Original Research Article

Prevalence and Factors Influencing Anxiety in Patients with Stroke Attending a Tertiary Care Teaching Hospital, a Cross Sectional Study

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ABSTRACT

Background: The incidence rate of stroke in Low and Middle Income Countries (LMICs) has increased. There has been a decrease in the stroke incidence in high-income countries (HICs) indicating approximately 42 percent decrease in stroke incidence in HICs and more than double increase in stroke incidence in LMICs, during the past four decades. India has been experiencing significant demographic, economic and epidemiological transition during the past two decades. These have resulted in an increase in life expectancy and consequently an increase in ageing population. Higher anxiety levels are associated prospectively with increased risk for incident stroke independent of other risk factors. Anxiety is a modifiable experience that is highly prevalent among the general population. The current study assesses the factors influencing anxiety in stroke patients (Post-stroke anxiety-PSA).

Materials & methods: This cross sectional study was conducted in the Department of Neurology and the Department of Psychiatry in NRI General Hospital, located in Andhra Pradesh, South India. The study had included 98 eligible stroke patients and evaluated them for anxiety using Hamilton Anxiety Rating Scale (HAM-A).

Results: The prevalence of anxiety was high (18.4%) among stroke patients (Post-stroke anxiey-PSA), out of which 11.2% had mild anxiety, 5.1% had moderate anxiety and 2% had severe anxiety. After controlling for all the other factors in the multivariate analysis, the odds of anxiety are 4.839 times increase in middle class (Odds ratio 4.839, 95% CI 1.049 to 22.327, P value 0.043), which was statistically significant. The odds of anxiety were 7.809 times increase in high class (Odds ratio 7.809, 95% CI 1.067 to 57.158, P value 0.043), which was statistically significant. Presence of UMN facial palsy was also independently associated with increased risk of stroke in study population, (Odds ratio=5.037, 95% CI 1.424 to 17.816, P value=0.012) which was statistically significant. The factors which had no statistically significant association with stroke were, age of the person, gender, education, family type, presence of aphasia and presence of stressful life event.

Conclusions: The prevalence of anxiety was high among stroke patients. Health care providers treating stroke patients at different levels should be sensitized regarding this and there is a need to develop appropriate interventions to deal with Post-stroke anxiety (PSA) patients.

Key word: Ischemic stroke, anxiety, stressful life event.

INTRODUCTION

Stroke is defined by the World Health Organizations as 'a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin.' A transient ischaemic attack (TIA) is defined as stroke symptoms and signs that resolve within 24 hours. There are limitations to these definitions.[1] The incidence rate of stroke in LMICs has increased from 56/100,000 person-years

during 1970-1979 to 117/100,000 person-years during the period 2000-2008. There had been a decrease in the stroke incidence from 163 per 100,000 person-years in 1970-1979 to 94 per 100,000 person-years during 2000-2008 in high-income countries (HICs) indicating approximately 42 per cent decrease in stroke incidence in HICs and more than double increase in stroke incidence in LMICs, during the past four decades. [2] India has been experiencing significant demographic, economic and epidemiological transition during the past two decades. [3] These have resulted in an increase in life expectancy and consequently an increase in ageing population. [4] Emotional changes related to cerebrovascular disease may be caused by patient's brain damage per se or by psychological reactions. Emotional problems influence stroke patient recovery of motor and cognitive deficits as well as the mortality risk associated with stroke thus it is necessary to identify their existence at their early stages and institute appropriate treatment. [5] Higher anxiety levels were associated prospectively with increased risk for incident stroke independent of other risk factors. Anxiety is a modifiable experience that is highly prevalent among the general population. Assessment and treatment may contribute to developing more effective preventive and intervention strategies for improving overall cardiovascular health as well. [6] The aim of our study is to assess the prevalence of anxiety in the acute stage of ischemic stroke and to identify the factors associated.

Objectives:
1. To assess the prevalence of anxiety among the stroke patients presenting to a tertiary care teaching hospital in South India
2. To analyse the factors associated with anxiety in the study population

MATERIALS AND METHODS
Study site:
This study was conducted in the Department of Neurology and Psychiatry in NRI General Hospital, which is a tertiary care teaching hospital located in the state of Andhra Pradesh, South India.

Study population:
The study population included all the adult patients diagnosed with ischemic stroke by clinical examination and confirmed by appropriate imaging (CT scan/MRI Brain) and were attending follow up visit in neurology OPD 3 to 12 months after stroke.

Sample size and sampling method:
A group of 98 eligible and consenting participants were included in the study sequentially by convenient sampling.

Data collection tools:
Hamilton Anxiety Rating Scale (HAM-A) was used to assess the severity of anxiety in the study group. Lawton scale of Instrumental Activities of Daily Living (IADL) was applied to assess the degree of physical impairment. Mini Mental Status Examination (MMSE) was applied to assess cognitive impairment. Presumptive Stressful Life Event Scale (PSLES) was administered to find the role of stressful life events.

Inclusion Criteria:
1. All adult patients with the diagnosis of Ischemic Stroke made by a neurologist both
2. clinically and with CT/ MRI scan belonging to both genders
3. Conscious and cooperative patients and accompanied by at least one informant.
4. The stroke should be of first episode.

Exclusion Criteria:
1. Patients with past history of psychiatric illness.
2. Patients with neuroradiological evidence of hemorrhage.
3. Patients with duration of less than 3 months and more than 12 months from the stroke episode.

Study procedure:
After obtaining informed consent, the special proforma was administered for collecting the socio-demographic profile. This consisted of socio-demographic data, history of present illness, history of past

medical and psychiatric illness and detailed neurological examination. CT scans findings and other important investigations. Hamilton Anxiety Rating Scale (HAM-A) was used to assess the severity of anxiety in the study group.

Statistical methods:

IBM SPSS statistical soft ware version 21 was used for statistical analysis. Socio demographic variables like age and gender, religion, education, occupation, socioeconomic status, type of family etc were taken as explanatory parameters. Presence of anxiety as assessed by HAM anxiety score was considered as primary outcome. Descriptive analysis of all the explanatory and outcome parameters was done. All the categorical variables were presented in frequencies and percentages. The numerical variables presented in Means and Standard deviations. The association between various explanatory variables and anxiety was assessed by univariate binary logistic regression in the first step. Unadjusted odds ratios along with 95% CI were presented. Variables showing statistically significant association in univariate analysis were included in the multivariate binary logistic regression analysis, to identify the independent predictors of anxiety.IBM SPSS statistical softtware version 21 was used for statistical analysis. [7]

RESULTS

Table 1: Distribution of Socio demographic parameters in study population (N=98)

Parameter	Frequency	Percent
I. Sex		
Male	66	67.3%
Female	32	32.7%
II. Religion		
Hindu	79	80.6%
Christian	14	14.3%
Muslim	5	5.1%
III. Education		
Illiterate	67	68.4
Primary	23	23.5
Secondary education and higher	8	8.2
IV. Socio economic status		
Low	39	39.8
Middle	52	53.1
High	7	7.1
V. Type of family		
Nuclear	81	82.7
Joint	17	17.3

Among the study population male participants were 66 (67.3%) reaming 32 (32.7%) were female participants. Hindus constituted (79) 80.6% of participants and the proportion of Christians and Muslims were 14.3% and 5.1% respectively. Majority 67 (68.4%) were illiterates and 23 (23.5%) were completed primary education and only 8 (8.2%) were completed secondary education and higher. Seven (7.1%) belonged to high socio economic status. The proportion of low and middle socio economic status people were39.8% and 53.1% respectively. Eighty-one (82.1%) of them belonged to nuclear family, 17 (17.3%) belonged to joint family (Table 1).

Table 2: Distribution of disease related parameters in study population (N=98)

History	Frequency	Percent
I. Side of lesion		
Left	58	59.2%
Right	40	40.8%
II. Cranial nerve involvement		
None	64	65.3%
UMN facial palsy	34	34.7%
III. Speech defects		
Normal	55	56.1%
Aphasia	43	43.9%
IV.CT Findings		
Fronto parietal infarct	30	30.61%
Capsulo ganglionic infarct	25	25.51%
Frontoparieto temporal infarct	14	14.28%
Frontal infarct	13	13.27%
Parieto temporal infarct	12	12.24%
Occipital infarct	4	
V. Instrumental activities of daily living scale		
Normal	35	35.7%
Mild	32	32.7%
Moderate	14	14.3%
Severe	17	17.3%
VI. Presumptive stressful life score		
Present	31	31.6
Absent	67	68.4

The lesion was on left side for 58 (59.2%) patients and was on right side for remaining 40 (40.8%) patients. UMN facial palsy was seen in 34 (34.7%) of patients and aphasia was seen in 43 (43.9%) of patients. The most common lesion in CT was fronto parietal infarct, which was seen in 30 (30.61%) patients, followed by capsuloganglionic infarct, seen in 25 (25.51%) of patients. As per Lawton instrumental activities of daily living, 35 (35.7%) people were having normal scores, 32 (32.7%) had mild limitation, 14 (14.3%) had moderate limitation and 17 (17.9%) had severe limitation of activities of daily living.

Thirty-one (31.6%) people had presumptive stressful life score (Table 2).

The prevalence of anxiety in study population was 18.4%, as 18 subjects out of 98 had anxiety of various severities. Out of the 98, 11 (11.2%) had mild anxiety, 5 (51%) had moderate anxiety and 2 (2%) had severe anxiety (Table 3).

Table 3: Prevalence of anxiety in study group(N=98)

Anxiety	Frequency	Percent
III. HAM anxiety score		
Normal	80	81.6
Anxiety	18	18.4%
• Mild anxiety	11	11.2%
• Moderate anxiety	5	5.1%
• Severe anxiety	2	2.0%

Table 4: Univariate Logistic regression analysis of factors associated with anxiety in study population(N=98)

Parameter	Unadjusted odds ratio	95% CI of odds ratio		P value
		Lower	Upper	
Gender (baseline=Male)				
Female	1.400	0.486	4.037	0.533
Education (baseline=Illiterate)				
Primary	1.273	0.395	4.107	0.686
Secondary education and higher	0.655	0.074	5.829	0.704
Socioeconomic status (baseline=Low)				
Middle	2.348	0.686	8.032	0.174
High	6.569	1.064	40.487	0.043*
Family type (Baseline=Joint)				
Nuclear	4.250	0.526	34.356	0.175
Cranial nerve involvement (baseline=None)				
UMN facial palsy	3.894	1.344	11.287	0.012*
Speech defects (base line= None)				
Aphasia	3.703	1.204	11.387	0.022*
Limitation of ADL (Baseline= Normal)				
Mild	0.857	0.209	3.518	0.831
Moderate	1.000	0.170	5.878	1.000
Severe	4.200	1.086	16.242	0.038*
Presumptive stressful life score (baseline= No stressful event)				
Yes	1.100	0.371	3.265	0.864

* Statistically significant

The demographic factors which had shown increased risk of anxiety were female gender (Odds ratio=1.400, 95% C.I. 0.486 to 4.037, P value 0.533), primary school educational status (Odds ratio=1.273, 95% CI 0.395 to 4.107, P value 0.686), high socioeconomic class (Odds ratio=6.569, 95% CI 0.526 to 34.356, P value 0.043), and living in nuclear family (Odds ratio=4.250, 95% CI 0.266 to 28.433, P value 0.175). (Table 4)

Table 5: Multivariate logistic regression analysis of factors associated with anxiety in study population (N=98)

Parameter	Adjusted odds ratio	95% CI of odds ratio		P value
		Lower	Upper	
Socioeconomic status (baseline=Low)				
Middle	4.839	1.049	22.327	0.043*
High	7.809	1.067	57.158	0.043*
Speech defects (base line= None)				
Aphasia	1.963	0.563	6.849	0.290
Cranial nerve involvement (baseline=None)				
UMN facial palsy	5.037	1.424	17.816	0.012*
Limitation of ADL (Baseline= Normal)				
Mild	0.684	0.142	3.295	0.636
Moderate	1.602	0.222	11.564	0.640
Severe	2.882	0.586	14.169	0.193

* Statistically significant

The disease related factors associated with increased risk of Anxiety were presence of aphasia (Odds ratio=3.703, 95% CI 1.204 to 11.387, P value=0.022), Severe limitation of ADL (Odds ratio=4.200, 95% CI 1.086 to 16.242, P value 0.038) and presence of stressful life event (Odds ratio=1.100, 95% CI 0.371 to 3.265, P value 0.864). Out of these severe limitation of ADL and presence of aphasia

had shown statistically significant association.(Table 4)

After controlling for all potential confounders there was a statistical significantly association of anxiety with higher socio economic status and UMN facial palsy.

There was significantly increased odds of anxiety with increasing socio economic status in multivariate analysis. After controlling for all the other factors in the multivariate analysis, the odds of anxiety were 4.839 times increase in middle class (Odds ratio 4.839, 95% CI 1.049 to 22.327, P value 0.043), which was statistically significant. The odds of anxiety were 7.809 times increase in high class (Odds ratio 7.809, 95% CI 1.067 to 57.158, P value 0.043), which was statistically significant. Presence of UMN facial palsy was also independently associated with increased risk of stroke in the study population, (Odds ratio=5.037, 95% CI 1.424 to 17.816, P value=0.012) which was statistically significant.

DISCUSSION

The present study was prospective, cross sectional, hospital based descriptive study, found the prevalence of Post-stroke anxiety in 18.4% of Acute Ischemic stroke patients.

The anxiety rates observed in stroke patients were higher than the ones observed in studies of general population where the estimated pooled 1-year and lifetime prevalence rates of anxiety were 10.6% (7.5–14.3) and 16.6% (12.7–21.1) respectively as reported by Somers JM et al. [8] Our study confirms the similar finding of more anxiety in post stroke patients than in general population.

Our study found prevalence of anxiety was more in Women than in Men stroke survivors. McLean et al observed higher prevalence of anxiety amongst women in the general population. [9] Tang WK et al reported 23% of stroke survivors exhibited anxiety. [10] The anxiety group had significantly more women, higher GDS scores (7.5±4.5 vs 3.5±3.6), and lower scores for total SSQOL (3.9±0.6 vs 4.5±0.6) and SSQOL domains of energy (2.0±1.2 vs 3.4±1.4), mood (3.6±1.5 vs 4.6±0.9), personality (3.4±1.7 vs 4.4±1.1), and thinking (2.4±1.2 vs 3.5±1.4), after adjustment for sex and GDS score. In subsequent multivariate regression analysis, the Hospital Anxiety Depression Scale anxiety score was negatively associated with the SSQOL total score ($r=-.154$) and 5 of the 12 domain scores, namely energy ($r=-.29$), mood ($r=-.102$), personality ($r=-.195$), thinking ($r=-.136$), and work/productivity ($r=-.096$). [10]

Compared with the non-Post Stroke Anxiety group, Post Stroke Anxiety patients were more likely to have right frontal acute infarcts. Right frontal infarcts remained independent predictors of PSA in the multivariate analysis, with an odds ratio of 4.44 (*P*=0.002). [11] Our study also observed the similar finding of patients with right frontal infarcts were noted to have more anxiety.

Astrom et al proved that in terms of injury characteristics, PSA correlates significantly with right hemisphere lesions, while co-morbid PSA and Post-stroke depression (PSD) were linked to left hemisphere lesions. [12] Castillo et al. found anxiety more prevalent in association with posterior right hemisphere lesions, whereas worry without anxiety disorder was associated with anterior lesions. [13]

Burton et al. assessed that the overall pooled estimate of anxiety disorders by clinical interview and reported as 18% (95% confidence interval 8–29%, $I^2=97\%$) and 25% (95% confidence interval 21–28%, $I^2=90\%$) for anxiety assessed by Anxiety subscale of The Hospital Anxiety and Depression Scale. The combined rate of anxiety by time after stroke was: 20% (95% confidence interval 13–27%, $I^2=96\%$) within one-month of stroke; 23% (95% confidence interval 19–27%, $I^2=84\%$) one to five-months after stroke; and 24% (95% confidence interval 19–29%, $I^2=89\%$) six-months or more after stroke. Anxiety after

stroke occurs frequently although methodological limitations in the primary studies may limit generalizability. Given the association between prevalence rates and the Hospital Anxiety and Depression Scale-Anxiety cutoff used in studies, reported rates could in fact underrepresent the extent of the problem. Additionally, risk factors for anxiety, its impact on patient outcomes, and effects in tangent with depression remain unclear. [14] The methodology of the study may explain the difference with the results of Present Study.

Ayerbe et al reported the incidence of anxiety in patients followed up to 10 years after stroke ranged from 17 to 24%. Cumulative incidence was 57% with a prevalence range of 32-38%. Among patients who developed anxiety after stroke in the entire follow-up period of 10 years, 58% developed anxiety by 3 months. Predictors of anxiety included age under 65, female gender, inability to work, depression treatment, smoking and stroke severity. Anxiety at 3 months was associated with lower QoL at follow-up. [15]

White JH et al reported that anxiety (47%) was more common than depression (22%) at baseline after stroke. Anxiety (but not depression) scores improved over time. Anxiety post-stroke was positively associated with baseline PSD ($p < 0.0001$), baseline anxiety ($p < 0.0001$) and less disability ($p = 0.042$). Post Stroke Depression was associated with baseline anxiety ($p < 0.0001$), baseline depression ($p = 0.0057$), low social support ($p = 0.0161$) and low community participation ($p < 0.0001$). [16]

Burvill PW et al reported the prevalence of anxiety disorders was 5% in men and 19% in women; in community controls, it was 5% in men and 8% in women. Adopting a non-hierarchic approach to diagnosis, gave a prevalence of 12% in men and 28% in women. When those who showed evidence of anxiety disorder before stroke were subtracted, the latter prevalence was 9% in men and 20% in women. [17]

Those studies that have found relationships between PSA and age and gender report that women and younger patients (<59 years) were more susceptible to PSA. [18-19]

Barker Collo and Sussane L examined the prevalence of anxiety as well as the relationships of age, gender, hemisphere of lesion, functional independence, and cognitive functioning (i.e., memory, attention/impulsivity, cognitive speed) to anxiety at 3 months post-stroke. Prevalence of moderate to severe anxiety in the sample was 21.1%, with co-morbidity in 12.3% of cases. In regression analysis, left hemisphere lesion contributed to prediction of anxiety, as did cognitive speed, explaining 50.7% of the variance. The findings suggest that individuals with left hemisphere lesions may be particularly at risk of developing anxiety after stroke. While age and hemisphere of lesion contributed, cognitive performance explained the38.5%proportion of variance in anxiety. The findings suggest that cognition and mood are linked over and above physical independence and that both should be addressed as part of the rehabilitative process. [20]

CONCLUSIONS

The prevalence of anxiety was high (18.4%) among stroke patients, out of which 11.2% had mild anxiety, 5.1% had moderate anxiety and 2% had severe anxiety. The factors which were strong independent predictors of anxiety were higher socio economic class and presence of UMN facial palsy. The factors which had no statistically significant association with stroke were age of the person, gender, education, family type, presence of aphasia and presence of stressful life event.

RECOMMENDATIONS:

The health care practitioners at various levels treating stroke patient needs to be sensitized about higher incidence of anxiety and must be equipped to deal with it effectively. More evidence is needed on the

subject to properly understand the interplay of various demographic and disease related parameters in causing anxiety to devise effective interventions.

Limitations:

The probability of chance occurrence of many findings was high in the study, due to smaller sample size.

Conflict Of Interest: None declared

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How to cite this article: Pavan Kumar TV, Pasha SA, Chaitanya Ch. Prevalence and factors influencing anxiety in patients with stroke attending a tertiary care teaching hospital, a cross sectional study. Int J Health Sci Res. 2018; 8(4):16-23.

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