

CLINICAL PROFILE OF STROKE PATIENTS WITH REFERENCE TO THE PRESENCE AND DURATION OF MODIFIABLE RISK FACTORS

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ABSTRACT

BACKGROUND

Stroke or brain attack is the sudden loss of neurological function caused by interruption of the blood flow to the brain. Ischaemic stroke is the most common type, affecting about 80 percent of individuals with stroke and results when a clot blocks or impairs blood flow. In hemorrhagic stroke, rupture of blood vessel leads to accumulation of blood, depriving the brain of essential oxygen and nutrients. If clinical symptoms persist even after 24 hrs. or imaging is suggestive of any new lesion, it is termed as stroke. In clinical practice, various types of neurological deficits are possible, including impairment of consciousness and of sensory, motor, cognitive, perceptual, and language abilities.

METHODS

120 patients participated in the study. The primary objective of our study was to find out the role/prevalence of various modifiable risk factors in primary stroke patients. We also tried to find out the synergistic effect of various risk factors, lag period between appearance of risk factor and occurrence of stroke and effect of various risk factors on physiotherapy indices.

RESULTS

Results showed that out of 120 patients, as many as 103 patients were hypertensive, 57 were diabetics and 48 were smokers. Significant numbers of patients were not aware of their blood pressure and diabetic status.

CONCLUSIONS

In our study, hypertension by far was the most prevalent factor for causing stroke; this was followed by diabetes and smoking as modifiable risk factors. Hypertension and smoking formed the lethal combination in many patients.

KEYWORDS

Stroke, Diabetes, Hypertension.

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BACKGROUND

Stroke or CVA (Cerebro-Vascular Accident) is the sudden appearance of neurological deficit caused by interruption of the vascular supply to the brain parenchyma. In clinical practice, Ischaemic stroke is most commonly encountered, affecting about 80 percent of patients presenting with features suggestive of stroke and results when a thrombus disrupts blood flow, depriving the brain of its usual oxygen

and micronutrients. Haemorrhagic stroke occurs due to rupture of blood vessels leading to leakage of blood in the brain. Clinically, a number of neurological deficits may be seen including impairment of consciousness and of sensory, motor, cognitive, perceptual, and language abilities. If clinical symptoms persist even after 24 hrs or imaging is suggestive any new lesion, it is termed as stroke. Motor deficits may occur as by paralysis (hemiplegia) or weakness (hemiparesis), typically on the side of the body opposite to the side of the lesion.

Fiona C Taylor et al¹ mentioned "stroke as a global stroke health problem" in a study in South Asia network for chronic disease. It is the second commonest cause of death and fourth leading cause of disability worldwide. By 2030, approximately 20 million people each year will suffer from stroke and of these 5 million will not survive.² In developed countries, stroke is the first leading cause for disability, second leading cause of dementia and third leading cause of

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death. Stroke (CVA) is also responsible for seizures, frequent falls and depression in first world countries and is a leading reason of functional impairments, with 20% of survivors requiring hospital/nursing care even after 3 months and 15%-30% being permanently disabled.³

Stroke is no longer a disease of the developed world. Low and middle income countries account for 85.5% of total stroke deaths worldwide and the number of disability-adjusted life years in these countries was approximately higher than in high income countries. Another important thing to notice is that like coronary artery disease, stroke also occurs a decade earlier in India as compared to western countries. It is pertinent to understand the temporal association of appearance of modifiable risk factors and causation of stroke.

This study concludes that India is witnessing stroke epidemic and it demands urgent action through evidence based stroke policy that is specific to the need of the country. Stroke like any chronic disease can be treated with inexpensive generic drugs and life style modifications. If action is not taken now against this avoidable disease, it will have an adverse effect on economic development of the country.⁴ Though several models for organized stroke care are available from developed countries, it relies on a strengthened primary health care system and improved pre-hospital and acute stroke care services.⁵

METHODS

Study Design

Cross sectional study.

Sample Size

The estimated sample size at 90% was 120 subjects in the study.

Inclusion Criteria

1. Acute onset neurological deficit.
2. Age - Should be more than twenty five years.
3. Patient willing to participate in study.

Exclusion Criteria

1. Uncooperative patients.
2. Neurologically deficit patients secondary to RTA, trauma, multiple sclerosis, epilepsy.
3. Pregnancy.
4. Any psychiatric disorders, mental retardation.

Sampling Method

Convenient sampling was used.

Variable

Independent Variable

- i. Hypertension
- ii. Smoking/Smokeless tobacco
- iii. Alcohol
- iv. Diabetes
- v. Dyslipidaemia

Dependent Variable

- i. Stroke

Procedure

Stroke patients were enrolled from the in-patient and out-patient Department of Medicine. Then, based on screening all the patients were selected and invited to participate in the study on the basis of above mentioned inclusion and exclusion criteria. After explaining the purpose of the study, study objectives, method of testing, benefits of study, and an informed consent were taken from all participants. Followed by the history taking and examination of all stroke patients, data was recorded as per health attitude form.

$$\text{Event Percentage (\%)} = \frac{\text{Number of Patients in Individual Event} \times 100}{\text{Total Number of patients}}$$

Data Analysis

The data was managed on excel sheet and all the data was expressed as number and percent variation as compared to total number of patients and was statistically analyzed by percentage among total number of patients.

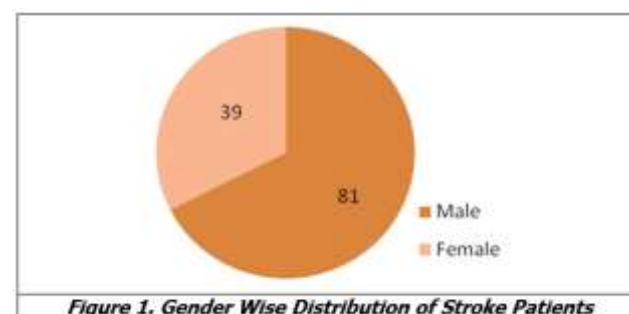
All the required data was collected by the researcher, modifiable risk factors were assessed with the help of above mentioned qualitative outcome tools. Manual entry of data was done on a pre-planned format. The individual record of each subject was noted on his/her own form.

RESULTS

Age Group (Years)	Number of Cases
25-35	03
36-45	13
46-55	22
56-65	39
66-75	30
76-85	07
>86	06
Total	120

Table 1. Age Wise Distribution of Stroke Patients

Data analysis shows age wise distribution of stroke. Result shows that highest numbers of stroke (32.5%) patients were from age group of 56-65 years. 57.5% patients were in two categories combined together i.e. 56-75 years.

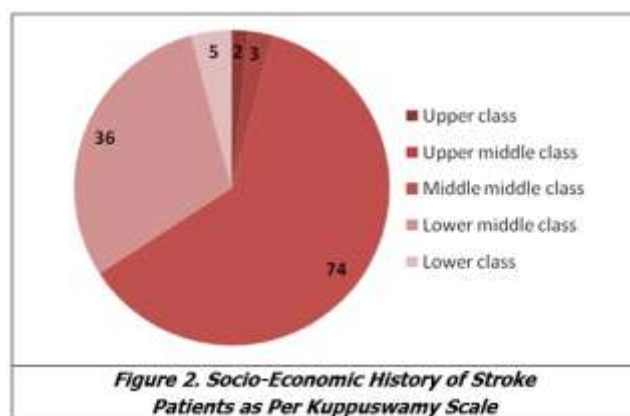


Data analysis shows gender wise distribution of stroke. Result shows that out of 120 patients, 67.5% are male and 32.5% are female as shown in table.

Family History	Diabetes	Hypertension
Present	39	60
Absent	81	60
Total	120	120

Table 2. Family History of Hypertension and Diabetes in Stroke Patients

Data analysis show incidence of family history of hypertension and diabetes in patients of stroke. Result showed that out of 120 patients, 50% are having family history of hypertension and 32.5% were having family history of diabetes.



Data analysis showed that out of 120 patients, maximum patients (61.7%) belonged to middle class followed by lower middle class.

Duration	Hypertensive	Diabetes
Diagnosed for the first time	25	9
Up to 1 year	8	13
1 to 5 years	12	11
5 to 10 years	28	18
Above 10 years	30	6
Total	103	57

Table 3. Status and Duration of Hypertension and Diabetes in Stroke Patients

Result showed that out of 120 patients at the admission as many as 85.8% patients were hypertensive and 14.2% were non hypertensive. 20.9% patients had no idea of their blood pressure status. Out of 120 patients, 47.5% were having raised blood sugar. 52.5% patients were having their sugar levels in normal limit. Surprisingly, in our study out of 57 patients who had diabetes, stroke occurred maximally in patient group of 5 to 10 years duration suggesting either late diagnosis or sub maximal control.

Duration	Smoking	Smokeless Tobacco	Alcohol
Up to 1 year	0	0	0
1 to 5 years	0	2	6
5 to 10 years	9	6	5
Above 10 years	39	30	26
Total	48	38	37

Table 4. Number of Stroke Patients with Habit of Substance Abuse

Data analysis showed that out of 120 patients, 40% were smokers as compared to 60% being non-smokers. More than 81% of all smokers were smoking for duration of more than 10 years. Almost 32% were using smokeless

tobacco mostly as chewing as compared to 68% being non-users. More than 78% of all smokeless tobacco users were using it for duration of more than 10 years. 30.9% patients were alcoholic as compared to 69.1% were non-alcoholic. More than 70% patients admitted to be drinking for more than 10 years.

Presence of Modifiable Risk Factor/s	Number of Cases	%
Hypertension	103	85.8%
Diabetes	57	47.5%
Hypertension with Diabetes	42	35%
Smoking	48	40%
Smokeless tobacco	38	31.7%
Smoking with smokeless tobacco	22	18.3%
Alcohol	37	30.9%
Hyperlipidaemia	21	17.5%

Table 5. Prevalence of Modifiable Risk Factors in Stroke Patients

Data analysis showed frequency of various modifiable risk factors present in patients admitted with stroke. Result show 103 cases were of hypertension, 57 were of diabetes, 42 of hypertension with diabetes, 48 were of smoking, 38% were of smokeless tobacco, 38 were of alcohol and 21 had hyperlipidaemia as shown in Table 11.

DISCUSSION

The primary objective of this study was the role and prevalence of various modifiable risk factors in aetiology of stroke patients. We also tried to find the lag period between the appearance of risk factors and occurrence of stroke.

In our study, the mean age of the patients was 59±13.06 (range 25 to 90 years). The Mumbai⁶ and Trivandrum⁷ registries showed that the mean age of patients with stroke was 66 and 67 years respectively. In contrast, in the Bangalore study the mean age was 54.5 years.⁸ In Trivandrum, stroke occurred at rate of 7.1 per 1000 per year in people aged ≥55 years, and the rate escalated to 13.3 in people aged ≥75 years (age-adjusted). Similar results were seen in various registries around the country.⁹ The stroke in the young age group defined as 40 years or less comprised 3.8%. There were 81 males (mean age 60.16±13.07) and 39 females (mean age 54.25±7.9). 33% patients (25 males and 14 females) were in the age group of 55-65 years. Our study shows that early onset of stroke compared to the current belief that stroke is a disease of older age group. There were 16 cases of stroke between the age group of 25-35³ and 36-45 and also 22 cases between the age group of 46-55 years.

In our study it is revealed there were 81 males and 39 females. This result shows the ratio to be near about 2:1. According to the study by Lasek-Bal Anetta¹⁰ and Jeyraj Durai Pandian¹¹ et al it was shown that in Mumbai registry, men had a higher stroke incidence rate than women (crude incidence rate 149/100,000 person years versus 141/100,000 person years for women). Women (68.9 years) were older compared than men (63.4 years).

In our study, it was found that out of 120 stroke patients, 50% had a family history of hypertension whereas it was around 32.5% for diabetes mellitus. Marianne¹² et al

showed that in industrialised countries, the risk of becoming hypertensive for an individual with a family history of hypertension has been estimated to be up to four times higher than average.

In our study, we used Kuppuswamy scale to see the socioeconomic status of stroke patients which revealed that most of the patients belong to middle and lower middle class. Specifically 2% belongs to upper class and 61.7% to middle middle class. 30% belongs to lower middle class and 4% to the lower class. Our findings are in accordance with the finding of Shraddha et al that revealed that there were three classes from where elderly belongs to; upper middle, upper lower, lower and lower middle. Most of the elderly (64.8%) belongs to class IV. None of the elderly belongs to upper socio-economic group. 27.6% of the aged female and 10.6% of aged male belongs to lower socio-economic class according to Modified Kuppuswamy socio-economic scale.¹⁶

On analysis of risk factors according to the type of stroke, hypertension still remained the most prevalent risk factor for both ischaemic and haemorrhagic stroke. Similar study by Indra Kumari et al revealed that hypertension is the prevalent risk factor for stroke followed by smoking, diabetes and dyslipidaemia. In our study, result showed that 103 patients out of 120 stroke patients had either hypertension at time of admission or had history of hypertension including those on medications as compared to 17 who were normotensive at admission and with no prior history of hypertension. We also categorised hypertensive patients as per the duration of disease which showed 25 stroke patients were not aware of their blood pressure status, 8 patients had hypertension since 1 year, and 12 patients had history of 1 to 5 years, 28 being in group of 5 to 10 years. Also 30 patients were hypertensive for more than 10 years. It showed that longer the duration of hypertension longer the risk. Our findings are in sync to the findings by Jian Guang Yu et al.¹³ which showed that hypertension is the most powerful modifiable factor and the second most powerful risk factor, after age for stroke, regardless of geographic location and ethnicity. Approximately 54% of strokes worldwide can be attributed to hypertension. People with hypertension are 3 to 4 times more likely to suffer a stroke than those without hypertension.¹⁴

The previous study by Britton et al¹⁵ shows that on admission 69% of the stroke group and 39% of the controls had BP more than 170/100 mmHg. Dalal et al¹⁶ in ICMR multicentric study, revealed hypertension alone or in various combinations has been a major risk in ischaemic and haemorrhagic strokes. The ICMR multicentric prospective case control study of ischaemic strokes revealed that hypertension as one of the important risk factors. The relationship between blood pressure and ischaemic stroke has been firmly established. For example, at mean DBP of 98 mmHg the RR is 2 and at mean DBP of 105 mmHg the RR is 4. Our study showed that hypertension has a statistically significant impact on stroke. It also suggested that it is pertinent to screen general population for presence

of hypertension and also follow them regularly to confirm the control of blood pressure.

In our study, 57 patients were found to be hyperglycaemic as compared to 63 which were normoglycemic at the time of admission. According to this study, 9 patients were not aware of their sugar levels at the time of admission whereas 13 patients had diabetes since 1 year duration, 11 had diabetes between duration between 1 to 5 years. Followed by 18 patients had diabetes for duration of 5 to 10 years and 6 patients had diabetes for more than 10 years. Our findings are supporting the findings by lead investigator Jane C. Khoury¹⁷ which suggested that diabetics aged less than 65 years have up to a 12-fold increased risk of stroke compared to people of a similar age who do not have diabetes. In the over 65s, there was still an increase in stroke of about 2- to 3-fold in diabetic patients. Dr. Khoury suggested that the reason for the larger increase in younger patients is that these individuals do not have as many other risk factors for stroke, so the presence of diabetes makes a big difference. By the time patients get to their 70s, more other risk factors come into play so the individual effect of diabetes may not be so great. The data also suggest a race difference, with evidence of higher ischaemic stroke risk in whites than blacks conferred by diabetes at almost all ages.¹⁷

People with diabetes are at very high risk of heart disease and stroke, also known as cardiovascular disease (CVD) and cerebrovascular disease. In fact, up to 80% of people with diabetes will die as a result of a heart attack or stroke.¹⁸ In addition, people with diabetes may develop heart disease 10 to 15 years earlier than individuals without diabetes. High blood glucose is one risk factor for heart attack or stroke but people with diabetes often have a number of other risk factors.¹⁹

The present study also checked the association between habit of smoking and stroke. Result revealed that out of 120 stroke patients, 48 had the habit of smoking and 72 were non-smoker. The chronicity of smoking was classified based on duration in years. Result concluded that out of 48, 9 were having habit of smoking for less than 10 years and 39 were smokers for more than 10 years. Our findings are parallel to study done by Sanne A. et al²⁰ which showed that cigarette smoking has been shown to be an independent risk factor for both ischaemic and haemorrhagic stroke in both men and women. Overall, smokers have an approximate doubling the risk of incurring a stroke during lifetime compared to non-smokers.²⁰

Smoking also significantly increases the risk of heart disease and stroke.²¹ It was found in study conducted previously that smokers are three times more likely to have a stroke than non-smokers. The previous study shows that more you smoke, the more this risk increases. If you smoke 20 cigarettes a day, you are six times more likely to have a stroke compared to a non-smoker.^{22,23}

Our study result that habit of tobacco chewing is also one of the prevalent factors for causing stroke although it was not a major cause. It was seen that out of all the stroke patients included, 38 patients had habit of tobacco chewing

and 82 being non chewer. This finding is well reported by Agashe et al²⁴ which showed the recent data from the Inter-stroke study conducted in 22 countries including India. It confirmed smokeless tobacco as a major risk factor accounting for large population attributable to risk of stroke. Studies have shown that smokeless tobacco has mainly short term effects on cardiovascular system. This suggests that the risk may wane after discontinuation of smokeless tobacco.

Our study revealed that habit of alcoholism was seen in 37 patients out of 120 patients compared to 83 being teetotallers. Duration wise distribution showed that 26 patients history of alcoholism for more than 10 years and 5 patients had history of 5 to 10 years. Our study concluded that alcohol is also one of the important risk factor of stroke. Risk of stroke has been found to be increased in hypertensive patients who were also heavy drinkers. Out of 120 patients, 33 male patients were alcoholics. Smoking and alcoholism were comparatively higher in patients of younger age groups (< 40 yrs.).²²

These are various risk factors which can be categorised according to the prevalence of causing stroke. In a recent study conducted in Gujrat, Fiona C Taylor et al¹ it was found the modifiable risk factors such as hypertension (40%), alcoholism (35%), smoking (28%), and hyperlipidaemia (17%) are the commonest cause of stroke among the elderly and smoking, alcoholism, increased BMI, diabetes, and hypertension are significantly associated with strokes among young people. In our study, the result supports the updated data in Stroke Update Factsheet, 2012.²³ A total of 120 cases were included out of which 103 patients had history of hypertension alone so defining hypertension is the most prevalent cause of stroke. This is followed by diabetes as a prevalent factor for causing stroke in 57 patients of the total 120 patients.

Coexistence of modifiable factors increases the chance of having stroke by manifold, and it is an uncommon occurrence. Smoking is major predisposing factor which is clear from our study as 48 patients had history of smoking. Smokeless tobacco is more common in developing countries like India.²⁴ It is one of the major factors 38 patients had history of taking smokeless tobacco. Our study reveals that 37 patients had the history of alcohol consumption and 25 had hyperlipidaemia. Hypertension and smoking combined can multiply the probability of smoking leads to hypertension so thus for causing stroke. In our study, it was found that out of total patients, 57 were hypertension and diabetes combined.

Heart disease and smoking appear to be greater risk factors for the Indian compared with US population. A recent hospital based multicentre prospective stroke registry in India with an objective to identify and recruit 10,000 acute stroke patients from 100 hospitals within India conducted an interim analysis to determine aetiologies, clinical management and outcome with 5301 patients. Analysis found patients with stroke had high rates including high alcohol consumption, tobacco consumption, diabetes, hypertension, and dyslipidaemia.²⁵ In addition to this, this

study identified that the short-term mortality was higher among stroke patients with increased rate of risk factors.

Clinical Significance

It highlights the prevalence and importance of modifiable risk factor in causing stroke.

Limitation

Large sample size could be used in future for research study with more comprehensive data analysis.

Further Research

Larger sample size would be helpful to further elucidate our findings.

CONCLUSIONS

In our study, hypertension is the most prevalent modifiable risk factor for causing stroke; this is followed by diabetes as second common risk factor responsible for causation of stroke. Hypertension and smoking combined can multiply the probability of stroke as smoking leads to hypertension. In aetiology of stroke, alcohol consumption and hyperlipidaemia also seem to play an important role. So this proves our hypothesis of the study which was to identify and see the prevalence of various risk factors of stroke. It also established that physiotherapy had significant correlation with functional outcome and cognition through Barthel index and mini mental score. Also, fatigue was found to be prevalent factor in majority of the cases with significant results. Our study also suggest early detection and control of risk factors can prevent stroke and associated residual deficits, breaking the notion that stroke cannot be prevented.

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