Frequency of Depression in post stroke patients presenting at Tertiary Care Hospital, Larkana.

Khadija Shaikh [1,*], Alam Ibrahim Siddiqui [2], Sooraj Jokhio [3], Saima Parveen Shaikh [4], Kanwal Chandio [5], Benazir Junejo [6]

ABSTRACT:
Objective: To document the prevalence of PSD and to identify associated clinical and demographic factors in a tertiary care setting.
Methodology: We carried out a cross-sectional study among 179 stroke survivors at a tertiary care hospital in Larkana during 15 June 2025 to 15 December 2025. The clinical features along with demographic details were recorded and the depression symptoms were analyzed with authentic methods. Chi-square tests were used to determine the correlation of depression with stroke patient's features. Ethical approval and written informed consent were secured.
Results: 40.1% population of patients experience depressive disorder. Patients within the age bracket of 40-60 years experienced more symptoms of depression than the older ones, however, this contrast was not significant statistically. It was also observed that the within six months of the stroke episode, the patients were more prone to experience depressive disorder as compared to those having relatively longer duration since the episode of stroke (48.7% vs. 33.0%; p=0.03). Moreover, clinical depression was found more prevalent in patients suffering from diabetes mellitus type II (61.9% vs. 32.8%; p=0.01) as well as amongst individuals with consistent smoking habits (p=0.04). No significant association as regards gender or hypertension was observed.
Conclusion: Stroke is a substantive risk factor for developing clinical depression among the survivors. Thorough screening along with adequate follow up may significantly address the neurological and psychiatric needs of these patients, resulting in improved quality of life.

Key words: Beck Depression Inventory, Diabetes mellitus; post-stroke depression; Stroke; Risk factors; Hypertension.

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Introduction:

Stroke has long been recognized as a leading cause of death and disability worldwide. The current stroke care system in Pakistan is still incapacitated to handle this growing issue, which has an effect on the country's overall health care system. To reduce the chances of subsequent morbidity and mortality, a comprehensive stroke care system is urgently needed.[1] Over 50% of stroke survivors experience permanent disability, which places a significant psychological and social burden on the patients and their loved ones.[2] Neuropsychological factors are commonly overlooked in post stroke management although these are essential in improving life quality.[3] The inception of post-stroke depression (PSD) is multifaceted, emerging from the confluence of various biological and psychosocial elements.[4] Notable psychosocial risks include a prior depression / history of psychiatric disorder, speech difficulties i.e. dysphasia, lonely living, post-stroke social disengagement, and non-supportive family.[5] About 11% to 75% of stroke survivors have been reported to experience post stroke depression. Nearly 10% to 27% of patients suffer from major depressive disorder within the initial months of stroke, while 15% to 40% develop minor depression symptoms.[6] Depression is the fourth largest contributor to the Global Burden of Disease (GBD), approximately affecting 3.8% of people globally.[7-8] This figure incorporates approx. 5.0% of the adult population and increases to 5.7% among those aged 60 years and older[9] People suffering from a depressive disorder, especially those who have concurrent medical conditions like ischemic heart disease, stroke, or diabetes face a comparatively higher mortality risk.[10] It has been observed in stroke patients that various neurobiological features such as the precise location of brain infarcts and the intensity of brain atrophy are directly related to the development of post-stroke depression.[11] These biological factors coupled with psychosocial effects emanating from functional disability and compromised quality of life are a precursor to the development of depressive symptoms.[12] A study found that among the stroke patients 35% were suffering from depression.[13]

Among neuropsychiatric complications, depression is the most common following a stroke, thus negatively affecting the post stroke recovery and overall prognosis. Post-stroke depression (PSD) impedes rehabilitation efforts, develops the chances of recurrent strokes, and also produces higher mortality rates.10 Unfortunately, even with its high occurrence,[13] post stroke depression is often not properly diagnosed and remains undertreated, especially in under- resourced health care settings. It is pertinent to note that the frequency of PSD varies owing to various factors including sex, age, stroke complexity and severity, psycho-social support, and overall health care system prevalent in the

1. FCPS Resident at neurology department. Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana.
2. Professor; Department of Neurology. SMBBMU Larkana
3. Consultant Physician; SMBBMU. Larkana
4. Assistant professor; Sir Syed Medical College for Girls, Karachi
5. FCPS Resident; Department of Neurology. SMBBMU. Larkana
6. FCPS Resident; Department of Medicine Unit 2. SMBBMU, Larkana

**=corresponding author* :
Email: doctorshaikh03@gmail.com
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society.[9] Analyzing the incidence / type of depression in post-stroke patients is therefore very crucial in ensuring a comprehensive patient care involving integrated screening and intervention methodologies.

Objective:

To document the prevalence of post stroke depression (PSD) and to identify associated clinical and demographic factors in a tertiary care setting.

Methodology:

This cross-sectional study was performed at the Department of Neurology, Chandka Medical College Hospital, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBU), Larkana. The prior approval was taken from the College of Physicians and Surgeons Pakistan (CPSP) and the ERC of the institute. The study was performed over a period of six months from 15 June 2025 to 15 December 2025. During period of study 179 patients were recruited using non-probability convivence sampling. The estimation was based on prevalence of 35% for post-stroke depression with 95% confidence interval (7% margin of error).[13] For enrolment of patients, consecutive sampling technique was adopted.

The patients were recruited in accordance with the previously established eligibility criteria. Included were all patients, regardless of gender, between the ages of 40 and 60 who had experienced a stroke within the previous three months and had visited the neurology OPD for follow-up. Patients with other recognized conditions, such as metabolic syndrome, hypothyroidism, hyperthyroidism, non-alcoholic fatty liver, pheochromocytoma, or Cushing's disease, were not eligible. Similarly, patients with cognitive impairment-related comprehension problems or those with communication difficulties were excluded. Patients who had previously been treated or under treatment with antidepressant therapy, those who had a history of delirium, bipolar affective disorder, dementia, mania, or PTSD were also excluded.

Prior to participation in the study, an informed consent in written was obtained from prospective patients. Duration of stroke, demographic data, as well as related comorbidities were recorded while taking history. The Beck Depression Inventory (BDI)[14] was used to asses the depression. BDI is a 21-item tool in which each item is ranked from 0 to 3 depending on intensity/severity. A combined score of 9 or more was determined as evidence of depressive disorder. A standard proforma was designed for the subject study and the degree/ intensity of depression symptoms was recorded.

SPSS version 22 was used to analyzed the data gathered. Quantitative variables i.e. BDI, age and time duration since stroke episode were reflected as mean (average) and standard deviation. Frequencies / percentage format was used for various categorical variables, including stroke type, sex, incidence of hypertension, diabetes mellitus, dyslipidemia, status of smoking and the prevalence or absence of depressive symptoms. Data stratification was performed for variables such as sex, age, type of stroke, incidence of hypertension, diabetes, duration of stroke. Afterwards, chi-square test was used to determine the relations. A p-value < 0.05 was determined as statistically significant.

Results:

179 post-stroke patients were recruited for this study. Most of the participants were between the age bracket of 61 to 80 years (69.8%), while 30.2% fell in the age group of 40 to 60 years. Women were higher in number than men (53.6% vs. 46.4%). 42.5% of the patients were those who had their stroke event within the prior six months while 57.5% of the patients were those who had a stroke duration of longer than 6 months. It was also observed that the frequency of Ischemic stroke was higher (66%) than hemorrhagic stroke (34%).

Table No 1: Table 1: Baseline characteristics of the participants.

Variables	n (%)
Age	
40 to 60 years	54 (30.2)
61 to 80 years	125 (69.8)
Gender	
Male	83 (46.4)
Female	96 (53.6)
Duration of Stroke	
≤ 6 months	76 (42.5)
> 6 months	103 (57.5)
Diabetes Mellitus type II	
Yes	42 (23.5)
No	137 (76.5)
Hypertension	
Yes	85 (47.5)
No	94 (52.5)
Smoking	
Yes	64 (35.8)
No	115 (64.2)
Depression	
Yes	71 (39.7)
No	108 (60.3)
Total	179 (100)

Comorbidities were widely observed. Approximately 25% of the patients had type II diabetes mellitus while almost half (49%) had hypertension. 63% were reported as non-smokers while smoking (current) was stated by 37% of the total patients. While assessing for psychiatric disorders, it was noted that 40.1% of patients had depression, thus validating its considerable incidence among post-stroke patients.

Various considerable patterns were observed when we assessed the patients with and without depression on a comparative scale. Young patients (40–60 years) showed a higher depression incidence than those aged 61–80 years (49% vs. 36%), however this difference was not of statistical significance (p=0.06). It was also noted that gender was not related with depression, with almost similar incidence among male (42.2%) and female (37.5%; p=0.52). Contrastingly, the time duration of stroke had an important relationship: individuals within 6 months of stroke were more likely to report depressive symptoms (49%) as compared to those after 6 months (34%; p=0.03).

Comorbid diabetes mellitus and smoking also showed strong associations with depression. Patients with diabetes reported depression more frequently than those without diabetes (61.9% vs. 32.8%; p=0.01). Similarly, smoking was more common among depressed patients (29.7%) than among their non-depressed counterparts (45.2%; p=0.04). Hypertension did not demonstrate a significant association (p=0.31). Taken together, these findings suggest that a shorter duration since stroke, diabetes, and smoking behavior contribute to a higher likelihood of depression among post-stroke patients in this cohort.

Table No 2: Patient characteristics corresponding to the stroke clusters.

Variables	PSD Yes. n (%)	PSD No n (%)	P value
Age			
40 to 60 years (n=54)	27 (50)	27 (50)	0.06
61 to 80 years (n=125)	44 (35.2)	81 (64.8)	
Gender			
Male	35 (42.2)	48 (57.5)	0.52
Female	36 (37.5)	60 (62.5)	
Duration of stroke			
≤ 6 months	37 (48.7)	39 (51.3)	0.03
> 6 months	34 (33)	69 (67)	
Diabetes mellitus type II			
Yes	26 (61.9)	16 (38.1)	0.01
No	45 (32.8)	92 (67.2)	
Hypertension			
Yes	37 (43.5)	48 (56.5)	0.31
No	34 (36.2)	60 (63.8)	
Smoking			
Yes	19 (29.7)	45 (70.3)	0.04
No	52 (45.2)	63 (54.8)	

Discussion:

In this study, we found that nearly two out of five post-stroke patients (39.7%) suffered from depression. This prevalence falls within the range reported in many low- and middle-income settings, where figures typically vary between 30% and 50%.[14] For example, a Sri Lankan study described a prevalence of 44%,[15] while Nigerian outpatients reported 42.9%.[16] Our rate was lower than the 92% reported in an Indian tertiary care hospital,[17] but higher than the 35% recorded in an earlier Indian study.[18] Such variation likely reflects differences in patient selection, timing of assessment, and the diagnostic tools used, but together the evidence underscores that depression remains a common and disabling sequela of stroke.

Age showed an interesting trend in our cohort. Young patients (40-60 years) showed a higher depression incidence than the old ones aged 61-80 years (49% vs. 36%), however this difference was not of statistical significance (p=0.06). This association may be justified because of the socio-economic disruption that young individuals usually encounter when a stroke disrupts employment opportunities and compromises family earnings. It is interesting to note that identical statistics were reported in countries like Bangladesh and Ethiopia and Bangladesh where the young patients were at risk of psychosocial distress as compared to older ones.[19,20] Contrastingly, countries such as Sri Lanka, marked older age as a higher factor resulting in post-stroke depression.[15] Meanwhile, these differences are suggestive of differentiated socio-economic and cultural contexts prevalent in the societies thus impacting the post stroke psycho-social response.

It was also observed that those patients who were considered within 6 months of the onset of stroke were more prone to depression than those considered later. Meanwhile, this observation is very much consistent with the prior literature suggesting that depressive symptoms peak in the early post-stroke duration, wherein functional recovery is rather uncertain and the patients are substantively dependent on attendants / family and caregivers.[16-17] This study underscores the importance of early psychological assessment in stroke survivors, specially in the initial months of recovery.

It was noted that the comorbid conditions have a strong influence on the prevalence of depression. Patients suffering from diabetes mellitus had significantly higher degree of depression which also matches with findings from Bangladesh and Ethiopia,[20,21] This correlation is reflective of biological factors i.e. vascular injury and systemic inflammation as well as the psychological weight of multiple chronic conditions. Smoking was also identified as an important factor. In this cohort, smoker patients were more prone to develop depressive symptoms. This finding also matches with prior studies in South Asian societies.[18-20] Interestingly, hypertension did not reflect a significant correlation with depression given the fact that hypertension is a common comorbidity in this setting. This, even though disputes earlier research studies,[14] but is consistent with others,[18] suggesting that hypertension may however augment the severity or frequency of stroke rather than pose as a direct risk factor for depression.

In our cohort, gender did not have a direct relation with PSD. In this study, Men and women were affected equally; this finding is different form the observations in other south Asian countries of India and Bangladesh where female gender has remained at a higher risk of developing PSD.[15,20] This inconsistency may be reflective of the environmental and overall sociocultural context in our setting, whereby both men and women (regardless of gender) are faced with identical bottlenecks in accessing psycho social support and rehabilitation. It is however stated that although while our study did not evaluate lesion characteristics, prior literature suggests that left-sided cortical and subcortical strokes are at the highest risk of development of PSD.[16] Summing up, our results of the study and the global literature augment the view that post-stroke depression results from a complex interaction of organic brain changes with psychosocial stress factors.

Limitations

The study design and being single center study are major limitation to apply the results of current study to larger population. Also, we did not record the changes in mood and depression over period of time.

Conclusion:

It is clear from this study that almost two out of five stroke survivors in a tertiary care setting experience clinical depression. This study found that smoking, diabetes mellitus, and a shorter stroke duration were significant predictors. These results emphasize the value of focused treatment plans in addition to routine examinations, screenings, and follow-ups. Combining post-stroke therapy with psychological support can greatly enhance patients' quality of life.

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Authors' Contribution	
Khadija Shaikh	concept, design, data collection, manuscript writing
Alam Ibrahim Siddiqui	data interpretation, manuscript revision
Sooraj Jokhio	Data collection, Literature review
Saima Parveen Shaikh	Data Analysis, draft writing
Kanwal Chandio	data collection, data analysis
Benazir Junejo	data analysis, Manuscript revision