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# FREQUENCY OF DEPRESSION IN PATIENTS WITH STROKE

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## ABSTRACT

**Introduction:** Stroke is a common neurological problem and the third leading cause of death in developed countries of the world. Among survivors, over 50% develop significant disabilities including neuro-psychiatric disabilities. Post stroke depression (PSD) is a common but less reported condition among survivors. **Objectives:** To determine the frequency of depression in patients with stroke. **Materials and methods:** This was a cross-sectional study conducted at Department of Neurology, Services Hospital, Lahore from January, 2014 to December, 2014 over a period of 1 year. A total of 100 cases having stroke minimum 1 month ago, were recruited in the study. For evidence of depression, Personal Health Questionnaire (PHQ-9) with criteria for mild, moderate, moderately severe and severe depression was used. **Results:** Mean age of the patients was  $54.8 \pm 8.1$  years. In our study 63% of the patients were female while 37% patients were male. Post stroke depression was found in 35% of cases; 15% had severe depression, 8% had moderately severe, 9 % had moderate and only 3% patients had mild depression. Among these 35 patients, 22 patients (62.8%) had involvement of dominant half of brain while 13 patients (37.2%) had non-dominant half involved. **Conclusion:** Post stroke depression is present in significant number of post stroke patients. So it is advised to do PSD evaluation of all stroke patients for early and proper management.

**KEY WORDS:** Stroke; Post stroke depression; Depression.

## INTRODUCTION

Stroke is a common neurological problem and the third leading cause of death in developed countries of the world.<sup>(1)</sup> According to a survey in 2010, about 11.5 million patients suffered from ischemic strokes (63% in low-income and middle-income countries) and 5.3 million patients had hemorrhagic strokes (80% in low-income and middle-income countries). An estimated 5.8 million individuals died from stroke in a year<sup>(2)</sup>. Among survivors, over 50% have significant disabilities creating physical, social and psychological burden on themselves as well as on the family<sup>(3)</sup>. Neuropsychological symptoms are probably among the most commonly ignored complications in stroke patients. Depression is a common yet often unrecognized neuropsychological consequence of stroke, having biological, psycho behavioral and social dimensions<sup>(4)</sup>. Post stroke depression (PSD) is multifactorial in origin and develops under the influence of biopsychosocial factors. The anatomical correlates of PSD change over time. The most relevant psychosocial risk factors for PSD may include: past history of depression and other mental disorders, dysphasia,

functional impairment, lone living style, post-stroke social isolation & lack of family support<sup>(5)</sup>. PSD is prevalent in both genders, but appears to be slightly more common among women than men. The reported prevalence of depression following a stroke varies from 20% to 50% within the first year, with an apparent peak within the first 6 months of onset of event<sup>(6)</sup>. According to another study, prevalence has been estimated to be around 30–35%, ranging from 20 to 60%<sup>(7)</sup>. The disparity of reported prevalence rates significantly depends on study methodology, diagnostic assessment tools, and time elapsed after stroke onset. Several established depression screening tools have been validated in stroke cohorts, and at least one tool has been developed specifically for depression screening in stroke survivors. The Zung and the PHQ-9, are designed to be both a screening tool and a diagnostic tool, where not just the overall score but the specific combination of symptoms are taken into consideration<sup>(8)</sup>. Depression impedes rehabilitation progress following stroke and is associated with impaired functional outcome, cognitive decline, and increased mortality. Similarly, depression has been linked to increased risk of stroke occurrence. Despite high prevalence and serious sequels, PSD

remains undetected and untreated<sup>(6)</sup>. So we planned this study to find the magnitude and related factors of PSD in survivors of stroke. Early diagnosis and successful intervention may improve clinical outcome of PSD and should be considered a key for better stroke care. Early effective treatment of depression may have a positive effect not only on depressive symptoms but also on the rehabilitation outcome of stroke patients.

**Table-1**  
**Distribution of Post stroke depression by gender (n=100)**

PSD	Male		Female	
	Number	%	Number	%
Yes	12	32.4	23	36.5
No	25	67.6	40	63.5
Total	37	100.0	63	100.0

**Table-2**  
**Distribution of patients according to Depression Level**

Depression Level	Male	Female	Total
NO DEPRESSION	25	40	65
MILD	0	3	3
MODERATE	4	5	9
MODERATELY SEVERE	3	5	8
SEVERE	5	10	15

## MATERIAL & METHODS

After approval from hospital ethical review board, this study was planned. It was a cross-sectional survey conducted at department of neurology, Services Institute of Medical Sciences (SIMS), Services hospital, Lahore over a period of one year, from January, 2014 to December, 2014. A sample size of 100 cases was calculated with 95% confidence level, 9.5% margin of error and taking expected percentage of depression i.e. 34% after 1 month in post stroke patient<sup>(7)</sup>. All the patients with stroke (confirmed by CT scan) presenting in out patient department, minimum after one month of the event, above 40 years of age were included in the study. Those having subarachnoid hemorrhage and venous etiology of stroke on CT scan brain, having history of death of spouse within 6 month duration and previous history of stroke were excluded from the study as all these factors are proven as isolated risk factors in different studies. These patients were evaluated for presence or absence of depression by researcher himself. A questionnaire was used as a data collection tool and score was given using Personal Health Questionnaire (PHQ-9) on the basis of diagnostic and statistical manual fourth version (DSM-iv). The rating

scale was shown in questionnaire incorporated in performa with interpretation of total score as less than 4 as no PSD, 5-9 as mild PSD, 10-14 as moderate PSD, 15-19 as moderately severe PSD and 20-27 as severe PSD. Also age, gender, side of the brain involved (dominant or non-dominant) and educational status of the patients were evaluated. All the collected data was entered into SPSS (statistical package for social sciences) 21.0 version and was analyzed descriptively. In our descriptive analysis, counts and percentages were calculated for qualitative variables like gender, PSD while mean and standard deviation were calculated for quantitative variables like patient age etc.

## RESULTS

The mean age of patients was found to be  $54.8 \pm 8.1$  years in our study. Out of the total 100 patients, 33 patients (33%) were in 40-50 year age group, 46 patients (46%) were in 51-60 years age group and the remaining 21 patients (21 %) were in 60 years and above age group. Among 100 patients, 37% (n=37) were male and 63% (n=63) were female. In our study PSD was found in 35% (n=35) of the patients. Among these 35 patients with PSD 23 patients (65.7%) were female and 12 patients (34.3%) were male. Out of total of 63 female patients included, PSD was present in 23 patients (36.5%) and was absent in the remaining 40 patients (63.5%). As far as the male patients are concerned, out of the total 37 patients, PSD was present in 12 patients (32.4%) and absent in the remaining 25 patients (67.6%). Mild depression was present in 3 female patients but no male patient was found with mild depression in this study. Moderate depression was present in 4 male and 5 female patients. Moderately severe depression was observed in 3 male and 5 female patients. Severe depression was observed in 5 male and 10 female patients. The average post stroke duration was  $1.97 \pm 0.8$  months in patients with PSD while it was  $2.26 \pm 1.1$  months in patients without PSD. In 22 patients (62.8%), lesion was on the left side of the brain (dominant half) and 13 patients (37.14%) had lesion on the right side of the brain (non-dominant half). There were 67 (67%) illiterates, 16 (16%) educated up to primary school, 5 (5%) educated up to middle school and 8 (8%) educated high school and above of the total 100 patients.

## DISCUSSION

Stroke is a disease associated with many complications. PSD is one of the important complications during post-stroke period. Although it is an important research issue and lot of work is being done on this subject in

world but a little data is available on this subject in Pakistan<sup>(9)</sup>. In this study we found that amongst the patients selected for the study, 37% were male and 63% were females. It is in accordance with the results presented by most of the previous authors. ZhangWN and colleagues also found female gender as a risk factor. They calculated Odds Ratio (OR) value being 3.1483,  $P < 0.05$ <sup>(10)</sup>. It may be due to the factor that depression and psychological disorders are also otherwise more common in females than males. In our study we found the PSD in 35% of the patients. The reported frequency of PSD in previous studies ranges from 20% to 65%<sup>(11)</sup>. This wide variation in results is due to different criteria for patient selection, some earlier studies are concerned with depression after ischemic stroke only or both ischemic and hemorrhagic stroke<sup>(12)</sup>. The results also depend on the time elapsed after stroke and difficulties in estimating depression in stroke patients with a cognitive or physical handicap also cause inaccuracies<sup>(13)</sup>. Although there was considerable variation in the reported frequency of depression after stroke across individual studies. A meta-analysis has estimated the pooled frequency of PSD at 33%, even with relevant differences across studies<sup>(14)</sup>. PSD is commonly unrecognized and untreated in clinical practice. According to Schubert et al, nonpsychiatric physicians fail to diagnose 50% to 80% of the actually existing depression. However, PSD is most likely not solely a psychological reflection of a physical disability<sup>(15)</sup>. Folstein MF and colleagues conducted a trial and demonstrated that stroke patients were significantly more commonly depressed than orthopedic patients with equal levels of functional disability (45% versus 10%)<sup>(16)</sup>. In our study also we found that 62.8% of patients with PSD had left hemisphere involvement than 37.2% having right side involved. Our findings are consistent with findings of Saxena A and Suman A, who found the PSD in 68.8% of patients with left hemisphere involvement than 42.9% of patients with right side involved ( $P = 0.008$ )<sup>(17)</sup>. However, Wei N and colleagues recently published their systematic review on this topic and they found no correlation between PSD and side of brain involved. They only found significant association between non dominant hemisphere stroke and incidence of depression for studies within sub acute post-stroke phase. Due to this discrepancy in literature, this hypothesis that lesion of the dominant hemisphere are associated with an increased risk of depression after stroke, is no longer considered true<sup>(18)</sup>. The mean age of patients found in our study was  $54.8 \pm 8.1$  years. In our study this age was higher than previous studies because we included patients above age of 40 years because in our society particularly, male members are

bread earners and disability at younger age is found having more depression than older ones<sup>(19)</sup>. However, Naess presented their report on 196 patients with stroke and they found that stroke patients in age group 15–49 had lower PSD incidence than elderly patients<sup>(20)</sup>. But some data suggest that there was no significant differences between various age groups<sup>(21)</sup>. The conflict conclusion may be drawn because different group of patients were chosen to be studied in different centers. So a large study sample with multi-center involvement must be conducted to sort this out. Also, there is a great variability in the method applied and the diagnostic tools used for the detection of PSD. Some researchers used structured statements or questions and other follow a structured interview and the diagnostic standards defined by DSM (Diagnostic and statistical manual of mental disorders)-III, III-R, and IV, and some even base their assessment only on clinical findings. Even when most of the studies based on the same diagnostic tool, the diagnosis on cutoff score varies in different rating scales. The PHQ-9 is a brief diagnostic and severity measure of depression, which has been widely used in research and clinical practice<sup>(22)</sup>. The PHQ-9 was successfully used for screening post-stroke depression patients in our study. Similar findings are noted in the Heart and Soul study of depression among patients with coronary heart disease<sup>(23)</sup>. A meta-analysis that included chronic care conditions involving patients from cardiology, renal dialyses, brain injury and stroke facilities as well as general medical out patients found the PHQ-9 acceptable as a diagnostic screening tool for major depression<sup>(24)</sup>. In spite of the abundant literature available on this topic, it is still difficult to define the real prevalence rate of PSD, essentially because of the weak concordance across studies. This relevant variability arises not only from methodological problems of the investigations (differences in study populations and the timing of assessments) but also from the complexity in recognition, assessment, and diagnosis of depression. In our study, there were 35 patients who were found to have PSD and these patients were referred to psychiatrist for treatment. It is recommended for all stroke patients to be evaluated for depression and must be treated accordingly to reduce the morbidity, mortality and to improve the functional outcome of the patients.

## CONCLUSIONS

Post stroke depression is common in patients with stroke and it directly or indirectly affects both morbidity and mortality in these patients. So in order to improve outcome in these patients, all patients with stroke should be screened and evaluated accordingly.

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**Author's contribution:**

**Dr. Adnan Aslam:** Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

**Dr. Ahsan Numan:** Data collection, data analysis, manuscript writing, manuscript review

**Dr. Muhammad Arif:** Data collection, data analysis, manuscript writing, manuscript review

**Dr. Abubaker Siddique:** Data collection, data analysis, manuscript writing, manuscript review