Department of Psychiatry

Original Research Article

A PROSPECTIVE STUDY ON POST STROKE DEPRESSION AND DISABILITY IN ACUTE CEREBROVASCULAR ACCIDENT PATIENTS.

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ABSTRACT

Background: A prospective study on prevalence of post stroke depression and its association with disability in acute cerebrovascular accident patients.
Material and Methods: Prospective and follow up study done during February 2019 to may 2019 in the department of Psychiatry at Osmania medical college, Hyderabad.
Results: 100 patients with hemispheric stroke were identified during study period. The mean age of sample 44.42 years and SD of 6.59. There 52 males, 32 females Lesion location based on CT scan was found to be right hemisphere lesion location accounted for 37%, left hemisphere lesion location was found to be 57.1% and bilateral 6%. Site of lesion basal ganglia 23.8%, frontal 3%, internal capsule 23%.
Conclusion: PSD associated with increased disability and worse rehabilitation outcome. Therefore there is a urgent need to routinely screen post stroke survivors for depression and treatment should be started. Depression was also related to functional disability The relationship between PSD and disability support the importance of reactive factor.
Keywords: Stroke, Depression.

INTRODUCTION

Stroke is defined by WHO as A rapidly developed clinical signs of focal or global disturbance of cerebral function ,lasting more than 24 hours or until death with no apparent non vascular cause .Stroke is caused by interruption of blood supply to brain, usually because blood vessel burst or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to brain tissue.[1]
Depression is defiend by WHO as a common mental disorder characterized by sadness, loss of interest in activities and by decreased energy. Depression is differentiated from normal mood changes by the extent of its severity, the symptoms and duration of the disorder. According to an estimate, prevalence of identifiable depression is 5 - 10 % of population at any given point of time which requires psychological treatment. Risk of developing depression in female during a lifetime 10 -20 % which is comparatively higher than males,[2]
Post stroke depression is defined/categorized as per DSM 5, mood order which occurs due to general medical condition.[3] Post stroke depression in terms of early studies found related with stroke related factors for example location of stroke and focal disturbance of neurotransmitter pathways.[4]
In addition to stroke related factors , patient related factor examples age, sex, personality, coping abilities or enhanced disability and poor rehabilitation outcomes, extended use of healthcare, higher rate of mortality, suicidal ideation and social support provided are also associated with post stroke depression. PSD is segregated into two major types. Major depression and minor depression. Major depression was found to be associated with left anterior location of lesion of stroke. Risk of developing cognitive impairment is high among patient suffering from major depression.
Minor or dysthymia was found to be associated with stroke involving lesion of posterior brain. Chance of development of cognitive impairment was found to be negligible with this type of minor depression.

Major depression was found to be associated with high functional impairment.[5,6,7,8,9] Study of post stroke depression is of vital importance to avoid long-term unfavorable consequences of stroke

Aim of the study: A prospective study on prevalence of post stroke depression and its association with disability in acute cerebrovascular accident patients.

Objectives

1. To study the prevalence of depression in patients of 1st episode. of stroke.
2. To study the prevalence of depression at the time of discharge ,1st month and 3rd month.
3. To study the association between disability and post stroke depression.
4. To study the sociodemographic data of sample study.

MATERIALS AND METHODS

After Ethics committee approval prospective and follow up study done during February 2019 to may 2019 in the department of Psuchiatry at Osmania medical college ,Hyderabad. Informed consent was obtained from study subjects.

Patients with definite history of first episode of recent stroke who got admitted in tertiary care hospital, all the study subjects are given MMSE after 2weeks of stroke and those who score above 23 are entered into study.

Informed consent was taken and entered into semi structured intake proforma. Socioeconomic Status of study subjects are assessed by using Modified Kuppuswmay Scale(2017). Study subjects are assessed for depressive symptoms and diagnosis of depression is made as per ICD 10 criteria.

Depression is quantified by using MADRS scale, Disability is assessed by using BARTHELS INDEX at the time of 1st assessment, 1st month and 3rd month after stroke.

Inclusion Criteria

1. Age :18-60 years
2. First episode of stroke with duration of 14 days confirmed by computed
3. tomography (CT) or magnetic resonance imaging (MRI).
4. Cooperative stroke patients.

Exclusion Criteria

1. Severe aphasia, unconscious and hardly to cooperate for examination
2. Past history of psychiatric Disorder.-depression or psychosis
3. Altered sensorium patients (hemorrhagic stroke).
4. MMSE score<23.
5. Transient ischemic attack

SCALES REQUIRED

ICD -10 [INTERNATIONAL CLASSIFICATION OF DISEASES] FOR DIAGNOSIS OF DEPRESSION

Post stroke Depression according to ICD 10 is included under Organic including symptomatic mental disorders i.e A variety of mental disorders as well as changes in personality, perception and mood may be attributable to brain dysfunction due to cerebral disease or systemic disease secondarily affecting brain

Ex:a. Organic delusional syndrome b.schizophrenia like delusional syndrome associated with epilepsy c.mood disorder- Organic mood disorders.

MMSE

It is a 30-point questionnaire that is used to measure cognitive impairment It is also used to estimate the severity and progression of cognitive impairment and to follow the course of cognitive changes in an individual over time Administration of the test takes between 5 and 10 minutes and examines functions including registration (repeating named prompts), attention and calculation, recall, language, ability to follow simple commands and orientation. It was originally introduced by Folstein et al. in 1975. Severity of cognitive impairment, 24-30: no cognitive impairment, 18-23 : mild cognitive impairment, 0-17: severe cognitive impairment.

MADRS

Used to measure the severity of depressive episodes in patients with mood disorders. It was designed in 1979 by Montegomery S A, Asberg M.Higher MADRS score indicates more severe depression, and each item yields a score of 0 to 6. The overall score ranges from 0 to 60. The questionnaire includes questions on the following symptoms 1. Apparent sadness 2. Reported sadness 3. Inner tension, 4. Reduced sleep , 5. Reduced appetite , 6. Concentration difficulties ,7.Lassitude 8.Inability to feel 9.Pessimistic thoughts 10. Suicidal thoughts .Usual cutoff points are: 0 to 6: normal or symptom absent, 7 to 19: mild depression ,20 to 34:moderate depression, > 34: severe depression.

BARTHEL'S INDEX

Used to measure performance in activities of daily living (ADL). Each performance item is rated on this scale with a given number of points assigned to each level or ranking. It uses ten variables describing ADL and mobility. A higher number is associated with a greater likelihood of being able to live at home with a degree of independence following discharge from hospital. The amount of time and physical assistance required to perform each item are used in determining the assigned value of each item. Scale was introduced in 1965,and yielded a score of 0–100 (Mahoney, F.I. & Barthel, D.W., 1965. The Barthel index has been shown to have portability with satisfactory reliability and validity. Barthel index has demonstrated high inter rater reliability (0.95) test retest relaibility (0.89) as well as high correlations (0.74–0.8) with other measures of physical disability. Consists of 10 items addressed in the Barthel scale are; presence or absence of fecal incontinence, presence or absence of urinary incontinence, help needed with grooming ,toilet use, feeding, transfers (e.g. from chair to bed), walking, dressing, climbing stairs, bathing.

- Score of 0-100

- 0-20: total dependency
- 21-60: severe dependency
- 61-90: moderate dependency
- 91-99: slight dependency
- 100: independent

Socioeconomic status of the patient was assessed by Modified Kuppuswamy scale (2017) consisting of education, occupation and monthly income of family members.

Semi structured intake proforma for entering patients data like age, gender, marital status ,sociodemograpghic factors, clinical data ,stroke characteristics were used.

Statistical analysis was done by using SPSS Version 22. Description of categorical variables like sex, marital status, employment status, stroke lesion ,depression was presented as numbers and percentages . Analysis to determine the relationship between PSD and demographic variables and stroke characteristics were performed by Pearson chi square test at 5% significant p value<0.05 was considered statistically significant.

RESULTS

Base line characteristics of study sample:

100 patients with hemispheric stroke were identified during study period. Of these 5 were excluded because of aphasia ,8 had impaired cognition (MMSE score <24), 3 had altered sensorium, final sample was 84 , 13 defaulted did not report for follow up at 1 month , 20 at 3 months follow up .

The mean age of sample 44.42 years and SD of 6.59. There 52 males, 32 females 97.6% were married, 1.2% were single,1.2 % divorced, none were professional, 20.23 % were skilled workers,79.7% semiskilled, majority were illiterate semi skilled (67), 14.2% illiterate, 33.3% secondary education, 15.4% intermediate,4.7% are graduates. 91.6 %rural, 8.3 % urban. The disability status were 15.4 % slight disability, 71.4 %moderate disability, 13% severe disability.

Stroke characteristics: Lesion location based on CT scan was found to be right hemisphere lesion location accounted for 37%, left hemisphere lesion location was found to be 57.1% and bilateral 6%. Site of lesion basal ganglia 23.8%, frontal 3%, internal capsule 23%.

Prevalence of PSD: The overall prevalence of PSD in sample size was found to be 65.4%, 33 % at 1st follow up 14.2% at second follow up.

Post stroke depression and sociodemographic factors:

Highest depression was found to be in age group 41-50 years (14.2%) relatively lower percentage among 28-40years (7.1%), followed by 51-60 years (13%). Our study found statistically significant association between PSD and age group (p value= 0.02). PSD was found higher among males (70.9%) compared to female (29%). The association between gender and PSD was statistically significant (65.4%). The results also showed a statistically significant association between age, sex, site of lesion.

Higher depression among married patients then single (1.8%), divorce (1.8%),

In education higher depression found in the secondary education group 33.3%, followed by illiterates (14.2%), intermediate (15.4%), graduates (4.7%).

Employment: highest depression found among the semi skilled (50%) workers than skilled workers (23.6%).

Socioeconomi status: Upper lower socioeconomic status patients found tobe higher depression of 54.5%, 23..6% in lower middle, 20% in upper middle,1.8%in lower SES patients.

PSD and disability of study sample for 3 assessments:

At the time of 1st assessment 13 were mildly depressed, 60 were moderate and 11 were severe depressed and at 2nd follow up 24 were mildly depressed ,18 were moderate and nil severe and at 3rd assessment 10 were mild and 4 were moderate depressed and nil severe depressed patients .13 were mild dependent,60 moderate and 11 severe at 1st assessment .24 were mild dependent, 18 moderate, nil severe at 2nd assessment. 10 mildly dependent, 4 moderately dependen , nil severely dependent at 3rd assessment.

LATERALITY, SITE OF LESION AND PSD

In this study out of total 84 patients ,48 were left side lesion, 31 were right side lesion and 5 were on bilateral lesions(in Graph 8).55 were found to have PSD, among the subjects who were depressed 18 had right hemisphere lesion location , 33 had left hemispheric lesion 4 had bilateral lesion. The study did not find statistically significant association between PSD and laterality of lesions chi square 1.448 and p value 0.48' .as shown in Table 4.

In study sample who had PSD ,20 had basal ganglia lesion location ,3 had frontal, 2 had internal capsule lesions. No statistically significant found in site of lesion and post stroke depression with chi square 0.83 and p value of 0.73.in Table 4.

In this sample study, 60 (71.4) %were cortical lesions and 24 (28.5%)were sub cortical lesions .36 patients (42.8%) of cortical lesions were depressed and 19 (22.6%) were depressed in sub cortical lesions.it is found statistically significant with chi square of 10.37 and p value of 0.01. shown in Graph 8.

PSD AND SEX: In this study, out of 55 depressed patients, 39 were males (n=52) (70.9%), 16 were females (n=32), (29.09%)shown in Graph 1. Male sex was statistically significant associated with PSD of p value 0.019.

PSD AND AGE: In this study, out of 55 depressed patients 12 patients were between 41-50 years range,11 were 51-60, 6 were 28-40. shown in Graph 2.

PSD AND EDUCATION: In the study sample, 12 were illiterates, 27 were educated up to primary, 28 were studied up to secondary (higher), 13 were studied up to intermediate, 4 were studied up to

graduate.28 were depressed in higher education group, 12 depressed in illiterate, 11 were in intermediate ,4 were depressed on graduate group .
The association between PSD and education was statistically significant p value 0.0009.depicted in Graph 3.

PSD AND OCCUPATION: In this study sample,67 patients were semiskilled of which 42 were depressed (50%), among 17 skilled patients, 13 were depressed (23.6%). in Graph 3.No significant association was found with chi square =1.14, p value=0.28 .

PSD AND SOCIOECONOMIC STATUS:
Socioeconomic status of the study sample are most of the depressed patients were upper lower (54.5%),(23.6%) were lower middle, ,upper middle(20%),lower (1.8%) shown in Graph 5.
No significant association was found between SES groups with chi square = 4.2 ,p value= 0.24.

PSD AND FAMILY TYPE:
In this study,52 pateints (94.5%)were depressed from the nuclear family and 3 patients (5.4%) from joint family were depressed shown in Graph 6.
No statistically significant from family type and PSD with chi square = 3.77 p value of 0.15.

MEAN AND STANDARD DEVIATION OF MADRS:
In this study sample, MADRS scores reduced statistically significantly over 3 follow ups with p value 0.0005 and F = 7.95. shown in table 5.
MCA, PCA and PSD: In this study, out of 84 study sample 55 were found to have middle cerebral artery territory infarct, of which 33 (39%) were found in depressed group .
2 patients had posterior cerebral artery territory infarct in the study sample, 1 was found in depressed group.
No statistically significant association found between PSD and middle cerebral artery and posterior cerebral artery.

CORELATION BETWEEN MADRS AND BI :
Correlation was done between Montegomery Asbergs Depression Rating Scale and Barthel's Index at 1st ,2nd and 3 rd assessment it was found negative correlation between them with r=-0.579, r=-0.34, r=-0.24 respectively and it was statistically significant with p value 0.05.

DISABILITY and PSD: Out of 84 patients, 55 patients were depressed from the study sample, of which 10 (11.9%)were slightly dependent for their activity of daily living , 34 (40.4%)were moderately dependent and 11(13.1%) were severely dependent.
There was statistically significant found with PSD and disability, chi square 8.63 p value of 0.01. shown in Table 8.

RISK FACTORS & PHYSICAL ILLNESS IN STUDY SAMPLE: This study sample showed 33.3% of hypertensive, 4.7% were diabetes mellitus and 32.1% were alcohol abuse in Table.3

ALCOHOL AND PSD: From study sample, 27 patients were taking alcohol, of which 19 patients were found to be depressed shown in Table.9
Chi square of 4.22 and p value 0.515 found statistically non significant between depression and alcohol use.

HYPERTENSION AND PSD: Among study sample, 28 patients found to be hypertensive, 19 were found to be depressed in Table 10. No statistically significant found between depression and hypertension with p value of 0.745 and chi square of 0.105.

DIABETES AND PSD: diabetes among the study sample, 4 patients were diabetic one was found to have depression in this study and found statistically not significant among depression and diabetes mellitus.

DISCUSSION

This study was done to know prevalence of post stroke depression and its correlation with lesion localization and disability in sample. The sample consisted of 84 patients. Prevalence was observed at three time intervals after stroke. Initial assessment was done 2 weeks post stroke. 55 patients (65.4%) were depressed, which is in keeping with landmark studies done by Robinson and Starkstein, Hackett et al. and the FINNSTROKE study.[10]
Berg et al reported slightly lesser prevalence of 50% than our study.[11] In study done by H. Dam et al,[12] out of 92 stroke patients, 28 were depressed (30%) was the prevalence of PSD . In this study, at the end of 1 month during second assessment, 28 patients (33.3%) were found to have depression. After 3 months 12 were found to have depression (14.2%). This study is in line with Sunny Broke study (66), where 486 patients were assessed (mean SD +/-age 74.9+/- 11.6 years). There were 150 patients available for assessment at 3 months and 136 at 1 yr. marked depressive symptoms were noted is 22% to 27% at 3 months and 21-22% at 1yr.With respect to the course of depressive symptoms, prevalence declined only slightly from3 months to 12 months in the group as a whole.
Robinson et al,[13] found depression following stroke was chronic lasting for 2 years.
House et al,[14] found little diagnosable depression by 1 year. Study done on community sample demonstrated 33% patients recover,40% have persistent symptoms.
In another Indian study by Rao SS et al,[15] on hospital sample out of 47 patients prevalence of PSD was 32 (58%) were depresed 2 weeks post stroke, 28 (56%) at 1 month , 23 (48%) at 3 months follow up.
In Finnstroke study on community sample 16 on incidence, severity of depression at 3 and 12 months after stroke, depression was common among stroke survivors and its rate did not decrease at 1 year follow up.
Our study is in line with Sunnybrooke study, Finstroke study and Rao SS which say that depression is common in stroke survivors did not decrease at follow up at 3 months.

Indian Study done by Ankita patel et al,[17] on hospital sample found slightly higher prevalence, out of the 52 patients, 38 were depressed (73.08%) .

In this study, found higher prevalence when compared with study done by Ramasubbu,[18] as the sample was collected from rehabilitation centre , prevalence was found to be 25.5 %. Taken together it may be concluded that prevalence of post stroke depression varied with the site of collection of sample, with hospital based studies showing prevalence 35-53%, rehabilitation based sample showing 23-40%,community based studies showing 9-23%.

Landmark studies by Herman et al,[19] Starkstein et al,[20] and Folstein et al,[21] also reported wide range of prevalence of PSD ranging from 18-61%. Other reasons for wide range could be because all these studies were done at different time periods following stroke, in different population samples i,e hospital based or rehabilitation based and using different measures to score depression. This study population were hospital based, so the prevalence of PSD might be higher than other community or rehabilitation based study population.

PSD and laterality of lesion

In this study, 10 were depressed out of left cortical, 11 out of 14 left subcortical and 26 out of 35 of right cortical, 8 out of 10 right subcortical. Our study did not find statistically significant association between laterality of lesion with PSD (p value of 0.1) which is in line with the study done by Starkstein, et al,[22] which revealed no statistically significant differences between PSD and laterality of lesion. In left cortical group, 4 of 16 patients had major depression, while 3 of 16 had minor depression. In the left subcortical group 4 of 13 patients had major depression, while 1 of 13 patients had minor depression. In the right cortical lesion group, 0 of 9 had major depression while 1 of 9 had minor depression. In the right subcortical lesion group 1 of 7 patients had major depression while none had minor depression.

This study found no association in severity of depression between laterality of lesions.But this study found significant association between PSD and cortical site of lesion with chi square 10.37 and p value of 0.01. Similar results were found in study done by Ankita patel,[17] where chi square value: 13.993 and p value: 0.016.

This study is in line with Ankita et al,[17] study ,19 patients (50%) had left sided lesion, 11 patients (28.95%) had right sided lesion,7 patients (18.42%) had both sided lesion. The association between PSD and laterality of lesion was not significant as chi square value was 2.147 and p value: 0.54.

This study did not find any correlation between brain atrophy and depression. Study by Starkstein et al found patients diagnosed as major depressive disorder show more brain atrophy .No significant association was found between laterality of lesion and PSD , and this finding is in line with studies by PLP Morris, T Pohjasvaara , AJ Carson, A.House, A. Srivastava, Sinyor. Some studies found PSD was more associated with right sided lesion (Dam, Anderson, Mc Hale). Landmark studies by Robinson, Pooja Rajashekaran, Stahl, Folstien, Bhogal found PSD more associated with left sided lesions.

In a review by Lifa yu,[25] authors concluded that studies done with exclusion of aphasia found PSD was more associated with right sided lesion. So patients with left sided lesions having aphasia, communication deficits might be having depression but excluded. Hence PSD was more associated with right sided lesion. Lifa yu analyzed 3,668 patients in 52 studies and showed that there was a weak relationship between PSD and right hemisphere lesion. Taken together wide divergence among different study findings between PSD and laterality of lesion could be attributed to methodological differences among study setting, whether hospital or rehab center or community, time passed since stroke, selection criteria used, different tools used to measure PSD.

Post stroke depression and site of lesion

This study found statistically significant association between cortical lesion and PSD. Chi square 10.37 and p value 0.01, similar results found in the study done by Ankita patel et al (62). (chi square value: 13.993 and p value: 0.016).

This in line with studies by Robinson which says there is a positive correlation between severity of depression and proximity of lesion frontal pole. The site of lesion most frequently associated with PSD was found to be basal ganglia, although the association was not statistically significant (p value 0.73) studies by Starkstien, Herman, Morris, noted greater depression in left sided basal ganglia lesions. Rajashekaran 26 found PSD was associated with left sided cortical and subcortical lesions. All these findings favor complex and multiple interactions of cortical and subcortical brain structures. With in these networks of neuronal activity not only many specific lesions of cortex or subcortical ganglia evoke disorders of emotional behavior but also cause disruption of ascending or descending neuronal pathways. Noradrenergic activation, neurochemical changes of serotonergic receptor and the interruption of dopaminergic pathways ascending from ventral tegmental area have been implicated in the pathogenesis of Post stroke depressive disorders. Moreover, most of the implied neuronal pathways have to be transit through basal ganglia and their surroundings white matter. Therefore lesions of basal ganglia and their surroundings affect different neurotransmitters system, may cause serious cortical remote effects. Damage to basal ganglia and surrounding white matter may produce a significantly higher frequency of depressive disorders because these structures are most important subcortical or cortical gateway.

DISABILITY AND PSD

Our study is keeping in line with Ankita et al (62) study, we found 13 out of 84 were slightly dependent, 60 were moderate dependent 11 were severe

dependent on Barthel's index score. Our study found statistically significant association between PSD and disability at 1st assessment (within 2 weeks post stroke) (chi square of 8.63 ad p value of 0.01). Study done by Ankita patel (62), 7 patients (18.42%) had mild disability, 19 patients (50%) had moderate disability and 12 patients (31.58%) had severe disability. The association between the severity of disability and PSD was nearly significant as chi square value: 5.217 and p value: 0.074.

In this study, found negative correlation between the MADRS and BI score with r= -0.579 and in Ramasubbu et al,[18] study, sample study scored (CES-D scale) were negatively correlated with Barthel scores (r=0.25,,P<0.001). This study is keeping with the above study. Thus, Ramasubbu et al (18 study, and this study found greater functional impairment was associated with higher depression scores. As the barthel index scores increases the physical activity increases and functioning improves this leads to improvement in depression, and depression scores decreases, hence negative correlation . similar negative correlation between MADRS score and barthel s index score where r= -0.579,r= -0.34,r=-0.24 at 1st ,2nd and 3rd assessment of depression and disability at 2 weeks after stroke ,1month and 3rd month after the discharge was found at subsequent follow ups .

This study is in line with study done by Eran Chemerinski, et al (68), showed a positive correlation between changes in HDS scores and changes in Johns Hopkins Functioning Inventory (JHFI) scores (P<.001), Thus, greater improvement in mood was associated with more improvement in ADL function. This study showed that there is a statistically significant association between depression and disability. This finding is similar to previous studies like Sunny Brooke study, Finnstroke, Srivastava. A,. This study is in accordance with Indian study by Rinu Susan Raju,[27] who found strong association between PSD and functional impairment, disability.The nature of association between PSD and physical disability is likely to be complex. Functional impairment, disability may cause depression and early depression may cause functional impairment. That is impaired function predisposes to depression, which is in turn has impact on functional recovery.

This study also found depression following stroke was associated with both the cortical site of lesion and significant physical disability (not associated with laterality of lesion). This study is in resonance with study by Ahmed Hatim Sulaiman (28who also found PSD was associated with left sided lesion(p=0.03) and significant physical disability(p=0.004) (Study was done 4-8 weeks post stroke.)

As this study was prospective study, assessments were done at 3 points – 2 weeks post stroke, 1 month and 3 months. None of the patients developed depression during follow up ,33 patients could not be followed up, 24 patients showed improvement of disability,[22] patients showed spontaneous recovery from depression and there was no change in severity of depression during follow up. None of the study subjects in depressed group showed worsening of depression scores in further follow up. Patients were offered treatment, explained about treatment options, risks, benefits of taking treatment and 2 patients not consented for taking treatment.

SOCIO DEMOGRAPHIC VARIABLES:

AGE

In this study ,55 depressed patients 12 patients were aged between 41-50 years, 11 patients were between 51-60 years and 6 patients were 28-40years.The association between middle age and PSD was significant with chi square =7.355, and p value of 0.02. with mean and SD of 44.42+_6.59. These study is in contrast to M.Astrom et al,[29] , Srivastava et al,[30] age mean of 46.06+-11.9 .Different studies have found variable results like a study by Erikson found young age as a predictor of PSD . Finnstroke study by Kotila,[33] found old age to be associated with PSD . There are studies which have shown no significant association between age and PSD (Paulocci, Dam et al,[12] T.Pohjasvaara et al.[31] These studies reveal complex, multifactorial relationship between age and PSD. Possible causes for more depression among 41-50 years in our study might be due to fact that they were young, could not accept their deficits and thus got depressed. More than 50% of study sample were between 41-50 years that may be another reason for higher prevalence of PSD in that group.

This study did not find younger age group as more depressed ones which is in contrast to the M Mac Haleet al32) where younger patients (U =1201, p=0.03) and with greater physical disability (U =954, p=0.001) were more depressed.

In this study, range of age group of sample taken was 18-60 years but study done by Litton et al 33 have taken sample age of greater than 40 years of age. The above study have found prevalence of depression as 47% and this study found 65.4% which not keeping in line with study.

GENDER AND PSD

In this study 52 were males, and 32 were females. Male gender was statistically significantly associated with PSD (chi square 5.47 and p value 0.019.). This in line with study by Anu Berg, H,[11] Palomaki H. The majority of earlier studies by Poynter 34, Paradiso 30 found female gender associated with PSD. Reasons might have been genetic factors, psychosocial inequalities, issue related to recovery, differential access to rehabilitation.

Out of 55 depressed patients, 39 were males (n=52) (70.9%), 16 were females (n=32),(29.09%). Male sex was significantly associated with PSD of p value 0.019. and chi square 5.47.the reason for such association might be because there were more male subjects in our study sample (52 males, 32 females).Other reasons could be poor coping abilities of males and most of the times in indian context men are bread winners of the family.

This study is keeping in accordance with Srivastava study et al (59) where the study sample had male to female ratio 41:10 and 18 were found to have depression. Depressed patients were mostly males (p value of <0.05). Vera Schepers et al (35 also found male preponderance. This study is in contrast with L Caerio et al 36, Hersman N et al37 where females were more depressed with statistically significant with p value of <0.05.

In a review by Poynter 34, it was found out of 56 publications,47 primary studies between 1982-2006 on 75131 subjects of which 11910 were women,62899 men. The prevalence of post stroke depression was more among women in 35 studies .Review also found that association of post stroke depression with left sided lesions was higher among females.

This study found statistically significant association between education, PSD, which is not in line with study done by T.Pohjasvaara et al,[31]

In this study males (46.4%) were more depressed than females (19%) study sample comprised of. 62% males and 38% females, males out numbered females. This is in line with Litton et al 33 study where 68 % males and 32% females were taken.

Family, Marital status, Domicile and PSD:

In this study, 54 were depressed (out of 82 sample of married subjects). This study did not find statistically significant association between PSD and marital status which is contrast to study done by Srivastava et al.[30] The reason may be in our sample, majority of study subjects were married and so cannot be generalized to general population.So no conclusion could be drawn.

In this study ,51 out 77 rural subjects were depressed, we did not find statistically significant association between PSD and doimicile which is not in line with by Srivastava et al 30 study. They found patients from urban background were more depressed and found statistically significant association between PSD and doimicile.

In this study, 52 patients were depressed out of 76 nuclear family type and did not find statistically significant association between PSD and family type not in line with study done by Srivastava et al,[30] they found statistically significant association between PSD and family type.

Socioeconomic status and PSD

In this study, upper lower socioeconomic status subjects were more depressed which in not keeping in line with N. Paul et study 38, found significant association between PSD and low socioeconomic status.

In this study, none of the study subjects met criteria for alcohol dependence syndrome, 32% of total sample showed non dependent abuse, out of which 30% of depressed subjects showed non dependent abuse. The association between Alcohol abuse and PSD was not significant chi square 4.22 p value 0.515.

33.3% were hypertensive in study sample, 34.5% were hypertensive in depressed group, the association was not statistically significant chi square 0.105 and p value 0.745.

In this study, only 4% were diabetic, of these 2% were in depressed group. The association was not statistically significant with PSD and diabetes mellitus chi square 2.618 p value 0.105.

Difficulties in assessing depression in medically ill patients

Working with medically ill patients poses challenges which are not found in general psychiatric practice like

a) Hospitalized patients lack rest and privacy,
b) Interruptions from nursing staff, other consulting services technician, performing bedside test and patients has to be shifted to other places for investigations like imaging, sonography
c) Illness related fatigue limits ability to tolerate a standard diagnostic, assessment and application of rating scales.,
d) Medication, medical illness can impair cognition on physiologic grounds,
e) Psychological impact of facing life limiting illness can also affect patients memory.

In this study, this problems were countered by

a) bbreviating the interview, completing assessments in 2-3 sittings
b) Taking patients choice of next interview, assessments were preferably done in afternoon 2pm so as not to let hormonal variations affect assessments.
c) Returning later and continuing interview after a small break
d) Assissting the patient with recall
e) Improving alliance, rapo with patient by helping patient eg: putting on a blanket, adjust angle of bed, bring a glass of water.

CONCLUSION

PSD associated with increased disability and worse rehabilitation outcome. Therefore there is a urgent need to routinely screen post stroke survivors for depression and treatment should be started. Depression was also related to functional disability The relationship between PSD and disability support the importance of reactive factor.

PSD is the most common psychiatric disturbance following stroke. It is necessary to recognize depression because it hampers rehabilitation, increases disability, delays recovery. There is possible risk of suicide. Hence it has to be detected and treated.

With the above results, this study conclude alternate hypothesis is accepted because depression was more prevalent in post stroke survivors. Post stroke depression was found to be significantly associated with disability.

Limitations in this study

Bias in methodology

a) This study is a time bound prospective study with a small sample hence the results cannot be generalized to general population.

b) The sample was picked up from a corporate hospital which mostly caters to middle and high socioeconomic group.

c) The disability among stroke patients could be compared with patientssuffering from neurological and orthopedic conditions with similar disability. This study suffers from lack of a control group .

d) During follow up some patients dropped out from the study due to various reasons

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