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Tariq Feroz Memon

health sector reforms unit (HSRU) Department of health Sindh

Manzoor Ali Lakhair

Liaquat university of medical and health sciences LUMHS

Muzaffar shaikh

Liaquat university of medical and health sciences jamshoro.

Abeer Raque

Muhammad Saleem Rind

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SOCIO-DEMOGRAPHIC RISK FACTORS FOR HEMORRHAGIC AND ISCHEMIC STROKE: A STUDY IN TERTIARY CARE HOSPITAL OF HYDERABAD

Dr. Tariq Feroz Memon¹, Dr. Manzoor Ali Lakhair², Dr. Muzaffar shaikh³, Dr. Abeer Rafique⁴, Dr. Muhammad Saleem Rind⁵

¹ Research coordinator health sector reforms unit (HSRU) Department of health Sindh

² Associate professor Department of neurology LUMHS Jamshoro

³ Professor Department of medicine LUMHS Jamshoro

⁴ FCPS trainee

⁵ Medical officer

Correspondence to: Dr. Manzoor Ali Lakhair Associate professor Department of Neurology Liaquat university of medical and health sciences LUMHS
Email: manzoor.ali@lumhs.edu.pk

ABSTRACT

Background: Stroke is a common neurological disorder and major cause of death and disability worldwide. Stroke is a second leading cause of death after cancer and ischemic heart disease. Incidence of stroke has not been well studied in Pakistan but it is estimated that 350,000 cases of stroke occur per year. **Objective:** To determine the frequencies and Socio-demographic features of Hemorrhagic and Ischemic strokes among stroke patients in tertiary care hospital. **Material & method:** This cross-sectional study was carried out at department of medicine Liaquat university hospital Hyderabad from June to September 2010, Patients were included in study according to inclusion and exclusion criteria. A data was collected on pre-designed proforma and data was analyzed according to study design. **Results:** Out of 261 included stroke patients, 54% were males and 46% were female patients. The mean age of patients was 54.7 years. In 172 patients (66%) had Ischemic stroke whereas 89 (34%) patients had hemorrhagic stroke noted in this study. The high proportion of patients (36.4%) were between i.e., 55-64 years, Most of them (79%) were married, only 8% were unmarried and 13% were widowed, divorced or separated. In this study (67.0%) patients of both sexes were illiterate, Positive family history of stroke was noted in 24.5% patients. Regarding Stroke types 66% had Ischemic and 34% had hemorrhagic stroke. Incidence of Ischemic stroke was more in females (70.8%) and hemorrhagic stroke was more in males (38.3%). **CONCLUSION:** This study on socio demographic factors of stroke patients is the effort by which we would be able to take appropriate preventive measures to create awareness about stroke. In future more extensive surveys should be conducted to get knowledge about the effects of demographic and other factors on the onset of stroke.

Key words: Ischemic Stroke, Hemorrhagic Stroke, Age groups, socio demographic factors

Introduction:

World Health Organization's definition of stroke is "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" [1]. Damage to the brain is caused blockade of blood supply due to some embolism/atherosclerosis or burst of the blood vessel [2]. Stroke is a common cause of disability and third leading cause of death worldwide [3-4]. Almost 80% of strokes are Ischemic in origin and the rest are Hemorrhagic [5]. Ischemic stroke is more common where blood supply to brain is interrupted due to blockade of tiny blood vessels by some blood clot/atherosclerosis which leads to a process of cerebral ischemia (infarction) and treatment involves intravenous thrombolytic therapy [6-8]. Hemorrhagic stroke results from rupturing of blood vessels to brain, due to aneurysm resulting in bleeding in the surrounding tissues [9]. This bleeding compresses nearby blood vessels and causes the deprivation

of oxygen and important nutrients of surrounding tissues. This blood can also cause edema and in turn further compression of the vessels. Hemorrhagic stroke carries higher risk of death, as it usually affects a large area of the brain. Surveys that evaluate the socio-demographic distribution of Hemorrhagic and Ischemic strokes have not been carried out in Hyderabad so therefore this study was conducted to determine frequencies of Hemorrhagic and Ischemic strokes among stroke patients admitted at Liaquat University Hospital in Hyderabad, Pakistan.

Methodology:

This cross-sectional study was carried out at Liaquat University of Medical and Health Sciences (LUMHS) during June to September, 2010. LUMHS is situated in the centre of Hyderabad city and is one of the biggest public sector hospitals. A special questionnaire was designed for the purpose of this study. It included questions related to age, sex,

education level, marital status, socio-economic condition, family history of stroke and stroke type. Before collecting the data, permission was taken from Board of Advance Studies and Research (BASR) as well as Ethical Review Committee (ERC) of Liaquat University of Medical and Health Sciences, Hyderabad, Pakistan. Purpose of conducting present study was explained in detail to all patients/relatives, before taking consent from them. Out of 1296 patients admitted in medical wards, 261 were diagnosed and confirmed as stroke patients (using CT scan). Patients of both genders and aged > 25 years were included in this study. Patients younger than 25 years and diagnosed with other diseases like infective meningitis (Tuberculosis or Bacterial), space occupying lesions, psychosis, viral/bacterial encephalitis and multiple sclerosis were excluded. Patients were characterized to have a positive family history of stroke, if they had first degree relatives who had stroke (Ischemic/Hemorrhagic). A special questionnaire was designed for the purpose of this study. It included questions related to age, sex, education level, marital status, socio-economic condition, family history of stroke and stroke type, purpose of conducting present study was explained in detail to all patients/relatives, before taking consent from them. Data was analyzed by STATA 10 software. Descriptive analysis was done by calculating proportions. While statistical analysis was done by using Chi2 test by the same program to identify differences in distribution of Hemorrhagic

and Ischemic strokes among patients. Values of $p < 0.05$ were considered significant.

RESULTS:

Out of 261 stroke patients, male were 54% of and 46% were female patients, Out of these 172 (66%) patients had Ischemic stroke whereas 89 (34%) had Hemorrhagic stroke. The mean age of patients in this study was 54.7 years and all patients were divided into five different age groups ranging from 25 years-65 years and above age (Figure 1).

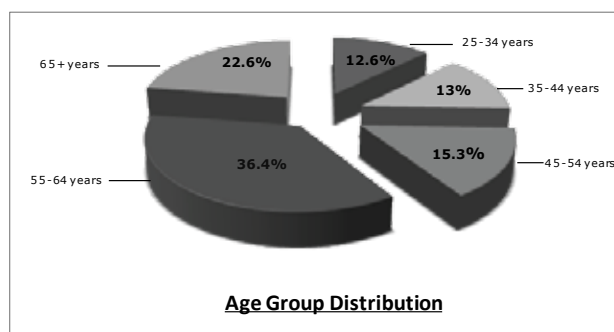


Figure 1: Percentage distribution of stroke patients in different age groups. Values are represented as percentages (n=261)

The high proportion of those patients (36.4%) had 55-64 years of age, while (12.6%) patients had 25-34 years of age as shown in (Table 1).

	Males	Females	Total
Number of Subjects=n (%)			
	n = 141 (54.0%)	n = 120 (46.0%)	n = 261 (100%)
Age groups			
25-34	14 (10.0%)	19 (15.8%)	33 (12.6%)
35-44	15 (10.6%)	19 (15.8%)	34 (13.0%)
45-54	27 (19.1%)	13 (10.8%)	40 (15.3%)
55-64	53 (37.6%)	42 (35.0%)	95 (36.4%)
65+	32 (22.7%)	27 (22.6%)	59 (22.6%)
Education			
Illiterate	81 (57.4%)	93 (77.5%)	174 (67.0%)
Primary	30 (21.2%)	16 (13.3%)	46 (17.6%)
Secondary/Higher	30 (21.2%)	11 (9.1%)	41 (15.4%)
Marital Status			
Un-Married	10 (7.1%)	11 (9.1%)	21 (8.0%)
Married	113 (80.2%)	94 (78.3%)	207 (79.0%)
Widow/Divorced/Separated	18 (12.7%)	15 (12.5%)	33 (13.0%)

Socio-Economic condition (Monthly Income)			
Lower (< 10,000)	77 (54.6%)	53 (44.1%)	130 (50.0%)
Middle (10,000-50,000)	47 (33.3%)	55 (45.8%)	102 (39.0%)
Upper (>50,000)	17 (12.1%)	12 (10.0%)	29 (11.0%)
Family History Stroke			
Yes	35 (24.8%)	29 (24.1%)	64 (24.5%)
No	106 (75.2%)	91 (75.9%)	197 (75.5%)
Stroke Type			
Ischemic Stroke	87 (61.7%)	85 (70.8%)	172 (66.0%)
Hemorrhagic Stroke	54 (38.3%)	35 (29.2%)	89 (34.0%)

Table 1: Socio-demographic distribution of stroke patients (n=261)

Distribution of stroke among males and female patients of different age groups is shown in figure 2).

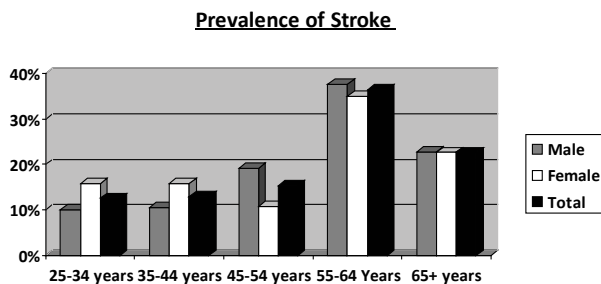


Figure 2: Prevalence of stroke patients in different age groups (n=261)

In this study (79%) stroke patients, either males or females, were married, while only 8% were unmarried and 13% widowed, divorced or separated (Figure 3; Table 1).

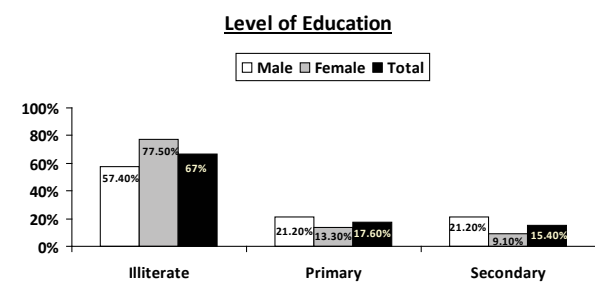


Figure 3: Level of education among stroke patients (n=261)

Regarding the educational status of patients, (67%) had no educational attainment, while prevalence of stroke in patients having primary and secondary/ higher education was (17.6%

and 15.4% respectively). In this study 57.4% male patient and 77.5% female patients were illiterate, while 42.4% male and 22.4% female patients were educated with a secondary or higher degree as shown in (Figure 4).

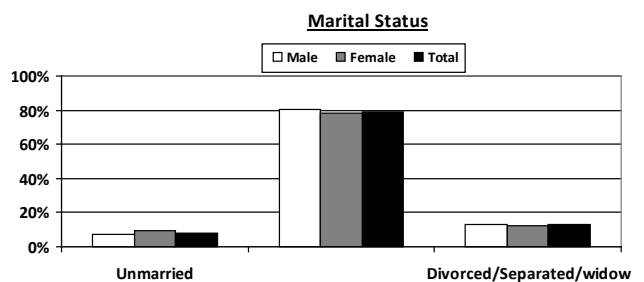


Figure 4: Marital status of stroke patients (n=261)

Socio-economic status of stroke patients included in this study was shown in figure5.

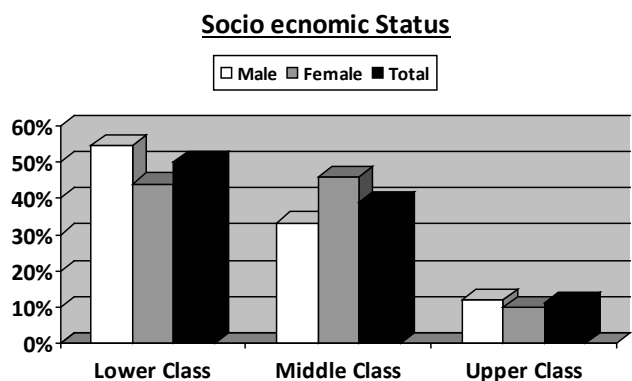


Figure 5: Socio-economic status of stroke patients (n=261)

Positive stroke family history was present in 24.5% patients and prevalence of stroke was high in those patients with no family history (75.5%) of stroke (Figure 6).

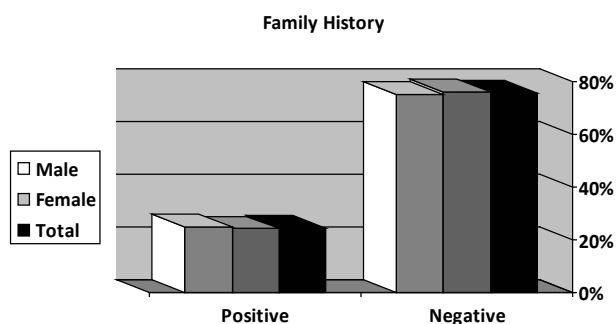


Figure 6: Family history of stroke in the patients (n=261).

Regarding the stroke sub types, Ischemic stroke was noted in 66% of the patients and 34% had Hemorrhagic stroke. Incidence of Ischemic stroke was more in females (70.8%) patients than males patients (61.7%). Hemorrhagic stroke was commonly noted in male patients (38.3%) than female patients (29.2%) as shown in (Figure 7).

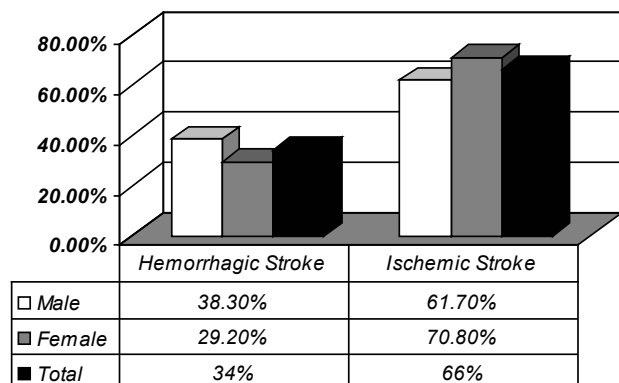


Figure 7: Prevalence of Ischemic and Hemorrhagic stroke in patients (n=261)

Regarding the distribution of Hemorrhagic ($p < 0.001$) and Ischemic stroke ($p > 0.05$) in different age groups, in 25.8% patients had hemorrhagic stroke noted in elderly (65+ years) age group, while 21.3% had hemorrhagic stroke in younger (25-34) age group. In ischemic stroke, 43% patients belong to older age group (55-64 years) and 8.1% patients were noted in (25-34) years of age as

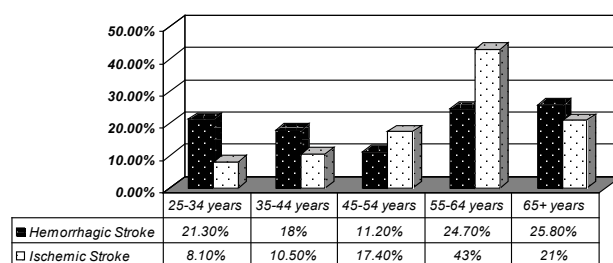


Figure 8: Prevalence of Ischemic and Hemorrhagic stroke in male and female patients of different age groups (n=261)

AGE GROUP	Hemorrhagic stroke	Ischemic stroke	p value
	89 (34.0%)	172 (66.0%)	(Chi2test)
25-34 years	19 (21.3%)	14 (8.1%)	0.001*
35-44 years	16 (18.0%)	18 (10.5%)	
45-54 years	10 (11.2%)	30 (17.4%)	
55-64 years	21 (24.7%)	74 (43.0%)	
65+ years	23 (25.8%)	36 (21.0%)	

Table 2: Comparison and distribution of patients of different age groups with Hemorrhagic and Ischemic stroke (n=261). Values are represented as: n (%). Significant difference by Chi2 test: * $p < 0.05$

DISCUSSION:

Knowledge of risk factors and prevalence of stroke is essential for the development of primary medical care system. Data on epidemiology of stroke are therefore, required to guide health policy development to decrease stroke morbidity and mortality. Demographic characteristics of present study were similar to related studies conducted elsewhere [10]. Apart from pathophysiology of stroke, emotional outcomes following stroke have received growing consideration [11]. In the present study, we found that incidence of stroke in male patients (54%) was slightly higher as compared to females (46%). Only one study conducted in Mayo Hospital, Lahore shown the female dominance (52%). Almost all other studies have shown higher frequency of males, ranging from 59.2 to 71.42% [12-15]. Olsen & Andersen (2010) have reported increased survival rate after stroke, in females as compared to males. They also have suggested that an important underlying role could be that of female sex hormones resulting in female survival superiority over men [16]. The mean age of the patients in our study was 54.7 years which was slightly lower than one of study where the mean age of the patients was 59

years [17]. In the present study majority of Hemorrhagic stroke patients belonged to age group 65+ years. While majority of Ischemic stroke patients belong to the younger age group (25-34 years) In the present study majority of Ischemic stroke patients were uneducated as compared to Hemorrhagic strokes patients. One of the local study reported that 82% of their patients had Ischemic stroke and 18% had Hemorrhagic [18]. While the frequency reported by some other studies was 78–79% for Ischemic and 17–21% for Hemorrhagic strokes [12, 19]. Prevalence of Ischemic stroke was found to be the most predominant in the present study and 66% of the patients included in this study had Ischemic stroke. The findings of this study were similar to some local studies with higher proportion of Ischemic stroke in their studies ranged 61%-70.1%. [20, 21]. We found a high prevalence (79.0%) of stroke in married patients as compared to both un-married (8.0%) as well as widowed/ divorced/ separated (13.0%) patients. Although much data is not available to support this finding, Rees et al., (2007) have reported that stroke as well as other neurological disorders such as epilepsy, multiple sclerosis, Parkinson's could result in sexual dysfunction [22]. In these patients divorce might be an outcome of stroke rather than predisposing factor for stroke, but the exact underlying cause is not yet known. We also found that the lower socio-economic group was more vulnerable in case of males (54.6% for lower- and 33.3% for middle socio-economic group). While in case of females, patients from middle socio-economic group were comparatively more likely (44.1%) to be predisposed to stroke as compared to lower socio-economic group (45.8%). These results suggest that relationship between socio-economic status and stroke could be very complicated and apart from finding the source of income, other factors should also be taken into account such as source of income, monthly expenses and family members etc. Multiple factors such as drinking, smoking, obesity and use of addictive compounds may also be taken into account in future studies. Interestingly, majority of the patients (75.5%) had no family history for stroke. Choi et al., (2009) have reported that family history of stroke is an independent risk factor for ischemic stroke. However, a positive sibling history is more strongly correlated with the incidence of stroke than a positive parental history, and this finding may indicate the possible role of environmental factors in a shared household in addition to the genetic factors involved in family medical history [23].

CONCLUSION:

This study on socio demographic factors in tertiary care hospital of Hyderabad is the best approach by which we would be able to identify those factors which may be responsible for occurrence of stroke and appropriate preventive measures should be taken to minimize the burden of stroke. In future

more extensive surveys should be conducted to get knowledge about effects of demographic and other factors on the onset of stroke.

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Author's contribution:

Dr. Tariq Feroz Memon: Protocol Writing, Study Concept & Design, Data Collection, Data analysis, manuscript writing & Manuscript Review.

Dr. Manzoor Ali Ikhair: Protocol Writing, Study Concept & Design, Data Collection, Data analysis, manuscript writing & Manuscript Review.

Dr. Muzaffar Shaikh: Protocol Writing, Study Concept & Design, Data Collection, Data analysis, manuscript writing & Manuscript Review.

Dr. Abeer Rafique: Data Collection, Data analysis, manuscript writing & Manuscript Review.

Dr. Muhammad Saleem Rind: Data Collection, Data analysis, manuscript writing & Manuscript Review.