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Depression in stroke patients; a cross sectional study highlighting the association of stroke on age and gender basis.

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ABSTRACT

INTRODUCTION
Stroke is the second leading cause of death. Depressive disorder is characterized by period of sad mood and anhedonia occurring for two consecutive weeks. Among stroke survivors, the consequence of physical and psychological changes can be devastating. One of those psychological changes is post-stroke depression (PSD). Stroke itself has debilitating morbidity and superimposed PSD further decreases the quality of life of patients and impairs recovery. This study leads us to know the magnitude of post stroke depression.

OBJECTIVE
To determine the frequency of post stroke depression in patients under treatment at tertiary care hospital Karachi.

METHODS
A cross-sectional study was conducted at the Neurology out-patient department, Civil Hospital, Karachi. A total of 340 patients of both male and female genders, aged between 20-70 years with post stroke duration of greater than three months were included in the study using no-probability purposive sampling. The patients were approached through neurology out-patient department. Informed consent was obtained from all the patients after explanation of the study protocol. Patients with cognitive impairment (modified 6-item Mini-Mental Status score < 3), with focal or diffuse organic brain disorder that may be associated with psychiatric manifestation like intellectual disability,A-V malformation, tumor, intracranial infections, systemic diseases that may predispose them to depression e.g. hypo/hyperthyroidism, SLE or those already diagnosed with depression or prior anti-depressant treatment were excluded from the study.data wascollectedby using a predesigned questionnaire. SPSS version 19.0 was used for data entry and analysis. Chi square test was used to assess the association.

RESULTS
The average age of the patients was 38.45 ± 9.48 years. Post stroke depression was observed in 45% cases, out of which 13.2% had mild, 44.1% had moderate and 42.8% had severe depression. Prevalence of post stroke depression was significantly high in patients below 40 years of age and in patients who had ischemic type of stroke.The study results further revealed that patients younger than 40 years were more likely to have post stroke depression than those above 40 years of age (p=0.009) and patients who suffered from ischemic stroke were more likely to suffer from depression than those who suffered from hemorrhagic stroke (50% vs. 33.6%, p=0.005).

CONCLUSION
Prevalence of post stroke depression was significantly higher in patients with ischemic stroke than those with hemorrhagic stroke. We emphasize the importance of a thorough psychiatric evaluation of post stroke patients, particularly those who have a severe disability and a history of previous depressiveepisodes.

KEY WORDS
Depression, Ischemic Stroke, Hemorrhagic Stroke

INTRODUCTION

Stroke is the second leading cause of death after myocardial infarctionand the most frequent cause of adult disability[1-3].In 2010, t people with first stroke were estimated to be 16.9 million, stroke survivors to be 33 million whereas stroke-related deaths to be 5.9 million[4]. Of all strokes, 88% are ischemic,9% are intracerebral hemorrhagic and 3% are subarachnoidhemorrhagic[5]. Mortality and morbidity from stroke are on the rise. According to WHO,in 2002 the total number ofdeaths due to cerebrovascular accidents in Pakistan was 78,512. InBrazil, the absolute number of hospitalizations due to stroke rangedbetween 198,705 and 295,596 per annum between 1994 and 1997,and it was estimated that 25% were recurrent cases[6]. Aftersuffering a stroke, 80% of patients present motor impairment[7].

Depressive disorder is characterized by period of sad mood andanhedonia(inability to experience the pleasure from normally pleasurable lifeevents such as eating, exercise, social or sexual interaction) occurringfor two consecutive weeks as defined by DSM IV criteria for depression[8].Among strokesurvivors, the sequelae of physical and psychologicalchanges can be devastating. One of those psychological changes ispost-stroke depression (PSD)which constitutes an important complication of stroke, resulting in increased disability as well as mortality[9].Morris et al., in1993 reported that, over a10-year period, depressed stroke patients were 3.4 more times likely todie than their non-depressed counterparts[10]. Depression is thought tohave a detrimental effect on stroke recovery through a number ofmechanisms. For instance, a depressed patient may be less motivatedto participate in stroke rehabilitation because of persistent fatigue orlack of hope. Cognitive impairment may also impede the recoveryprocess, causing non adherence to treatment schedules, which maylead to increased mortality.PSD is common among both men and women. In 2005, a systematic reviewof 51 primary articles by Hackett et al., in2005 estimated the overallfrequency of PSD to be 33%[11]. Stroke itself has debilitating morbidityand superimposed PSD further decreases the quality of life of patientsand impairs the recovery.

This study enabled us to know the magnitude ofpost stoke depression, so, that departmental protocol could be developedfor early screening and referral for treatment of PSD. By earlyidentification and treatment of PSD we could improve the quality of lifeof our patients, expedite their recovery and make them functional[12,13].

METHODS

After seeking ethical approval, a cross-sectional study was conducted at the Neurology out-patient department, Civil Hospital, Karachi.As per the minimum required sample size,with 95% confidence level, anticipated frequency of PSD of 33%[11] and absolute precision of 5%, a total of 340 patients of either gender, aged between 20-70 years with post stroke duration of greater than three monthswere included in the study using no-probability purposive sampling.The patients were approached through neurology out-patient department. Informed consent was obtained from all the patients after explanation of the study protocol. Patients with cognitive impairment (modified 6-item Mini-Mental Status score < 3), with focal or diffuse organic brain disorder that may be associated with psychiatric manifestation like intellectual disabilityA-V malformation, tumor, intracranial infections etc., with systemic diseases that may predispose them to depression e.g. hypo/hyperthyroidism, SLE or who were already diagnosed as having depression or prior anti-depressant treatment were excluded from the study. Thepatients were interviewed by the principal investigator using a pre designed questionnaire which had questions pertaining to age, gender, poststroke duration, type of stroke (i.e. Ischemic or Hemorrhagic) and frequency of depression. All the stroke patients were evaluated by Beck Depression Inventory questionnaire for diagnosis of depression.The severity of depression was categorized as mild, with depression score 10-19, moderate, with depression score 20-29 and severe, with depression score ≥30.

The data were analyzed on SPSS version 19. Frequency and percentage were calculated for qualitative variable like gender, type of stroke ischemic and Hemorrhage and frequency of depression whereasmean ±SD were computed for quantitative variables like age, and post stroke duration. Variables considered as potential confounders and/or effect modifiers such as age and gender were stratified to find out the effect of these on the outcome.Post stratification chi-square test was applied for inferential analysis and the significance level was set at 0.05.The duration of study was six months.

RESULTS

The study results showed that the mean age of the patients was 38.45 ± 9.48 years whereas 58% of them were male. The average duration of post stroke cases was 4.25 ± 2.68 months whereas 68% of the stroke cases were of ischemic type. Prevalence of post stroke depression was found to be 45%out of which 13.2% were mild, 44.1% were moderate and 42.8% were severe (table 1).The study results further revealed that patients younger than 40 years were more likely to have post stroke depression (PSD) than those above 40 years of age (p=0.009).There was no significant gender difference among prevalence of PSD(43.1% vs. 46.9%, p=0.49). Patients who suffered from

ischemic stroke were more likely to suffer from depression than those who suffered from hemorrhagic stroke (50% vs. 33.6%, p=0.005) (table 2).

Table 1: Participants Profile

Variable (n=340)	Frequency(%)/Mean±S.D.
Age (Years)	38.45±9.48
Gender	
Male	197(58.0)
Female	143(42.0)
Type of Stroke	
Ischemic	230(68)
Hemorrhagic	110(32)
Post Stroke Depression	
Yes	152(45)
No	188(55)
Severity of Post Stroke Depression [1]	
Mild	20(13.2)
Moderate	67(44.1)
Severe	62(42.7)
Post Stroke Duration (Months)	4.25±2.68
[1]n=152	

Table 2: A univariate analysis of association between selected study variables and post stroke depression

Variable (n=340)	Post Stroke Depression Yes (n=152) Frequency(%)	No (n=188) Frequency(%)	p
Age Groups			
20-30 Years	45(57.0)	34(43.0)	
31-40 Years	52(49.5)	53(50.5)	0.009
41-60 Years	35(36.8)	60(63.2)	
61-70 Years	20(32.8)	41(67.2)	
Gender			
Male	85(43.1)	112(56.9)	0.49
Female	67(46.9)	76(53.1)	
Type of Stroke			
Ischemic	115(50.0)	115(50.0)	0.005
Hemorrhagic	37(33.6)	73(66.4)	

DISCUSSION

Stroke is a sudden non-convulsive focal neurological deficit produced by insufficiency of blood circulation to the brain[14]. In most western countries, 0.2% of the population suffers a stroke every year[9]. In addition to major impact of stroke on patients' physical health, many patients experience emotional disorders following stroke. The frequent appearance of emotional disorders following stroke has been recognized for many years.Goldstein (1948) found that patients with left hemisphere injury developed depression, irritability and explosive outbursts which he termed the "catastrophic reaction"[15].

Depression is a common neuropsychiatric consequence of stroke affecting approximately 40% of the patients. In addition to the psychosocial stress due to disability, loss of independence, and worsening of quality of life, neurobiological factors such as site of infarcts and brain atrophy have also beenproposed to be related to depression after stroke[16]. In recent years, post-stroke depression (PSD) has attracted worldwide interest. Literature reports a prevalence rateof major depression of 19.3% among hospitalized patients and 23.3% among outpatient samples[17]. Longitudinal studies of stroke patients have shown that about 20% of these patients develop Major and another 20% develop Minor depression during the first year after stroke[9].

In our study prevalence of post stroke depression was found to be 45% out of which 13.2% were mild, 44.1% were moderate and 42.8% were severe. The average duration of post stroke cases was found to be 4.25 ± 2.68 months which is higher than those reported for outpatient samples by two reviews i.e. 23.3%[17]and 33%[18].This could be attributed to difference in the method of assessing depression or to population characteristics. The prevalence of post-stroke depression has been reported earlier to be about 30%[19, 20]. Anearlier study also reported the prevalence of moderate to severe depression to be15%[21].The current study was done at 3 to 6 months post-stroke, whereas that study was done 4 to 8 weeks post stroke. Time lapsed after stroke has been mentioned as a variable in the prevalence of post stroke depression[19, 22]. The exclusion of a number of patients in this study as in other studies, because of severe cognitive or communicative deficits, may contribute to an underestimate of psychiatric morbidity. However, Starkstein and Robinsonin 1989 suggested that aphasia does not cause depression, but the two may coexist. As yet, there remains no reliable method of assessing mood disorders for patients with severe comprehensive deficits[15].

Demographic variables are important determinants of post stroke depression. Depressive symptoms were found statistically associated with young age group in our study. Prevalence of post stroke depression (PSD) was significantly high in patients below 40 years of age than those above 40 years of age (p=0.009). Our result has similarity with previous studies[23, 24]. However, most of the studies on association between age and post stroke depression show contradictory findings and reveals complex relationship between age and post stroke depression which could be dependent upon several factors.

A significant association was found between post stroke depressionand Ischemic stroke type in our study.Prevalence of post stroke depression was significantly higher in patients suffering from ischemic stroke than those suffering from hemorrhagic stroke (p=0.005).This finding is in congruence with other studies[16,25].An earlier study reported high depression among patients having ischemic stroke in the left hemisphere as compare to thosehaving it in the right hemisphere[16]. However, many studies report contradictory results as well [26,27]. Just as functional depression may arise from several mechanisms, the cause of PSD is likely to represent a mixture of etiologic factors. Socio-demographic, psychological and biological risk factors mediate the relationship between stroke and depression[28]. The association of depression with worse prognosis in stroke patients lends more support to the hypothesis that psychological rather than neurological factors are the main determinants of post stroke depression[29].

Furthermore, 68% of the patients in our study were found to have ischemic whereas 32% were found to have hemorrhagic stroke. Likewise, a number of earlier local studies have also consistently reported ischemic stroke to be more prevalent than hemorrhagic stroke. Marwat MA et al., in 2009reported the prevalence of ischemic stroke to be50% whereasthat of hemorrhagic stroke to be 29.5%[30]. MemonFA et al., in 2009found the prevalence of ischemic stroke to be 62%andof hemorrhagic stroke to be36% of stroke patients[31].Lakhair MA et al., in 2008reported the prevalence of ischemic stroke to be75% whereas that of hemorrhagic stroke to be 25%[32]. Memon RA et al., in2008 also reported the prevalence of ischemic stroke to be 77% whereas that of hemorrhagic stroke to be 23%[33].Likewise, Zafar A et al., in 2007 found the prevalence of ischemic stroke to be 88% whereas that of hemorrhagic stroke to be 12%[34].Similarly Khan J et al.,in 2006 found ischemic stroke to be present in71.4% whereas hemorrhagic stroke to be in 28.6% of the participants[35].

Limitation:It is acknowledged that the study may have suffered from recall bias, an inherent weakness of a cross-sectional study design.BDI is not designed to be used in stroke patients. How did patients who could not read and write complete this?

Recommendation: We emphasize the importance of a thorough psychiatric evaluation of post stroke patients, particularly those who have a severe disability and a history of previous depressive episodes.

CONCLUSION

The study findings revealed a high prevalence of post stroke depression among patients. The study results further revealed that patients younger than 40 years were more likely to have post stroke depression than those above 40 years of age whereaspatients who suffered from ischemic stroke were more likely to suffer from depression than those who suffered from hemorrhagic stroke.

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Saira Abbas; concept, data collection, data analysis, manuscript writing, manuscript review
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Muhammad Amir Umer; data analysis, manuscript writing, manuscript review
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Asfia Irfan; data analysis, manuscript writing, manuscript review
Adnan Anwer; data analysis, manuscript writing, manuscript review