 as part of standard post-stroke evaluation, especially in under-resourced and high-risk populations such as those served by RTEH Muzaffargarh.

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