

# Magnitude of Post Stroke Depression (PSD) and Its Association with Socio-Demographic and Disease Related Factors in Stroke Survivors Visiting Tertiary Care Hospitals: A Cross-Sectional Descriptive Study

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## ABSTRACT

**Objectives:** To determine the magnitude of Post Stroke Depression (PSD) and its association with socio-demographic and disease related factors among stroke survivors visiting tertiary care hospitals of Peshawar, Pakistan

**Methodology:** A cross-sectional study was carried out in three major tertiary care hospitals, of Peshawar on 120 stroke survivors. A valid ( $r = 0.79$ ) and reliable ( $r = 0.84$ ) self-administered Siddiqui Shah Depression Score (SSDS) was used as study tool. A non-probability convenience sampling technique was used. Demographic information, including age, gender, marital status, income status, education, and family system was obtained. Disease related factors, including duration after stroke, co-morbidity, and level of dependency were measured. Depression level was evaluated via SSDS translated into Urdu.

**Results:** Post Stroke Depression (PSD) was found in 79.1% of the total sample. Sixty-six (55%) survivors were males. The mean age of the respondents was  $47.43 \pm 11.83$  years. Chi-Square test showed a significant association between the age of stroke survivor and education status, while other demographic variables were found to be non-significant. In disease related factors, duration after stroke revealed significant association with PSD, whereas level of dependency was also found significant.

**Conclusion:** The prevalence of PSD is high among stroke survivors and timely detection, family support, and adequate measures by healthcare professionals are important in management of PSD.

**Key words:** Post Stroke Depression, Stroke Survivors, Stroke, Depression, Functional Disability, Social Support, Dependency

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## INTRODUCTION

Post Stroke Depression (PSD) is the highest prevailing psychiatric complication and the most common emotional disorder afflicting stroke survivors<sup>1</sup>. The prevalence of PSD has been reported to be as low as 5% and as high as 70% around the globe<sup>2</sup>. Literature reports that nearly 30% of the stroke survivors develop depression, either at early or late stages after stroke<sup>3</sup>. However, only a small number of patients are diagnosed

and even fewer are treated in common clinical practice. Although depression affects the functional recovery and quality of life, it is usually ignored or misdiagnosed. PSD prevalence varies across different regions of the globe. Umair J. et.al has reported prevalence of PSD as 37.9% among stroke survivors<sup>4</sup>. Similarly, Chen et. al conducted a cohort study over five years and reported 33% prevalence of PSD among stroke patients<sup>5</sup>. Jiang X. et al. have reported wide range of prevalence ranging from 5% to 63% in their studies<sup>6</sup>. Stroke survivors with PSD suffer higher mortality rate and minor improvement in rehabilitation programmes in comparison to non-depressed stroke patients<sup>7</sup>.

The situation in Pakistan is not very different from the rest of the world. In local context, Seethlani et al have reported the prevalence rate of PSD as 47% while another study conducted by Adnan et al, found a prevalence rate of 35% in stroke survivors<sup>8,9</sup>. These

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variations in the reported prevalence of PSD may be due to the differences in study settings, study designs, diagnostic tools, and timing of assessment<sup>10</sup>. None of these findings give a clear etiology of the prevalence of PSD. Despite extensive literature on this topic, there is no agreement on causal mechanism, risk factors and consequences of PSD which usually results in longer hospital stay and hinders the process of rehabilitation and recovery<sup>11</sup>.

The available evidence suggests PSD as being multifactorial in origin, and consistent with bio psychosocial model of mental illness<sup>12</sup>. Literature also shows that multiple factors are responsible for the development of depression in stroke survivors. However, the most common reason reported is the neuro-chemical disproportion in the brain that results in pathology of the disease which influences the person's physical and cognitive manners, mood regulation, and imbalance leading to depression among stroke survivors<sup>13</sup>. Further, demographics such as age of the stroke survivor, gender, marital status, level of literacy, residence, socio-economic background, location of lesion, co-morbidity, severity of diseases, social and family support system, and personal habits and lifestyle are the factors that associate, correlate and contribute in the development of PSD in stroke survivors<sup>6,7,14</sup>.

A study conducted by Alajbegovic et al reported that the incidence of PSD is higher in working age group (20 to 70 years) especially in those who experience stroke for the first time in life<sup>15</sup>. In addition, higher prevalence has been reported in females than males and in those who had left hemisphere lesion location<sup>16</sup>. The tendency or risk of development of PSD has also been found high in stroke survivors who lack family or social support<sup>17</sup>. PSD is common but unnoticed which, on the whole, prolongs the treatment and rehabilitation process<sup>8</sup>.

The idiopathic nature of psychological distress makes the stroke survivors overburdened economically in their families<sup>9</sup>. Early detection and taking appropriate intervention for the prevention of PSD in stroke survivors may limit the number of deaths due to stroke. In Pakistan, especially in local region there has been a great discrepancy in reporting true prevalence and factors responsible for PSD. The current study was, therefore, aimed to assess the magnitude of PSD in local context, and to determine its association with demographic and disease related variables.

## METHODOLOGY

A cross sectional study was carried out recruiting 120 stroke survivors to assess the frequency of PSD and

associated factors in non-aphasic stroke survivors with no previous history of mental illness and one month after the stroke visiting tertiary care hospital. Study duration was from November 2018 to April 2019. A non-probability convenience sampling technique was used. A valid ( $r = 0.79$ ) and reliable ( $r = 0.84$ ) self-administered Siddiqui Shah Depression Scale (SSDS) was used as a study tool<sup>18-20</sup>. Approval was obtained from Advance Studies & Research Board (ASRB) and Ethical Review Board (ERB) of Khyber Medical University (KMU), Peshawar. A sample of 120 was calculated via online Raosoft Sample Size Calculator ( $P = 47\%$ )<sup>9</sup>. It was further divided proportionally according to the sampling frame available in three different tertiary care hospitals. The data was analyzed using SPSS version 20 and presented in the form of tables, frequencies, and percentages. Chi-square and Pearson correlation tests were applied to interpret the findings of the study. Depression and Dependency for Care were categorized as per recommended guidelines of the SSDS and the following categories were used.

### For Level of Depression

No Depression	01-25
Mild Depression	26-36
Moderate Depression	37-49
Severe Depression	50-50+.

### For Level of Dependency for Care

Almost independent for care	< 6
Limited care dependent	06-14
Partially dependent	15-20
To a great extent dependent	21-28
Complete care dependent	>28

## RESULTS

All the study participants returned the filled questionnaire so the response rate remained 100%. PSD was found in 79.1% of the stroke survivors. The mean age of the respondents was  $47.43 \pm 11.83$ . Majority of the respondents [79 (65.8%)] were in the age group of 35-65 years, and more than half [66 (55%)] of them were males. More than two thirds (70%) of the sample stroke survivors belonged to rural areas. Moreover, [63(52.5%)] reported their average income to be between PKR11,000 to PKR30,000 per month. Majority of the respondents [105(87.5%)] were married, whereas almost half [53(44.2%)] were unemployed. Very few of the respondents were single (10%). As shown in Table 1, more than half, [66(55%)] of the respondents were living in joint families.

**Table 1: Comparison of PSD with Demographic variables**

Variable	Category	PSD	No PSD	Total	P-value
Age group	<36	13(81.25%)	3(18.75%)	16	0.001
	36-65	61(77.21%)	18(22.78%)	79	
	>65	21(84%)	4(16%)	25	
Gender	Male	50(75.75%)	16(24.24%)	66	0.370
	Female	45(83.33%)	9(16.66%)	54	
Residence	Rural	69(81.17%)	16(18.82%)	85	0.460
	Urban	26(74.28%)	09(25.71%)	35	
Marital Status	Single	11(91.66%)	1(8.33%)	12	0.535
	Married	81(77.14%)	24(22.85%)	105	
	Widow	2(100%)	0(0%)	2	
	Separated	1(100%)	0(0%)	1	
Employment	Unemployed	42(79.24%)	11(20.75%)	53	0.645
	Self-Employed	23(71.87%)	9(28.12%)	32	
	On Daily wages	13(81.25%)	3(18.75%)	16	
	Salaried	12(92.30%)	1(7.69%)	13	
	Pensioners	5(83.33%)	1(16.66%)	6	
Qualification	Illiterate	51(83.60%)	10(16.39%)	61	0.159
	Matric	29(69.04%)	13(30.95%)	42	
	Intermediate	8(80%)	2(20%)	10	
	Graduate or above	7(100%)	0(0%)	7	
Income Status	<10000	36(81.81%)	8(18.18%)	44	0.662
	11K – 30K	48(76.19%)	15(23.80%)	63	
	31K – 50K	7(77.77%)	2(22.22%)	9	
	>50K	4(100%)	0(0%)	4	
Family Structure	Single	40(74.07%)	14(25.92%)	54	0.261
	Joint	55(83.33%)	11(16.66%)	66	

**Table 2: Association of Co-morbidity and PSD in Stroke Survivors**

Variable	Category	PSD	No PSD	Total	P-value
Co-Morbidity	Hypertension	54(76.05%)	17(23.94%)	71	0.515
	Diabetes	19(79.16%)	05(20.83%)	24	0.318
	Neuropathies	16(84.21%)	03(15.78%)	19	0.166
	IHD	6(100%)	0(0%)	6	0.515

**Table 3: Association of Disease Related Factors and PSD in Stroke Survivors**

Variable	Category	PSD	No PSD	Total	P-value
Time	One Month	55(73.33%)	20(26.66%)	75	0.062
	Two Months	40(88.88%)	05(11.11%)	45	
Hemisphere Affected	Left side	45(71.42%)	18(28.57%)	63	0.077
	Right Side	29(85.29%)	5(14.70%)	34	
	Both side	21(91.30%)	2(8.69%)	23	
Care Provider	Wife	54(72.97%)	20(27.02%)	74	0.189
	Children	18(90%)	2(10%)	20	
	Relatives	20(86.95%)	3(13.04%)	23	
	None	3(100%)	0(0%)	3	

**Table 4: Association of the Level of Dependency for Care and PSD (n=120)**

Variable	Category	PSD	No PSD	Total	P-value
Level of Dependency for Care	Almost Dependent	1(20%)	4(80%)	5	0.000
	Limited Dependent	19(61.29%)	12(38.70%)	31	
	Partially Dependent	25(73.52%)	9(26.47%)	34	
	To a great extent Dependent	36(100%)	0(0%)	36	
	Complete Dependent	14(100%)	0(0%)	14	

Table 1 shows comparison of demographic variables with PSD. It can be inferred from the findings that the gender, residence, marital status, employment, income status and structure of the family system have shown no significant effect on development of PSD. However, age of stroke survivors plays a significant role in this regard with a  $P=0.001$ .

Table 2 displays the association of co-morbidities with PSD. Post-Stroke Depression was found in stroke survivors having comorbidities; that is, Hypertension, Diabetes, Neuropathies, and Ischemic Heart Diseases. Over all, no significant association was found among co-morbidities and Post Stroke Depression.

Table 3 illustrates the association of factors related to disease process with PSD such as duration after the occurrence of stroke, the affected hemisphere of the brain and body side, and care provided to the patient with PSD. These findings suggest that there is no significant association found between PSD and disease related variables in stroke survivors.

Table 4 demonstrates that the level of dependency and PSD is positively associated. These findings reveal that a very low number of the stroke survivors live independently and majority were dependent on others. As the level of dependency increases, the tendency of depression occurrence in stroke survivors increases.

## DISCUSSION

This was the first study from local context to generate the first line data regarding depression among stroke survivors. PSD is a common ailment but unnoticed and ignored at the time of treating and caring for stroke survivors. The overarching aim of this study was to determine the magnitude of PSD and its association with demographic and disease related variables. Depression is one of the most common ailments after the stroke incident. The current study reported 79.1% prevalence of depression in stroke survivors. The findings of this study are consistent with previous studies reported at local and international level<sup>8</sup>. For instance, a study reported by Alajbegovic et al. found PSD among 63% female stroke patients in Bosnia. Similarly, another study by Kumar (2015) reported depression amongst 47% stroke patients in Karachi<sup>9,15</sup>.

PSD has been found significantly associated with age in the current study. Previous studies also reported similar findings that PSD has a strong relationship with younger age. Current study noted PSD was more prevalent in males as compared to females, however, these results are contrary to previous studies findings which noted high rate of PSD among female stroke survivors<sup>11</sup>. The reason of high prevalence of PSD in males remains unknown.

Joint family system may be another factor in the development of PSD, however, physical impairment by stroke carries a high risk for developing depression in stroke survivors<sup>21</sup>. The findings of current study also suggested high prevalence of PSD in married people, whereas previous studies reported that post stroke depression was associated with single, separated or widowed status<sup>22</sup>. The results of current study revealed that PSD has significant correlation with education level. Similar findings were reported by a previous study which showed a significant association between level of education and post-stroke depression<sup>23</sup>. Socio-economic status and social support from family and friends plays an important role in rehabilitation. These findings are consistent with White JH. et al who reported social support to be a significant predictor<sup>24</sup>. Similarly, another study also supported the current study findings that PSD was associated with low social support<sup>25</sup>. Trend of PSD has a temporal effect which means the condition of the patient changes as time passes. Patients at one-month post stroke had higher prevalence of PSD as compared to patients at two months (57.89% and 42.1%) respectively. The study results were consistent with the findings of a previous study<sup>26</sup>.

The current study generated baseline data from local context to uncover the unnoticed problem of depression among stroke survivors. This study recruited a small sample of stroke survivors therefore caution needs to be taken in generalization of findings. The study employed convenient sampling technique which may be another limitation in generalization of findings. The current study was limited to only three tertiary care hospitals of Peshawar, therefore future studies may include multiple centers with large sample size and random sampling techniques. The study highlighted that many factors are involved in the development of PSD in stroke survivors. Healthcare workers need to be vigilant while caring for stroke survivors for early detection and management of psychological complications.

## CONCLUSION

The study concluded that prevalence rate of depression (PSD) was 79.1% in stroke survivors. Moreover, PSD has significant association with lack of social or family support among stroke survivors. Over all, dependency for care and poor physical and mental wellbeing are strongly associated with PSD in stroke survivors. Therefore, proper steps and interventions need to be taken by healthcare agencies and professionals to reduce further ailments among stroke survivors.

**Authors' contributions :** AA Conceived the idea ,worked on methodology and concept designing, research and manuscript writing and final galley proofing. DM and SA Supervise the project worked on designing and concept, data collection and data entry in SPSS, worked on statistical test application, manuscript writing. did critical review. SN did Critical review of the final version and essential changes in manuscript.

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