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CEREBRAL INFARCTION;
MOST COMMON RISK FACTORS AMONG PATIENTS

1. MBBS, FCPS (Medicine)
Assistant Professor Medicine,
Medical Department,
Faisalabad Medical University,
Faisalabad.
2. FCPS (Medicine)
Senior Registrar,
Medical Department,
DHQ Hospital Faisalabad.
3. MBBS, FCPS (Cardiology)
Senior Registrar,
Cardiology Department,
Faisalabad Institute of Cardiology,
Faisalabad.

Correspondence Address:
Dr. Shakeel Ahmad
Senior Registrar,
Cardiology Department,
Faisalabad Institute of Cardiology,
Faisalabad.
drsa495@hotmail.com

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Muhammad Adnan Sarwar[1], Huma Muzaffar[2], Shakeel Ahmad[3]

ABSTRACT… Objectives: To determine the frequency of different risk factors among patients of stroke due to cerebral infarction. **Study Design:** Descriptive cross sectional survey. **Setting:** Punjab Medical College and affiliated hospitals (Allied Hospital and DHQ), Faisalabad. **Duration with Dates:** Six months from June 2006 to November 2006. **Methods:** This was a cross sectional survey that included 195 patients with stroke due to cerebral infarction. The main outcome variable was frequency of different risk factors which were described as frequency distribution table. **Results:** Hypertension was seen among 142 (73%) patients, followed by diabetes mellitus in 83 42.5% patients, ischemic heart disease in 74 (38%) patients, smoking in 59 (30.3%) patients, obesity in 53(27%) patients, atrial fibrillation in 43 (22%) patients and dyslipidemia in 23 (11.8%). **Conclusion:** Hypertension is the most common risk factor followed by diabetes mellitus associated with stroke due to cerebral infarction.

Key words: Stroke; Cerebral Infarction; Risk Factors.

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INTRODUCTION

Stroke IS referred to a serious illness that is caused by insufficient blood supply to the brain. It is described as an abrupt and sudden onset of clinical signs and symptoms characteristic of neurological deficit that is attributable to a focal vascular cause long lasting for more than twenty four hours.[1,2]

Stroke is a leading cause of ailment and death throughout the world.[3] The age adjusted annual death rate from stroke is 116 per 100,000 populations in USA and some 200 per 100,000 in UK, some 12% of all deaths. It is higher in black African populations than in Caucasian.[4] Approximately 80% of brain strokes are due to ischemic cerebral infarction attributable to a definitive vascular region and 20% to brain hemorrhage.[5]

According to the knowledge present so for, Hypertension was commonest risk factor studied (56%), cigarette and huqqa smoking (29%), ischemic coronary artery disease (33%), Insulin and non-insulin dependent diabetes mellitus (27%), dyslipidemia (31%), atrial fibrillation and other arrhythmias (24%), obesity and over weight (14%) and family history of infarctive stroke (13%). Males were predominant slightly but significantly than females (52% Vs 48%) and mean age was 51 years approximately.[6] The patients studied had more than one risk factors for cerebral infarction which make this study interesting and worth reading.

The rationale of my study was that stroke due to cerebral infarction is major health problem. It is causing enormous economic burden. If we identify true underlying modifiable risk factors. We might be able to put efforts for better primary and secondary prevention. This could help in administering appropriate intervention over health care setup. This can result in decrease hospital admissions, morbidity and mortality in our hospitals which are already very busy.

OPERATIONAL DEFINITIONS

Cerebral Infarction

It was characterized by abrupt onset of focal

neurological clinical deficit, lasting more than 24 hours usually with vascular origin cause. Though some patients had a gradual progression of symptoms, common deficits included weakness of limb, difficulty in speech, difficulty in swallowing, loss of vision and sensory loss. CT Scan brain showed a hypo dense abnormal area relating to weakness of body part.

Common risk factors causing cerebral infarctive stroke

Hypertension

Hypertension was diagnosed if BP was more than 140/90 documented by the medical professional. Usually we find that BP was not well controlled in patients presented with infarctive stroke. Poor patients follow up with the treating physician was also observed.

Diabetes Mellitus

Diabetes was diagnosed in patients who were taking anti-diabetic medications or who got their HBA1c >6.5 or Fasting blood glucose greater than 110 mg/dl. Usual symptoms were included polydipsia, polyphagia, polyuria. Two readings were done in case of asymptomatic patients.

Dyslipidemia

This was labeled if patients had abnormal 8 hours fasting lipid profile. Total cholesterol >200mg/dl, LDL cholesterol >130mg/dl and TGs >250mg.

Ischemic Coronary Artery Disease

Ischemic coronary artery disease was diagnosed on the basis of significant typical left sided exertional chest pain or evidence of ischemia on ECG or obstructive lesions found during coronary angiography.

Atrial Fibrillation

Atrial fibrillation was noticed in the presence of significant history of palpitation. ECG evidence seen was irregularly irregular RR intervals with absent P waves. The ventricular rate was mostly uncontrolled if not taking proper medications.

Smoking

History was the mainstay to label the patient as smoker or non-smoker or ex-smoker. Examination of fingers will also show cigarette marks if patient is unable to give history.

Obesity

It was labeled if clinically patient was obese or BMI>30 kg/m^2. Central obesity was considered more harmful.

MATERIAL AND METHODS

Study Design

Cross sectional survey.

Setting

I did this study at Punjab medical college and affiliated hospitals (Allied and D.H.Q.) Faisalabad.

Sample Size

The sample size was calculated by using WHO sample size calculator taking confidence level 95%, anticipated population 55%, Absolute precision: 7%, sample size was 195.

Sampling Technique

Non-probability consecutive sampling

Duration with Dates

Six months from June 2006 to November 2006.

Sampling Technique

Non-probability purposive sampling

Sample Selection

Inclusion Criteria

- Patients of age more than 40 years and both sexes
- Diagnosed cases (clinical plus C.T. Scan brain proven) of patients with cerebral infarction
- Patients with single or multiple cerebral infarction

Exclusion Criteria

- The stroke patients diagnosed as case of cerebral hemorrhage, Tumor, Tuberculomas.
- Very serious patients who need artificial mechanical respiration.

Data Collection Procedure

195 patients with stroke due to cerebral infarction

admitted in Medical Unit-IV of DHQ hospital Faisalabad fulfilling the above mentioned inclusion criteria of cerebral infarction included in study after approval from institutional ethical review committee. Written informed consents were taken from patients if possible or attendants after explaining the purpose of research. Brain hemorrhage, tumor or tuberculomas was excluded from study through CT scan brain. Details of various modifiable risk factors of cerebral infarction were taken through history, relevant examination and investigations as follows;

- I took history of previous hypertension or anti hypertensive medication, diabetes mellitus or use of oral hypoglycemic agents or insulin, previous history of dyslipidemia and treatment for it and history of smoking in terms of years and number of cigarette per day. I took present or past history of chest pain, shortness of breath and use of anti-ischemic drugs, history of palpitation, light headedness.
- Physical examination included weight and height for BMI. I took blood pressure with mercury sphygmomanometer from both arms. Two readings were taken at least twelve hours apart. I examined pulses for rate and rhythm.
- I sent fasting sample for blood sugar and lipid profile to hospital laboratory that was reported on auto-analyzer. ECG was done to see Q-waves for old infarction, ST-segment or T-wave changes for ischemia or absent P-waves and irregular R-R interval for atrial fibrillation. Data was calculated on proforma.

Data Analysis Procedure

SPSS-14 was used for data analysis. Descriptive statistics like mean with standard deviation were applied on age, male to female ratio were given. Frequency with percentage of common risk factors like hypertension, diabetes mellitus, smoking, dyslipidemia, ischemic heart disease, atrial fibrillation, obesity were calculated in infarctive stroke patients.

RESULTS

195 patients included in the study. (Including both males and females).

Distribution of patients by Age

60.47 $\pm$ 8.85 years [range 41-92 years] was the mean age of the patients included in the study. 41 – 50 years patients were 21 in number, 88 (45%) patients were of age range of 51 – 60 years, 61 (31.3 %) patient of age range of 61 – 70 years, 15 (8%) patients of age range of 71 – 80 years and 10 (5%) patient of age range of > 80 years of age. (Table-I)

Distribution of patients by Sex

Patients were also distributed according to sex. There were 128 (65.6 %) male patients in the study, while 67 (34.4%) patients were female. Male to female ration was 1.91:1. (Figure 1)

Distribution of patients by results of Sleep Deprived Epilepsy

The patients were also distributed according to the frequency of risk factors. The following were the results: hypertension was seen among 142 (73%) patients, followed by diabetes mellitus in 83 42.5% patients, ischemic heart disease in 74 (38%) patients, smoking in 59 (30.3%) patients, obesity in 53(27%) patients, atrial fibrillation in 43 (22%) patients and dyslipidemia in 23 (11.8%). (Figure 2)

Age	No. of patients	Percentage
40 – 50	21	10.7
51 – 60	88	45
61 – 70	61	31.3
71 – 80	15	8
> 80	10	5
Mean + SD	60.47 $\pm$ 8.85	
Range	40 – 92	

Table-I. Distribution of patients by age (n=195)
Key: SD Standard deviation

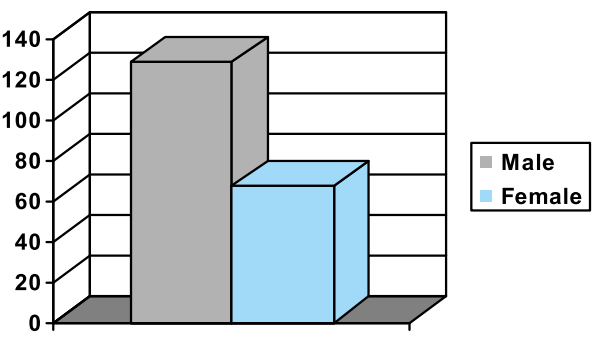

Figure-1. Distribution of patients by sex (n=195)

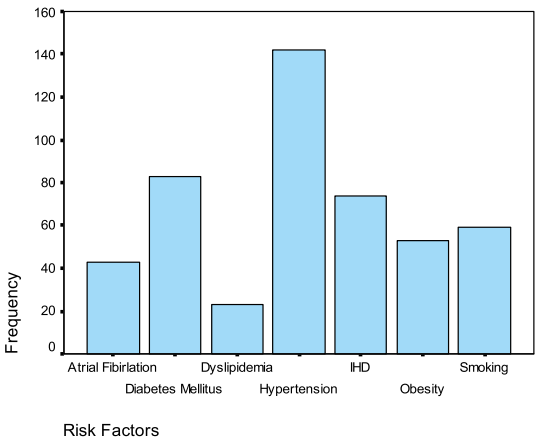

Figure-2. Distribution of patients by frequency of risk factors

DISCUSSION

I conducted the study in a Medical Unit of Allied/ DHQ hospital which is a teaching institute to detect the frequency of risk factors among patients who presented with stroke due to cerebral infarction. The results of this study showed that most common risk factor in our study was hypertension (73%), followed by diabetes mellitus (42.5%), ischemic heart disease (38%), smoking (30.3%), obesity (27%), atrial fibrillation (22%) and dyslipidemia (11.8%).

In literature, there are many studies that have described the frequency of risk factors among patients with stroke due to cerebral infarction. However, the results of these studies are variable with each other.

In a study by Marwat MA, et al, 82 patients with stroke were admitted. Like our study, the frequency of different risk factors was noted. The following were the findings of their study. Total patients were 88. Male: female ratio was 70:30. The age range of very wide 45-95 years. 68 patients were hypertensive (75%), 48 were diabetic (54.5%), 32 were having coronary artery disease (36.3%). Hyperlipedaemia was observed in 12 (13.6%) patients.

Cerebral infarction was seen among 50% of the whole population of the study, while intracerebral hemorrhage was seen among 29% patients. Like our study, hypertension was seen most commonly in this study i.e. 75% in this study while this was seen as 73% in our study. The mean age of the patients in this study was 65.9+9.15 years while it was 60.47 $\pm$ 8.85 years in our study however, there was not much difference in sex distribution i.e. male to female ratio was 2:1 in this study, while in our, it was 1.9:1 in our study.[7]

In another study conducted by Khan SN, et al, 281 patients with stroke were included and the following findings were observed. The male: female ratio was 1.05:1 while in our study it was a bit higher i.e 1.91:1. The most frequent risk factors included hypertension 65.8%, smoking 43%, diabetes mellitus 41.3%, underlying cardiac diseases 29.1%, family history of stroke/transient ischemic attack in the first-degree relatives 26.7%, high cholesterol 25.5%, history of past transient ischemic attack 24.9% and significant extra cranial carotid atherosclerosis in 18.18%. Like our study, hypertension was the most commonly seen among other risk factors followed by diabetes mellitus and others.[7]

In a study by Aly Z, et al, 398 patients were studied for the presence of risk factors of stroke. The mean age of our sample was 39$\pm$14.2 years and male to female ratio was 3:2. The following was observed. Hypertension (69.1%) and stress (55.8%) were identified as two major risk factors. Hypercholesterolemia (36.7%), age (33.7%), diabetes (33.4%), smoking (29.1%), and family history of stroke (29.1%).[8]

In our study, hypertension was reported in 73% patients. There are other studies in literature in which the frequency of hypertension is reported lower than our study. Frequency of hypertension is by Fayyaz et al (58%),[9] Khawaja and Shakoor (56%)[10] and Vohra et al (50%).[11] However, Marwat AM[7] and Khan SN, et al[12] has described a frequency that is quite comparable to our results i.e. 75% and 65.8%.

Higher ratio of risk factors in male patients is due presence of extra risk factor like smoking. In older age groups, more patients are males.[10]

In our study, the frequency of patients with diabetes was 42.5% while others show: Alam I, et al 28%,[13] Kaul S 38%,[14] and Liaquat A 27%.[15] However, Marwat MA, et have shown the results in concordance with that to our study i.e. 48%.[7]

This study has certain limitations. Although we did the randomization of the patients, this represents only a small sample size of a single unit.

The above discussion reflects that frequency of different risk factors is variable among different clinical trials. This also highlights the need for more clinical trails on community basis at multiple centers to cover the actual population.

CONCLUSION

Hypertension is the most common risk factor associated with stroke due to cerebral infarction followed by diabetes mellitus. Ischemic heart disease, atrial fibrillation and obesity are also other important risk factors. These can be modified by taking measures to improve health education.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Muhammad Adnan Sarwar	1st Author	
2	Huma Muzaffar	2nd Author	
3	Shakeel Ahmad	3rd Author	