ORIGINAL ARTICLE

FREQUENCY OF MODIFIABLE RISK FACTORS IN STROKE PATIENTS

Muhammad Zuhaid, Salman*, Javed Akhtar Chawla, Umer Farooq***, Aamir Ahmad*, Saminullah Khan, Momina Asfandiyar*****

Department of Community Medicine, Rehman Medical College, Peshawar, Women Medical College,Abbottabad ***Ayub Medical College Abbottabad, *Medicine Unit, Ayub Teaching Hospital, Abbottabad, ***Shifa International Hospital, Islamabad, Pakistan**

Background: Stroke is one of the common causes of admission in medical and neurology units in hospitals. The aim of this study was to find out the frequency of modifiable risk factors, and association of ischaemic stroke with these risk factors in stroke patients admitted in Ayub Teaching Hospital Abbottabad. **Methods:** This a cross-sectional descriptive hospital based study, carried out in medical units of Ayub Teaching Hospital, Abbottabad on 150 patients with stroke. Thorough history, clinical examination and appropriate investigations were performed to collect all the relevant information. CT scan was done to confirm the diagnosis. **Results:** Out of 150 subjects, 90 (60%) were males, while 60 (40%) were females. Ischaemic stroke was found in 105 (70%) patients and 45(30%) were having haemorrhagic stroke. The risk factors were hypertension in 127 (84.7%), diabetes 31 (20.7%), Coronary artery diseases 31 (20.7%), previous TIA/stroke 42 (28%), smoking 28 (16.7%) and obesity 16 (10.7%). **Conclusion:** There was no statistically significant association between risk factors and type of stroke except coronary artery diseases.

Keywords: Modifiable risk factors, Stroke, Coronary artery disease

J Ayub Med Coll Abbottabad 2014;26(2):235–8

INTRODUCTION

Stroke is a rapidly developing phenomenon of focal and at times global loss of cerebral function with no apparent cause other than that of vascular origin.[1,2] WHO estimated that 5.5 million people died of stroke in 2002, and roughly 20% of these deaths occurred in South Asia.[3] Stroke is the second most common cause of death and the first leading cause of disability in developed and developing countries.[4,5] Moreover, according to WHO report 2002, total number of deaths due to stroke in Pakistan was 78512.[6] Stroke-specific mortality has been reported between 7% and 20% in various studies from Pakistan. Up to 63% of all stroke patients develop complications and up to 89% are dependent on others for activities of daily living.[7]

The main pathological causes of stroke are cerebral infarction, primary intra-cerebral haemorrhage and sub-arachnoid haemorrhage. In developed countries about 85–90% of strokes are due to cerebral infarction and 10–15% due to intracranial hemorrhage.[8]

Pakistan is the sixth most populous country in the world with an estimated population of approximately 167 million by July 2008.[9] It's having growth rate of 2% per year. There are no sizeable community based epidemiological studies on stroke in Pakistan. Stroke and transient ischemic attacks (TIA) are highly prevalent in Pakistan. A recent community-based study suggested approximately 21.8% prevalence of stroke and/or TIA in an urban slum of Karachi.[10]

Hypertension, atrial fibrillation, diabetes mellitus, ischemic heart disease, hyperlipidemia, cigarette smoking, alcohol abuse, obesity, physical inactivity, asymptomatic carotid stenosis, transient ischemic attack and other cardiac disorders are all potentially treatable conditions that predispose to stroke.[11] Alarmingly, more than 70% of people with hypertension remain unaware of their condition, and less than 3% had adequately controlled blood pressure.[12] Ironically physicians in general practice are using wrong cut offs (higher cut offs) to treat hypertension and this further contributes to under diagnosis, under treatment and poor control of hypertension. This logically can be a major, potentially modifiable, risk factor of stroke. A cross sectional survey among 1000 physician in urban areas of the country, found that approximately 30% of physician were using wrong cut off for diagnosis of blood pressure in persons under age of 60 years and this figure rose to approximately 80% for population aged over 60 years. Similarly high proportion of physicians were using inappropriate or suboptimal therapy e.g. 24% using sedatives as first line therapy either alone or in combination with antihypertensive medications.[13] Prevention of modifiable risk factors remains an important approach to reduce the incidence, recurrence, disability and mortality of stroke.[14]

This study aimed to find the frequency of modifiable risk factors of stroke and association between ischemic stroke and its modifiable risk factors among patients admitted to the medical units of Ayub Teaching Hospital, Abbottabad.

MATERIAL AND METHODS

This cross sectional descriptive hospital based study was carried out in medical units of Ayub Teaching Hospital Abbottabad. Patients with stroke, who presented within a week of development of symptoms, were included in the study. This study spanned from Jan 1, 2013 to June 30, 2013.All the patients admitted during this period and fulfil the inclusion/exclusion criteria were included in the study. Informed consent was taken from the patients and confidentiality of information was assured to them. Pre-designed *pro forma* were used to record demographic and clinical data. CT scan was performed to confirm the diagnosis of stroke and to differentiate between ischemic and haemorrhagic stroke.All the patients with bacterial and viral meningitis, encephalitis, multiple sclerosis and guillian-bare syndrome, were excluded from the study. Stroke was defined as a clinical syndrome characterised by rapidly developing clinical symptoms and/or signs of focal, and at times global (applied to patients in deep coma and those with sub-arachnoid haemorrhage), loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Hypertension was diagnosed as patient taking anti-hypertensive drugs or having blood pressure of ≥140/90 mmHg.

Diabetes was diagnosed as patients taking oral anti diabetic drugs or subcutaneous injections of insulin, or having: a random venous plasma glucose concentration ≥11.1mmol/l or a fasting plasma glucose concentration ≥7.0 mmol/l. Cigarette smoking was considered even when the frequency was one or more cigarettes per day as according to a study, 1–4 cigarettes per day have detrimental effect on heart and blood vessels.[15] Data was analysed using SPSS-16. Continuous variables like age and monthly household income were presented as Mean±S.D. Moreover, the associations of stroke with modifiable risk factors was established using chi square, *p*-value ≤0.01 was considered significant.

RESULTS

A total of 150 patients with stroke confirmed on CT scan, were included in the study. Demographic characteristics of the patients are shown in table-1. Out of these 90 (60%) were males, while 60 (40%) were females. Educational status of the patients was quite discouraging as 114 (76%) were illiterate. Moreover, 27 (18%) of the patients with stroke were current users of tobacco, while 28 (18.7%) were ex-users. Ischemic stroke was detected in 105 (70%) of the patients, while haemorrhagic stroke in 45 (30%).

Modifiable risk factors of stroke are shown in Table-3. Hypertension was found to be the most common risk factor, affected 127 (84.7%) of the patients. Those who had previous TIA or stroke were 42 (28%). Diabetics and those with coronary artery diseases were having the same frequency, 31 (20.7%). Cigarette smoking accounted for 28 (18.7%), while 16 (10.7%) were obese and thus resulted to be the least common risk factor of stroke.

Association between stroke type and modifiable risk factors was assessed using chi-square test and is shown in Table-5. The association between type of stroke and coronary artery diseases showed significant results (*p*=0.001).

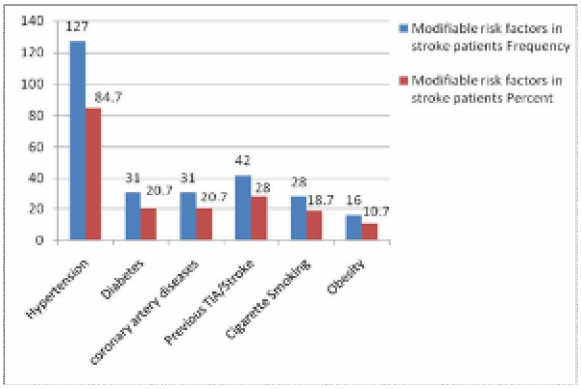

Figure-1: Modifiable risk factors of stroke

Table-1: Demographic characteristics of the patients

Demographic Characteristics	Frequency	Percent
Gender		
Male	90	60.0
Female	60	40.0
Marital Status		
Married	137	91.3
Divorced	1	0.7
Widowed	12	8.0
Age in years (Mean±SD)		
65±12.5	NA	NA
Monthly household income in PKR(Mean±SD)		
14426±9801.8	NA	NA
Educational Status		
Illiterate	114	76.0
Can read & write	14	09.3
Elementary	4	02.7
Primary	3	02.0
Secondary	12	08.0
College	2	01.3
University	1	0.7
Tobacco use		
Never used	95	63.3
Current user	27	18.0
Ex-user	28	18.7
Exercise		
Yes	31	20.7
No	119	79.3
Frequency of exercise		
Daily	30	20.0
Once in a week	1	0.7
No. of visits to a health facility in last month		
No visit	87	58.0
<3	41	27.3
3-5	21	14.0
>5	1	0.7

Table-3: Association between stroke and modifiable risk factors

	Modifiable risk factors		*p*-Value
	Diabetes		
	Yes	No	
Ischemic Stroke			
Yes	20	85	
No	11	34	
Haemorrhagic Stroke			0.454
Yes	11	34	
No	20	85	
	Hypertension		
	Yes	No	
Ischemic Stroke			
Yes	86	19	
No	41	4	
Haemorrhagic Stroke			0.152
Yes	41	4	
No	86	19	
	Coronary artery diseases		
	Yes	No	
Ischemic Stroke			
Yes	29	76	
No	2	43	
Haemorrhagic Stroke			0.001
Yes	2	43	
No	29	76	
	Previous TIA/Stroke		
	Yes	No	
Ischemic Stroke			
Yes	32	73	
No	10	35	
Haemorrhagic Stroke			0.302
Yes	10	35	
No	32	73	
	Cigarette Smoking		
	Yes	No	
Ischaemic Stroke			
Yes	20	85	
No	8	37	
Haemorrhagic Stroke			0.855
Yes	8	37	
No	20	85	
	Obesity		
	Yes	No	
Ischaemic Stroke			
Yes	8	97	
No	8	37	
Haemorrhagic Stroke			0.065
Yes	8	37	
No	8	97	

DISCUSSION

Stroke is considered to be a leading cause of mortality and morbidity among adult population. Incidence of stroke increases with advancing age, more in males as compared to females.[16] Our study showed male to female ratio of 1.5:1, similar to some other studies.[16–18]

According to the study results mean age of the patients was 65 years which is nearly similar to a study conducted in Nigeria but greater than a study conducted in Bannu district which is 57.5 years.[19,20] This may be due to lack of awareness regarding risk factors and health facilities in that under developed area resulting in an early initiation of the disease.

Ischemic stroke was found in 70% of the patients which is quite similar to a study conducted in PGMI Hayatabad Medical Complex; Peshawar.[21] Hypertension was the most common risk factor according to our study. This finding is congruent to that of other studies conducted in various regions in Pakistan and Africa.[19–22]

Studies have shown that lowering blood pressure substantially reduces the risk of vascular events.[23] Those who had experienced previous attacks of TIA or stroke, were 42 (28%) of the patients. This finding isn't congruent to other studies conducted in different regions where that risk factor had got less priority.[20–22] Diabetes and cardiovascular diseases had the same frequency, accounted 20.7% for diabetes and the same for cardiovascular diseases. This finding is nearly similar to that of a regional study conducted in teaching hospitals in Bannu.[20] Smoking was considered to be a less common risk factor , accounted for 18.7%, almost double that of another study conducted in Nigeria.[19] Obesity was the least common risk factor according to our study accounting for 10.7% of the subjects. This finding is congruent to another regional study but the percentages are different.[20] Our study results showed that those who have coronary artery disease are more at risk of developing Ischemic stroke as compared to haemorrhagic stroke

As it was a cross sectional descriptive hospital based study, so the results may not be projected to the whole population. Further more epidemiological studies would be needed to evaluate the risk factors. However, the present findings would lay a footing for similar studies in other parts of our country.

CONCLUSION

The results showed that there is no statistically significant association between all the risk factors (hypertension, diabetes, previous TIA/stroke, obesity, cigarette smoking) with stroke type except coronary artery diseases, which showed significant association with ischemic stroke.

RECOMMENDATIONS

Controlling blood pressure, glycaemic status and ischemic heart diseases may result in decreasing stroke events and its related disabilities and deaths.

REFERENCES

1. Shah FU, Salih M, Saeed MA, Tariq M. Valididty of Siriraj stroke scoring. J Coll Physcians Surg Pak 2003;13:391–3.
2. Khan JA, Shah MA, Young stroke-clinical aspects. J Coll Physicians Surg Pak 2000;10:461–6.
3. World Health Organization (WHO). The Atlas of Heart Disease and Stroke. http://www.who.int/cardiovascular_diseases/resources/atlas/en/
4. Feigin VL. Stroke epidemiology in the developing world. Lancet 2005;365:2160–1.
5. Donnan GA, Fisher M, Macleod M, Davis SM. Stroke. Lancet 2008;371:1612–23.
6. Judith M, George AM, editors. The Atlas of Heart diseases and Stroke. World Health Organization and CDC, 1st ed. London; The Han Way Press London, 2004.
7. Farooq MU, Majid A, Reeves MJ, Birbeck GL. The epidemiology of stroke in Pakistan: past, present, and future. Int J Stroke 2009; 4:381–9.
8. Alam I, Haider I, Wahab F Khan W, Taqweem MA, Nowsherwan. Risk factors stratification in 100 patients of acutestroke, J Postgrad Med Inst 2004;18:583–91.
9. Murray CJ, Lopez AD. Mortality by cause for eight regions of the world:Global Burden of Disease Study. Lancet 1997;349:1269–76.
10. Feigin VL. Stroke epidemiology in the developing world. Lancet 2005;365:2160–61.
11. Elkind MS, Saco RL. Stroke. risk factors for stroke prevention. Semin Neurol 1998;18(4):429–40.
12. Jafar TH, Levey AS, Jafary FH, White F, Gul A, Rahbar MH, *et al*. Ethnicsubgroup differences in hypertension in Pakistan. J Hypertens 2003;21:905–12.
13. Jafar TH, Levey AS, White FM, Gul A, Jessani S, Khan AQ, *et al*. Ethnicdifferences and determinants of diabetes and central obesity among SouthAsians of Pakistan. Diabet Med 2004;21:716–23.
14. Straus SE, Magumdar SR, Mc Alistair FA. New Evidence for stroke prevention. JAMA 2002;288:1396–8.
15. K Bjartveit A, Tverdal. Health consequences of smoking 1–4 cigarettes per day. Tob Control 2005;14:315–20.
16. Kamal A, Aslam S, Khattak S. Frequency of risk factors in stroke patients admitted in DHQ Hospital D. I. Khan. Gomal J Med Sci 2010;8:200–3.
17. Feigin VL, Lawes CM, Bennett DA, Barker-Collo SL, Parag V. Worldwide stroke incidence and case fatality in 56 population basedstudies.A systemic review. Lancet Neurol 2009; 8:355–69.
18. Ahmed A, Yousuf M, Iqbal J, Khan MM. Frequency of known risk factors for stroke in poor patients of a teaching hospital in District Swat. J Saidu Med Coll 2007;1:52–6.
19. Peter O Okokhere, Idowu A Bankole, and Christian A Erohubie. Characteristics, risk factors and case fatality rate of stroke in hospitalized patients in semi-urban South–South Nigeria. SAGE Open Medicine 2013.
20. Abdul Razzaq, Mian Akhtar Ali Kakakhail, Fawad Ahmad, Mohammad Ishaq. Frequency of modifiable risk factors in stroke patients admitted to teaching hospitals in Bannu district. Gomal J Med Sci 2012;10(1):93–5
21. Amanullah, Nazir Shah, Shams-ur-Rehman, Salma Ataullah**.** Frequency of cerebral infarction and haemorrhage in the patients of stroke**.** J Ayub Med Coll Abbottabad 2009;21(4):102–5
22. Syed Riazul Hasan, Ahmad Salman Khan Ghouri. Frequency of known risk factors of stroke and its outcome in patients admitted in sindh government Qatar hospital Karachi. Pak J Med Sci 2007;23(4):634–6.
23. Neal B, MacMahon S, Chapman N. Effect of ACE inhibitors, calcium antagonists, and other blood-pressure-lowering drugs: results of prospectively designed overviews of randomized trials. Blood pressure Lowering Treatment Trialists Collaboration. Lancet 2000;356:1955–6.

Address for correspondence:

Dr. Muhammad Zuhaid, Department of Community Medicine, Rehman Medical College, Peshawar, Pakistan.
Email: m.zuhaid@yahoo.com