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COMPARATIVE STUDY ON THE HEMORRHAGE AND ISCHEMIC STROKE PATIENTS– ANALYSIS OF MORTALITY, CLINICAL DEVELOPMENT AND RELATIONSHIP BETWEEN STROKE VARIABLES

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ABSTRACT

Introduction – Heart-disease and cancer are the top two killers in the world, but strokes are the third most common cause of death worldwide. Furthermore, one-third of stroke victims are left with long-term disabilities. An Ischemic-strokes account on 80% of all strokes, while hemorrhagic strokes account for 20% of all strokes.

Aim of this study – The main aim of this study is comparing the hemorrhage and ischemic stroke patients – analysis of mortality, clinical development and relationship between stroke variables.

Research Methodology – The design of this research is descriptive and exploratory in nature conducted at the department of neurosurgery, Lady ready hospital Peshawarr . The current study included 100 patients with an acknowledged stroke incidence (57 men and 43 women). The difference of statistics between infarct and hemorrhage on the demographic & clinical variables was discovered through the use of univariate and Multivariate analysis.

Data analysis – The data have been analyzed on total 100 patients based on the two types of the strokes using various statistical tools on clinical and demographic variables.

Conclusion –It is concluded that the in comparison to ischemic stroke, hemorrhagic stroke affected a younger age group. Stroke patients with a history of hypertension had a statistically insignificant link between their hypertensive history and the occurrence of the disease, according to the univariate analysis.

Keywords – Ischemic, Hemorrhagic, stroke, patients, mortality, clinical, risk etc.

1. INTRODUCTION

1.1 Stroke

Stroke is one of the top causes of mortality and disability around the world. Due to the accessibility of intense therapies, ischemic stroke is currently viewed as a period subordinate infection and

records for 87% of all strokes. Intracerebral discharge, which represents 10% of all strokes, and aneurysmal subarachnoid drain, which represents 3% of all strokes, are instances of hemorrhagic strokes. 2.7 million individuals kicked the bucket of ischemic stroke in 2017, 3 million from intracerebral discharge, and 0.4 million from aneurysmal subarachnoid drain in 2017. By and large, ischemic stroke has a preferable visualization over hemorrhagic stroke, which is bound to result in mortality in the acute and subacute stages. Because "stroke" comes from the Greek word "apoplexia," which means "deadly blow," drawing direct comparisons between our modern understanding of stroke and what has traditionally been referred to as apoplexy would be incorrect." [1]

A stroke is a medical disease in which blood flow to the brain is disrupted. The brain begins to die within minutes without the oxygen and nutrients carried by blood cells. This can result in problems such as brain damage, incapacity, or death. At the point when the blood stream to a locale of your mind is obstructed or decreased, cerebrum tissue is denied of oxygen and supplements, bringing about a stroke. In practically no time, synapses start to bite the dust. A stroke is a health related crisis that requires prompt consideration. Early mediation can assist with forestalling cerebrum harm and different issues

1.2 Ischemic Stroke

Ischemic strokes represent most of strokes (87%). At the point when blood course through the vein that takes care of oxygen-rich blood to the mind is interfered with, an ischemic stroke occurs.[2] Ischemic strokes are as often as possible brought about by checks brought about by blood clumps. Ischemic strokes happen when the blood supply routes that transport blood to the mind become stopped up, bringing about the deficiency of cerebrum tissue. Ischemic strokes can be isolated into two classes:

• Thrombotic Strokes - Thrombotic strokes happen when a blood coagulation creates in the mind's blood veins. [3]

• Embolic Strokes - Embolic strokes result from plaque develop or blood clumps in different spots of the body. They can go through your circulation system and into one of the blood veins that supply your mind

1.3 Hemorrhagic Stroke

A hemorrhagic stroke happens when a vein in the mind holes or bursts (tears open). The spilling blood puts an excess of strain on the synapses, making them separate. A hemorrhagic stroke occurs when blood clots in the brain, impairing its capacity to function. The bleeding can occur inside the brain or between the brain and the skull. About 20% of all strokes are caused by this condition. A hemorrhagic stroke occurs when a blood vessel ruptures in the brain and causes bleeding into the brain. Intracerebral haemorrhage (ICH) and subarachnoid haemorrhage are two additional types of hemorrhagic stroke (SAH) [4]. Hemorrhagic strokes are classified into two groups based on the location of the bleeding and the aetiology:

- **Intracerebral haemorrhage** - A broken blood vessel in the brain causes intracerebral haemorrhages.

- **Subarachnoid hemorrhage** - When a blood vessel in the brain is injured, blood accumulates on the surface, causing subarachnoid haemorrhages.

1.4 Causes of ischemic stroke vs. Hemorrhagic stroke

When the brain loses access to its important blood supply due to bleeding from a blood artery, hemorrhagic strokes occur. Ischemic strokes, on the other hand, occur when one of the blood arteries feeding the brain becomes blocked. [5]

There are a number of risk factors that can raise your possibility of having ischemic stroke or a hemorrhagic or ischemic stroke:

- High -cholesterol
- High- blood- pressure
- Heart -disease
- Diabetes
- Advancing -age
- Alcohol & drug abuse
- Poor diet choices

2. REVIEW OF LITERATURE

Emilia Salvadori, et al (2021) [6] -Studies comparing the recovery outcomes of ischemic (IS) and hemorrhagic (HS) strokes have shown inconsistent results. We needed to assess useful results upon release from a serious restoration medical clinic, think about IS versus HS, and break down potential indicators in this review observational examination of successive IS and HS patients. The key outcome was the Modified Rankin Scale (mRS) at discharge. HS was found in 81 of the 229 patients (mean age 72.9 13.9 years, 48 percent men) (35 percent). HS patients were significantly younger (75 ± 12.5 vs. 68.8 ± 15.4 years, p = 0.002), required longer hospitalizations both in acute (23.9 ±36.7 vs. 35.2 ±29.9 days, p = 0.019) and rehabilitation hospitals (41.5 ±31.8 vs. 77.2 ±51.6 days, p = 0.001), and had more severe initial clinical deficits (mean number of neurological impairments: 2.0 ±1.1 vs. 2.6 ± 1.4.

Rosa De Lima Renita Sanyasi and Rizaldy Taslim Pinzon (2018) [7] -Because stroke is a life-threatening disorder, it is critical to recognise and recognise various stroke symptoms. Stroke treatment is delayed due to a lack of awareness about the symptoms of a stroke. The goal of this study is to examine ischemic versus hemorrhagic stroke clinical symptoms and risk variables. This was a case-control experiment. Ischemic and hemorrhagic stroke patients were the participants of this investigation. Subject information was entered into an electronic stroke registry at Yogyakarta's Bethesda Hospital. Leg weakness was the most prevalent clinical complaint in both groups (76.4 percent vs 71.4 percent), while facial drooping was the least common (2 percent vs 3.6 percent). The most prevalent risk factor in both groups (48 percent vs. 71.4 percent) was hypertension, while atrial fibrillation was the most uncommon.

Amelia K. Boehme, et al (2017) [8] - Because stroke is such a diverse sickness, establishing risk factors and treatment is dependent on the pathogenesis of the disease. There are two kinds of hazard factors for stroke: modifiable and non-modifiable. Non-modifiable danger factors for both ischemic and hemorrhagic stroke incorporate age, sexual orientation, and race/identity, while modifiable danger factors incorporate hypertension, smoking, diet, and actual latency. The focal point of stroke anticipation has generally been on modifiable danger factors. Changes in way of life and conduct, for example, dietary changes or stopping smoking, bring down the danger of stroke, yet additionally bring down the danger of other cardiovascular diseases.

Zhang Y, et al (2011) [9] - The combined effects of many lifestyle factors on stroke risk are yet unknown, particularly in the case of hemorrhagic stroke. We studied the relationship between different lifestyle indicators (smoking, BMI, physical activity, and vegetable and alcohol consumption) and total and type-specific stroke incidence in 686 Finnish participants aged 25 to 74 who were free of coronary heart disease and stroke at the start of the study. 1478 patients had an incident stroke event over the course of a 13.7-year follow-up period (1167 ischemic and 311 hemorrhagic). Both men and women had comparable inverse relationships.

Ivica Bilić, et al (2009) [10] - The goal of the research was to prove that risk factors for ischemic

and hemorrhagic strokes are the same. A total of 1066 stroke patients were included in this retrospective analysis. Patients with ischemic and hemorrhagic stroke were compared in terms of risk variables and hospital-based survival. Patient records were consulted for information. For dependent samples, statistical analysis was performed using the chi2-test and the t-test. There were 70 (47.9%) female patients and 76 (52.1%) male patients in the hemorrhagic stroke group. Ischemic stroke patients were split into two groups: 450 (48.9%) females and 470 (51.1%) males. Finally, data analysis revealed differences between hemorrhagic and ischemic strokes in terms of risk factors as well as stroke outcome.

3. PROBLEM STATEMENT

Up until recently, there were very few Indian studies dedicated to the problem of stroke. Many prospective and retrospective studies are now being conducted to shed more light on the mystery of stroke, however, as a result of a shifting trend It is found a link between elevated cholesterol and an increased risk of ischemic stroke, but others did not. It only looked at hemorrhagic stroke found a negative correlation, with an increased risk even at the lowest total cholesterol level. However, no concrete conclusions could be drawn from these investigations about the risk factors for stroke. Hence the study entitles – "**Comparative Study on The Hemorrhage and Ischemic Strokes – Analysis of Mortality, Clinical Development and Relationship Between Stroke Variables".**

4. OBJECTIVES OF THE STUDY

- To discuss the concept of hemorrhagic and ischemic stroke
- To think about clinical discoveries and hazard factors in hemorrhagic and ischemic stroke patients.
- To estimate the variables that influence the mortality result of a stroke in the medical clinic.

5. MATERIALS & METHODS OF STUDY

5.1 Research Design

The design of this research is descriptive and exploratory in nature.

5.2 Study setting

This study was conducted at the department of neurosurgery, Lady ready hospital Peshawarr .
This study was carried out at Madras Medical College, a government general hospital that serves primarily low-income rural and urban residents with low literacy rates.

5.3 Sample of the study

The current study included 100 patients (57 men and 43 women) who had been admitted with a confirmed stroke, which was defined as a sudden start of a neurological deficit or a subarachnoid haemorrhage with symptoms lasting at least 24 hours. (Unless death occurred within 24 hours of symptom onset or CT/MRI revealed a lesion consistent with the symptoms) and there is no underlying brain trauma, tumour, or infection that is causing the symptoms.

5.4 Type of Stroke

Using all available data, skilled physicians classified stroke cases as ischemic or hemorrhagic. When the abstractor was unable to determine the type of stroke based on the physical diagnosis or imaging reports, the documentation was evaluated by a study physician in consultation with a neurologist to classify the stroke type.

5.5 Criteria of the study

5.5.1 InclusionCriteria:

- Patients over the age of 45 were included because they make up the majority of that age group.
- Patients with a CT scan that shows a lesion.

5.5.2 Exclusion Criteria:

- Stroke in people under the age of 45.
- Patients with cardioemboli and venous thrombosis who have had a stroke.

5.6 Tools and Methods used in this study

In each case, a complete history of the onset, predisposing factors, and nature of the stroke was recorded. Following that, a thorough clinical examination was performed to check for the GCS and the existence of seizures. Patients were asked about risk factors such as SHT, DM, smoking, and alcohol consumption.

Patients were then sent for extra tests, for example, a total hemogram, glucose, urea, creatinine, serum electrolytes, and a chest X-ray.Within 48 hours of the beginning of stroke, all patients had a fasting lipid profile performed by a computerized analyzer. In intense stroke, serum TG fixations don't change, and estimation inside the initial 48 hours seems, by all accounts, to be a decent impression of typical TG esteems in individual patients.

Reverberation was utilized to check and screen the cardiovascular framework depending on the situation. ALOKA echocardiography was utilized to perform two-dimensional and M mode echocardiography with the patient in the left horizontal position. The echocardiogram was performed by a senior cardiologist. This cardiologist, who was dazed to, not really settled the presence of blood clot sooner rather than later. The construction of the mitral, aortic, tricuspid, and aspiratory valves (different phases of spewing forth and stenosis were evaluated) just as the presence of vegetations were given exceptional consideration.

- In all instances, an EKG was performed to rule out acute coronary syndrome, arrhythmias, and signs of long-term hypertension.
- All cases received a CT scan within 24 hours. For patients who had a posterior circulatory stroke, an MRI was performed.
- For analysis, all of the data's results are presented in tabular form.

5.7 Statistical tools used in this study

- Clinical and demographic data, with frequencies and percentages assigned to qualitative forms.
- Clinical and demographic data, with mean and standard deviation for quantitative forms.
- Univariate analysis was used to determine whether there was a substantial distinction between hemorrhage and infarct on demographic and clinical variables.
- A multivariate calculated relapse examination was utilized to decide the factual importance contrast among discharge and infarct dependent on segment and clinical factors.
- P value of less than 0.05 was considered to be significant.

6. DATA ANALYSIS AND RESULTS

6.1 Demographic profile

The table and figure below show the stroke subtypes that occur:

Table 1: Type of the stroke

Type of Stroke	F	%
Hemorrhage	22	22%
Infarct	74	74%
SAH	4	4%
Total	100	100

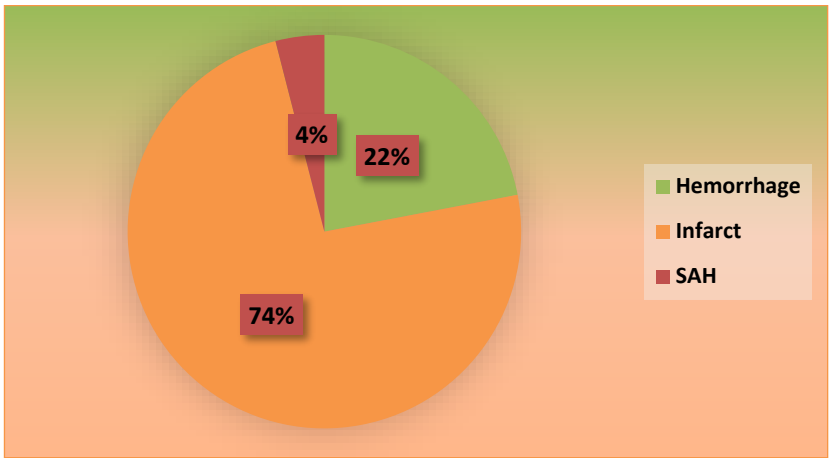

Figure 1: Type of the stroke

It is stated from the above table that 22% of the patients suffer from Hemorrhage, 74% suffer from Infarct and remaining 4% suffer from SAH.The below table and figure depicting the sex shows a preponderance of ischemic stroke in male gender.

Table 2: Gender of the Patient

Type of stroke	Male	Female
Hemorrhage	9	13
Infarct	50	24
SAH	1	3

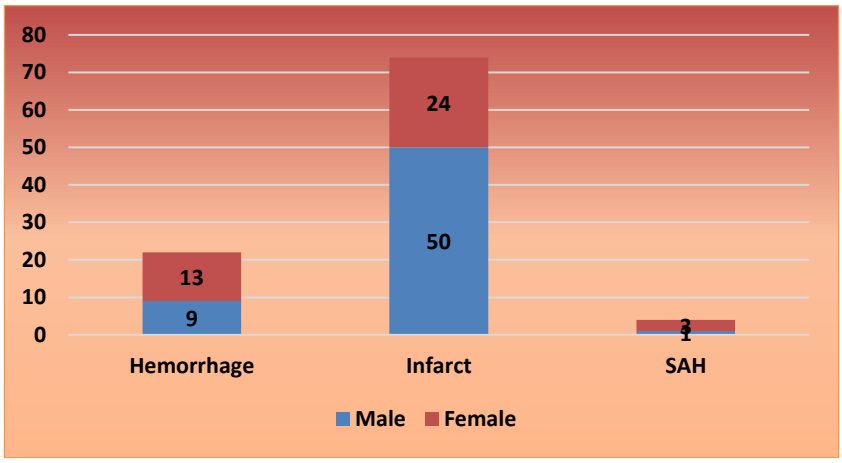

Figure 2: Gender of the Patient

It is stated that 9 male and 13 female suffer from Hemorrhage, 50 males, 24 females suffer from Infarct and 1 male, 3 females suffer from SAH stroke.

Table 3: Age group of the Patient

Age group	Hemorrhage	Infarct
46-55	2	5
56-65	15	23
66-75	5	39
76-85	0	7

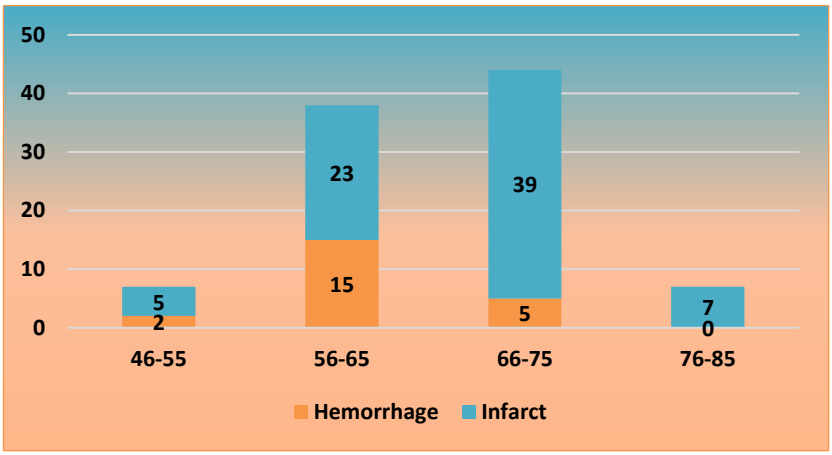

Figure 3: Age group of the Patient

Although the figure and table show a linear relationship between stroke and age in the 45-75 age group, it is worth noting that the incidence of hemorrhagic stroke decreases in the 66-75 age group.

Table 4: Relationship between smoking and stroke

Opinion	Infarct	Haemorrhage
Smoking	43	5
No smoking	5	4

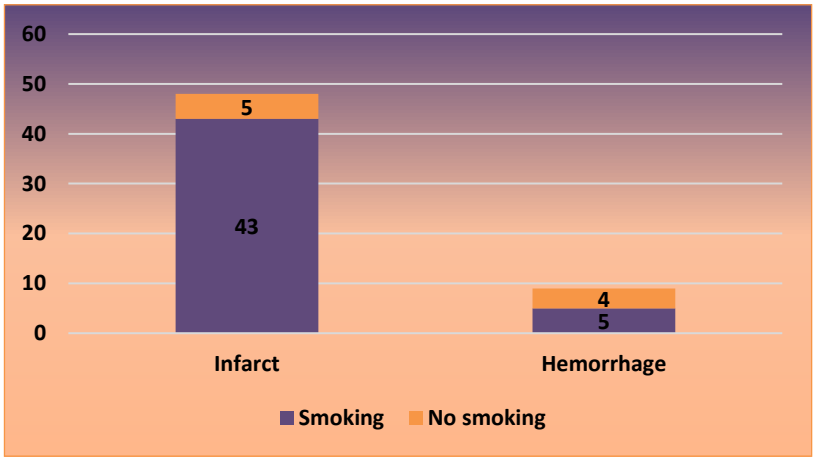

Figure 4: Relationship between Smoking and Stroke

It is stated from the above table and figure that 43 from infarct and 5 from Haemorrhage are comes under smoking while remaining comes under no-smoking category.

6.2 Relationship between Demographic and ClinicalVariablesofStroke

Table 5:Relationship between DemographicandClinicalVariablesofStroke

Variables	Infarct	Hemorrhage	SAH	P value*
Sex(M: F)	48:26	8:14	1:3	0.03
Hypertension history	47%	50%	50%	0.97
Diabetichistory	50%	36%	50%	0.53
Smoking	58%	22%	25%	0.01
Alcohol	51%	14%	25%	0.01
Seizures	14%	59%	50%	0.001

*P<0.05issignificant

Men outmatched women overall, and in cases of infarction, men had a higher incidence of

hemorrhagic stroke. The discovery that people with a history of hypertension, diabetes, smoking, and alcohol consumption were more likely to have an infarct is a significant step forward during the study.

6.3 Relationship among types of strokes and Variables through Univariate analysis

Table 6: Relationship among types of strokes and Variables through Univariate analysis

Variables	Infarct (Mean ±SD)	Hemorrhage (Mean ±SD)	SAH (Mean ±SD)	Pvalue*
Age	67.69±8.55	62.40±8.06	62.40±7.91	0.006
SBP	162.90±18.75	184.74±28.66	173.02±29.72	0.001
Diastolic blood pressure	108.47±16.59	122.10±21.42	117.01±27.34	0.005
High density lipoprotein	36.55±8.12	48.37±5.12	47.03±2.32	0.001
Low density lipoprotein	164.82±30.39	134.28±25.78	138.24±25.33	0.001
Totalcholesterol	231.10±24.13	229.16±21.63	227.15±22.11	0.71
TGL	252.29±31.60	231.46±31.16	228.26±33.25	0.01

*P<0.05issignificant

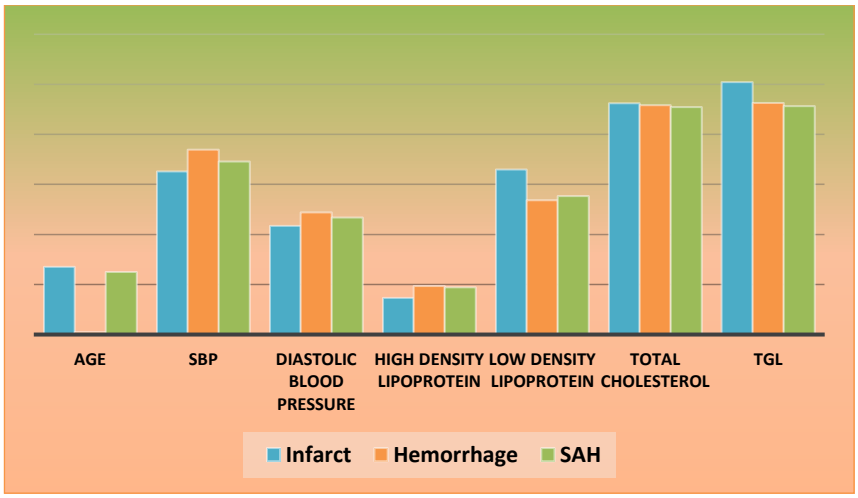

Figure 5: Mean of the variables

Compared to ischemic stroke, hemorrhagic stroke affects people who are younger. Ischemic stroke victims were on average 67.69 years old, compared to 62.40 for hemorrhagic stroke victims. Subarachnoid haemorrhage patients were, on average, 59.75 years old. Because aneurysms are the most common cause of subarachnoid haemorrhage, it occurs early. Patients between the ages of 56 and 65 are most commonly affected by hemorrhagic stroke. Cerebral infarction, on the other hand, usually strikes people between the ages of 66 and 75.

On the other hand, our research found a larger tendency toward bleeding (48.37) than ischemia in terms of mean HDL levels (36.55). A similar link was found in a previous study done in Western Washington between 1989 and 2000. HDL values were found to be 55 in hemorrhagic stroke patients and 50 in ischemic stroke patients. According to another case-control study, the link between HDL cholesterol and stroke was stronger in those with atherosclerotic vascular disease, and our findings support this. The presence of a low HDL-C concentration was found to be associated with an increased risk of dying from an ischemic stroke in a 1997 multivariate analysis. A 5% drop in HDL cholesterol was linked to a 1.18 relative risk (95 percent confidence interval, 1.04 to 1.35). Higher HDL –C levels, on the other hand, were shown to be more closely associated with nonfatal stroke in a study published in 2000. Stroke death did not have any connections to

anything in the study. The theory put forth was that fatal stroke patients who were also heavy drinkers had greater HDL levels. When it came to subarachnoid haemorrhage and cerebral infarction, higher levels of HDL cholesterol were linked to a lower risk, but not to a higher risk of bleeding inside the brain itself. All of the subgroups had cholesterol levels above 200 on average. Hemorrhagic patients, on the other hand, had a mean blood pressure of 227.15±22.11. [231.10±24.13] was lower than in ischemic stroke. According to the results of a study done in Western Washington, hemorrhagic strokes have a lower mean TC level (229) than ischemic strokes (235). Low levels of serum cholesterol may cause endothelial weakness in the tiny intracerebral arteries, resulting in hemorrhagic stroke when combined with hypertension.
Univariate Analysis of steady factors uncovered that age, LDL, complete cholesterol and greasy substances had a straight relationship with infarct and more raised degrees of systolic circulatory strain, diastolic pulse and HDL were more associated with hemorrhagic stroke.

6.4 Development of the stroke through Multivariate analysis

It is shown by the Multivariate assessment of hazard factors for stroke by strategic relapse that the high HDL-C level has in reverse association with the improvement of ischemic stroke however the high LDL-C has direct relationship.

Table 7: Development of the stroke through Multivariate analysis

Variables	Significant	Exp(B)
Diastolic blood pressure	0.97	1.036
High density lipoprotein cholesterol	0.001	.812
Low density lipoprotein cholesterol	0.23	1.029
Seizures	0.12	.254

Diastolic and high diastolic blood pressure were found to be strongly linked to hemorrhagic stroke as well. All variables' significant values are less than or equal to 1.00, so it's noteworthy.
Variables including diastolic blood pressure, low density lipoprotein cholesterol, and total cholesterol were found to be strongly correlated with mortality rates exclusively in patients who had ischemic strokes.

6.5 Mortality of stroke patients in Hospitals

Table 8: Mortality of stroke patients in Hospitals

Variables	Significant	Odds ratio	Lower limit	Upper limit
Diastolic blood pressure	0.023	1.31	1.18	1.69
High density lipoprotein	0.108	0.840	0.679	1.041
Low density lipoprotein	0.001	1.35	1.13	1.88
Total cholesterol	0.001	1.277	1.12	1.461

7. CONCLUSION

The examination arrived at the accompanying resolutions:
Although smoking, liquor, high LDL and low HDL are earnestly associated with ischemic stroke, the autonomous danger factors for the improvement of stroke are high LDL and low HDL.
High levels of diastolic circulatory strain, LDL – C, outright cholesterol are independent danger factors for the mortality in stroke patients.
Ischemic stroke is normal resident than hemorrhagic stroke.
Males are ordinarily impacted than females.

7.1 Findings

Hemorrhagic stroke accounted for just 26% of the cases, whereas infarct stroke accounted for 74%. (ICH 22 percent, SAH 4 percent).

Hemorrhagic stroke patients had lower mean LDL cholesterol levels (134.28 mg/dL) than those with ischemia (164.82 mg/dL; P = 0.001). It is clear from the univariate LDL cholesterol study that having a higher LDL – C level raises your risk of heart disease and stroke.

We found that our study group had higher TGL levels in infarct patients (252.2±31.60) compared to hemorrhagic patients (231.46±31.16) while considering triglycerides. As indicated by David Tanne et al., Director of the stroke unit at Sheeba Medical Center in Israel, high fatty oil levels are related with an expanded danger of ischemic stroke. This connection is huge. As per our discoveries, men dwarf ladies with regards to ischemic strokes, which are more normal. Hemorrhagic strokes were likewise more normal in ladies. The average age was determined to be 65 for both sexes.

REFERENCES

1. Coupland, Alex & Thapar, Ankur & Qureshi, Mahim & Jenkins, Harri & Davies, Alun. (2016). The definition of stroke. Journal of the Royal Society of Medicine. 141076816680121. 10.1177/0141076816680121.
2. Gebreyohannes, Eyob & Bhagavathula, Akshaya & Befekadu, Tamrat & Seid, Mohammed & Taye, Kaleab. (2019). 2019 Ischemic Stroke. Stroke Research and Treatment. 2019. 10.1155/2019/7275063.
3. Rojsanga, Worapot & Sawanyawisuth, Kittisak & Chotmongkol, Verajit & Tiamkao, Somsak & Kongbonkiat, Kannikar & Kasemsap, Narongrit. (2019). Clinical risk factors predictive of thrombotic stroke with large cerebral infarction. Neurology International. 11. 10.4081/ni.2019.7941.
4. Mehta, Parth & Aka, Unnithan. (2020). Hemorrhagic Stroke. https://www.ncbi.nlm.nih.gov/books/NBK559173/
5. Silva, Gisele & Koroshetz, Walter & González, R. & Schwamm, Lee. (2010). Causes of Ischemic Stroke. 10.1007/978-3-642-12751-9_2.
6. Emilia Salvadori, et al (2021). Comparison between Ischemic and Hemorrhagic Strokes in Functional Outcome at Discharge from an Intensive Rehabilitation Hospital. Diagnostics 2021, 11, 38
7. Rosa De Lima Renita Sanyasi and Rizaldy Taslim Pinzon (2018) - CLINICAL SYMPTOMS AND RISK FACTORS COMPARISON OF ISCHEMIC AND HEMORRHAGIC STROKE.JKKI, Vol 9, No 1
8. Amelia K. Boehme, et al (2017). Stroke Risk Factors, Genetics, and Prevention. Circulation ResearchVol. 120, No. 3
9. Zhang Y, Tuomilehto J, Jousilahti P, Wang Y, Antikainen R, Hu G. Lifestyle Factors on the Risks of Ischemic and Hemorrhagic Stroke. Arch Intern Med. 2011;171(20):1811–1818. doi:10.1001/archinternmed.2011.443
10. Bilić, Ivica & Dzamonja, Gordan & Lusic, Ivo & Matijaca, Meri & Caljkusić, Kresimir. (2009). Risk factors and outcome differences between ischemic and hemorrhagic stroke. Acta clinica Croatica. 48. 399-403.