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# Study of Epidemiological Factors in Acute Stroke and It's Correlation with Outcome

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**ABSTRACT**

The incidence of stroke rapidly increases with age, doubling for each decade after age 55. Prevention remains the most viable avenue for lessening the burden of stroke on society, particularly given the high incidence of stroke worldwide, insidious contribution of stroke risk factors, and the paucity of proven acute stroke therapies. The present study is aimed to study the correlation between epidemiological factors in acute stroke patients and its outcome. The study concluded that the epidemiological factors has primarily no direct relationship with the type of stroke and outcome of stroke.

**Keywords**: Epidemiological factors & Acute Stroke

## INTRODUCTION

The term cerebrovascular accident or stroke includes any neurological dysfunction of sudden onset secondary to interruption in blood flow or by haemorrhage in to or around brain other than trauma. It is one of the leading causes of mortality and morbidity worldwide and accounts for 20% of all neurological admissions in India.[1]

The prevalence of stroke and its cost will undoubtedly rise as the aging population increases in any country. Stroke is the fourth killer and number one cause of adult disability in the United States. In addition, stroke incidence and mortality are increasing in less developed countries in which the lifestyles and population restructuring are rapidly changing.

In the U.S., the prevalence of stroke is roughly 3% of the adult population, which translates to approximately 7 million individuals. Worldwide estimates indicate that primary haemorrhages constitute a higher percentage of all strokes, ranging from 10% to 25%. Individuals of Asian, African, and Latin American origin tend to have a higher frequency of primary haemorrhage than persons of European origin.[2]

In addition, although primary haemorrhage accounts for 10 to 17% of all strokes in Western countries, in Asian it is approximately 25%.[3]

[1]*Lauritzen, M., Dreier, J. P., Fabricius, M., Hartings, J. A., Graf, R., & Strong, A. J. (2011). Clinical relevance of cortical spreading depression in neurological disorders: migraine, malignant stroke, subarachnoid and intracranial hemorrhage, and traumatic brain injury. Journal of Cerebral Blood Flow & Metabolism, 31(1), 17-35.*

[2]Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2011 update: a report from the american heart association. Circulation. 2011;123:e18–e209.

[3]Ariesen MJ, Claus SP, Rinkel GJ, Algra A. Risk factors for intracerebral hemorrhage in the general population: a systematic review. Stroke.

The incidence of stroke rapidly increases with age, doubling for each decade after age 55. Prevention remains the most viable avenue for lessening the burden of stroke on society, particularly given the high incidence of stroke worldwide, insidious contribution of stroke risk factors, and the paucity of proven acute stroke therapies. Longitudinal studies have identified several characteristics/conditions that boost a person's risk for primary or recurrent stroke.[4]

Epidemiologic studies can help identify groups of individuals or regions at higher risk for stroke. They can also help us better understand the natural history of certain conditions and therefore push the direction of therapeutic investigations. Furthermore, the study of trends across different time periods and different populations can help investigators evaluate the effects of stroke care programs and treatment options.

Epidemiologic studies on stroke help us with understanding the natural history of the disease, identification of risk factors, and prognostic factors that can lead to markers for disease mechanisms. Epidemiology and observational data can inform scientists of possible novel areas for more focused research. They help us identify the individuals, groups, or geographic areas that are at increased risk of disease or poorer outcomes.

**Objectives**

1. To study the Epidemiological factors in acute stroke patients.
2. To study the correlation between epidemiological factors in acute stroke patients and it's outcome.

**Methods**

The study is carried out at MGM Medical College & Hospital, Kamothe, Navi-Mumbai. Total 50 patients of acute CVA admitted to the wards and ICU of MGM Hospital within 72 hours of onset of CVA are selected for the study.

Detailed clinical history of the patients is recorded with particular reference to the central nervous system. Careful examination of patients is done and based on the inclusion and exclusion criteria 50 patients are selected for the final study.

**Inclusion criteria:**

- 50 cases of C.T/MRI proven cerebrovascular accident
- within 72 hours of onset patients
- aged 20 years and above
- minimal 72 hours of stay in the hospital.

**Exclusion criteria:**

- Age – less than 20 years
- Known case of IHD, congenital, valvular or cardiomyopathic heart diseases
- Stroke cases which came after 72 hours
- Individuals with head injury
- Known hepatic and renal diseases
- Electrolyte imbalance

**Investigations**

Blood examination

- CBC, CREAT,
- UREA, ELECTROLYTES,
- RBS, LFT

CT/MRI Brain

12 lead E.C.G is taken for all cases as soon as the patient is admitted (within 72 hrs), then on day 3, then on the day before death or discharge of the patient from the hospital.

**Statistical Analysis**

**Table no 1 Age group vs Type of stroke**

[4]Chong J, Sacco R. Risk factors for stroke, assessing risk, and the mass and high-risk approaches for stroke prevention. In: Gorelick PB, editor. Continuum: Stroke Prevention. Hagerstwon, Maryland: Lippincott Williams and Wilkins; 2005. pp. 18–34.



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| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | haemorrhagic | Ischemic | |
| age group | 31 to 40 years | Count | 2 | 6 | 8 |
| | | % | 10.50% | 19.40% | 16.00% |
| | 41 to 50 years | Count | 3 | 6 | 9 |
| | | % | 15.80% | 19.40% | 18.00% |
| | 51 to 60 years | Count | 6 | 6 | 12 |
| | | % | 31.60% | 19.40% | 24.00% |
| | 61 to 70 years | Count | 4 | 7 | 11 |
| | | % | 21.10% | 22.60% | 22.00% |
| | more than 70 years | Count | 4 | 6 | 10 |
| | | % | 21.10% | 19.40% | 20.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.783

As seen in the above table, most of the study population in haemorrhagic stroke belongs to the age group of 51 to 60 years (31.60%) followed by 61 to 70 years (21.10%) and more than 70 years (21.10%) while in Ischemic stroke, most of the study population belongs to the age group of 61 to 70 years (22.60%) followed by 51 to 60 years (19.40%) and more than 70 years (19.40%). There was statistically no significant difference between age group and Type of stroke.

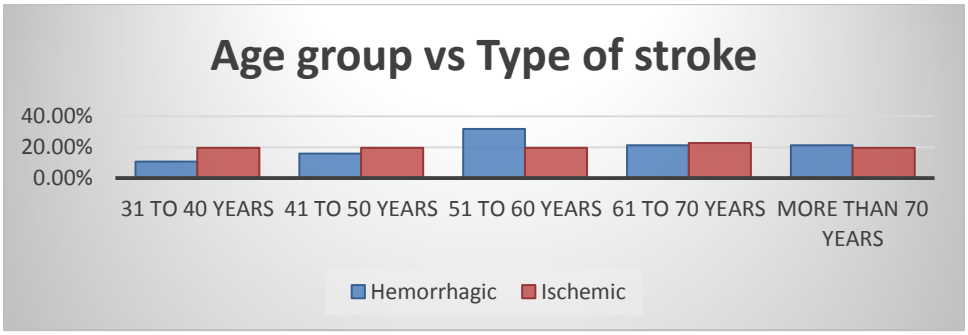


**Table no 2 Age group vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| age group | 31 to 40 years | Count | 0 | 2 | 2 | 4 |
| | | % | 0.0% | 18.2% | 33.3% | 16.0% |
| | 41 to 50 years | Count | 0 | 3 | 0 | 6 |
| | | % | 0.0% | 27.3% | 0.0% | 24.0% |
| | 51 to 60 years | Count | 2 | 4 | 0 | 6 |
| | | % | 25.0% | 36.4% | 0.0% | 24.0% |
| | 61 to 70 years | Count | 3 | 1 | 3 | 4 |
| | | % | 37.5% | 9.1% | 50.0% | 16.0% |
| | more than 70 years | Count | 3 | 1 | 1 | 5 |
| | | % | 37.5% | 9.1% | 16.7% | 20.0% |



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| | | | | | |
|---|---|---|---|---|---|
| Total | Count | 8 | 11 | 6 | 25 |
| | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.117 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.189 (NS)
P value (Haemorrhage vs Ischemic) -0.065 (NS)
As seen in the above table, in haemorrhagic stroke death was most commonly observed in 61 to 70 years (37.5%) and more than 70 years (37.5%) while in Ischemic stroke death was most commonly observed in 61 to 70 years (50%) and 31 to 40 years (33.3%). There was statistically no significant difference between age group
and Stroke final outcome.

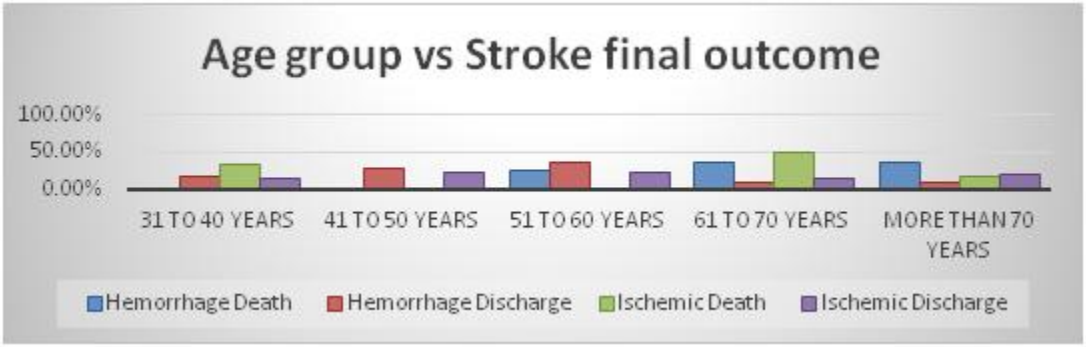


**Table no 3 Gender vs Type of stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhagic | Ischemic | |
| Gender | Female | Count | 5 | 4 | 9 |
| | | % | 26.30% | 12.90% | 18.00% |
| | Male | Count | 14 | 27 | 41 |
| | | % | 73.70% | 87.10% | 82.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.282
As seen in the above table, there was male predominance (73.70% vs 87.10%) in both haemorrhagic stroke and Ischemic stroke as compared to female (26.30% vs 12.90%). There was statistically no significant difference between sex and type of stroke.

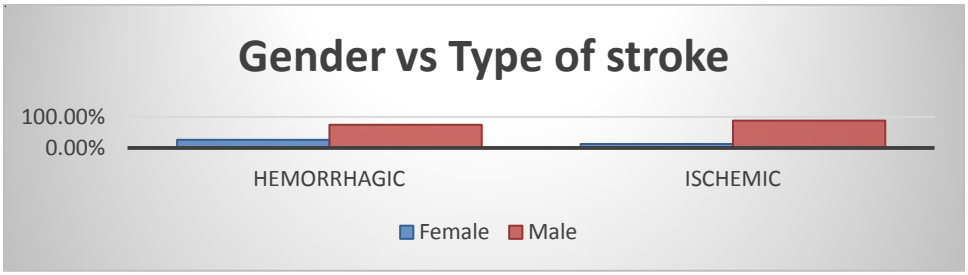




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**Table no 4 Gender vs Stroke final outcomes**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Gender | Female | Count | 3 | 2 | 0 | 4 |
| | | % | 37.5% | 18.2% | 0.0% | 16.0% |
| | Male | Count | 5 | 9 | 6 | 21 |
| | | % | 62.5% | 81.8% | 100.0% | 84.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.345 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.294 (NS)
P value (Haemorrhage vs Ischemic) -0.694 (NS)
As seen in the above table, death occurred in 62.5% of male and 37.5% of female study population in haemorrhagic stroke while death occurred predominantly in male study population in Ischemic stroke. There was statistically no significant difference between gender and Stroke final outcome.

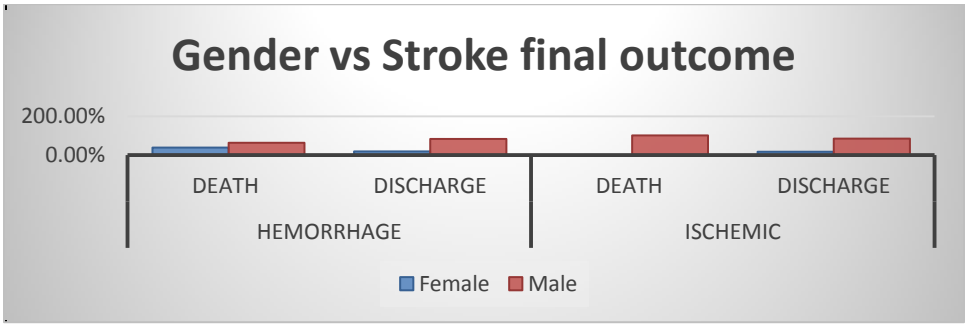


**Table no 5 Time of Onset vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhage | Ischemic | |
| Time of Onset | less than 6 hours | Count | 9 | 8 | 17 |
| | | % | 47.40% | 25.80% | 34.00% |
| | 6-12 hours | Count | 1 | 9 | 10 |
| | | % | 5.30% | 29.00% | 20.00% |
| | more than 12 hours | Count | 9 | 14 | 23 |
| | | % | 47.40% | 45.20% | 46.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.909

As seen in the above table, most of the study population in haemorrhagic stroke had time of onset of less than 6 hours (47.40%) and more than 12 hours (47.40%) while in Ischemic stroke, most of the study population had time of onset of more than 12 hours (45.20%) followed by 6 to 12 hours (29%). There was statistically no significant difference between age group and Type of stroke.



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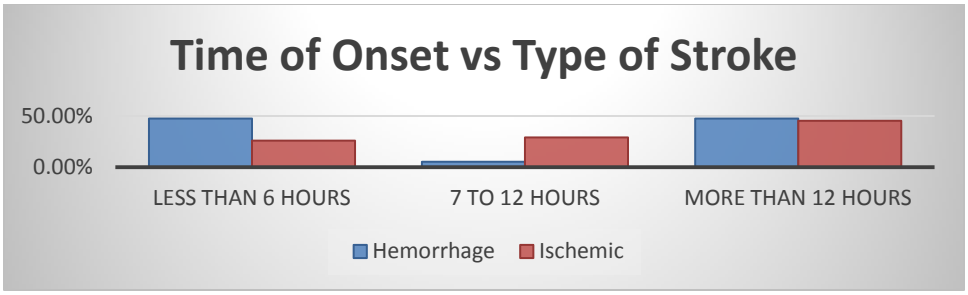


**Table no 6 Time of Onset vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Time Of Onset | less than 6 hours | Count | 5 | 4 | 2 | 6 |
| | | % | 62.5% | 36.4% | 33.3% | 24.0% |
| | 6-12 hours | Count | 1 | 0 | 1 | 8 |
| | | % | 12.5% | 0.0% | 16.7% | 32.0% |
| | more than 12 hours | Count | 2 | 7 | 3 | 11 |
| | | % | 25.0% | 63.6% | 50.0% | 44.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.174 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.743 (NS)
P value (Haemorrhage vs Ischemic) -0.328 (NS)

As seen in the above table, in haemorrhagic stroke death was most commonly observed in time of onset of less than 6 hours (62.5%) followed by more than 12 hours (25%) while in Ischemic stroke death was most commonly observed in time of onset of more than 12 hours (50%) followed by less than 6 hours (33.3%) There was statistically no significant difference between time of onset and Stroke final outcome.

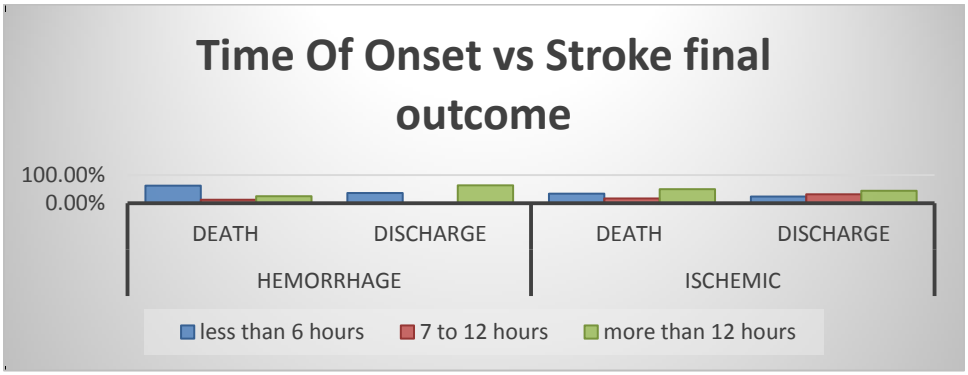


**Table no 7 Hypertension vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Hemorrhage | Ischemic | |
| Hypertension | No | Count | 11 | 16 | 27 |
| | | % | 57.90% | 51.60% | 54.00% |
| | yes | Count | 8 | 15 | 23 |



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| | | | | | |
|---|---|---|---|---|---|
| | | % | 42.10% | 48.40% | 46.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.879

As seen in the above table, Co morbidities like Hypertension was observed in higher number of Ischemic stroke (48.40%) as compared to haemorrhagic stroke (42.10%). There was statistically no significant difference between Hypertension and type of stroke.

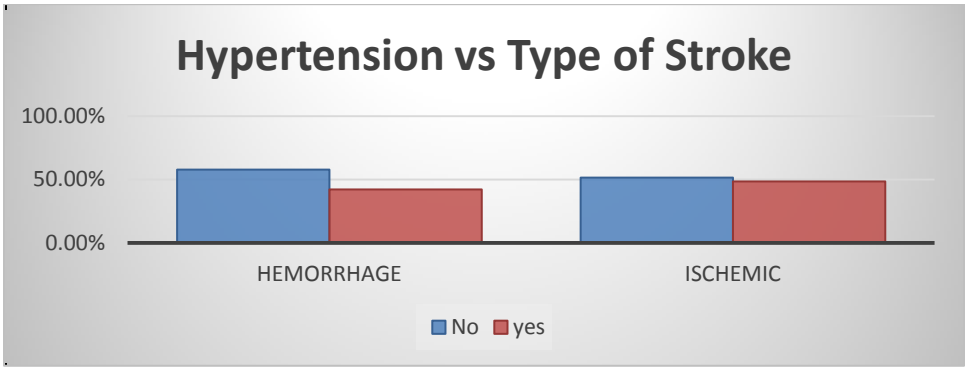


**Table no 8 Hypertension vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Hypertension | No | Count | 3 | 8 | 3 | 13 |
| | | % | 37.5% | 72.7% | 50.0% | 52.0% |
| | Yes | Count | 5 | 3 | 3 | 12 |
| | | % | 62.5% | 27.3% | 50.0% | 48.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.125 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.930 (NS)
P value (Haemorrhage vs Ischemic) -0.324 (NS)

As seen in the above table, Co morbidities like hypertension was observed in higher number of haemorrhagic stroke (62.5%) as compared to Ischemic stroke death (50%). There was statistically no significant difference between Hypertension and type of stroke.

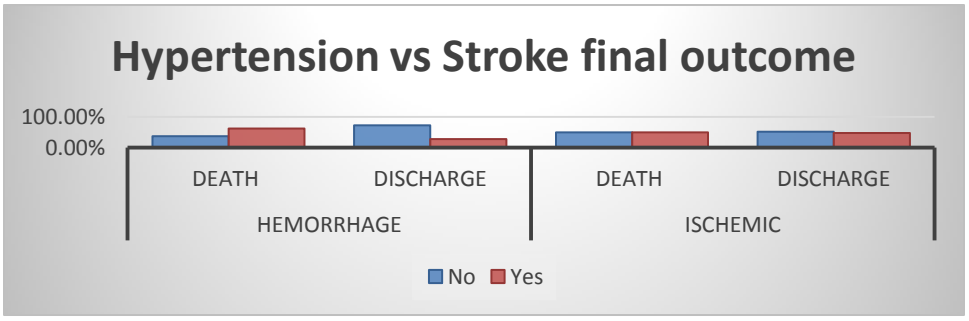




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**Table no 9 Diabetes vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhagic | Ischemic | |
| Diabetes | No | Count | 14 | 21 | 35 |
| | | % | 73.70% | 67.70% | 70.00% |
| | Yes | Count | 5 | 10 | 15 |
| | | % | 26.30% | 32.30% | 30.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.656

As seen in the above table, Comorbidities like diabetes was observed in higher number of Ischemic stroke (32.30%) as compared to haemorrhagic stroke (26.30%). There was statistically no significant difference between diabetes and type of stroke.

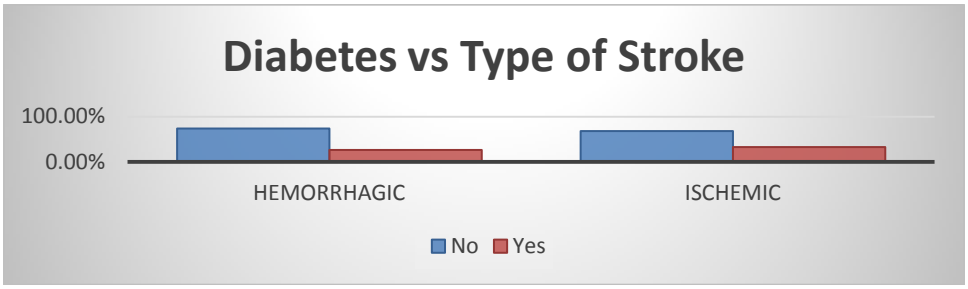


**Table no 10 Diabetes vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Diabetes | No | Count | 7 | 7 | 4 | 17 |
| | | % | 87.5% | 63.6% | 66.7% | 68.0% |
| | Yes | Count | 1 | 4 | 2 | 8 |
| | | % | 12.5% | 36.4% | 33.3% | 32.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.243 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.950 (NS)
P value (Haemorrhage vs Ischemic) -0.409 (NS)

As seen in the above table, Comorbidities like diabetes was observed in higher number of Ischemic stroke death (33.3%) as compared to haemorrhagic stroke (12.5%). There was statistically no significant difference between diabetes and type of stroke.



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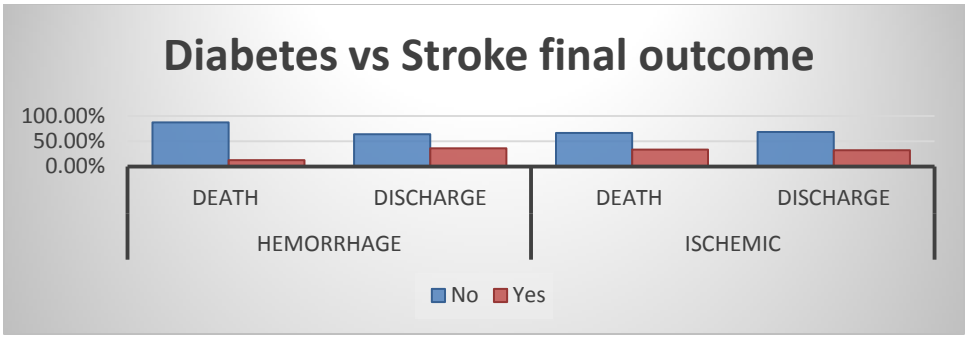


**Table no 11 Smoking vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhage | Ischemic | |
| Smoking | No | Count | 18 | 24 | 42 |
| | | % | 94.70% | 77.40% | 84.00% |
| | Yes | Count | 1 | 7 | 8 |
| | | % | 5.30% | 22.60% | 16.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.105

As seen in the above table, Smoking was observed in higher number of Ischemic stroke (22.60% ) as compared to haemorrhagic stroke (5.30%). There was statistically no significant difference between smoking and type of stroke.

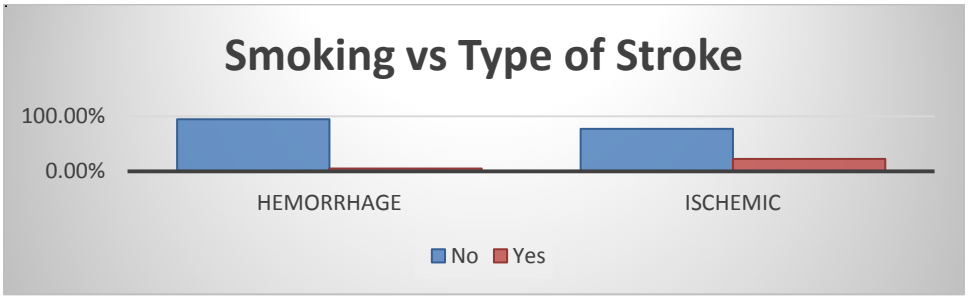


**Table no 12 Smoking vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Smoking | No | Count | 8 | 10 | 4 | 20 |
| | | % | 100.0% | 90.9% | 66.7% | 80.0% |
| | Yes | Count | 0 | 1 | 2 | 5 |
| | | % | 0.0% | 9.1% | 33.3% | 20.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.381 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.483 (NS)
P value (Haemorrhage vs Ischemic) -0.837(NS)



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As seen in the above table, smoking was observed in higher number of Ischemic stroke death (33.3%) as compared to haemorrhagic stroke (0%). There was statistically no significant difference between smoking and type of stroke.

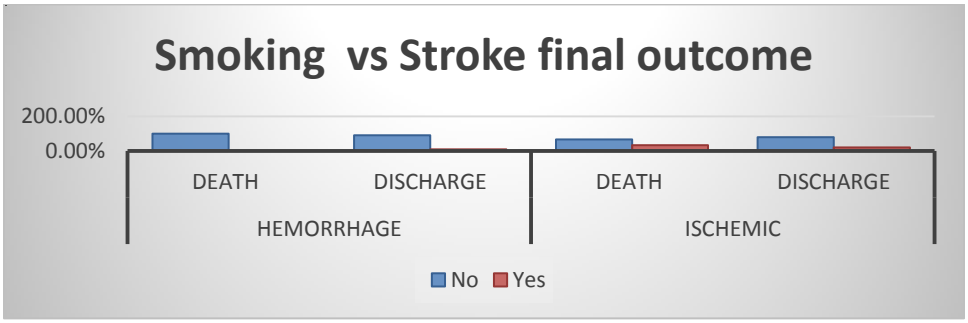


**Table no 13 Alcohol vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhage | Ischemic | |
| Alcohol | No | Count | 13 | 16 | 29 |
| | | % | 68.40% | 51.60% | 58.00% |
| | Yes | Count | 6 | 15 | 21 |
| | | % | 31.60% | 48.40% | 42.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.075

As seen in the above table, alcohol intake was observed in higher number of Ischemic stroke (48.40%) as compared to haemorrhagic stroke (31.60%). There was statistically no significant difference between alcohol intake and type of stroke.

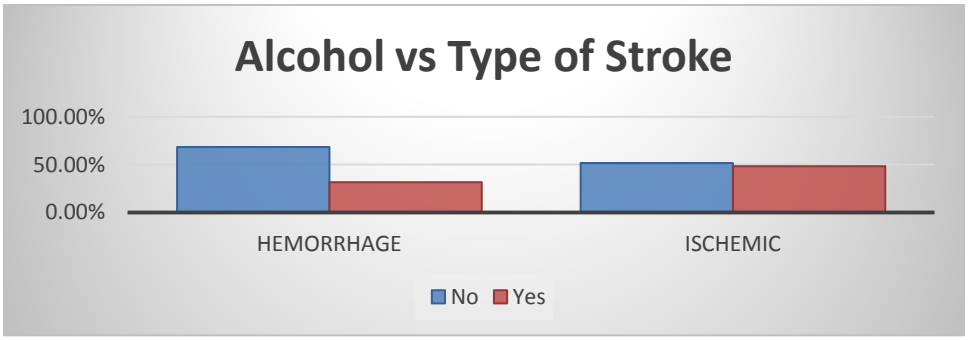


**Table no 14 Alcohol vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Alcohol | No | Count | 5 | 8 | 4 | 12 |
| | | % | 62.5% | 72.7% | 66.7% | 48.0% |
| | yes | Count | 3 | 3 | 2 | 13 |
| | | % | 37.5% | 27.3% | 33.3% | 52.0% |
| Total | | Count | 8 | 11 | 6 | 25 |



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| | | | | | |
|---|---|---|---|---|---|
| | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhagic Death vs Haemorrhagic Discharge) – 0.636 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.411 (NS)
P value (Haemorrhage vs Ischemic) -0.574 (NS)

As seen in the above table, Alcohol intake was observed in higher number of haemorrhagic stroke death (37.5%) as compared to Ischemic stroke (33.3%). There was statistically no significant difference between alcohol intake and type of stroke.

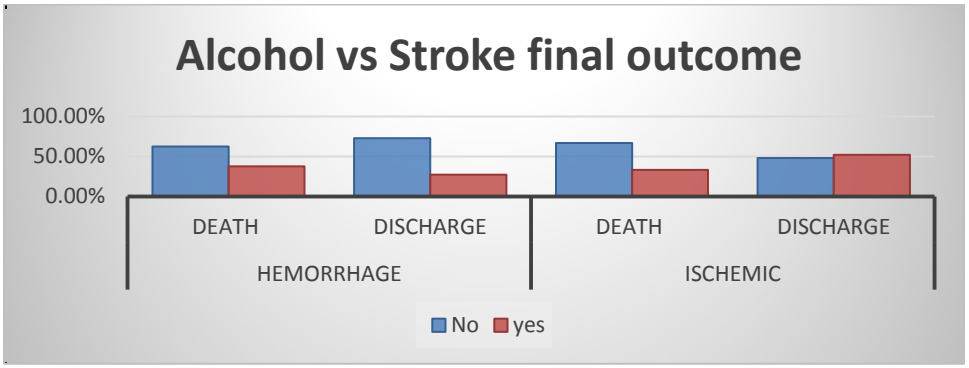


**Table no 15 Tobacco chewer vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhage | ischemic | |
| Tobacco chewer | No | Count | 15 | 30 | 45 |
| | | % | 78.90% | 96.80% | 90.00% |
| | Yes | Count | 4 | 1 | 5 |
| | | % | 21.10% | 3.20% | 10.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.285
As seen in the above table, tobacco chewing was observed in higher number of haemorrhagic stroke (21.10%) as compared to Ischemic stroke (3.20%). There was statistically no significant difference between tobacco chewing and type of stroke.

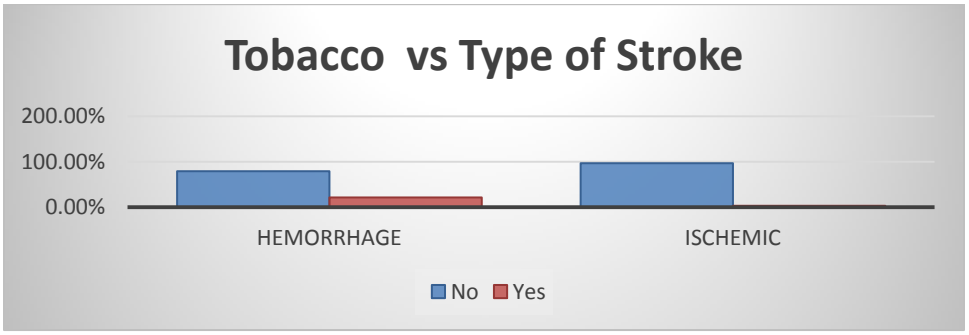




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**Table no 16 Tobacco chewer vs Stroke final outcome**

| | | | Haemorrhage | | Ischemic | |
|---|---|---|---|---|---|---|
| | | | Death | Discharge | Death | Discharge |
| Tobacco chewers | No | Count | 7 | 8 | 5 | 25 |
| | | % | 87.5% | 72.7% | 83.3% | 100.0% |
| | Yes | Count | 1 | 3 | 1 | 0 |
| | | % | 12.5% | 27.3% | 16.7% | 0.0% |
| Total | | Count | 8 | 11 | 6 | 25 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

Chi square test, P value (Haemorrhage Death vs Haemorrhage Discharge) – 0.435 (NS)
P value (Ischemic Death vs Ischemic Discharge)- 0.038 (NS)
P value (Haemorrhage vs Ischemic) -0.529 (NS)

As seen in the above table, tobacco chewing was observed in higher number of Ischemic stroke death (16.7%) as compared to haemorrhagic stroke (12.5%). There was statistically no significant difference between tobacco chewing and type of stroke.

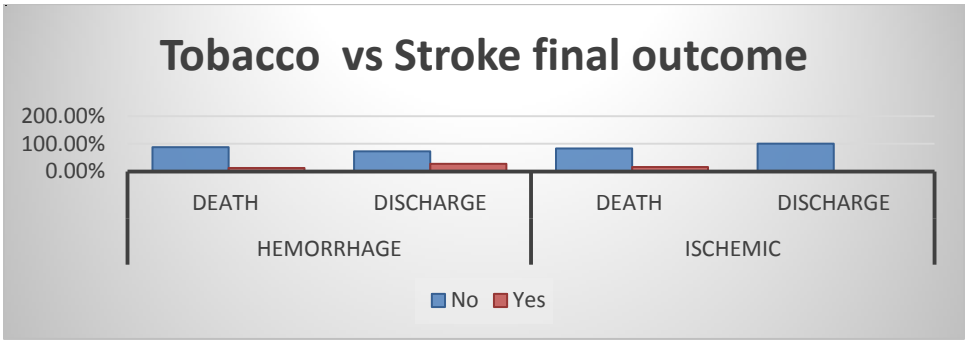


**Table no 17 Outcome vs Type of Stroke**

| | | | Type of stroke | | Total |
|---|---|---|---|---|---|
| | | | Haemorrhage | Ischemic | |
| Outcome | Death | Count | 8 | 6 | 14 |
| | | % | 42.10% | 19.40% | 28.00% |
| | Discharge | Count | 11 | 25 | 36 |
| | | % | 57.90% | 80.60% | 72.00% |
| Total | | Count | 19 | 31 | 50 |
| | | % | 100.00% | 100.00% | 100.00% |

Chi square test, P value- 0.001
As seen in the above table, death was observed in higher number of haemorrhagic stroke (42.10%) as compared to ischemic stroke (19.40%). There was statistically no significant difference between death and type of stroke.



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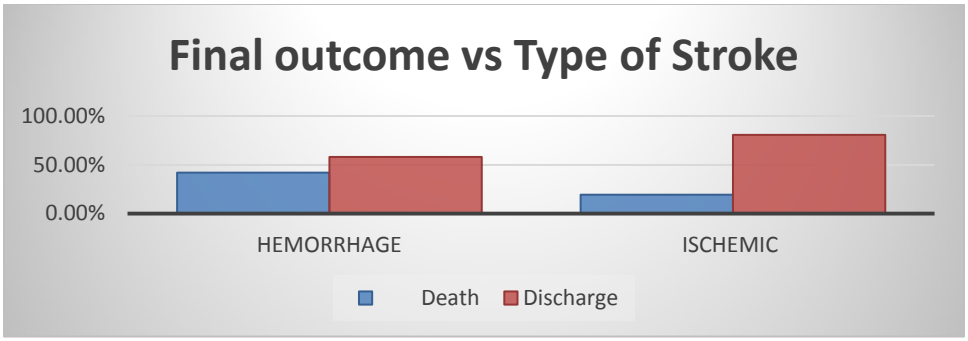


## Discussion

In the present study, most of the study population in haemorrhagic stroke belongs to the age group of 51 to 60 years (31.60%) followed by 61 to 70 years (21.10%) and more than 70 years (21.10%) while in Ischemic stroke, most of the study population belongs to the age group of 61 to 70 years (22.60%) followed by 51 to 60 years (19.40%) and more than 70 years (19.40%). There was statistically no significant difference between age group and Type of stroke. In the present study, in haemorrhagic stroke death was most commonly observed in 61 to 70 years (37.5%) and more than 70 years (37.5%) while in Ischemic stroke death was most commonly observed in 61 to 70 years (50%) and 31 to 40 years (33.3%). There was statistically no significant difference between age group and Stroke final outcome. This is in agreement with the study conducted by **K Ghanachandra Singh et al.**[5]**,** in which 15 cases (30%) of stroke occurred in the age group of 51 - 60 years; another 13 cases (26%) occurred in the age group of 61 - 70 years. This findings is in agreement with the study done by **Benjamin et al.**[6] at the International stroke centre, in 2001, Boston, USA, found that almost three quarters of all strokes occurred in people over 65 years of age. After age 55, the risk of a stroke doubled per decade. Similarly **Sharat Kumar B. Jaikar et al.**[7]**,** reported that maximum stroke cases were seen between 60-90 years because of strict control of hypertension and other risk factors, incidence of stroke is less in middle age group.

In the present study, there was male predominance (73.70% vs 87.10%) in both haemorrhagic stroke and Ischemic stroke as compared to female (26.30% vs 12.90%). There was statistically no significant difference between sex and type of stroke.

In the present study, death occurred in 62.5% of male and 37.5% of female study population in haemorrhagic stroke while death occurred in predominantly male study population in Ischemic stroke. There was statistically no significant difference between gender and Stroke final outcome. This is in agreement with the study conducted by **Hedna V.S. et al.**[8]**,** in which there was male dominance with 32 (71%) being diabetic males compared to 13 (29%) diabetic females.

In the present study, most of the study population in haemorrhagic stroke had time of onset of less than 6 hours (47.40%) and more than 12 hours (47.40%) while in Ischemic stroke, most of the study population had time of onset of more than 12 hours (45.20%) followed by 6 to 12 hours (29%). There was statistically no significant difference between time of onset and Type of stroke.

[5]*Singh, K. G., Singh, S. D., Bijoychandra, K., Kamei, P., & Chingkhei, B. M. (2014). A study on the clinical profile of stroke in relation to glycaemic status of patients. JIACM, 15(3-4), 177-81.*

[6]*Benjamin, E. J., Plehn, J. F., D'Agostino, R. B., Belanger, A. J., Comai, K., Fuller, D. L., ... & Levy, D. (1992). Mitral annular calcification and the risk of stroke in an elderly cohort. New England Journal of Medicine, 327(6), 374-379.*

[7]*Jaikar, S. K. B., Divya, N. S., & Rajan, C. (2014). Analysis of electrocardiographic changes in cerebrovascular accidents. IOSR J Dental Med Sci, 13(05), 25-29.*

[8]*Hedna, V. S., Bodhit, A. N., Ansari, S., Falchook, A. D., Stead, L., Heilman, K. M., & Waters, M. F. (2013). Hemispheric differences in ischemic stroke: is left-hemisphere stroke more common?. Journal of Clinical Neurology, 9(2), 97-102.*



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In the present study, in haemorrhagic stroke death was most commonly observed in time of onset of less than 6 hours (62.5%) followed by more than 12 hours (25%) while in Ischemic stroke death was most commonly observed in time of onset of more than 12 hours (50%) followed by less than 6 hours (33.3%) There was statistically no significant difference between time of onset and Stroke final outcome.

In the present study, Comorbidities like Hypertension was observed in higher number of Ischemic stroke (48.40%) as compared to haemorrhagic stroke (42.10%). There was statistically no significant difference between Hypertension and type of stroke. In the present study, death due to co morbidities like hypertension was observed in higher number of haemorrhagic stroke (62.5%) as compared to Ischemic stroke death (50%). There was statistically no significant difference between Hypertension and type of stroke. Similarly in the study done by **Roger V.L. et. al.**[9] showed that 77% of the patients with stroke had hypertension.

Similarly in the study done by **Pantoni L. (2010)**[10] suggested that lacunar stroke was caused almost entirely by hypertension-related small vessel disease. **Shaper et. al. (1991)**[11] concluded that, hypertension; cigarette smoking and pre-existing IHD were found to be the major risk factors.

In the present study, co morbidities like diabetes was observed in higher number of Ischemic stroke death (33.3%) as compared to haemorrhagic stroke (12.5%) . There was statistically no significant difference between diabetes and type of stroke. Both diabetes and metabolic syndrome are recognized to increase the risk of ischemic stroke in men and women.

These findings is in agreement with the study conducted by **Tandur S. & Sundaragiri S. (2016)**[12] in which hypertension was present in majority of the cases, i.e., 35%, which is comparable with that found in the studies of **Sacco et. al.**[13] in which hypertension was the most frequently reported cardiovascular disease affecting 38–75% of patients in each stroke diagnostic subtype, and diabetes mellitus was present in 30% of the patients in present study. In a study conducted by **Eaker E.D. et al**[14] Hypertension accounts for 35–50% of stroke risk which is comparable to the present study, i.e., 35%.

In the present study, Smoking was observed in higher number of Ischemic stroke (22.60%) as compared to haemorrhagic stroke (5.30%). There was statistically no significant difference between smoking and type of stroke. In the present study, smoking was observed in higher number of Ischemic stroke death (33.3%) as compared to haemorrhagic stroke (0%). There was statistically no significant difference between smoking and type of stroke. Similarly in the study done by **Gorelick et al.**[15] showed that individuals who had been smoking for 1-33 pack-years had increased risk for stroke than their non-smoker counterparts and there was an increased stroke risk with increased pack-years of smoking.

In the present study, alcohol consumption was observed in higher number of Ischemic stroke

[9]*Roger, V. L., Go, A. S., Lloyd-Jones, D. M., Benjamin, E. J., Berry, J. D., Borden, W. B., ... & Fullerton, H. J. (2012). AHA statistical update. Heart disease and stroke statistics–2012 Update. A report from the American Heart Association. Circulation, 125(1), e2-20.*

[10]*Pantoni, L. (2010). Cerebral small vessel disease: from pathogenesis and clinical characteristics to therapeutic challenges. The Lancet Neurology, 9(7), 689-701.*

[11]*Shaper, A. G., Wannamethee, G., Macfarlane, P. W., & Walker, M. (1993). Heart rate, ischaemic heart disease, and sudden cardiac death in middle-aged British men. Heart, 70(1), 49-55.*

[12]*Tandur, S., & Sundaragiri, S. (2016). A study of electrocardiographic changes in acute cerebrovascular accidents. Int J Med Sci Public Health, 5(12), 2560-5.*

[13]*Sacco, R. L., Foulkes, M. A., Mohr, J. P., Wolf, P. A., Hier, D. B., & Price, T. R. (1989). Determinants of early recurrence of cerebral infarction. The Stroke Data Bank. Stroke, 20(8), 983-989.*

[14]*Eaker, E. D., Chesebro, J. H., Sacks, F. M., Wenger, N. K., Whisnant, J. P., & Winston, M. (1993). Cardiovascular disease in women. Circulation, 88(4), 1999-2009.*

[15]*Gorelick, P. B., Rodin, M. B., Langenberg, P., Hier, D. B., & Costigan, J. (1989). Weekly alcohol consumption, cigarette smoking, and the risk of ischemic stroke: Results of a case-control study at three urban medical centers in Chicago, Illinois. Neurology, 39(3), 339-339.*



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(48.40%) as compared to haemorrhagic stroke (31.60%). There was statistically no significant difference between alcohol consumption and type of stroke. In the present study, alcohol consumption was observed in higher number of Ischemic stroke death (37.5%) as compared to haemorrhagic stroke (33.3%). There was statistically no significant difference between alcohol and type of stroke. These findings is in agreement with the study done at the University of Lille Nord de France by **Prugger C. et al.**[16] showed that 25% of all the people with stroke were classified as "heavy drinkers"(4-5 pegs/day){120-150ml},they were found to be getting stroke 14 years earlier than people who do not drink heavily. For younger patients with a stroke in the deep part of brain, heavy drinkers were much more likely to die within 24 months than their non-heavy counterparts.

In the present study, tobacco was observed in higher number of haemorrhagic stroke (21.10%) as compared to Ischemic stroke (3.20%). There was statistically no significant difference between tobacco and type of stroke. In the present study, tobacco was observed in higher number of Ischemic stroke death (16.7%) as compared to haemorrhagic stroke (12.5%). There was statistically no significant difference between tobacco and type of stroke.

## Conclusion

The study concluded that there was statistically no significant difference between age group and type of stroke. There was statistically no significant difference between age group and the final outcome of stroke. The study also showed that the gender of the patient has no relation with the type of stroke and the final outcome of stroke. The study findings showed that no significant relationship between time of onset of stroke and the final outcome.

Similarly there is statistically no significant difference between hypertension and type of stroke, diabetes and type of stroke, smoking and type of stroke, alcohol and type of stroke and tobacco and type of stroke.

So finally it can be concluded from the study that the epidemiological factors has primarily no direct relationship with the type of stroke and outcome of stroke.

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