



Original Article

**FREQUENCY OF DEPRESSION IN PATIENTS WITH STROKE**

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**ABSTRACT**

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**Objective:** To determine the frequency of depression in patients with stroke admitted in tertiary care hospital.

**Subjects and Methods:** This descriptive cross sectional study was conducted from Sept. 2012 to March 2014 in Medical Unit 4, Civil Hospital Karachi. Adult patients with history of first event of stroke during last 3 months were included after ethical approval and informed consent. Patients with brain tumors, central nervous system infections, mental retardation, critical illness, seizures and previously diagnosed depression were excluded. Performa based on Siddiqui Shah Depression Scale (SSDS) questionnaire was used for data collection with outcome as having depression (SSDS < 26) or no depression (SSDS > 26). Data analyzed by SPSS version 15. Chi-square test applied to study association of depression with gender, age groups and etiology of stroke. *P*-value < 0.05 taken as statistically significant

**Results:** Among 363 cases (64% males and 36% females), mean age was 56.57+9.78 years. Depression was found in 47% cases of stroke. Rate of depression was significantly high in males (56.2%) than females (43.8%). Also depression was significantly more in > 50 years age as compared to < 50 years. Though depression was higher in ischemic (65%) than hemorrhagic stroke cases (34.9%) but it wasn't statistically associated.

**Conclusion:** Post stroke depression is prevalent and usually unrecognized. Male gender and age above fifty years are suggested risk factors. Screening the stroke patients for depression and possible intervention by family support, rehabilitation, social acceptance and timely psychiatrist or psychologist referral may lead to better quality of life.

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**INTRODUCTION**

Stroke is defined by the World Health Organization as "rapidly developed clinical signs of focal or global disturbance of cerebral function with no apparent non-vascular cause."<sup>1</sup>As per estimate of WHO, every year about 15 million of the world population suffers from stroke out of which around 33% (5 million) die

and 33% have residual disability. Globally every 10<sup>th</sup> of a second, life is taken by stroke and every 1/2 second an incident of stroke occurs. High blood pressure is the major risk factor in stroke which causes more than 80% of stroke cases (12.7 million) worldwide. Other risk factors of stroke are smoking, atrial fibrillation, heart failure and heart attack.<sup>2</sup>

Stroke is broadly classified as ischemic or haemorrhagic. Ischemic stroke is caused by obstruction in a blood vessel supplying blood to brain either due to blood clot formation or atherosclerotic process secondary to accumulation of lipids in vessel walls. Around 4/5<sup>th</sup> (> 80%) of stroke cases are caused by ischemic brain infarction.<sup>1</sup> Hemorrhagic stroke is caused by rupture of a blood vessel that leads to the bleeding in brain parenchyma. It accounts for 1/5<sup>th</sup> (13%) of stroke cases and carries higher mortality.<sup>2</sup> The initial diagnosis of stroke is clinical, followed by imaging techniques i.e. computed tomography (CT) scan or Magnetic resonance imaging (MRI) brain.<sup>3,4</sup>

The prevalence of depression in Pakistan has been estimated to be as high as 34%.<sup>5</sup> Stroke survivors are at risk of developing depression, and this affects their recovery from stroke.<sup>6</sup> Several regional and international scales have been widely used to classify depression. The Diagnostic and Statistical Manual (DSM-IV) categorizes post-stroke depression as "mood disorder due to a general medical condition (i.e. stroke)."<sup>3</sup> Siddiqui-Shah Depression Scale (SSDS) is a self-reported scale based on 36 questions to diagnose and measure the severity of depression. Each question carries 3 points with a maximum score of 108 (36x3). SSDS >26 is cut-off to label depression. This scale bears high sensitivity and specificity with test re-test reliability of 0.85.<sup>4</sup>

Despite of its high prevalence, post stroke depression continues to be under-recognized and un-treated.<sup>5</sup> This is particularly worrisome as depression has greater negative impact on quality of life than stroke itself.<sup>6</sup> In 2011, Qamar ZK found depression in 38% cases of stroke at neurology department of Liaquat University Hospital, Pakistan.<sup>2</sup> This study had a limited sample size of 81 cases and depression was assessed on an international scale i.e. DSM IV criteria.

Current study was conducted to determine the frequency of depression in stroke cases using the regional scale that has been applied by few studies. The prevalence of post stroke depression varies worldwide and results of this study can be used for comparison with regional and international data, and to identify the high risk cases to be screened and intervened with possible better quality of life and reduced morbidity.

## PATIENTS AND METHODS

All adult patients (>18 years), admitted in medical department Civil Hospital Karachi with first event of stroke within 3 months were included after ethical approval from institutional committee. Patients with mental retardation who are unable to answer the questionnaire, evidence of central nervous system infection, brain tumors, history of head injury and previously diagnosed cases of depression were excluded. Also the conditions mimicking stroke (i.e. conversion disorder, hypertensive encephalopathy, hypoglycaemia, complicated migraine and seizures) were excluded.

Stroke was defined as clinical features of focal neurological deficit lasting >24 hours i.e. sudden onset weakness, numbness or difficulty in speech that was confirmed by Plain Computed Tomography (CT) scan Brain as hypo-dense zone (ischemic stroke) or hyper dense zone (haemorrhagic stroke). The purpose, risk and benefits of the study were explained and informed consent obtained. Patients were then asked to fill the specially designed proforma based on Siddiqui Shah Depression Scale (SSDS) questionnaire (Urdu version). Those who cannot read or write were helped by the authors themselves. The patients were categorized as having depression (SSDS score >26) or no depression (SSDS score < 26).

Data was analyzed by SPSS version 16. Descriptive statistics was applied to calculate the frequencies and percentages of categorical variables (gender, type of stroke and depression). Mean and standard deviation was calculated for quantitative variables (i.e. age). Stratification was undertaken for age, gender and type of stroke. Chi-square test was applied to see the effect of these on outcome variable.  $P < 0.05$  was considered as statistically significant.

## RESULTS

Total 363 stroke patients were included in this study. There were 234(64%) males and 129(36%) females. Mean age was  $56.57 \pm 9.78$  years. Most of the patients were > 40 years of age. Ischemic stroke was observed in 69% cases and hemorrhagic stroke in 31%. Depression was observed in 47% cases of stroke. Depression was significantly high in > 50 years of age (64.4%) as compared to < 50 years (35.5%;  $p=0.0005$ ). Also depression was significantly high in males (56.2%) than females (43.8%;  $p=0.002$ ). Though depression was higher in ischemic stroke (65%) than hemorrhagic (35%) but there was no statistically significant difference ( $p = 0.110$ ; table 1).

## DISCUSSION

Depression is common among stroke patients. We found depression in almost half of the cases with stroke. Previous studies have acknowledged wide variation in post stroke depression worldwide. The pathophysiologic mechanisms

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**TABLE 1**  
**DEPRESSION IN PATIENTS WITH STROKE ACCORDING TO AGE GROUPS,**  
**GENDER AND TYPE OF STROKE.**

Variable	Stratification	Frequency n=363	Depression in Stroke n (%)		Chi square value	p-value
			Yes n =169	No n =194		
<b>Age groups</b>	< 50 years	164(45%)	60(35.5%)	104(53.6%)	11.95	0.0005*
	> 50 years	199(55%)	109(64.4%)	90(46.3%)		
<b>Gender</b>	Males	234(64.5%)	95(56.2%)	139(71.6%)	9.39	0.002*
	Females	129(35.5%)	74(43.8%)	55(28.4%)		
<b>Etiology</b>	Ischemic	252(69.4%)	110(65%)	142(73%)	2.54	0.110
	Hemorrhagic	111(30.6%)	59 (35%)	52(27%)		

(Test of significance Chi-square test; \*Significant p-value < 0.05)

of post stroke depression are not known. Robinson and his co-workers advocated the location of cerebral lesion as the most important factors in determining post-stroke depression.<sup>8</sup> However, certain studies failed to confirm this relationship.<sup>7,9,10</sup> Disability after stroke has also been implicated in the etiology of post stroke depression.<sup>11</sup> However, some studies found only weak association between post-stroke depression and disability.<sup>12,13</sup>

Frequency of depression in patients with stroke was observed in 47% cases. This rate is higher than those reported in a systematic review article of outpatient sample (33%).<sup>14</sup> The possible reasons in this variation are differences in definitions, tools and timing of assessment, the difficulty in recognition of depression in the background of stroke related disability. The higher prevalence observed in our study could be the reflection of higher regional prevalence of depression, social, economic, cultural factors and poor quality of life in our patients with insufficient rehabilitation and health care facilities.

The prevalence of post-stroke depression at about 30% was seen in earlier studies.<sup>6,10</sup> Also the time lapsed after stroke has been mentioned as a variable in the prevalence of post stroke depression.<sup>16,17</sup> A Malaysian study conducted on 80 stroke patients has shown 15% prevalence of moderate to severe depression.<sup>15</sup> The study was done at 3 to 6 months post-stroke, whereas current study was done within 12 weeks post stroke. Authors recommend further studies to study the association of time lapsed after first event of stroke in our region. The exclusion of a number of patients in this study as in other studies, because of severe cognitive or communicative deficits may contribute to an underestimate of psychiatric morbidity. However, Robinson RG<sup>18</sup> suggested that aphasia does not cause depression, though both may

coexist. Since now, there remains no reliable method of assessing mood disorders for patients with severe comprehensive deficits.

Demographic variables are important determinants of post stroke depression. Depressive symptoms were found statistically associated with age group in our study. Rate of post stroke depression (PSD) was significantly high in > 50 years of age than below 50 years of age ( $p=0.0005$ ). Our result has similarity with previous studies.<sup>19</sup> However, most of the studies on significance between age and post stroke depression show contradictory findings and reveals complex relationship between age and post stroke depression which could be found dependent upon other multiple factors.

Regarding type of stroke, 69% were ischemic and 31% were hemorrhagic. Though depression was high in ischemic than hemorrhagic stroke but difference was not statistically significant. (65% vs. 34.9%;  $p=0.110$ ). This finding is in congruence with other studies.<sup>19</sup> An earlier study reported high depression among patients having ischemic stroke in the left hemisphere as compared to those having it in the right hemisphere.<sup>20</sup> However, many studies do not agree with this and report contradictory results.<sup>21</sup>

Just as functional depression may arise from several mechanisms, the cause of PSD is likely to represent a mixture of etiologic factors. Socio-demographic, psychological and biological risk factors mediate the relationship between stroke and depression. The association of depression with worse prognosis in stroke patients lends more support to the hypothesis that psychological rather than neurological factors are the main determinants of post stroke depression.<sup>22</sup>

Similarly depression was significantly high in males than

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females (56.2% vs. 43.8%  $p=0.002$ ). This is in accordance with many other studies.<sup>23</sup> One reason of high depression among working age group of male might be that physical disability in that group is of greater importance for male as compare to female or another explanation of higher depression in men was attributed to their less coping abilities as compare to females.<sup>24</sup> Particularly in Pakistan, high post stroke depression among males could also be attributed to the cultural norms as high level of responsibilities and expectations are attached with male gender. Males are responsible to earn bread and butter for large families. Joint family system in the country adds fuel to the fire and in such scenario physical impairment by stroke carries a higher risk of developing depression. However certain studies have contrary results showing higher prevalence of depression in females with stroke.<sup>25,26</sup>

This study was conducted to determine the frequency of depression in patients with stroke. The regional scale was used rather than international scale that has been used by fewer studies. Also the study was conducted in a tertiary care hospital where we had the opportunity to get an appropriate sample size. Certain limitations of study include the inability to follow patients and lack of randomization. Authors recommend that results of the study should be interpreted carefully and further regional studies including other social factors and co-morbid conditions contributing to depression may broaden the spectrum of detailed analysis of depression in patients with stroke.

**CONCLUSION**

The prevalence of post stroke depression is high and frequent. It usually remains under-recognized. Male gender and age above fifty years are the suggested risk factors. This is particularly worrisome as depression has greater negative impact on quality of life than stroke itself. There is a need to screen stroke patients for depression as preventive measures like family support, rehabilitation and social acceptance in addition to timely intervention by psychiatrist or psychologist referral may improve the quality of life in patients with stroke.

**CONFLICT OF INTEREST**

Authors declare there is no conflict of interest.

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**AUTHORS CONTRIBUTION:**

\* Author : Conceived the idea and collected data.

\*\* Author : Revised the manuscript

\*\*\* Author : Data Analysis & citation.