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Prevalence and determinants of depression after acute stroke at tertiary care rural hospital in India: A cross-sectional study

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Abstract

Background: Depression is commonly unrecognized, undertreated, and associated with poor functional outcomes in stroke patients. There is a paucity of data available on post-stroke depression in India, especially in rural areas. The study aimed to bridge the existing knowledge gap by estimating the prevalence and identifying determinants of depression in post-acute stroke patients within rural settings by using standardized tools.

Materials and methods: A cross-sectional study was conducted in a tertiary rural hospital setting. Participants included post-acute stroke patients aged 18 years and above of either sex, admitted to the hospital between October 2020 and September 2022. Depression was assessed using standardized tools, and DSMV Criteria, and severity was assessed using Hamilton Rating Score.

Results: Out of 80 stroke patients, the majority 62.5% of patients were male, and 68.8% of patients were older than 60 years of age. 37.5% of patients had co-morbidities, the most common co-morbidity was hypertension, followed by diabetes. 28.7% of patients had an addiction history, majority were tobacco chewers. The prevalence of depression in post-acute stroke patients in this study was 58.7%. Depression was common in male patients older than 60 years of age (57%) and patients with right hemisphere infarcts (58.3%). Depression has an inverse relation with co-morbidities and addiction.

Conclusion: This study revealed a high prevalence of depression and helped to understand demographic and clinical determinants among post-acute stroke patients in a rural setting, which provides insight for healthcare personnel to routinely assess the mental health of post-stroke patients.

Keywords: post-stroke; depression; rural; Hamilton rating score; stroke

Introduction

According to the World Health Organization, stroke is characterized by rapidly developing clinical signs of focal (or global) disturbance of cerebral function with symptoms lasting 24 hrs or longer or leading to death with no apparent cause other than vascular origin [1].

In 2019, stroke was the second leading cause of mortality and the third common cause of disability-adjusted life years (DALYs) worldwide [2]. Stroke is a significant health concern in India also making stroke India's fourth leading cause of death and the fifth leading cause of disability [3].

Stroke is often accompanied by both physical and various psychological consequences. Among psychological, depression is the most common yet under recognized complication leading to poor post-stroke functional outcomes [4].

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The prevalence of depression ranged widely from 5% to 54% after stroke [5-7]. Meta-analysis data from 43 studies, the prevalence of depression was observed in 29 % of patients after stroke [8]. The prevalence of post-stroke depression was observed from 24% to 90% in India [9].

The prevalence of depression in post-acute stroke patients is a multifaceted phenomenon influenced by various demographic and clinical factors, including age, gender, severity of the initial stroke, comorbidities, and social support systems [10].

To the best of our knowledge, there remains a paucity of research specific to the rural parts of India. In most of the lower and middle-income countries including India, the focus of treatment has been on the physical aspects of disability rather than a comprehensive neurorehabilitation that aims to have good physical and mental outcomes [11].

The study aimed to bridge the existing knowledge gap by estimating the prevalence and identifying determinants of depression in post-acute stroke patients within rural settings by using standardized tools. Ultimately, post-stroke holistic management will help in improving the mental health outcomes and quality of life in stroke survivors of rural communities.

Materials and methods

A cross-sectional observational study was conducted after obtaining institutional ethical committee permission at a Dr. B.V.P. RMC and tertiary rural care hospital. The study was conducted between October 2020 to September 2022 to achieve the objectives of estimating the prevalence of depression in acute post-stroke patients by using diagnostic and statistical manual of mental disorders (DSM-V) criteria [12], identifying demographic and clinical determinants for depression in post-stroke patients, and investigating the severity of depression after acute stroke using the Hamilton depression rating scale by study doctor [13]. Clinically and radiologically confirmed 80 acute post-stroke patients of age more than 18 years of either sex, were recruited after fulfilling inclusion criteria with informed written consent. Patients with TIA, disturbed level of consciousness, sensory aphasia, dementia, history of psychiatric illness, and depression in the past were excluded from the study.

To meet the objectives of our study, a secondary data source was used to estimate the sample size and also to frame the questionnaire. The sample size was determined based on expected prevalence rates of post-stroke depression in rural populations, considering a confidence level of 95%. The sampling procedure used in this study was a purposive sampling method, we considered all eligible patients consecutively admitted to tertiary care rural hospital for acute stroke till we met the sample size. A primary source of information technique was adopted with a direct interview method using a pre-tested semi-structured questionnaire to collect data on demographic variables like age, gender, addiction, and clinical variables like type, characteristics, and severity of stroke. For assessing depression and its severity standardized tools DSM-V and the Hamilton rating scale respectively were used.

Sample size estimation was done using open epi software version 2.3.1. At a 95% Confidence level, 80% power of the study, the frequency of depression in acute stroke is 35%. The sample size estimated was 80.

Formula: n= DEFF*Np(1-p) [d2/Z21-α/2*(N-1) +p*(1-p)]

Statistical analysis

Statistical analysis data was entered in an excel sheet and analyzed using the Statistical Package for the Social Sciences 20 (SPSS Inc. Chicago). Results were presented in tabular and graphical forms mean, median, standard deviation, and ranges were calculated for quantitative data. Chi-square analysis was used in testing for significant differences between proportions and frequencies. A t-test was done to test for significant differences between the two means. The confidence interval was set at a 95% limit, with a level of significance, $p < 0.05$.

Results

The study included a total of 80 post-acute stroke patients from diverse rural settings. The majority 46.3% of patients were above 70 years of age, and 22.5% were between 61 and 70 years of age. The mean age was 66.8±11.9 years.

The majority of stroke patients 62.55% were male and 37.55% were female (Table 1).37.5% of patients with stroke had co-morbidities in history, hypertension was the most common comorbidity present in 16.3% followed by diabetes in 7.3%, both hypertension and diabetes in 11.3%.71.3% of patients with stroke did not have any addiction history, and 28.7% had an addiction history. The majority of 17.5% were tobacco chewers.

Table 1: Distribution of patients according to age, gender, co-morbidities, and addiction.

Parameter	*Frequency*	*Percentage (%)*
Age (in years)		
<40	3	1.8
41-50	7	8.8
51-60	15	20
61-70	18	22.5
>70	37	46.3
Total	80	100
Mean ± SD	66.8 ± 11.9	
Gender		
Female	30	37.5
Male	50	62.5
Total	80	100
Co-morbidity		
Nil	50	62.5
Asthma	01	1.3
DM	06	7.3
HTN	13	16.3
Both HTN&DM	09	11.3
IHD	01	1.3
Total	80	100
Habit		
Nil	57	71.3
Alcohol	05	6.3
Smoking	01	1.3
Both alcohol and smoking	03	3.6
Tobacco chewing	14	17.5
Total	80	100

The majority of patients 62.5% had left-side body weakness and 37.5 % had right-side body weakness (Table 2). 52.5% of patients had an infarct in the right middle cerebral artery followed by a left middle cerebral artery territory infarct in 31.3% of patients. 8.8% multi-infarct status. Depression was observed in 58.3% of patients with right hemisphere infarction and 52% with left hemisphere.

51.1% of patients who had post-stroke depression were >70 years of age, followed by 19.1% between 61-70 years of age group. Depression was present in 57.4% of males and females 42.6%. In patients without addiction, depression was present in 76.6% of patients, and in those with addiction only 23.4% of patients. Of the patients without co-morbidities, 59.6% had more prevalence of depression compared to patients with comorbidities 40.4% (Table 4). 85.1% had depression in patients with infarct in the MCA compared to PCA infarct 6.4% had depression and 8.5% of patients with multivessel infarct had depression. Of those with a history of CVA depression, 6.4% had depression and those without a history of CVA depression were observed in 93.6% of patients.

Table 2: Distribution of patients according to left or right-sided body weakness, territory infarct, and hemisphere-side infarct.

Presenting complaints	*Frequency*	*Percentage*
Left-sided body weakness	50	62.5
Right-sided body weakness	30	37.5
Total	80	100
Territory of infarct		
Right ACA	1	1.3
Left MCA	25	31.3
Right MCA	42	52.5
Right PCA	5	6.3
Multi-infarct status	7	8.8
Total	80	100
Hemisphere infarct		
Right hemisphere	48	60%
Left hemisphere	32	40%

The prevalence of depression among post-acute stroke patients at the tertiary care rural hospital was found to be 58.8%.36.5% of participants exhibited mild depression, 22.5% moderate depression, and no severe depression in any patient (Table 3).

Table 3: Prevalence of depression in patients with acute stroke.

Hamilton depression scale scoring	*Frequency*	*Percentage (%)*
Normal	33	41.3
Mild depression	29	36.3
Moderate depression	18	22.5
Total	80	100

Table 4: Association of factors with depression.

Factors		*Depression*		*Chi-square*	*p value*
		Absent	*Present*		
Age (in years)	<40	1 (3)	2 (4.3)	2.5	0.62 p>0.05 NS
	41-50	2 (6.1)	5 (10.6)		
	51-60	8 (24.2)	7 (14.9)		
	61-70	9 (27.3)	9 (19.1)		
	>70	13 (39.4)	24 (51.1)		
Gender	Female	10 (30.3)	20 (42.6)	1.2	0.26 p>0.05 NS
	Male	23 (69.7)	27 (57.4)		
Habits	Nil	21 (63.6)	36 (76.6)	3.4212	0.489 p>0.05 NS
	Alcohol	02(6.06)	03(6.38)		
	Smoking	01(3.03)	00(0.0)		
	Both alcohol and smoking	01(3.03)	02(4.26)		
	Tobacco chewing	08(24.24)	06(12.77)		
Co-morbidity	Absent	22 (66.7)	28 (59.6)	6.821	0.2342 p>0.05 NS
	Asthma	00(0.0)	01(2.13)		
	DM	03(9.09)	03(6.38)		
	HTN	02(6.06)	11(23.40)		
	Both HTN&DM	05(15.15)	04(8.51)		
	IHD	01(3.03)	000(0.0)		
Vessel involved	ACA	1 (3)	0	1.46	0.69 p>0.05 NS
	MCA	27 (81.8)	40 (85.1)		
	PCA	2 (6.1)	3 (6.4)		
	Multivessel	3 (9.1)	4 (8.5)		
History	Absent	31 (93.9)	44 (93.6)	0.003	0.95 p>0.05 NS
	Present	2 (6.1)	3 (6.4)		

Discussion

The study revealed a high prevalence of depression at 58.7% among post-acute stroke patients in rural tertiary care hospitals. Prevalence of depression in Kouwenhoven et al study post-post-stroke depression was found in 27% of patients and in Roth et al study depression was found in 19% of patients [14, 15]. In this study, the prevalence of depression in older age patients was high. Notably, the high prevalence of depression in this study may be due to the stigma of stroke due to cultural beliefs, limited access to mental health resources, socioeconomic disparities, and the unique challenges of rural life contribute to the prevalence of depression in rural settings. This finding underscores the importance of recognizing and addressing mental health issues in stroke survivors, particularly in a rural healthcare context where unique challenges may exist.

Depression was more prevalent in male (57.4%) stroke patients than in female. This finding is comparable to the prevalence of depression in the general population. However, the association was not statistically significant. In this study, the relation of depression with co-morbidities and addiction is inverse. However, the association is not statistically significant.

In this study, depression was more prevalent in patients with right-hemisphere infarcts 58.3% than in left-hemisphere infarcts 52%, however, the difference is not statistically significant. Depression was more prevalent in middle artery territory infarct. The depression was significantly influenced by the hemisphere infarct side. In contrast to this study, other studies showed that left hemisphere stroke had a higher incidence of depression. The post-stroke depression rate in the left

hemisphere stroke was 62%, compared to 46.7% in the right hemisphere stroke [16, 17]. Marchand et al found that depression is closely correlated with frontal and left hemispheric stroke [18].

This study provides insight into the high prevalence of depression and its determinants in post-acute stroke patients in a rural tertiary care hospital. The findings have immediate implications for healthcare practices in rural settings, that healthcare providers should consider routine mental health screenings and comprehensive assessments to identify at-risk individuals early in the recovery process and offer a foundation for future research.

Limitations: This study was carried out at one center in a time-bound period with a purposive sampling method. Patients were assessed at the time of presentation of acute stroke one time only, so not assessed at different time intervals after the stroke. Large prospective study designs could further explore the dynamic nature of depression during the post-acute phase and assess the long-term impact on stroke survivors in rural areas. Additionally, evaluating the effectiveness of tailored interventions to improve mental health outcomes in this population warrants further investigation.

Conclusion

This study enhances our understanding of the prevalence and determinants of depression in post-acute stroke patients in rural India, offering a foundation for further research. Provides insights to healthcare personnel to consider routine mental health screenings and comprehensive assessments in post-stroke patients and intervene in a timely.

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Conflicts of interest

The authors declare no conflicts of interest.

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