



ORIGINAL RESEARCH PAPER

Community Medicine

A HOSPITAL-BASED STUDY TO DETERMINE THE ROLE OF TOBACCO, ALCOHOL , HYPERTENSION AND DIABETES AS RISK FACTORS FOR STROKE

KEY WORDS: Hospital Based , Risk Factors, Stroke,role

Dr Veenal Chadha	Demonstrator, Department of Community Medicine, Government Medical College and Hospital 32 ,Chandigarh
Dr Muzamil Nazir*	Tutor, Department of Community Medicine, Maharishi Markandeshwar Medical College Solan *Corresponding Author
Dr Naveen Krishan Goel	Professor and Head, Department of Community Medicine, Government Medical College and Hospital 32 ,Chandigarh

ABSTRACT
Background: Stroke is one of the most disabling conditions leading to loss of mobility and independency. The lifetime risk of stroke after 55 years of age is 1 in 5 for women and 1 in 6 for men.
Objective: To determine the role of tobacco, alcohol, hypertension and diabetes as risk factors for stroke.
Methods: The study was conducted on patients presenting with stroke to the department of neurology of Dr. RPGMC at Tanda in Kangra district for a period of one year starting from September 2015 to September 2016.
Results: Ischaemic stroke was more common than haemorrhagic among males and females. Mean age of male and female patients was 62.53 ± 13.06 and 63.74 ± 14.37 years respectively.
Conclusion: Hypertension is an important risk factor. The pattern of smoking and alcohol consumption differed significantly between males and females.

INTRODUCTION

Stroke, characterized by a neurological deficit of sudden onset, typically due to brain infarction (“ischemic stroke”) or, less often, intracerebral hemorrhage, represents the primary neurological cause of acquired disability in adults and a leading cause of death.¹

Stroke is one of the most disabling conditions leading to loss of mobility and independency.² The lifetime risk of stroke after 55 years of age is 1 in 5 for women and 1 in 6 for men.³ The annual incidence rate of first-ever stroke study in Kolkata⁴ was 123.15 per 100,000 (men, 99.54 per 100,000; women, 149.49 per 100,000) persons per year (95% CI, 102.46-232.50; age-standardized rate to the WSP, 145.30; 95% CI, 120.39-174.74). According to the global data from 2004 covering 192 World Health Organization (WHO) member countries, the stroke related DALY loss ranged from 160 per 100,000 person-years in the Seychelles to 2,192 per 100,000 person-years in Mongolia. During that period, the stroke-related DALY loss in India was 597.6 per 100,000 person-years.⁵ About 85% of all strokes are ischaemic and 15% haemorrhagic.⁶

There are several studies in India determining risk factors of stroke. A multicentric, hospital-based, case-control study in the 1990s revealed that diabetes mellitus, hypertension, tobacco use, and low hemoglobin, rather than cholesterol level, were the most important risk factors of ischemic stroke.⁷ Sridharan⁸ analyzed the risk factors of ischemic stroke including patients of all age groups. Hypertension, electrocardiogram (ECG) abnormality, heart disease of any type, diabetes, smoking, and alcohol were associated with stroke. Low high-density lipoprotein (HDL) and elevated low-density lipoprotein (LDL):HDL ratio was observed among stroke patients.⁹ The major risk factors identified in a recent North Indian study were hypertension (a diastolic blood pressure >95 mmHg), hyperglycemia, tobacco use, and low hemoglobin levels (<10 g%).⁹ Another community-based study on biochemical risk factors from North India among urban, rural, and semiurban people has documented elevated levels of fasting blood glucose, cholesterol, triglycerides, and low HDL with urbanization.¹⁰ The pattern of tobacco consumption is commoner among less educated persons by nearly 2.69 times and prevalent among families with lower socioeconomic stratum.¹¹ India faces a double burden of tobacco exposure, with 15-20% prevalence of smoking and up to 40% of people having the habit of chewing tobacco. A large number of those who chew tobacco are women.¹² Among women of advanced age, the high incidence

and case fatality of stroke had a strong correlation with the high prevalence of hypertension.^{13,14}

So this study was conducted to corroborate the findings in a tertiary care hospital of Northern India.

OBJECTIVE:

To determine the role of tobacco, alcohol, hypertension and diabetes as risk factors for stroke.

Material and methods

1. Study Area:

The study was conducted on patients presenting with stroke to the department of neurology of Dr. Rajendra Prasad Government Medical College at Tanda in Kangra district of Himachal Pradesh.

2. Study period:

The study was carried out for a period of one year starting from September 2015 to September 2016.

Patient selection

Inclusion criteria:

Patients hospitalized for stroke diagnosed according to the diagnostic criteria as given under:

Diagnostic criteria:

Stroke was defined as a rapidly developing clinical syndrome of focal or global disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than due to vascular origin. Only stroke survivors were included in the study.

Patients with recurrent strokes were eligible if they did not have previous significant disability (Modified RANKIN Scale - 2), and no more than two previous ischemic events, the last one 6 months or more before the present event.

Sample Size:

All consecutive cases fulfilling inclusion criteria were included in the study.

Exclusion criteria:

- 1) Patients not consenting for study
- 2) Patients with dementia (MMSE less than or equal to 24) and aphasia
- 3) Patients not able to identify time of onset of stroke symptoms

- 4) Too ill to complete interview
- 5) Poor memory around time of stroke
- 6) Comatose/stuperose/intubated patients
- 7) Patients with other form of stroke(venous thrombosis and aneurysmal bleed)

Design

The study design was cross sectional. A questionnaire based interview was conducted for the purpose of eliciting information from the study participants . The information included details on socio demographic variables. The information was corroborated by conducting an interview with the nearest relative of the patient, who had been with the patient for last two days. Further details on prevalence of traditional risk factors was elicited using questionnaire method. The details included information on h/o cardiovascular disease /events, diabetes, any other chronic communicable or non-communicable disease.

Data collection :

Study unit was medicine ward both male and female at Dr RPGMC Tanda as admitted patients were included in the study. All the medicine wards were visited all days a week for 1 year starting from start of study period from September 2015 to September 2016.

Interview :

At medicine ward the patient and the attendant was interviewed face to face after explaining the study and its purpose and also after obtaining a written consent in hindi using a structured pilot tested interview based questionnaire for data collection.

STATISTICAL ANALYSIS:

Data was entered into an electronic database for statistical analysis (SPSS, VERSION 20.0). Data is presented as number (%) or mean (SD) as appropriate. Categorical variables were compared using the chi-square test or Fischer exact test. The p-value less than 0.05 was considered as statistically significant.

RESULTS

The present study was a hospital based study conducted at Dr RP Government Medical College Tanda. In all 120 patients were enrolled for the purpose of study. Mean age of male and female patients was 62.53 ± 13.06 and 63.74 ± 14.37 years respectively. Of the total 120 patients, 61 (50.8%) were between 61 – 80 years of age and 45 (37.5%) were in the age group of 41 – 60 years. 73 (60.8%) patients were males and the remaining 47 (39.2%) were females.

Table 1 shows distribution of patients according to blood pressure as per JNC 7 classification. 65% of patients in the present study had systolic blood pressure equal to and above 140 mm Hg. The mean systolic blood pressure was

146.83(±25.160 SD) mm Hg. The mean diastolic blood pressure was 86.11(±16.12SD) mm Hg.

Table 1: Distribution of patients according to blood pressure as per JNC classification

Systolic blood pressure (mm of Hg)	N (%)	Diastolic blood pressure (mm of Hg)	N (%)
Normal	11(9.2)	Normal	40(33.3)
Pre hypertension	31(25.8)	Pre hypertension	29(24.2)
Stage 1 HTN	39(32.5)	Stage 1 HTN	21(17.5)
Stage 2 HTN	39(32.5)	Stage 2 HTN	30(25)
Total	120(100)	Total	120(100)

Table 2: Genderwise distribution of patients according to random blood sugar

Random blood sugar levels (mg/dl)	Gender		Total	χ ²	df	P-value
	Male N (%)	Female N(%)				
<140	51(60.7)	33(39.3)	84(100)	3.911	2	.141
140-200	20(66.7)	10(33.3)	30(100)			
>200	2(33.3)	4(66.6)	6(100)			
Total	73(60.8)	47(39.2)	120(100)			

*χ²= chi square value; df= degree of freedom

Table 2 shows distribution according to random blood sugar among males and females. Nearly 61% males had random blood glucose levels less than 140 mg/dl. On the other hand 39% females had random blood sugar levels less than 140 mg/dl. Similarly 66.7% males had random blood sugar levels between 140 to 200 mg/dl. However the difference was not statistically significant (p value 0.141) .

Table 3 : Distribution of ischemic and haemorrhagic stroke among males and females

Gender	Radiological report type			χ ²	Df	P Value
	Ischaemic	Haemorrhagic	Total			
Male	59(80.8%)	14(19.2%)	73(100%)	.680	1	.410
Female	35(74.5%)	12(25.5%)	47(100%)			
Total	94(78.3%)	26(21.7%)	120(100%)			

*χ²= chi square value; df= degree of freedom

Table 3 shows distribution of ischemic and haemorrhagic stroke among males and females. Out of 73 males 59 had ischaemic stroke and remaining had haemorrhagic stroke. Out of 47 females, 35 presented with ischaemic stroke and only 12 had haemorrhagic. This difference was not statistically significant (p value 0.410).

Table 4: Gender wise distribution of patients according to pattern of smoking and alcohol consumption

Gender	Never smoked N(%)	Past smoker N(%)	Current smoker N(%)			χ ²	Df	P value
			Bidis	Cigarettes	Others			
Male (73)	22(30.14)	15(20.54)	48	8	2	29.51	2	.000
Female (47)	38(80.85)	2(4.25)	8	0	1			

	Never consumed alcohol N(%)	Past consumer N(%)	Current consumer N(%)			χ ²	Df	P value
			Whiskey	Desi	Rum			
Male (73)	21(28.76)	8(10.95)	27	35	13	52.072	2	.000
Female (47)	45(95.74)	1(2.12)	0	1	1			

*χ²= chi square value; df= degree of freedom

Table 4 shows gender wise distribution of patients according to pattern of smoking. It is seen that out of total 73 male patients, 22 never smoked. 15 of 73 left smoking more than one year back. Among those who were current smokers, smoked bidi mostly followed by cigarettes. The remaining ones smoked other forms. Among females nearly 81% never smoked and 4% are past smokers. Also among those who are current smokers, smoke bidi mostly. This difference in pattern of smoking differs significantly between males and females (p value 0.000).

It is seen that out of total 73 male patients, 21 never consumed alcohol. 8 of 73 left alcohol more than one year back. Among those who are current consumers, consumed desi mostly followed by whiskey. The remaining ones consumed rum. No female consumed whiskey. Also patients consumed more than one type of drink. This difference in pattern of alcohol consumption differs significantly between males and females (p value 0.000).

DISCUSSION

The mean age of our study population was 63.01 (±13.541 SD) years. In a study on Recent Heavy Drinking of Alcohol and Embolic Stroke by Matti Hillbom the mean age of cases was 44±10 years and controls was 44±13 years. According to mean age our study is similar to study by Stergiou, Maria Cristina Zurrú, E. Mostofsky, Allan House. Our study differed from study by Hillbom, Bova et al and Paganini-Hill. Most common type of stroke was ischemic in our study seen in 94 (78.3%) patients. The second most common type was haemorrhagic in 26(21.7%) patients. A study on Risk Factors for Stroke in Middle-Aged Men in Goteborg, Sweden by Per Harmsen out of total 141 stroke patients Subarachnoid hemorrhage was present in 13; Intracerebral hemorrhage in 14, Cerebral infarction in 68 and Unspecified stroke in 46 patients.

A study by Allan House CT brain scans obtained in 112/113 stroke patients. Severe events were reported by 3/12 (25%) of those with definite haemorrhagic strokes (as diagnosed by CT scan) and 24/101 (24%) of the remainder, where the CT scan showed an infarct or the scan was negative but the clinical diagnosis was of definite or probable cerebral infarction.

Our results are similar to study by Harmsen and Allan House.

The present study had 50% smokers. Out of those 35.8% were current smokers whereas 14.2% were those who had left smoking more than one year back. Bidi was most smoked type of cigarette.

In a study by Bova et al, smokers were 52 (28.6%) in study Group (182) and in control group (194) were 48 (27.4%) and OR 1.22 (95% CI 0.77-1.92). In a study by Clayton 6076 (66.0%) out of 9208 cases and 6380 (69.3%) out of 9208 controls never smoked. On the other hand 1683 (18.3%) of cases and 1701 (18.5%) of controls were exsmokers. In the same study 1449 (15.7%) of cases and 1127 (12.2%) of controls were current smokers. In a study by Grau <20 Cigarettes/d were smoked by 19 /197 among patients and 17 /197 among control subjects with OR 1.3 (95% CI 0.63-2.5) and (p value .52). Similarly ≥20 Cigarettes/d were smoked by 29 /197 among patients and 19 /197 among control subjects (p value.12). Former smoking in the same study was present in 27 /197 patients and 29 /197 control subjects (p value .88). The results were not statistically significant. In a study by Matti Hillbom current smoking was present in 113 (53%) cases and 100 (36%) controls. In a study on Precipitants of Brain Infarction Roles of Preceding Infection/Inflammation and Recent Psychological Stress by Macko smoking was present in 16% of stroke patients and in 28% of controls. According to a study by Ann M. Malarcher 48.0 %of cases and 29.8 % of controls were current smokers. The difference between two groups was significant (p value<0.01). In a multicenter case-crossover study by E. Mostofsky 28% cases and 52% controls never smoked. On the other hand 50% of

cases and 39% of controls were former smokers. In the same study 22% of cases and 10% of controls were current smokers. The results of our study were similar to study by Matti Hillbom.

55 % of patients in our study had never consumed alcohol. Out of the remaining 37.5% were current consumers and 7.5% were past consumers. Desi type was consumed mostly. Second most common type of drink consumed was Whiskey. 14 patients consumed rum more than other drinks. In a study by Grau high intake of alcohol i.e more than the equivalent of 50 g of pure alcohol daily was consumed by 38 /193 cases and 33 /197 controls with OR 1.2 (0.71-2.0). The difference was not statistically significant (Pvalue .50). Intake of > 40 g ethanol within the 24 hours preceding the onset of illness increased the risk for acute brain infarction both among men (P < .001) and women (P < .01) independently from other risk factors in a study on lifestyle-associated risk factors for acute brain infarction among persons of working age by Haapaniemi H. Moderate (151 through 300 g) and heavy (300 g) alcohol intake during the preceding week significantly (P<0.001) increased the risk of brain infarction in a study by Hillbom et al. The adjusted RRs were 3.61 (95% CI 1.67 to 7.79) and 3.74 (95% CI 1.61 to 8.72) respectively. Heavy drinking was the most significant risk factor, but neither former heavy drinking (adjusted RR 0.96, 95% CI 0.37 to 2.54) nor recent light drinking (adjusted RR 0.98, 95% CI 0.43 to 2.27) increased the risk. Moderate (adjusted RR 3.67, 95% CI 1.19 to 11.3) and heavy (adjusted RR 3.43, 95% CI 1.04 to 11.3) alcohol intake during the preceding week significantly (P< 0.05) increased the risk. Moderate and heavy alcohol intake (.40 g) within the preceding 24 hours before the onset of stroke also significantly (P value 0.01) increased the risk (adjusted RR 3.49, 95% CI 1.47 to 8.28). The results of our study differed from other studies.

CONCLUSION :

Ischaemic stroke was more common than haemorrhagic amongst both males and females. More than 60% of patients in the present study had systolic blood pressure equal to and above 140 mm Hg. Hypertension is thus an important risk factor for stroke. The pattern of smoking and alcohol consumption differed significantly between males and females who had stroke and majority of the females were non smokers and did not consume alcohol. Both of these risk factors were more significant among males.

REFERENCES

- Muller JE, Abela GS, Nesto RW, Tofler GH. Triggers, acute risk factors and vulnerable plaques: the lexicon of a new frontier. *J Am Coll Cardiol.* 1994 Mar 1;23(3):809-13.
- Stergiou GS, Vemmos KN, Pliarchopoulou KM, Synetos AG, Roussias LG, et al. (2002) Parallel morning and evening surge in stroke onset, blood pressure, and physical activity. *Stroke* 33:1480-1486.
- Stone PH. Triggering myocardial infarction. *N Engl J Med.* 2004 Oct 21;351(17):1716-8.
- Saposnik G, Baibergenova A, Dang J, Hachinski V. Does a birthday predispose to vascular events? *Neurology.* 2006 Jul 25;67(2):300-4.
- Macko RF, Ameriso SF, Barndt R, Clough W, Weiner JM, Fisher M. Precipitants of brain infarction. Roles of preceding infection/ inflammation and recent psychological stress. *Stroke J Cereb Circ.* 1996 Nov;27(11):1999-2004.
- Cohen S, Tyrrell DA, Smith AP. Psychological stress and susceptibility to the common cold. *N Engl J Med.* 1991 Aug 29;325(9):606-12.
- Paschalis C, Lekka NP, Polychronopoulos P, Spilioti M, Triccas G, Papapetropoulos T. The Association of stroke with Life Events. *Cerebrovasc Dis.* 1991;1(4):223-6.
- Andre-Petersson L, Engstrom G, Hagberg B, Janzon L, Steen G. Adaptive behaviour in stressful situations and stroke incidence in hypertensive men: results from prospective cohort study "men born in 1914" in Malmö, Sweden. *Stroke J Cereb Circ.* 2001 Aug;32(8):1712-20.
- Harmsen P, Rosengren A, Tsiropogianni A, Wilhelmsen L. Risk factors for stroke in middle-aged men in Goteborg, Sweden. *Stroke J Cereb Circ.* 1990 Feb ;21(2):223-9.
- Guiraud V, Touze E, Rouillon F, Godefroy O, Mas J-L. Stressful life events as triggers of ischemic stroke : a case-crossover study. *Int J Stroke Off J Int Stroke Soc.* 2013 Jul;8(5):300-7.
- Adams HP Jr, Bendixen BH, Kappelle LJ, Biller J, Love BB, Gordon DL, et al. Classification of subtype of acute ischemic stroke . Definitions for use in a multicenter clinical trial. TOAST. *Trial of Org 10172 in Acute Stroke Treatment -Stroke J. Cereb Circ.* 1993 Jan;24(1):35-41.
- Microsoft Word – NAT-preface 8.11.doc-climate_profile.pdf [Internet]. [cited 2013 Aug 30]. Available from: http://www.imd.gov.in/doc/climate_profile.pdf
- Kothari RU, Brott T, Broderick JP, Barsan WG, Sauerbeck LR, Zuccarello M, et al. The ABCs of Measuring Intracerebral Hemorrhage Volumes. *Stroke.* 1996 Aug 1;27(8):1304-5.
- Zevon MA, Tellegen A. The structure of mood change: An idiographic/nomothetic analysis. *J Per Soc Psychol.* 1982;43(1):111-22.