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PREVALENCE OF POST STROKE DEPRESSION IN A TERITIIARY CARE HOSPITAL

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Abstract: *Stroke is a leading cause of disability and death and post-stroke depression (PSD) is the most frequent psychiatric complication. PSD impacts significantly on recovery and quality of life and is dependent on factors including age, gender and brain damage as a result of stroke. Identifying such risk factors is vital in order to enhance post-stroke management. The aim of this research was to estimate the prevalence of depression among stroke survivors and rate its severity with the Hamilton Depression Rating Scale (HAM-D) and the Aphasic Depression Rating Scale (ADR). It further helps to determine the types of stroke that were most likely to result in depression based on different risk factors. A six-month observational study was performed among 100 stroke survivors (80 non-aphasic and 20 aphasic) admitted to the neurology department of a tertiary care hospital. Post-stroke depression in participants in the age group of 18 to 80 years was measured using the HAM-D and ADR scales. Informed consent was given by all participants. Depression was common in all age groups, especially over 60 years. Men were more likely to be affected than women, where 63% of males and 37% of females were depressed on the HAM-D scale and 68.4% of males and 31.6% of females on the ADR scale. Severity of depression was from mild to very severe. Age, gender, stroke etiology, smoking, alcohol consumption, functional impairment, and socio-economic status were the important determinants. PSD was more frequent among ischemic stroke patients, left-sided strokes, aphasia, and rural residents. Given the strong association between depression and poor recovery outcomes, prioritizing both physical and psychological health is essential in post-stroke care.*

Keywords *Depression, Stroke, Post-stroke depression, Hamilton Depression Rating Scale, Aphasic Depression Rating Scale, Tertiary care hospital*

1. INTRODUCTION

Stroke is a significant neurological issue and one of the main causes of death in clinical settings. Among survivors, more than half have severe physical disabilities and/or psychiatric complications, the most frequent of which is post-stroke depression (PSD)[1] In the literature, PSD has been characterized both as minor and/or major depression based on classification systems such as Diagnostic and Statistical Manual of Mental Disorders (DSM) and International Classification of Diseases (ICD) or by a score greater than a cut-off on validated depression severity scales [2].The pathophysiology of PSD is yet to be explained. While some studies indicate that functional disability caused by stroke is a risk factor for PSD, others propose a biological mechanism based on brain damage caused by stroke[3].Major depression is approximated at 10 – 27% among the survivors of stroke while 15 – 40% will have depressive symptoms within two months after a stroke[4].Mood symptoms of stroke also involve anxiety and despair feelings as well as anhedonia. Significant socio-demographic variables like age >55 years, sex and residential setting following stroke have been found to enhance the risk of PSD[5].Gender disparities in stroke outcome have disadvantaged women stroke survivors whereas stroke occurrence has traditionally been greater in men.recent research on young adults has revealed comparable stroke occurrence for ages 35-45 years and even greater occurrence (incidence rate ratio of 1.44) in women for ages ≤35 years[6].The three self-rating scales that we employed were the Geriatric Depression Scale (GDS), which has been specifically designed to be used among elderly subjects, the Zung Scale, which is among the most widely used self-rating scales, and the Center for Epidemiologic Studies Depression Scale (CES-D). The Zung Scale and the CES-D have been validated in stroke patients. The three scales used by our examiners that are known widely and against which new scales tend to be validated are the Hamilton Rating Scale (HRS), the Comprehensive Psychopathological Rating Scale-Depression (CPRS-D); and the Cornell Scale, especially developed for use with demented patients[7].\

2. MATERIALS AND METHODS

2.1 Study Design and Participants

A prospective cross-sectional study was conducted in outpatients and inpatients of Department of Neurology in Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, an 850 bedded tertiary teaching hospital, over a span of six months. All the patients of age group 18 to 80 years were investigated. Those patients who were medically unstable with systemic diseases and had a prior history of depression and anxiety, patients having depression due to other medical illnesses and those outside the hospital were excluded from the study.

2.2 Ethical Consideration

The Institutional Ethics Committee approved the study and Clearance to undertake the study was obtained from the Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation. Signed and written verbal informed consent form was taken from parents and guardians for participation of their children in the study and assured that the information will be kept confidential.

2.3 Study Procedure

100 patients who satisfied the inclusion criteria were enrolled in the study. Anthropometric measures such as age, gender, weight etc. of the patients were recorded using standard instruments. A well-developed questionnaire cum interview was used to collect data from patients and patient care givers (for patients with aphasia). All data which were taken, p-values were calculated using SPSS software. All statistical tests were performed at 5% significance level using SPSS version 20.0 statistical software packages

Different stages of post-stroke depression have been identified using scores given by Hamilton Depression Rating Scale (HAM-D) and Aphasic Depression Rating Scale (ADR). Stages can be categorized into 0-7 normal depression, 8-13 mild depression, 14-18 moderate depression,19-22 severe depression and >23 very severe depression.

3. RESULTS

Demographic Characteristics of Participants

A total of 100 post-stroke patients were enrolled. Nearly sixty-five percent (65/100) of the study participants were male. Forty-eight percent (39/100) of the participants were aged above sixty years. The majority, seventy-two percent (72/100), of the participants had ischemic stroke, while only two percent (2/100) had both ischemic and hemorrhagic strokes. Additionally, thirty-seven percent (37/100) of the participants had motor impairments, fifteen percent (15/100) had cognitive impairments, thirty percent (30/100) had both cognitive and motor impairments, and thirty-five percent (35/100) had no impairments.**(Table1)**

Table:1STUDY PARTICIPANTS DEMOGRAPHICS (TABLE-1)

Variables		N%
Age	<=20	1
	21-30	1
	31-40	7
	41-50	12
	51-60	31
	>60	48
Sex	Female	35
	Male	65
In-Patient/ Out-Patient	In-Patient	80
	Out-Patient	20
Type of Stroke	Ischemic	72
	Hemorrhagic	26
	Both	2
Lesions Located	Right Hemispheric	31

	Left Hemispheric	58
	Bilateral	11
Past Medical History	Absent	41
	Present	59
Baseline Medication Used	Antidepressants	4
	None	96
Smoking	Never	54
	Ex-Smoker	26
	Smoker	20
Alcoholic Status	Never	64
	Ex-Alcoholic	22
	Alcoholic	14
Functional Impairment	Cognitive	15
	Motor	37
	Total	30
	No Impairment	18
Phasic / Aphasic	Aphasic	20
	Phasic	80
Marital Status	Married/ Living Together	97
	Single/ Divorced / Widow	3
Education	Primary School or Less	79
	Secondary School	15
	More than Secondary School	6
Employment Type	Unemployed	21
	Informal/Wage	55
	Formal/ Salary	24
Hospitalization	No	35
	1	16
	2-7	35
	8-15	11
	>15	3

Prevalence And Severity of Post-Stroke Depression

The prevalence of post-stroke depression was 92% (92/100). In 80 patients who were evaluated using the Hamilton Depression Rating Scale, the severity of depression is given in the following table. Moderate depression was found to be the highest at 36.6%, and very severe depression was the least at 10%. Mild depression accounted for 28.8%, and severe depression accounted for 13%.**(Table2)& (Figure 1)**

Table:2 Distribution of Study Population Based on Severity of Depression based on HAM-D Scale

Severity of Depression	Frequency	Percentage
Normal	7	8.8
Mild	23	28.8
Moderate	29	36.3
Sever	13	16.3
Very Severe	8	10.0
Total	80	100.0

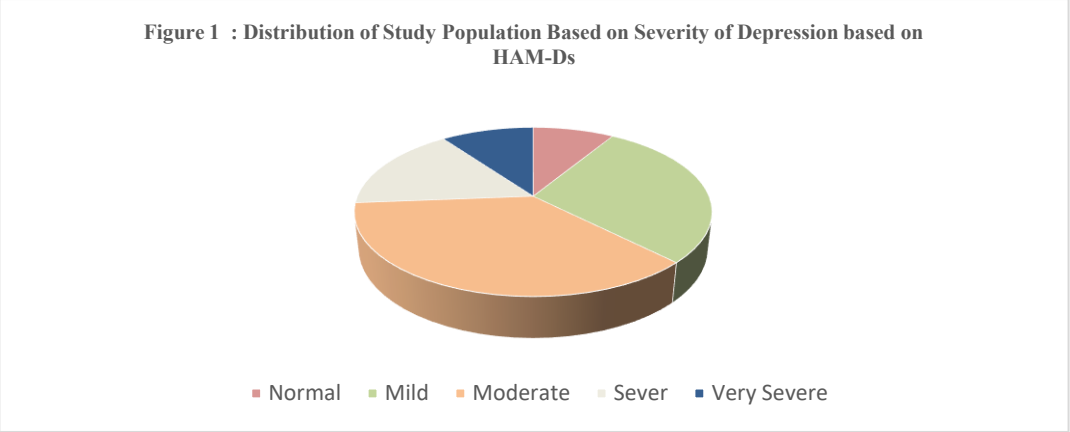

Figure 1: Distribution of Study Population Based on Severity of Depression based on HAM-Ds

In 20 patients who were evaluated using the Aphasic Depression Rating Scale, the severity of depression is given in the following table. Moderate depression was found to be the highest at 40 %, and very severe depression was the least at 5%. Mild depression accounted for 35.5 %, and severe depression accounted for 15%.**(Table 3) &(Figure 2)**

Severity of Depression	Frequency	Percentage
Normal	1	5.0
Mild	7	35.0
Moderate	8	40.0
Sever	3	15.0
Very Severe	1	5.0
Total	20	100.0

Table 3: Distribution of Study Population Based on Severity of Depression based on Aphasic Scale

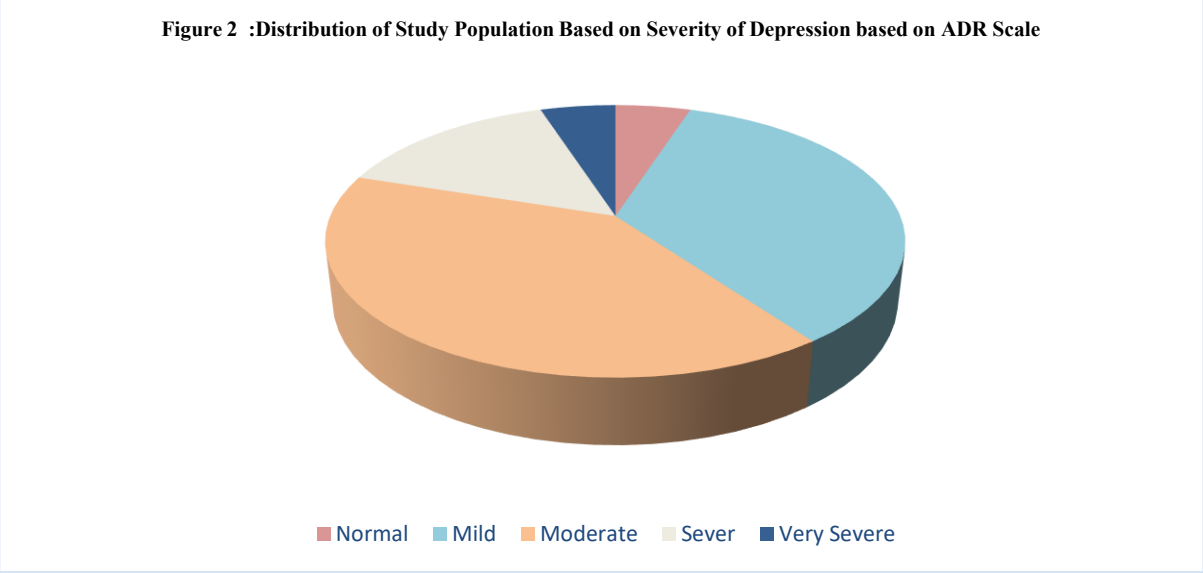

Figure 2: Distribution of Study Population Based on Severity of Depression based on ADR Scale

Table 4:Association of Study Subjects with and without depression in HAM D Scale

Variables		Patients with Depression	Patients Without Depression	Chi-Square/ Fisher's Exact Value	p Value
Age	<=20	0	1(14.3)	29.89	0.001
	21-30	0	1(14.3)		
	31-40	3(4.1)	2(28.6)		
	41-50	11(15.1)	0		
	51-60	21(28.8)	2(28.6)		
	>60	38(52.1)	1(14.3)		
Sex	Female	27(37.0)	2(28.6)	0.19	0.7
	Male	46(63.0)	5(71.4)		
In-Patient/ Out-Patient	In-Patient	56(76.7)	7(100.0)	2.07	0.3
	Out-Patient	17(23.3)	0		
Type of Stroke	Ischemic	54(74.0)	5(71.4)	4.82	0.2
	Hemorrhagic	18(24.7)	2(28.6)		
	Both	1(1.4)	0		
Lesions Located	Right Hemispheric	22(30.1)	3(42.9)	1.29	0.7
	Left Hemispheric	41(56.2)	4(57.1)		
	Bilateral	10(13.7)	0		
Past Medical History	Absent	29(39.7)	4(57.1)	1.39	0.3
	Present	44(60.3)	3(42.9)		
Baseline Medication Used	Antidepressants	3(4.1)	1(14.3)		
	None	70(95.9)	6(85.7)		
Smoking	Never	40(54.8)	4(57.1)	0.06	1
	Ex-Smoker	20(27.4)	2(28.6)		
	Smoker	13(17.8)	1(14.3)		
Alcoholic Status	Never	42(57.5)	5(71.4)	1.37	0.7
	Ex-Alcoholic	19(26.0)	2(28.6)		
	Alcoholic	12(16.4)	0		
Functional Impairment	Cognitive	10(13.7)	0	13.62	**0.001***
	Motor	32(43.8)	1(14.3)		
	Total	21(28.8)	0		
	No Impairment	10(13.7)	6(85.7)		
Phasic / Aphasic	Aphasic	1(1.4)	0	0.09	1
	Phasic	72(98.6)	7(100.0)		
Marital Status	Married/ Living Together	73(100.0)	6(85.7)	10.56	0.09
	Single/ Divorced / Widow	0	1(14.3)		
Education	Primary School or Less	56(76.7)	3(42.9)	5.73	**0.03***
	Secondary School	11(15.1)	4(57.1)		
	More than Secondary School	6(8.2)	0		
Employment Type	Unemployed	18(24.7)	1(14.3)	0.4	1
	Informal/Wage	35(47.9)	4(57.1)		
	Formal/ Salary	20(27.4)	2(28.6)		

Hospitalization	No	27(37.0)	4(57.1)	3.05	0.4
	1	11(15.1)	2(28.6)		
	2-7	30(41.1)	1(14.3)		
	8-15	4(5.5)	0		
	>15	1(1.4)	0		

Table 5:Association of Study Subjects with and without depression in ADR Scale

Variables		Patients with Depression	Patients Without Depression	Chi-Square/ Fisher's Exact Value	p Value
Age	<=20	0	0	3.48	0.5
	21-30	0	0		
	31-40	2(10.5)	0		
	41-50	1(5.3)	0		
	51-60	7(36.8)	1(100.0)		
	>60	9(47.4)	0		
Sex	Female	6(31.6)	0	0.45	1
	Male	13(68.4)	1(100.0)		
In-Patient/ Out-Patient	In-Patient	11(57.9)	1(100.0)	1.24	1
	Out-Patient	3(15.8)	0		
	ICU	5(26.3)	0		
Type of Stroke	Ischemic	13(68.4)	0	4.82	0.2
	Hemorrhagic	5(26.3)	1(100.0)		
	Both	1(5.3)	0		
Lesions Located	Right Hemispheric	5(26.3)	1(100.0)	3.46	0.3
	Left Hemispheric	13(68.4)	0		
	Bilateral	1(5.3)	0		
Past Medical History	Absent	7(36.8)	1(100.0)	1.58	0.4
	Present	12(63.2)	0		
Baseline Medication Used	Antidepressants	0	0	-	-
	None	19(100.0)	1(100.0)		
Smoking	Never	10(52.6)	0	2.45	0.5
	Ex-Smoker	4(21.1)	0		
	Smoker	5(26.3)	1(100.0)		
Alcoholic Status	Never	17(89.5)	0	6.49	0.1
	Ex-Alcoholic	1(5.3)	0		
	Alcoholic	1(5.3)	1(100.0)		
Functional Impairment	Cognitive	4(21.1)	1(100.0)	3.51	0.5
	Motor	4(21.1)	0		
	Total	9(47.4)	0		
	No Impairment	2(10.5)	0		
Phasic / Aphasic	Aphasic	19(100.0)	1(100.0)	-	-
	Phasic	0	0		
Marital Status	Married/ Living Together	17(89.5)	1(100.0)	0.12	0.9
	Single/ Divorced / Widow	2(10.5)	0		
Education	Primary School or Less	19(100.0)	1(100.0)	-	-
	Secondary School	0	0		

	More than Secondary School	0	0		
Employment Type	Unemployed	2(10.5)	0	1.7	1
	Informal/Wage	15(78.9)	1(100.0)		
	Formal/ Salary	2(10.5)	0		
Hospitalization	No	4(21.1)	0	5.12	0.2
	1	2(10.5)	1(100.0)		
	2-7	4(21.1)	0		
	8-15	7(36.8)	0		
	>15	2(10.5)	0		

4. DISCUSSION

In our study, the mean age assessed through the HAM-D scale was 59.62 ± 12.3 years, and through the ADR scale, it was 63.3 ± 11.9 years. In contrast, Matildes F.M. Sobreiro et al. found a mean age of 55.2 (SD ± 15.1) years and 46.8 (SD ± 14.7) years [**Error! Reference source not found.**] .Similar to Nasmi Noushad's study, where 67% of participants were male, our study also showed a male predominance in depression, with 63%, consistent with other studies[**Error! Reference source not found.**]. Our research found that 74% of depressed patients had ischemic strokes, and 24% had hemorrhagic strokes. This contrasts with Nasmi Noushad et al., where 79% had ischemic strokes and 21% had hemorrhagic strokes. A study by Aijaz MohiUd Din Bhat et al. reported 85% ischemic and 15% hemorrhagic strokes. In our study, 17.8% of patients were current smokers, 27.4% were ex-smokers, and 54.8% were non-smokers[**Error! Reference source not found.**]. This contrasts with Emen M. Khedr et al., where 53.2% of patients were current smokers and 46.8% were non-smokers [**Error! Reference source not found.**] .Additionally, 16.4% were current alcohol users, 26% were ex-alcohol users, and 57.5% were non-alcohol users. All married individuals in our study (100%) exhibited depression, whereas none of the unmarried individuals did. In contrast, Surafel Worku et al. found 39.8% depression in married individuals and 52.1% in unmarried individuals. Employment status in our study showed 75.3% employed and 24.7% unemployed among depressed patients. Surafel Worku et al. found 43.1% employed and 43.6% unemployed [**Error! Reference source not found.**].Regarding speech impairment, our study found 90% depression among aphasic patients, whereas Nereid Bunegurra et al. reported 23.9%.Functional impairment analysis showed a significant p-value (< 0.001) in our study, consistent with A. De Ryck et al.'s findings [**Error! Reference source not found.**] .The severity of depression in our study was as follows: 28.8% mild, 36.3% moderate, and 26.3% severe. In contrast, Nasmi Noushad et al. reported 23% mild, 12% moderate, and 9% severe depression. In contrast, Saira Abbas et al. showed 13.2% mild, 44.1% moderate, and 42.7% severe depression.[**Error! Reference source not found.**]

5. CONCLUSION

The prevalence of PSD is higher in stroke survivors. Furthermore, findings suggest that factors such as gender (women), type of stroke (ischemic), location of the stroke lesion (left side), post-stroke disability, aphasia, and functional independence directly influence the development of depression. Out of 100 patients, 92 (non-aphasic and phasic) were found to have depression. In the present study, rural residents, individuals with high school and middle school education, and those with lower-middle economic status were significantly associated with depression. Patients with neurological (stroke) and psychiatric disorders were found to contribute significantly to depression. A novel finding in our study is that individuals who experienced stroke events in the past also showed a significant association with depression. Since depression is closely associated with prolonged recovery duration and poor outcomes, efforts should prioritize optimal physiological and psychological health

6. LIMITATIONS

The study should be viewed in light of several limitations. A descriptive, one-time, self-report survey may hinder the generalization of findings. Similarly, the small sample size and restriction of sample selection to a tertiary care hospital are notable limitations. Due to the cross-sectional study design, we could not track changes in depression severity and prevalence over an extended period in stroke patients. Therefore, future research should focus on longitudinal designs and more accurate diagnosis of PSD.

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9. CONFLICTS OF INTEREST
The authors declare that no competing interest exists.

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