



## **Post Stroke Depression: Determination of Risk and Frequency of the Depression in Stroke Patients**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author JKD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AS, ABL, HK, SAPT, AAJ and AA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Objective:** In this study we will determine risk and frequency of the depression in stroke patients associated with quality of life.

**Methodology:** Study duration was from January 2020 to December 2020. An observational Cross Sectional Study was conducted on 105 patients. Study conducted in Medical units PUMHS Hospital Nawabshah. After the consent of patient, Detailed history, complete CNS examination CT Scan Brain was done. Data were analyzed by using SPSS 15 version Depression was assessed by instrument beck depression inventory.

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**Results:** Age ranged from 48-68 years, 58 males, 48 females, Education of the patient 66 were uneducated, 17 primary pass and 22 middle pass. occupation of the patient 41 were unemployed, 40 were housewife and 24 were self employed. Depression level was 20 patients with borderline depression, 59 with moderate depression and 26 with severe depression.

**Conclusion:** Post stroke depression is major problem after survival. Proper Treatment of stroke and depression can be prevented from complications and quality of life can be improved. Antidepressant drugs after acute stroke cognitive function can be improved with decreased mortality.

*Keywords: Stroke; depression; mood; disorders; antidepressants.*

## 1. INTRODUCTION

Stroke is defined as loss of blood supply to brain tissue with permanent hemiplegia, major risk factors include diabetes mellitus and hypertension, it can be hemorrhagic, thrombotic or embolic. Commonly ischemic 85% and hemorrhagic 12%, incidence 10-20 per 10000, age ranged 55-64, at the age of 85 or more incidence is 200 per 10000. According to American Heart Association 700000 strokes incidence each year and 163000 death due to stroke related in USA [1]. Stroke is a neurological disorder with increased death ratio in clinical practice. Psychiatrists recognized post stroke depression since 100 years but studies on post stroke begin from 1970. Half of patients have physical disability or post stroke depression, stroke was leading cause of disability during 2017. [2] Association between stroke and depression was first studied by Martin Roth [3]. Depression after stroke is a common psychiatric disorder, 30% patients are affected after survival [4]. Prognosis of patients become poor in depression, mortality risk is increased. In depression there is Risk of fall, cognitive impairment, suicidal risk, impaired quality of life and increased cost due to hospitalization [5]. Depression was more in patients with left frontal region of the cerebral hemisphere lesion following acute stroke during initial two months, compared to lesion right and posterior side of cerebral hemisphere [6]. Lesion in frontal, left lobe, putamen or caudate were associated with depression in acute stroke [7]. During brain injury release of proinflammatory protein or regional dysfunction may play role in neurochemical and physiological dysfunction for the pathophysiology of depression. In cerebral ischemia during animal and human experimentation, release of cytokines IL1, IL6 and TNF alpha [8]. Activation of indolamine 2, 3 dioxygenase due to release of cytokines metabolizes tryptophan to kynurinin depleting serotonin [9]. In acute and chronic stroke patients mechanism of depression is

separate. Serotonin transporter protein polymorphism was 3.1 more in post stroke depression compared without depression [10]. Depression was more in stroke patients compared to similar motor paralysis due to orthopedic problem reported by Folstein. [11] Vascular depression was proposed by Aloxopoulos et al in 1997 [12]. There is no role of Hypertension and hypercholesterolemia in Post Stroke Depression but history of diabetes mellitus associated with depression in stroke patients [13]. Disability a negative life event in stroke patients leads to depression, feeling guilt, low self esteem, grief, withdrawal from contact to family and friends, sleeping and eating disturbances [14]. Severity in negative physical, social and psychological factors in stroke leads to onset of depression [15] Recently Depression is considered to be important complication with increased morbidity and mortality. Depression associated with increased hospital stay, poor treatment outcome in patients with stroke [16]. Patients PSD treatment with antidepressant Nortryptaline 50 mg -100mg per day for 6 weeks, greater reduction in depression scale was observed compared with patients on placebo [17]. Same result was observed on patients PSD with citalopram 10-20 mg [18]. Antidepressant drugs act as ant-inflammatory.

The aim of this study is to determine the risk and frequency of the Depression in Stroke patients.

## 2. METHODOLOGY

Study duration was from January 2020 to December 2020. This study was performed in medical units at PUMHS Hospital Nawabshah 105 patients were enrolled both male and female, after the consent of patient, Detailed history, complete CNS examination CT Scan Brain was done. From the patients, proforma was filled along with BDI questionnaires. Patient included for the study were symptoms more than two weeks or longer, vascular cause, fully

conscious, willing for interview and were able to speak. Patients excluded from this study were TIA, cerebral tumor, cerebral abscess, unconscious or semiconscious, global aphasia, severity of the disease and not willing for interview. Diagnosis was confirmed by using CT Scan Brain. Data were analyzed using SPSS 15 version.

### 3. RESULTS

Patients presented with insomnia, loss of energy, loss of pleasure, loss of interest and depressed mood. Age ranged from 48-68 years mean 57+ - 35, 58 males, 48 females, Education of the patient 66 were uneducated, 17 primary pass and 22 middle pass. Occupation of the patient, 41 were unemployed, 40 were housewife and 24 were self employed. 90 patients presented with ischemic stroke and 15 patients presented with hemorrhagic stroke. 56 patients were smoker and 49 patients were non smoker, 25 patients were diabetic and 80 patients were hypertensive. Depression level was 20 patients with borderline depression, 59 with moderate depression and 26 with severe depression. 76 patients belonged to rural area and 29 patients belonged to Arabian area.

### 4. DISCUSSION

Frequency of depression was increased in patients with stroke, with functional impairment, smoking, low education and low socioeconomic level. These were the main risk factors other risk factors included environmental, physical and psychological with worse prognosis. Two factors are important first the damage of brain areas changes in neurotransmitters dopamine and serotonin, second psychological reaction due to disability with disturbed quality of life. Prevalence of depression in stroke patients was found in a study from 20%-65% [19]. There was no association with Age and gender in post stroke depression. Depression is more in female gender in a study. In 13 out 21 studies gender was not risk factor in PSD [20]. PSD was found in older stroke population in a study. In another study ratio of PSD was more in young age stroke

patients [21]. Post stroke depression was more in patients with severe disability as compared with minor impaired function [22]. Prevalence of PSD is more in patients with low education level published in previous studies. Patients with low education level are unable to tolerate disease and problems after the disease as compared with the educated person [23]. Patients of PSD living with their spouses were less symptoms compared with patients living without spouses due frustration and physical and emotional support in 90% of stroke survivors [24] Left sided hemiplegic presents were with more depressive symptoms in stroke survivors right sided cerebral hemispheric lesion. Incidence of PSD is more in left hemiplegic patients compared with right hemiplegia in stroke survivors [25]. In another study depression related with intracerebral lesion, right sided hemiplegic were more depressive in another study [26]. 6-12 Months after stroke, cognitive impairment, quality of social integration are important factors in mood disorders, during weeks after the incidence of stroke. Diabetic patients were associated with PSD than hypertensive or patients with hyperlipidemia [27] Localizing lesion in stroke patients as predictor of depression after stroke survival. Imaging studies Positron Emission Tomography (PET), Magnetic Resonance Imaging (MRI) and Diffusion Tensor Imaging(DTI) [28] Determination of neuronal circuitry damage by imaging in personality changes and mood disorders. There is a data by using DTI damage in fronto striato thalamic pathway, involving decision making, reward systems and emotional control can lead to risk of depression in stroke [28]. Difficulty in mood regulation was observed due to reduction of neurotransmitters in limbic structures, basal ganglia, frontal and temporal lobe [28] Morris et al explained in a study mortality in stroke patients with depression, importance of depression in stroke [29]. Death in patients with post stroke depression was within one year of the disease or late after 7 years. Reason or mechanism of early death in post stroke patients was not found in a recent study [30]. Increasing disability in stroke survivors PSD has an independent role as explained in previous studies [31].

**Table 1. Depression level**

Variables	Frequency	Percent	Valid Percent	Cumulative Percent
Border line depression	20	19	19	19
Moderate Depression	59	56.2	56.2	75.2
Severe Depression	26	24.8	24.8	100

**Table 2. BDI for depression level**

Score	Depression
1-10	Considered as normal
11-16	Mild
17-20	Border line
21-30	Moderate
31-40	Severe
40 or above	Extreme

**Table 3. Descriptive statistical analysis**

Variables	N	Minimum	Maximum	Mean
Age	105	48	68	57.35
Sex	105	1	2	1.44
Occupation	105	1	3	1.83
D.Level	105	3	5	4.05
Residence	105	1	2	1.27
M.Status	105	1	2	1.60
Education	105	1	3	1.58

**5. CONCLUSION**

Post stroke depression is major problem after survival. Socioeconomic, education, smoking and disability are the risk factors for depression in stroke survival. Counseling of the patient, Proper Treatment of stroke and depression can be prevented from complications and quality of life can be improved. Antidepressant drugs after acute stroke cognitive function can be improved with decreased mortality. Antidepressant drugs improve mood and functional recovery. Outcome of stroke can be improved with best management of PSD. There is a need of further research in treatment of PSD.

**CONSENT**

As per international standard or university standard, patients’ written consent has been collected and preserved by the author(s).

**ETHICAL APPROVAL**

As per international standard or university standard ethical approval has been collected and preserved by the authors.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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