

POST STROKE DEPRESSION AND ANXIETY: PREVALANCE AND CORRELATES

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ABSTRACT

Objectives: The objective of the study is to evaluate the prevalence of depression and anxiety in post-stroke patients and identify its predictors.**Materials and Methods:** This study was conducted for a period of 6 months among 81 patients admitted with stroke in SSIMS and RC, Davangere. The information compiled from patient data collection form was assessed for comorbid conditions and type of stroke. Assessment for depression and anxiety was conducted using Hamilton D (HAM-D) and HAM-A scale and information of location of lesion was obtained from patient's neuroimaging results. Quality of life (QOL) of post-stroke was assessed using stroke and aphasia QOL (SAQOL) questionnaire. Follow-up was conducted for patients who were diagnosed with depression and anxiety within 1 to 3 months.**Results:** Depression was more prevalent as compared to anxiety in post-stroke patients and was predominant in males and between the ages 61 and 70 years. Hypertension and diabetes were found to be a major comorbid conditions in such patients. Factors contributing to increased risk of depression and anxiety after stroke include age, sex, comorbidities, lesion location, and type of stroke. Post-stroke depression (PSD) and anxiety showed statistically significant association with left-sided lesion.**Conclusion:** PSD and anxiety are a relatively common complications and can result in poor QOL in stroke patients. Early detection of depression and anxiety symptoms may assist functional recovery and improve QOL in stroke patients. Careful evaluation of PSD and post-stroke anxiety should be integrated into clinical care of stroke patients.**Keywords:** Stroke, Post-stroke depression, Post-stroke anxiety, Quality of life, Hamilton Rating scale for depression, Hamilton rating scale for anxiety, Stroke and aphasia quality of life scale.© 2021 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2021v14i9.42348>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>

INTRODUCTION

Post-stroke depression (PSD) and post-stroke anxiety (PSA) are common neuropsychiatric symptoms after stroke, with estimated prevalence rates between 40% and 30%, respectively.

"Depression is a common mental disorder characterized by sadness, loss of interest in activities and by decreased energy" whereas "Anxiety is characterized by feelings of distress or worry, maladaptive thinking, perceived threat, and physiological arousal". The association of neuropsychiatric disorders with cerebrovascular disease includes depression, anxiety disorder, apathy, cognitive disorder, mania, psychosis, pathological affective display, catastrophic reactions, fatigue, and anosognosia. PSD occurs in a significant number of patients and constitutes an important complication of stroke, leading to greater disability as well as increased mortality Robert G Robinson *et al* [1].

Due to similarity in symptoms of depression and anxiety, anxiety is often misdiagnosed as depression itself Monica Vermani *et al* [2]. However, now there exists specific screening test for both anxiety and depression which can also be supported by various constructs from anatomical and neurobiological areas. Both PSD and PSA can significantly affect the recovery of the neurological function in patients with stroke, significantly reduce the quality of life (QOL) and increase the mortality EM Khedr *et al* [3].

Since the identification of PSD and PSA is a significant clinical problem, we evaluated the predictors that indicate patients at risk of developing PSD and PSA which include type of stroke, gender, QOL, etc. Early identification of PSD may improve the stroke outcomes and prevent psychiatric consequences Yihong Fang *et al* [4].

METHODS

A prospective observational study was conducted in SSIMS and RC (2019), a tertiary care teaching hospital, Davangere, for a period of 6 months aiming to determine the incidence and correlates for PSD and PSA. Ethical approval for the study was obtained from the Institutional Ethics Committee of Bapuji Pharmacy College, Davangere, Karnataka. A total of 81 patients were included in the study. Demographic details and Neuroimaging results were collected, and patients were evaluated at baseline and follow up for functional and cognitive deficits, PSD, PSA, and QOL after 3 months. Quantification of depression and anxiety was done by administration of Hamilton (HAM) A and HAM D scales. Patient's post-stroke QOL was quantified using stroke and aphasia QOL (SAQOL) questionnaire. Stroke severity was assessed using NIHSS scale and patient education was provided during the baseline. Collected data was then analyzed, significant variables associated within the data were identified by independent student t-test using SPSS 18.0 software. Descriptive characteristics among the groups were compared to check for deviations. Wilcoxon signed ranked test (2 independent samples) was employed to observe statistical significance between categories inaccuracy. A value of $p < 0.05$ was considered significant. Descriptive analysis of baseline and follow-up data was conducted with the help of the Shapiro-Wilk test of normality. The summarized findings were rearranged and tabulated in a graphical and table form.

RESULTS

Among the 81 individuals enrolled in the study -54 (67%) of males and 27 (33%) of females suffered from stroke. Most of the subjects belong to the age group of 61-70 years (42%) Table 1.

Among the study population, 69 (85%) had hypertension, 41 (50.6%) diabetes, 18 (22%) Ischemic heart disease (IHD), 12 (15%) respiratory infections, and 9 (11%) dyslipidaemia Table 2.

About 64 (79%) patients had ischemic stroke and 17 (21%) patients had hemorrhagic stroke Figure 1 and Table 3.

In view of lesion location, majority of the patients displayed a left hemispheric stroke followed by right and bilateral stroke Figure 2 and Table 4.

Among 81 patients- 36 (44%) patients showed significant symptoms of depression and 11 (13%) showed significant symptoms of anxiety after stroke onset. Out of these 10 (12%), patients had both depression and anxiety Figure 3 and Table 5.

Among 36 patients showing the symptoms of depression-19 (23%) patients showed mild depression, 10 (12%) showed moderate depression, and 7 (9%) patients severe depression Table 6.

Among 11 patients showing the symptoms of anxiety - 7 (6%) patients showed mild anxiety, 2 (3%) showed moderate anxiety, and 2 (3%) patients' severe anxiety Table 7.

The number of male patients was found to be more in the case of both post-stroke depressed and anxiety patients Figure 4 and Table 8.

Among both post-stroke depressed and anxiety patients, the majority of them were found to have ischemic stroke Figure 5 and Table 9.

The effect of stroke type was assessed by comparison with respect to HAM D, HAM A, and SAQOL score. By conducting the Wilcoxon Signed rank test, it was known that there was significant positive effect of ischemic stroke type on the development of depression and anxiety and QOL of the patient ($p \leq 0.05$) Table 9b.

Among the post-stroke, depressed patients left-sided lesions were more predominant in all mild, moderate, and severe depression Figure 6 and Table 10.

Among the PSA patients left-sided lesions were more predominant in all mild, moderate, and severe anxiety Figure 7 and Table 11.

By comparison of scores within baseline of depression, anxiety, stroke severity, and aphasia; it was seen that aphasia has positive relation with the left location of lesion, but HAM D and HAM A scores did not show any significant relationship ($p \leq 0.05$) Table 11b.

Among the 81 stroke patients, the majority of them had moderate QOL followed by mild, normal, and severe based on the SAQOL scores Table 12.

Moderate QOL was predominant in post stroke depressed patients whereas severe SAQOL score is seen in PSA patients Figure 8 and Table 13.

SAQOL scores of baseline patients were compared with HAM D and HAM A to assess if any decline in QOL patients showed significant relation with depression and anxiety. The results of the test showed a positive effect to moderate QOL ($p \leq 0.05$) Table 13b.

Among the 31 patients followed up, 8 (25%) patients were found to be normal, 14 (45%) with mild depression, 6 (19%) with moderate, and 3 (9%) with severe depression Table 14.

Out of the 31 patients who had PSD at baseline, 12 (39%) showed improvement in the HAM-D score and 19 (61%) showed no change Figure 9 and Table 15.

Among the 7 PSA patients followed up, 3 (42%) patients were found to be normal, 1 (14%) with mild depression, 3 (42%) with moderate anxiety Figure 9 and Table 16.

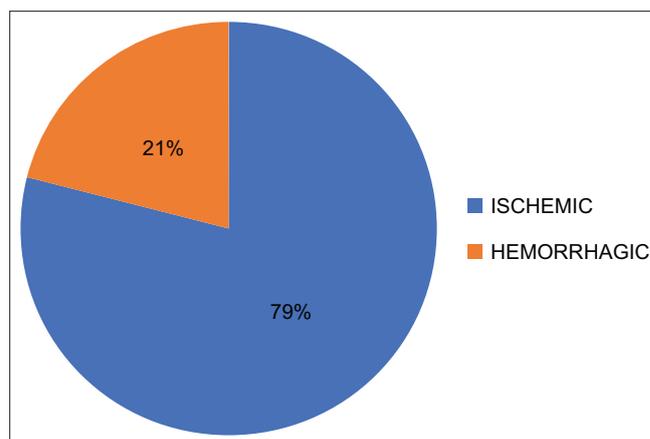


Fig. 1: Distribution of patients based on type of stroke



Fig. 2: Distribution based on location of lesion

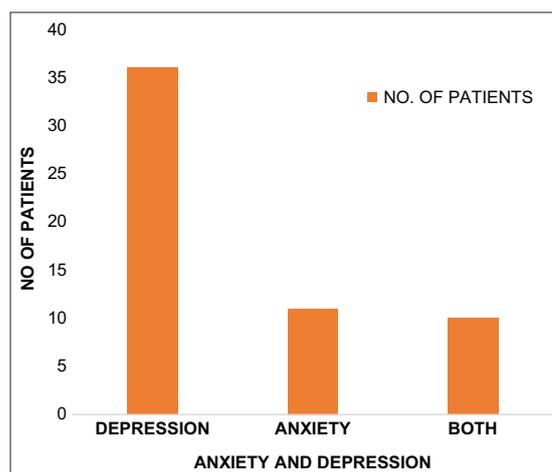


Fig. 3: Distribution based on prevalence of anxiety and depression

Out of the seven patients who had PSD at baseline, 4 (57%) showed improvement in the HAM-A score and 3 (43%) showed no change Table 17.

Among the post-stroke depressed and anxiety patients, most of them had mild QOL followed by moderate QOL according the SAQOL scores Figure 10 and Table 18.

Out of the 32 patients followed up, SAQOL scores compared to the baseline- 12 (37%) showed improved QOL, 15 (47%) had no change and in 5 (16%) patients the QOL decreased Table 19.

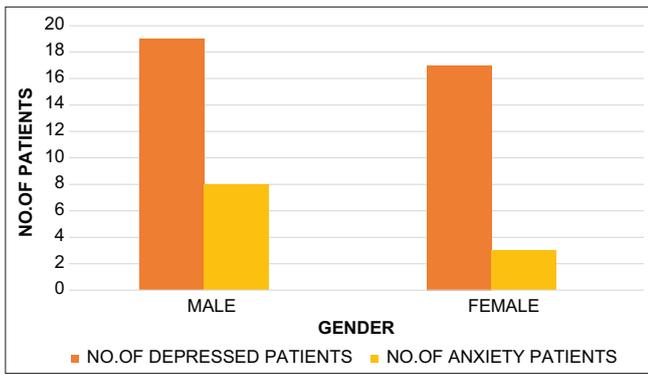


Fig. 4: Correlation between gender and depression and anxiety

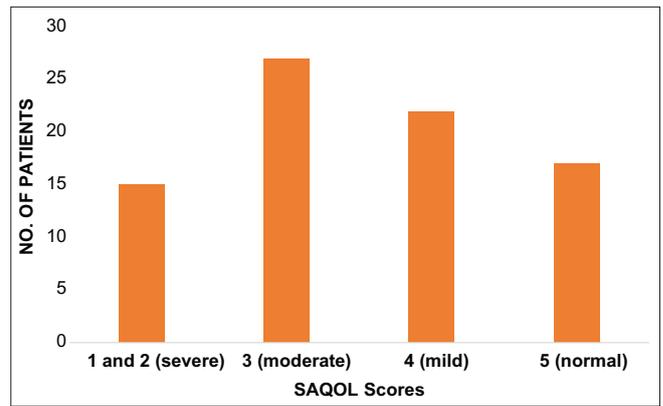


Fig. 8: Distribution based on stroke and aphasia quality of life scores

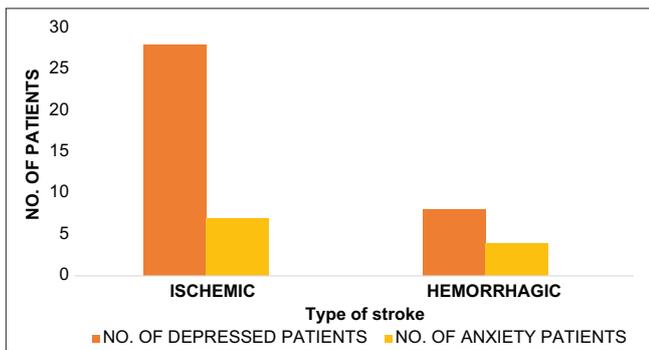


Fig. 5: Correlation between type of stroke, depression and anxiety

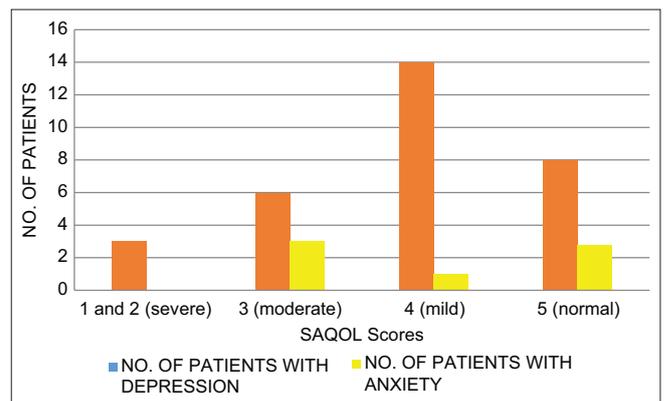


Fig. 9: Stroke and aphasia quality of life responses of patients with depression and/anxiety

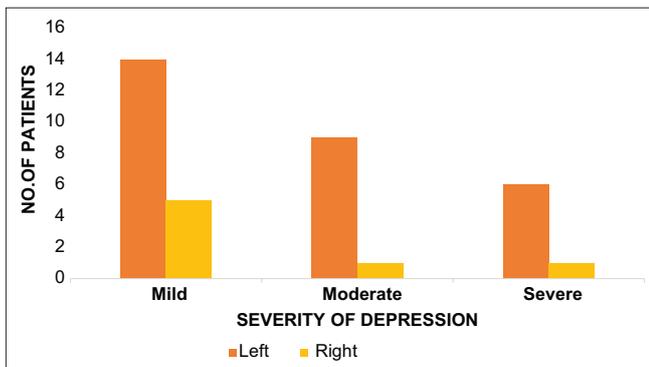


Fig. 6: Correlation between location of lesion and depression

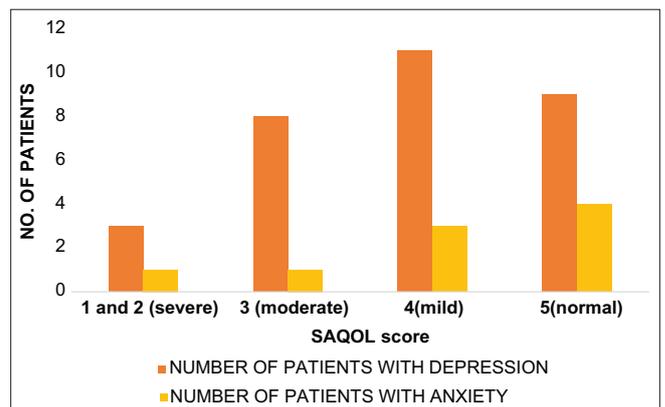


Fig. 10: Stroke and aphasia quality of life responses of patients with depression and/or anxiety at follow-up

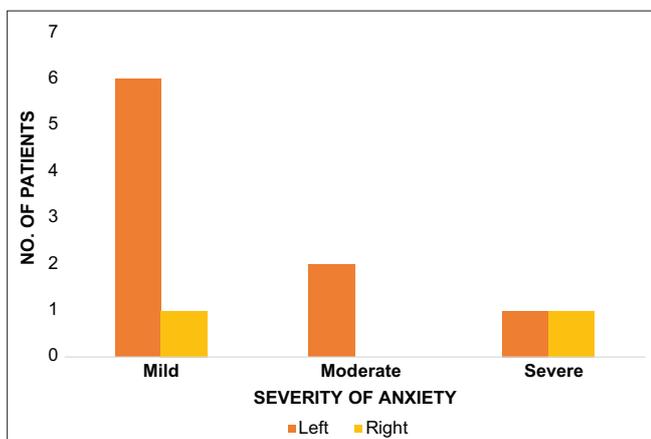


Fig. 7: Correlation between location of lesion and anxiety

DISCUSSION

The present study was conducted among the students and faculties of Bapuji Pharmacy College, Davanagere for a period of 6 months. The aim of this study was to investigate the prevalence of depression and anxiety in post-stroke patients, the relationship between lesion location and type of stroke with the occurrence of depression or anxiety, assess the comorbidity and provide patient counselling. During the study period, a total of 81 cases of stroke were monitored prospectively.

Table 1: Demographic characteristics of the subjects

Characteristics	No. of Subjects (n=81)	Percentage
Gender		
Male	54	67
Female	27	33
Age		
<20	0	0
21-30	1	1
31-40	7	9
41-50	10	12
51-60	15	18
61-70	34	42
71-80	9	11
>80	5	6

Table 2: Distribution of patients based on comorbid condition

Comorbid Condition	No. of Patients (n=81)
Hypertension	69
Diabetes	41
IHD	18
Respiratory Infections	12
Dyslipidemia	9

IHD: Ischemic heart disease

Table 3: Distribution of patients based on the type of stroke

Type	Number of Patients (n=81)	Percentage
Ischemic	64	79
Hemorrhagic	17	21

Table 4: Distribution based on location of lesion

Side of lesion	No. of patients (n=81)	Percentage
Left	59	73
Right	19	23
Both	3	4

Table 5: Distribution based on the prevalence of anxiety and depression

Parameter	No. of patients (n=81)
Depression	36
Anxiety	11
Both	10
None	24

Table 6: Distribution based on severity of depression

Severity	No. of patients (n=81)	Percentage
Normal	45	56
Mild	19	23
Mild-moderate	10	12
Severe	7	9

Table 7: Distribution based on the severity of anxiety

Severity	No. of patients (n=81)	Percentage
Normal	70	86
Mild	7	6
Moderate	2	3
Severe	2	3

Table 8: Correlation between gender and depression and anxiety

Gender	No. of depressed patients (n=36)	No. of anxiety patients (n=11)
Male	19	8
Female	17	3

Table 9a: Correlation between type of stroke, depression and anxiety

Type of stroke	No. of depressed patients (n=36)	No. of anxiety patients (n=11)
Ischemic	28	7
Hemorrhagic	8	4

Table 9b: Test statistics

Parameter	HAM D-stroke type	HAM A-stroke type	SAQOL score-stroke type
Z	-7.487	-8.119	-6.765
Sig. (2-tailed)	0.000	0.000	0.000

HAM: Hamilton, SAQOL: stroke and aphasia quality of life

Table 10: Correlation between location of lesion and depression

Severity of depression	Location of lesion	No. of patients (n=36)
Mild	Left	14
	Right	5
Moderate	Left	9
	Right	1
Severe	Left	6
	Right	1

Table 11a: Correlation between location of lesion and anxiety

Severity of anxiety	Location of lesion	No. of patients (n=11)
Mild	Left	6
	Right	1
Moderate	Left	2
	Right	0
Severe	Left	1
	Right	1

Table 11b: Test statistics

Parameter	HAM D-location of lesion	HAM A-location of lesion	Aphasia-location of lesion
Z	-1.393 ^b	-0.642 ^c	-2.762 ^b
Sig. (2-tailed)	0.164	0.521	0.006

HAM: Hamilton, SAQOL: stroke and aphasia quality of life

Table 12: Distribution based on SAQOL scores

SAQOL scores	Number of patients (n=81)
1 and 2 (severe)	15
3 (moderate)	27
4 (mild)	22
5 (normal)	17

SAQOL: Stroke and aphasia quality of life

Table 13a: SAQOL responses of patients with depression and/or anxiety

SAQOL scores	No. of patients with depression (n=36)	No. of patients with anxiety (n=11)
1 and 2 (severe)	6	8
3 (moderate)	15	1
4 (mild)	11	1
5 (normal)	4	1

SAQOL: Stroke and aphasia quality of life

Table 13b: Test Statistics

Parameter	HAM D - SAQOL score	HAM A - SAQOL score
Z	-4.942 ^b	-6.739 ^b
Sig. (2-tailed)	0.000	0.000

HAM: Hamilton, SAQOL: stroke and aphasia quality of life

Table 14: Severity of depression during follow up

Severity	No. of patients (n=31)
Normal	8
Mild	14
Moderate	6
Severe	3

Table 15: Change in severity of depression during follow-up

Severity	No. of patients (n=31)
Improved	12
No change	19
Deteriorated	0

Table 16: Severity of anxiety during follow up

Severity	No. of patients (n=7)
Normal	3
Mild	1
Moderate	3
Severe	0

Table 17: Change in severity of anxiety during follow-up

Severity	No. of patients (n=7)
Improved	4
No change	3
Deteriorated	0

Table 18: SAQOL responses of patients with depression and/or anxiety at follow up

SAQOL scores	Number of patients with depression (n=31)	Number of patients with anxiety (n=7)
1 and 2 (severe)	3	1
3 (moderate)	8	1
4 (mild)	11	3
5 (normal)	9	2

SAQOL: stroke and aphasia quality of life

Sudden occurrence of neurological deficits might cause depression and anxiety in stroke patients. Assessment of PSD and PSA was done by conducting HAM A, HAM D interview, and SAQOL questionnaire, along with the deliverance of bedside patient education. The study represents

Table 19: Change in SAQOL score at follow up

SAQOL score	Number of patients (n=32)
Improved	12
Same	15
Decreased	5

SAQOL: stroke and aphasia quality of life

a significant contribution to literature on the significance of PSD and PSA. It was found that symptoms of anxiety and depression were predominant after the stroke episode. By estimating the prevalence of PSD and PSA among the stroke survivors that PSD affected 44%. Our results were also consistent with the previous studies conducted by De Ryck *et al.* [5] and Karamchandani *et al.* [6] Prevalence of anxiety was 14% in stroke patients which is similar to the study conducted by De Wit *et al.* [7].

Out of 81 subjects enrolled in the study, 54 patients were males and 27 were females. The gender distribution shows predominant male involvement. This observation was similar to the study conducted by Schöttke and Giabbiconi [8] and Habibi-Koolae *et al.* [9]. The present study revealed that the patients belonging to the age group 61-70 years were more predominant which is in compliance with the outcomes of the study conducted by Schöttke and Giabbiconi [8].

In our study, hypertension (85%), diabetes mellitus (50.6%), and IHD (22%) were the major comorbidities among the post-stroke patients. This was in accordance with the findings of the study conducted by Habibi-Koolae *et al.* [10]. In our study, the prevalence of depression and anxiety were mostly observed in post-ischemic stroke patient (79%), similar results were observed in the study conducted by Karmachandani *et al.* [6] and De Wit *et al.* [7].

Out of 36 post-stroke patients with depression and 11 with anxiety, 80.55% and 82% of patients had left side lesions, respectively. This observation was similar to a study conducted by Rajashekar *et al.* [11] and Barker-Collo [12].

Out of 36 patients with symptoms of depression, 23% of patients showed mild depression, moderate depression was seen in 12% and 9% of severe depression. Moreover, among 11 patients showing the symptoms of anxiety, 6% patients showed mild anxiety, 3% showed moderate anxiety, and 3% patients' severe anxiety which is similar to the study conducted by Fang *et al.* [3].

The number of PSD and anxiety were found to be more common in male patients, in contrast with the study conducted by Paradiso and Robinson [13].

In terms of stroke-related factors, ischemic stroke type was found statistically associated with depression and anxiety, and also significant relation was observed between lesion location of stroke (left side) and depression or anxiety corresponding to the study conducted by Tsehayneh and Tafesse [14] and Leppävuori *et al.* [15].

By comparison of scores within baseline of depression, anxiety, stroke severity, and aphasia; aphasia is related to the left side location of lesion, contrasting to the study conducted by Pedersen *et al.* [16] but HAM D and HAM A scores did not show any significant relationship ($p \leq 0.05$). Among the 81 stroke patients, the majority of them had moderate QOL followed by mild, normal, and severe based on the SAQOL scores corresponding to the study conducted by Ramos-Lima *et al.* [17].

Moderate QOL was predominant in post-stroke depressed patients, whereas severe SAQOL score is seen in PSA patients, consistent to the study conducted by Khedr *et al.* [4] and Tang *et al.* [18], respectively. SAQOL scores of baseline patients were compared with HAM D and HAM A to assess if the degree of decline in QOL patients with depression

and anxiety. The results of the test showed a positive effect to moderate QOL ($p \leq 0.05$).

Out of 31 post-stroke depressed patients who was followed up, 25% patients were found to be normal, 45% with mild depression, 19% with moderate, and 9% with severe depression. Moreover, among seven PSA patients followed up, 42% patients were found to be normal, 14% with mild anxiety, 42% with moderate anxiety corresponding to the study conducted by Fang *et al.* [3].

Out of the 31 patients who had PSD at baseline, 39% showed improvement in the HAM-D score and 61% showed no change and out of the seven patients who had PSA at baseline, 57% showed improvement in the HAM-A score and 43% showed no change. In PSD and anxiety patients, most of them had mild QOL followed by moderate QOL according to the SAQOL scores. Out of 32 patients followed up, SAQOL scores compared to the baseline 37% showed improved QOL, 47% had no change and in 16% patients, the QOL decreased.

Out of 36 patients showing depressive symptoms, 31 patients were followed up. (68%) of the population showed significant symptoms of depression at follow-up. Out of 11 patients showing anxiety symptoms, seven patients were followed up. (57%) of the population showed significant symptoms of anxiety at follow-up. On the other hand, 38.7% of the participants who showed depressive symptoms at baseline and 57% of the participants had improved scores during the follow-up.

To sum up, factors contributing to increased risk of depression and anxiety after stroke include age, sex, co-morbidities, location of lesion, and type of stroke. Early detection of depression and anxiety symptoms may facilitate functional recovery and improve QOL in stroke patients if careful evaluation of PSD and PSA is integrated into clinical care of stroke patients.

CONCLUSION

The results of our study show the prevalence of PSD and Anxiety and its correlation with left-sided lesions and ischemic type of stroke. Common comorbidities associated with PSD and PSA were found to be hypertension and diabetes mellitus. Though the scores for both HAM-D and HAM-A had improved during follow-up, the patients were still found to have depression and/or anxiety.

A clear understanding of the relationship between depression and anxiety with the mentioned correlates post-stroke will assist clinicians in early identification of patients at the highest risk for mood disturbance and those likely to benefit from treatment interventions.

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CONFLICT OF INTEREST

There is no conflict of interest between the authors.

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