

Determination of association between different Risk Factors & Cardiac Anomalies with Stroke among Adults

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ABSTRACT

Background: There is presence of different risk factors for cerebrovascular complication as well as coronary artery. It is well acknowledged that diseases of the coronary artery enhance the stroke risk. In opposition to this, there is variation in the prevalence of these risk factors across ischemic stroke and disease of coronary artery as well as between the sub-types of stroke because of highly complicate etiology.

Objective: The objective of this research work was to determine different risk factors and cardiac anomalies, which have association with the incidence of stroke among adults.

Methodology:

Study Design: This cross sectional study design.

Place and Duration: Medicine Department of Services Hospital, Lahore from November 2020 to May 2022. Adult patients having age from fifteen to forty-five years of age who got admission in hospital due to occurrence of stroke were the samples of this research work.

Results: Among the participants, most of the patients were in age group of 41-45 years making 36 percent of whole strength. The percentages of the patients in age groups 26-30, 31-35 and 36-40 years were 18%, 20% and 22% correspondingly. Only four percent patients were having less than twenty-five years of age. Sixty-four percent patients were suffering from VHD (Valvular Heart Disease). Myocardial infarction was present in sixteen percent patients. Eight percent patients were present with atrial fibrillation and ten percent patients were present with IHD (ischemic heart disease). The risk equation of Framingham heart study discovered that seventy five percent patients of stroke were also having some types of cardiac complications.

Conclusion: Diseases of hearts among adults can result in stroke that is severe abnormality and requires to be handled meticulously. One leading cause of disability and mortality is stroke. Ischemic strokes among adults are likely to be related with heart than cerebral when there is unknown exact cause of complication.

Keywords: Ischemic, complication, meticulously, determine, occurrence, VHD, ISHD, cardiac, risk factors.

INTRODUCTION

There is rise in occurrence of strokes in adults having age from eighteen to fifty years and according to current estimations, it is responsible for up to 15% of 18% of all types of strokes^{1,2}. Adult population contemplating about pursual of employment and raise of family are having very high risk for recurring strokes³. Patients in the age group of 15-45 years of age with stroke diagnosis include intra-cerebral hemorrhage, cardiogenic emboli, cerebral infarction and arterio-venous malformation. The most common reasons of cerebral infarction among adults are cardiogenic emboli and atherosclerosis. Ischemic strokes among adults have various reasons in various populations and different regions as compared to elder population. It was discovered that most common reason of these strokes was cardiac embolism, which was followed by the next common cause of arterial dissections⁴. Atherosclerosis of large artery and small artery disease scarcely overshadowed other recognized reasons of strokes. There is predisposing of atherosclerotic cerebral infarction by HTN (Hypertension), hyperlipidemia and transient ischemic attack in past. About third proportion of adults who face stroke, are always present with cardiogenic cerebral embolism. There is no reach of the embolic particles to systematic circulation through bloods of veins due to pulmonary capillary bed, which is a filter in system of blood circulation⁵. Adults present with high risk factors of CVD (Cardiovascular disease) are more likely to meet their death as compared to the patients without these risk factors⁶.

DM (Diabetes Mellitus), hyperlipidemia, HTN and smoking are very common risk factors for CVDs^{7,8}. The most common reasons for intra-cerebral hemorrhage are arteriovenous malformation and HTN. Common reasons of sub-arachnoid hemorrhage are arteriovenous malformation, aneurysms and intra-ventricular hemorrhage. There is eight-time rise of stroke risk in females who are users of oral contraceptive pills⁹. There is presence of many ways through which stroke can be caused by alcohol, including persuading the anomalies in the structure of cardiac wall that enhances the risk of cerebral embolism; inducing

HTN which leads to formation of clot; stimulating the contraction of vascular smooth muscle of cerebral and changing the cerebrum's metabolism^{10,11}.

Although trans-esophageal ECG can recognize sources of cardiac embolism in the patients having unrecognized cerebral infarction, which is not possible by the conventional techniques of diagnosis¹². There is no categorization of some risk factors, which are the cause of stroke in some juvenile patients. For such patients, angiography and trans-esophageal ECG are much effective in the determination of the reasons of stroke. There is difference in the predictive and etiological traits of the adult patients as compared to the patients in their elder age. Brain infarction can be the reason of migraine headaches¹³. There is little disparity between the prevalence of migraine in adult patients with stroke and public (having less than forty-five years of age). Previously, it was discovered a relation between acute ischemic neurologic events and prolapsed mitral valve¹⁴. There are many causes of the stroke in adult population, but the main contributor is the problems related with heart. There is an estimation that more than 23.60 million population of the world will die 2030 due to CVD, forming it the main reason of death in world¹⁴. A study conducted in 2008 stated that 30% mortalities in the world are the outcome of CVDs and 80% of these mortalities are occurring in the countries with low or middle income¹⁵. Thirty-three million persons were affected by stroke in 2018 in which 16.90 millions were suffering from 1st stroke¹⁶. Just after the complications of heart, 2nd most common reason of death is stroke, which is responsible for 11.13% of all mortalities.

There is estimation that 2nd greatest cause of mortalities in whole world is stroke. It is the cause of death of more than 6 million persons every year. One person among 6 is affected by the incidence of stroke in world. Persons in the countries, which have poor resources, bear the burden of stroke. There are many things about the stroke as health problem, which are not known by public. There is need to step up the efforts for the improvement of education about public health issues and advocacy in whole globe¹⁷. So, this transverse research work was carried out to

determine the cardiac anomalies and risk factors linked with stroke in adult population in Medicine Department of Beijing Shunyi Hospital, China.

Rationale: To determine the cardiac anomalies and risk factors linked with the incidence of stroke in adult patients.

METHODOLOGY

This cross sectional study was carried out in Medicine Department of Services Hospital, Lahore from November 2020 to May 2022. In this study, we included the patients having age from fifteen to forty-five years suffering from stroke who got admission in hospital.

Inclusion Criteria:

- Patients with stroke from both genders having age from fifteen to forty-five years.
- Patients who were willing to participate and provided written consent form.

Exclusion Criteria:

- Patient present with other related illnesses or chronic infections.
- All the patients present with immunosuppressive complications and cancer

Sample Size: In this research work, we adopted the purposive sampling method. We included all the available patients in the duration of the collection of data who fulfilled the standard of inclusion criteria in this research work. In current research there was utilization of purposive technique for sampling and because of time constraint, we took one hundred samples.

Data Collection & Analysis: We created a semi-structured survey. We formulated a well-organized survey with the utilization of anticipated variables. The asked information in the questionnaire was about features of disease, socio-demographics and other related information. We also formulated a checklist. We also made modifications before the conduction of survey. We performed the reviews of the documents and conducted interviews to collect the required data. We modified and examined all the collected information. We enter all collected information in computer with the utilization of SPSS V.24.

RESULTS

Thirty six percent patients of this research work were having age from forty-one to forty-five years. The percentage of the recruited patients in the age groups 26-30 years, 31-35 years and 36-40 years was 18%, 20% and 22% correspondingly. The patients having age less than twenty-five years were only four percent. Table displays that majority of the patients were in the age group of 41 to 45 years of age. This may be because of the fact that with the increase of the age, there is enhancement in chances of atherosclerosis in vessels of blood.

Table 1: Age of Patients

Age	No
less than 25	4 (4%)
26 to 30 years	18 (18%)
31 to 35 years	20 (20%)
36 to 40 years	22 (22%)
41 to 45 years	36 (36%)
Total	100 (100%)

Table 1 showed Fifty four percent patients of this research study were males. Main fact was that we are living in a society, which is male dominance, and majority of the visiting patients in hospitals are normally males. Most of the patients (65.0%) of this research work were having VHD. Among remaining patients, sixteen percent patients were present with myocardial infarction, ten percent patients were present with myocardial ischemia and nine percent patients were having atrial fibrillation. This data states that patients present with the mitral stenosis had a very prevalence of stroke. This is possibly because of thrombo-embolism resulted by mitral stenosis. Ninety one percent patients of this research work were present with stroke of ischemic type. Only nine percent patients of this research work were available with intra-cerebral

hemorrhage. In this research work, it was observed that most of the patients who suffered from stroke, majority of them was present with stroke of ischemic type.

Table 2: Female patients' oral contraceptive proportion

Use of contraceptive	n=100	Percentage
Active users	26.0	56.50
used in the past	4.0	8.70
Non Users	16.0	34.80
Total	46.0	100.00

Table 2 showed Seventy percent patients of this research study were smokers and remaining thirty percent were non-smokers. There was high occurrence of stroke in smokers as compared to the patients who were non-smokers because one of the important risk factors for incidence of atherosclerosis is smoking. Approximately, 56.50% female patients in this research work were contraceptive utilizer. Only 8.70% females were contraceptive user in past. There was very high prevalence of stroke in the female patients who were currently using the contraceptive medication. There was high presence of VHDs in patients of ischemic stroke (67%) as compared to the patients with intra-cerebral hemorrhagic stroke (44.40%). There was high presence of myocardial infarction as 33.30%, myocardial ischemia as 22.20% and atrial fibrillation as 11.1% in the patients with intra-cerebral hemorrhagic stroke as compared to the patients present with ischemic stroke. The greater contributor in both stroke types was VHDs.

Table 3: Relationship between stroke and cardiac disease

Cardiac disease	Stroke			
	Ischemic (n = 91)		Intracerebral Hemorrhage (n = 9)	
	No	Percent	No	Percent
Myocardial infarction	13	14.40	3	33.30
Myocardial Ischemia	8	8.80	2	22.20
Vulvar Heart Disease	61	67.00	4	44.40
Atrial Fibrillation	8	8.80	1	11.10

DISCUSSION

In this transverse research study, we determined the relationship between cardiac diseases and stroke among adults, recognized various risk factors linked with stroke in adults and identified various socio-demographic factors of the patients having stroke. The findings of this current study showed that most of the patients were in the age group of 41-45 years. The percentages of the patients in other groups were very close to each other. Patients with age of less than twenty-five years were only four percent. Most of the recruited patients of this research work were living in non-urban regions. There is an increase in the incidence of stroke with increase in age exponentially¹⁸. One other research work also described the similar results and stated that only four percent patients were having less than twenty years of age and thirty six percent patients were present in age group of forty-one to forty-five years of age. One research study examined fifty patient who suffered stroke and discovered that the occurrence of stroke was much common in person having age from fifty to sixty-nine years¹⁹.

One other study investigated one hundred and eighteen stroke patients in South Asia and found that there was high incidence of stroke in the patients who were from 5th to 7th decades of their lives²⁰. One other research study also discovered the high incidence in the patients from 5th to 7th decade of their lives²¹. In this research work, fifty four percent patients were males. This finding is consistent with results of one other study, which found that the rate of occurrence of stroke is thirty percent higher in males as compared to females¹⁸. One other study showed that the incidence of stroke was twenty two percent higher in the male patients as compared to female patients in South regions of Asia²².

About 32% patients were available with history of stroke in their family followed by HTN in 20 percent, DM in 16 percent and IHDs in 12 percent patients. There was previous history of

stroke in 8 percent patients and 10 percent patients were present with transient ischemic attack history in past. This current research study stated that greater than 2/3rd patients were cigarette smokers. Different research works elaborated that there was increased risk of stroke among smokers. Many research works showed the strong correlation between stroke and habit of smoking cigarettes. Similar research works in Finland and Denmark had stated the enhanced stroke risk in cigarette smokers. One analysis conducted on thirty-two different research works discovered that associative ischemic stroke risk in smokers was 1.90 times greater than non-smokers. In this research work, 56.50% females were the current users of contraceptive medication. Only 8.70% females were present with history of contraceptives utilization. The consistent utilization of estrogen is related with enhanced stroke risk. The utilization of oral contraceptive medication has association with 9 times enhanced cerebral infarction's risk in females. Magnetic resonance imaging and computed tomography of the recruited patients displayed that there was presence of stroke of ischemic type in ninety one percent patients. Remaining patients had occurrence of stroke because of intra-cerebral hemorrhage. Current research work stated that most of the patients were suffering from VHDs (64%). Among remaining, myocardial infarction was present in 16 percent, IHDs in 10 percent and atrial fibrillation in 8 percent patients. Risk of stroke is augmented definitely by IHDs²³.

Limitations: This study is a single centered study.

Funding: No funding

Conflicts: No conflict of interest

CONCLUSION

One of the vital clinical complexities is stroke that may develop in the patients present with cardiac complications in adult population. Stroke is important cause of high rate of occurrence of morbidity as well as mortality. When the reason of the ischemic stroke among adults are not clear, it is important to have a meticulous look at heart.

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