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Dr Shailendra Singh
Senior Residence Medicine, Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh, India

Dr. Dileep Dandotiya
Junior Residence, PMS, Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh, India

Dr. Hritu Singh
Associate professor Psychiatry, RKDF Medical College, Bhopal, Madhya Pradesh, India

Dr. Shahid Abbas
Professor, MD Medicine, Sri Aurobindo Institute of Medical Sciences & PGI, Indore, Madhya Pradesh, India

Correspondence Author:
Dr Shailendra Singh
Senior Residence Medicine, Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh, India

Association of patient's habit, diet pattern and presence of co-morbid conditions among the patients with ischemic heart diseases

Dr. Shailendra Singh, Dr. Dileep Dandotiya, Dr. Hritu Singh and Dr. Shahid Abbas

Abstract
Background: Stroke is the second most common cause of mortality and major cause of morbidity globally. Understanding the risk factors associated with it can help the physician understanding the pattern and deciding the intervention to decrease the associated morbidity and mortality.
Aims and objectives: To study the association of smoking,hypertension, diabetes status and diet pattern of stroke patients.
Materials and methods: Ninety subject were studied in the Department of General Medicine at Sri Aurobindo Medical College and PGI, Indore (M. P.) for one and half year from June-2015 to March-2016 after dividing them in to Cases (n=45; patients with stroke) and Control (n=45; subjects without stroke). Patients smoking and drinking habit, co-orbit condition such as hypertension and diabetes status and type of diet was recorded of all the patients.
Results: Mean age of stroke patients was 36.80±7.90 years with male preponderance (62.2%). Habit of smoking/tobacco and presence of diabetes wasn't the significant factor associated with stroke (p>0.05) however, being a hypertensive and diet was found to be the risk factors for stroke development.
Conclusion: Smoking and presence of diabetes do not contribute in stroke development however type of diet and presence of hypertension plays a significant role in stroke development.

Keywords: Hypertension, stroke, diet, diabetes mellitus, diet pattern

Introduction
Stroke is one of the important life-threatening disease affecting 40 to 270 people in 100,000 populations in different regions in India. The risk of morbidity and mortality is significantly increased due to the presence of stroke [1, 2].
Risk factors of stroke can be grouped in to those modifiable such as hypertension, dyslipidemia, diabetes, tobacco smoking, atrial fibrillation, cardiac disorder, sickle cell disease, diet and body mass index and non-modifiable such as race, age, sex, low birth weight [3, 4].
Previous landmark studies including Interheart and Interstroke highlighted hypertension, diabetes, dyslipidaemia, obesity, smoking, physical activity, poor diet, and alcohol consumption as the most common risk factors for the development of stroke globally [5, 6].
In present study we tried to evaluate the different risk factors associated with the stroke. As there are multiple risk factors we have taken the most common one such as smoking, hypertension, diabetes and diet pattern. Hence, present study was performed to study the association of smoking, hypertension, diabetes status and diet pattern of stroke patients.

Materials and methods
Present case-control study was performed in the Department of General Medicine at Sri Aurobindo Medical College and PGI, Indore (M. P.) for one and half year from June-2015 to March-2016.
Patients with first ever episodes of ischemic stroke presenting within two weeks of the event having age between 15 years to 45 years and those willing to give informed consent were included in the present study. Patients with non-hemorrhagic stroke, renal, hepatic thyroid

dysfunction, collagen vascular diseases, chronic inflammatory diseases like HIV, syphilis, tuberculosis, cancer, patient on steroids and anticonvulsants, pregnancy state and Postpartum period and patients with rheumatic heart disease were excluded from the present study.

Forty-five cases of ischemic stroke visited/admitted at study center with weakness of limb, and a rise in serum biomarkers of stroke included as subjects in case group while forty-five individuals had no documented stroke served as subjects in control group for this study. Controls recruited from hospital staff or individuals who accompany patients referred to the hospital.

Patients smoking and drinking habit, co-orbit condition such as hypertension and diabetes status and type of diet was recorded of all the patients.

All the data analysis was performed using IBM SPSS ver. 20 software. Quantitative data is expressed as mean and standard deviation whereas categorical data is expressed as number and percentage. Cross tabulation was done to prepare the tables. Chi Square test was used to compare the categorical data. P value of <0.05 is considered as significant.

Results

Out of a population of ninety, more than half (56, 62.2%) of the subject was male while rest (34, 37.8%) was female. The age of all cases and controls found to be in the ranges from 15 to 45 years. The mean age (mean ± SD) of all samples (N=90) was 36.53±7.53 years. The scatter of mean age for the case group (n1=45) was 36.80±7.90 years and found within ranges from 15 to 45 years while for controls (n2=45) was 36.27±7.22 years had ranges from 20 to 45 years.

Table 1: Distribution and association of smoking\tobaccowith groups

Habit of Smoking/Tobacco	Cases	Control	Total
No	44 (97.8)	45 (100.0)	89 (98.9)
Yes	1 (2.2)	0 (0.0)	1 (1.1)
Total	45 (100.0)	45 (100.0)	90 (100.0)
$\chi_1^2 = 1.01$ and p>0.05 (Insignificant)			

Hypertension was recorded among four (8.9%) patients of case group. None of the control detected with hypertension. The differences of proportion in hypertension among subjects were associated significantly (p<0.05) with groups (case and control) that confirmed statistically. Henceforth, the statistical agreement projected that the hypertension was the significant factor that impacted the groups, case and control. Diabetes mellitus was diagnosed in 2 (4.4%) ischemic stroke patients of case group. None of the control detected with diabetes mellitus. The differences of proportions of samples with diabetes mellitus were not associated significantly (p>0.05) with groups (case and control) that was concreted statistically. Henceforth, the statistical agreement projected that the diabetes mellitus wasn't the significant factor that impacted the groups, case and control.

Table 2: Distribution and Association of Type of Diet with Groups

Type of diet	Case	Control	total
Vegetarian	24 (53.3)	32 (71.1)	56 (62.2)
Mixed	21 (46.7)	13 (28.9)	34 (37.8)
Total	45 (100.0)	45 (100.0)	90 (100.0)
$\chi_1^2 = 3.03$ and p<0.08 (Poorly Significant)			

Discussion

It is well established that stroke is a medical emergency condition that requires immediate interventions in terms of hospitalization to decrease the mortality due to stroke [4]. Stroke does not have any outward symptoms and causes damage to the brain hence called as silent killer sometimes. Stroke increases the risk of both transient ischemic attack and major stroke in the future [7].

In present study we tried to identify the major risk factors of stroke by comparing the habits, presence of hypertension, diabetes and diet patterns of stroke patients and comparing it with the control group.

Smoking is termed as one of the important risk factor for the development of stroke. Previous studies have smoking as a significant risk factors for the development of stroke as compared to non-smokers [8]. Smokers have 2- 3 times more risk as compared to non-smokers [9]. However in our study we did not find any significant association of smoking with stroke incidence. This may be because of small sample size. Another reason there was only one stroke patients who was smoker and none was there in control group due to that significant comparison was not established. However, smoking is an established risk factor for the development of stroke in numerous studies. In a study of Damodar *et al.* 60.7% patients of stroke were smokers [10]. Colditz and colleagues found a strong significant relationship between smoking and stroke among the young and middle aged women. Stopping smoking can provide some benefits in the risk of development of stroke [11].

Interstroke study has shown that hypertension is one of the important modifiable risk factor for the development of stroke which accounts for 47.9% and 56.4% for risk of ischemic, and hemorrhagic strokes respectively [12]. In line with this in present study hypertension was found to be more common among the stroke patients as compared to controls. This proves the association of hypertension in the development of stroke.

Previous studies have reported high blood sugar as the one of the important risk factor for stroke and also a bad prognostic factor for recovery after stroke as evidenced by poor functional recovery in one of the study. [13] However in present study we did not find any significant association of diabetes mellitus with the stroke, that may be due to small sample size and fact that majority of the patients in our study were not having diabetes. But as proven before by many studies diabetes mellitus is a known risk factor for stroke.

Previous studies have extensively investigated diet and nutrition as the risk factors for the development of stroke. [14] In present study we found a significant association of stroke patients died pattern and the occurrence of stroke. Majority of the patients of stroke had mixed type of diet as compared to those without stroke, however, vegetarian diet was found

to have no significant association with the risk of stroke. In line with the present study findings a Taiwan study also reported that vegetarian diet is associated with a lower risk of both ischemic stroke and hemorrhagic stroke [14]. Predimed trial highlighted the importance of Mediterranean diet which involve the consumption of mainly plant based food involving 7,447 highrisk participants. The trial divided patients in to those in to Mediterranean diet and control diet. They found that Mediterranean diet significantly reduced the risk of overall stroke by 42% as compared to control diet. This highlights the importance of plant-based dietary patterns among the stroke patients [15].

Small sample size and cross sectional nature was the main limitations of the present study; a large randomized clinical trial is needed to provide strengthen present study findings.

Conclusion

Based on the present study findings we can conclude that smoking and presence of diabetes didnot show significant association with stroke development that may be due to the limitation of the study as mentioned. However type of diet and presence of hypertension plays a significant role in stroke development. We recommend to look for these risk factors in order to prevent the occurrence of stroke in near future.

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