ORIGINAL ARTICLE

FREQUENCY OF COMMON MODIFIABLE RISK FACTORS FOR STROKE

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ABSTRACT

Background: Stroke is the most common cause of severe disability and third most common cause of death behind heart disease and cancer. The objective of the study was to determine the frequency of common modifiable risk factors of stroke.

Material & Methods: This cross-sectional study was conducted at Medicine Department, Peoples Medical College Hospital, Nawabshah, from July 2012 to December 2013. It consisted of 91 patients. Principle investigator reviewed the patients using semi structured questionnaire. It consists of socio demographic profile, risk factors and use of regular medication. Inclusion criteria were patient's aged 30 years and above admitted in medical ward having symptoms of stroke confirmed on Computed tomography. Those with brain tumor, meningitis, viral encephalitis, multiple sclerosis and metabolic encephalopathy were excluded. Patients were interviewed after informed consent.

Results: Out of 91 patients admitted with stroke there were 33 males and 58 females with a sex ratio among male vs female 1:1.7. Mean age of patients admitted with stroke was 58 years. Out of 91 patients, 59 had ischemic and 32 had hemorrhagic stroke. There were 73 patients with hypertensive stroke, while 64 had diabeties, 71 were current smokers, 64 had hypercholesterolemia and 58 were obese. The incidence of diabetes, hypertension, hypercholesterolemia, smoking and obesity was most commonly found in patients with ischemic stroke than hemorrhagic stroke.

Conclusion: Hypertension, diabetes mellitus, hypercholesterolemia, obesity, smoking and positive family history are important risk factors for stroke. In order to improve outcome we should modify and cope the controllable risk factors to prevent this life threatening condition.

Key Words: Stroke; Hypertension; Diabetes; Hypercholesterolemia.

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INTRODUCTION

Stroke is the first common cause of severe disability and third most common cause of death behind heart diseases and cancer in the developed and developing countries.[1] The incidence of stroke is approximately same in both sexes but after the age of 75 years, the incidence of stroke is much greater in women.[2,3] During the last three decades there is inclination in the incidence of disease in the South Asian Countries while declined in the Western region and is expected to rise further.[4] The stroke incidence in Pakistan is close to 250 per 100,000 populations, which means there are 350,000 new stroke patients every year in the country.[5] According to World Health Organization report 2002, total mortality in Pakistan due to stroke was 78512.[6] Stroke mortality will have almost doubled by 2020, mainly as a result of increase in the proportion of older people and the future affects of current smoking patterns in the developing countries.[7] Stroke is a huge burden on economy in terms of expenditure in treatment as well as disability associated with it, which translates into waste of precious man hours especially for developing countries.

A uniform definition of stroke is important for epidemiological studies. It is a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours", due to either cerebral infarction or intracerebral and sub-arachnoid hemorrhage.[8] Transient ischemic attack (TIA) distinguished from stroke as a neurological deficit lasting less than 24 hours. Stroke is associated

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with multiple risk factors. Usually the risk factors can be divided into modifiable and non-modifiable types. The major modifiable types include high blood pressure, abnormal blood lipids[9], tobacco use, heart diseases[10], physical inactivity, obesity, unhealthy diets, and diabetes mellitus.[11,12] The other modifiable types are low socioeconomic status, psychosocial stress, mental ill health, use of certain medication and alcohol etc. on the other hand, the non-modifiable risk factors include age, sex, ethnicity[13], family history and previous stroke, TIA and heart attack.

Fifteen million people annually suffer from stroke globally. Of those, 5 million die and another 5 million are left permanent disabled placing a burden on family and community.[14] Rapid interventions after the onset of stroke can limit neurological damage and improves patient's recovery time.[15,16] Considering all the studies previously done on this topic, intensive health education is required to improve knowledge of stroke, especially among the most vulnerable groups and those who are less aware of risk factors and perception of stroke.[17] The data also supports the need for targeted educational programs about stroke risk factors, underscoring the importance of public health programs to improve modifiable risk factors of stroke among vulnerable population. Further public education is needed to increase awareness of the risk factors of stroke. Our study focused on the assessment of the risk factors of stroke to help reduce the morbidity and mortality in future.

The objective of this study was to determine the frequency of common modifiable risk factors of stroke.

MATERIAL & METHODS

Study was conducted at Medicine Department of at Peoples Medical College Hospital (PMCH) Nawabshah, from July 2012 to December 2013. This study consisted of 91 patients. Principle investigator reviewed the patients using semi structured questionnaire. It consists of socio demographic profile, disk factors and their use of regular medication. Inclusion criteria were patient's aged 30 years and above admitted in medical ward having symptoms of stroke confirmed on Computed tomography were interviewed after explaining full study and taking informed consent. Those who have brain tumor, meningitis, viral encephalitis, multiple sclerosis and metabolic encephalopathy were excluded.

RESULTS

Among 91 patients that had stroke, there were 33 males and 58 females with a ratio among male vs female 1: 1.7 (Fig. 1). Mean age of patients admitted with stroke was 58 years with an average age slightly higher among females then males (Table 1). Out of 91 patients most of them belonged to middle class (n=39). The subjects usually had higher education status compared to undergraduates. The subjects mostly were unmarried compared to patients with married status. Only 15 patients had family history of stroke.

Out of 91 patients, 59 had ischemic and 32 had hemorrhagic stroke (Fig. 2). All the patients presented with raised blood pressures both systolic and diastolic in some, but the known history of hypertension was present in 73(80%) patients while the rest were not previously diagnosed Hypertensive. Out of 73 hypertensive stroke 48 had ischemic stroke and 25 had hemorrhagic stroke but was statistically not significant (p value-0.712). Most of the known hypertensive's were female (n= 44) while the rest were females (n=29).

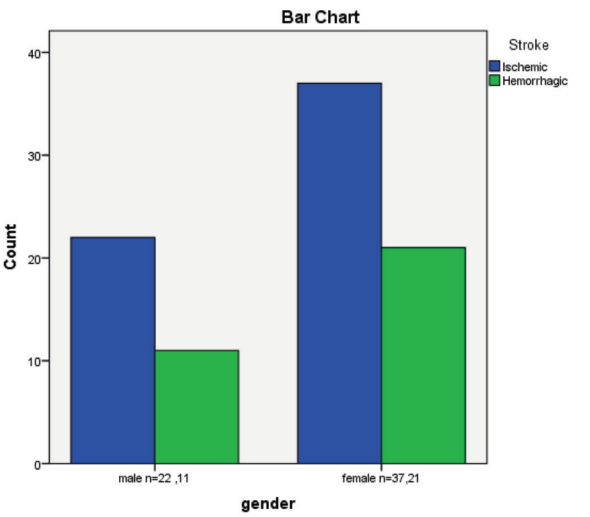

Figure 1: Ratio of male and females having stroke.

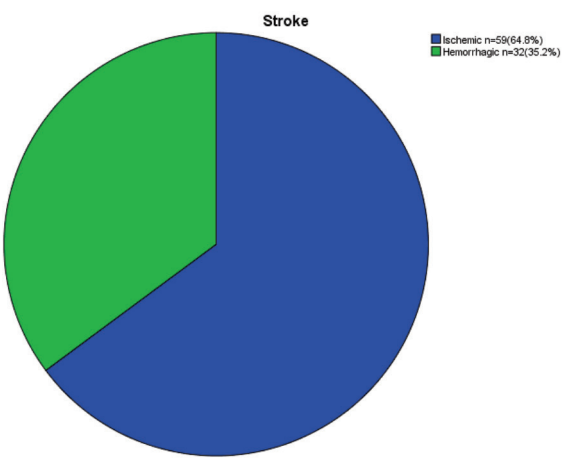

Figure 2: Ratio of ischemic and hemorrhage stroke.

Table 1: Demographic variables and their frequencies

Demographic variables	Frequency
Age in years (Mean ± SD)	58.05 ± 13.729
Dyslipidemia (mg/dl) (Mean ± SD)	128.92 ± 77.74
Hypertension (in mmHg) (Mean ± SD)	
Systolic BP	177± 16.23
Diastolic BP	105± 12.99
Diabetes Mellitus (mg/dl) (Mean ± SD)	380.1± 141
Obesity (kg/m2) (Mean ± SD)	35.68± 5.002
Socioeconomic status	
High class	27
Middle class	35
Lower class	29
Marital status	
Married	39
Unmarried	52
Education	
Higher graduate	50
Undergraduate	41
Family history (yes/ no)	35/ 56
Employed / unemployed	65/ 26
Previous history of stroke (yes/ no)	15/ 76

Table 2: Different variables and the types of stroke

	Stroke n=91		
Variables	**Ischemic**	**Hemorrhagic**	**P value**
1. Family history	n=59	n=32	
2. Hypertension	33	22	0.232
3. Diabetes mellitus	48	25	0.712
4. Smoking	41	23	0.812
Current smoker			
Exsmoker	21	9	
Never smoke	25	16	0.734
5. Hypercholesterolemia	13	7	0.808
6. Obesity	42	22	0.783
	37	21	

The risk factors like diabetes mellitus was seen in 64 patients and among them 41 had ischemic stroke and 23 had hemorrhagic stroke with statistically not significant (Table 2). Diabetes mellitus was most commonly seen among females i-e; n=39 and 25 males.

Of the 91 patients, there were 71 smokers, and from them 41 were ex-smokers and 30 were current active smokers. The incidence of ischemic stroke was higher among smokers (n=46) compared to hemorrhagic stroke (n=25) with statistically not significant. The hypercholesterolemia was present in 64 subjects with incidence of ischemic stroke was more (n=42) than hemorrhagic stroke (n=22) with statistical not significant. The hypercholesterolemia was higher among females (n=39) compared to males (n=25).

The body mass index was also higher among the patients with stroke. There were 58 patients who were obese with female preponderance. The incidence of ischemic stroke was greater among patients who were obese compared to patients with hemorrhagic stroke but the results were not statistically significant.

DISCUSSION

Cerebrovascular Accident is the leading cause of disability and third most common cause of death in developing and developed countries.[17] After heart diseases this ranks among most frequent cause of disability.[18] The incidence being increasing over 30 years with varying geographical causes including incidence of stroke belt seen in South Eastern U.S. According to WHO estimates there are nearly 20% of deaths in South Asia[18]. American Heart Association statistical updates suggest that if this rate continues to increase then it may reach one million per year.

Due to lack of large scale studies in the community, in Pakistan, the annual incidence is rising nearly 250/ 100,000.[19] Pushtoon community has the highest prevalence reported in Pakistan nearly around 4.8% in Karachi i-e;[20], which is the highest ever reported prevalence in the world. Framingham study also reports nearly 28% mortality after 30 days of stroke, while in U.S 20% individuals die of stroke after one year of stroke, with increasing mortality among those who have co morbidities. Bruno et al found increasing mortality in patients with severe hyperglycemia when treated with thrombolytic.[21, 22] In our study the frequency of diabetics was 70% (n=64) with most of them had uncontrolled blood sugar. However previous studies showed 27-42% cases with diabetes.[23,24] Study in Pakistan in 2004[24], in tertiary care hospital showed a much less incidence of diabetes among patients with stroke i-e; 15%. The stroke in diabetic patients more had ischemic compared to the hemorrhagic stroke.

In our study nearly 65% of the patients had hypertension. In our study nearly all the patients have raised blood pressure which was most commonly seen among females. This data is not consistent with previous studies on gender which showed predominance among males[24], and rates reported in men has been declined from 2.8% in 2006 to 2.5% in 2009, and then increased to 2.7% in 2010.[24] The Medical Research council and Thomson et al has also shown decline in stroke in patients with controlled hypertension.[24] In our study mean age of the patients with stroke was 58 years. On the contrary, Khan JA et al reported 26% of patients in 15-45 years of age.[24] According to American Heart Association, Strokes can occur at any age but risk doubles each decade after age of 55[24] Vohra et al in 2000, also reported 34% of patients fewer than 55 years of age. Among Americans age 65 and older prevalence is 40/ 1000 persons and one in 10 Americans over 75 has experienced stroke. Younger stroke reported by Syed et al, a frequency of 28%.[24]

The vast majority of the patients in Pakistan with stroke have comorbidities like hypertension, diabetes mellitus, smoking, dyslipidaemia and obesity. In our study, hypertension was the risk factor for the ischemic infarction more than hemorrhagic stroke. However hypertension was more commonly seen in ischemic infarct then hemorrhagic infarct but the results did not reach statistical significant value. Hypertension is the common cause of stroke especially intracerebral hemorrhage, but in developed countries this rate is declining largely due to efforts to control blood pressure and smoking. A cross sectional survey conducted in tertiary care hospital in Pakistan, revealed 39% of the people who had hypertension, dyslipidaemia and history of active smoking were in age range of 18-55 years.[24] Only 40% of hypertensive patients had controlled blood pressure. It is also more prevalent in Southeastern region of the United States. The Framingham Heart Study showed the declining response of stroke over past 50 years, but lifetime risk is declining at a slower rate. Dyslipidemia was also present among 70% of the patints presented with stroke with an increasing range of dyslipidemia was seen among ischemic stroke compared to hemorrhagic stroke but the results did not reach statistical significant value.

Study of 100 patients conducted in 2008[22], smoking reported to account for 94.7% of cases of stroke both hemorrhagic and ischemic stroke. While another study on risk factors of stroke showed 43% of smokers.[28] Our study was consistent with the findings of the previous studies; therefore the efforts should be made to reduce these modifiable risk factors in order to overcome this disabling disease.

CONCLUSION

Hypertension, diabetes mellitus, hypercholesterolemia, obesity, smoking and positive family history are important risk factor for stroke. In order to improve outcome we should modify and cope the controllable risk factors to prevent this life-threatening condition. Awareness programs and strategies should be made to control blood pressure, diabetes and stop smoking campaigns to reduce the incidence of stroke and patient morbidity and mortality.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.