



DYSLIPIDEMIA AS A RISK FACTOR IN ISCHEMIC STROKE PATIENTS AT A TERTIARY CARE CENTRE: CROSS-SECTIONAL STUDY

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ABSTRACT **Introduction:** Ischemic stroke is a significant issue for global public health and one of the leading causes of morbidity and mortality. It is brought on by a reduction in blood flow to a portion of the brain as a result of a clot or blood vessel obstruction. Smoking, cholesterol, diabetes mellitus, and hypertension are some of the prevalent modifiable risk factors for stroke. Increased cholesterol levels influence changes in the permeability of the vascular endothelium. Atherosclerosis is facilitated by hyperlipidemia, which also raises the chance of stroke occurrence. Therefore, the purpose of this study was to evaluate the prevalence and trends of dyslipidemia among people who had acute ischemic strokes. **Materials and Methods:** Study design: Descriptive cross sectional Study, Study Area: Department of Medicine, Shri Ram Murti Smarak Institute of Medical Sciences at Bareilly, Uttar Pradesh. Study Period: February 2021 to July 2022 (18 months). Study subject: Adult patients with acute ischemic stroke, Sample size: 100. Clinical features, risk factors, lipid profiles and stroke patterns were analysed through Excel 2019 and SPSS 16. **Results:** The average age of the study participants was 60.98 ± 14.7 years, and the median age was 62 years. 71% of the study participants were men and 29% were women. One of the most prevalent risk factors in the study sample was dyslipidemia, which was present in 40% of cases. **Conclusions:** This study concludes hypertension, dyslipidemia, and diabetes are the three main risk factors for stroke, with hypertension being the most common in the study group. As a modifiable risk factor, dyslipidemia should be the main focus of national efforts to avoid strokes. The study contends that enhancing the physical function of stroke survivors requires addressing hyperlipidemia through interventions like medication or exercise regimens.

KEYWORDS : Ischemic stroke, Hyperlipidemia, Hypertension, Risk Factor

INTRODUCTION

Stroke is a significant global public health burden and is the most common cause of permanent impairments among adults caused by a disruption of the blood flow due to blood vessel injuries in the brain. The World Health Organization defines a stroke as a neurological deficit caused by a cerebrovascular event that lasts longer than 24 hours or results in mortality within 24 hours.^[1] Atherosclerosis, which is characterized by plaque formation with an accumulation of lipids, fibrin, complex carbohydrates, and calcium deposits on the artery walls and results in a progressive narrowing of blood arteries, is a primary contributing factor in stroke.^[2,3] Therefore, controlling atherosclerosis is crucial for lowering the incidence of stroke in the general population.^[4,5] Blood lipid levels have been demonstrated to be associated with stroke.^[6] Hemorrhagic stroke is brought on by intracerebral bleeding, subarachnoid hemorrhage, subdural hematoma, or epidural hemorrhage. Ischemic stroke is brought on by systemic hypoperfusion, embolism, or venous thrombosis. Nearly 80% of stroke cases are ischemic strokes, while hemorrhagic strokes are less frequent. Particularly, there is a fivefold increase in the risk of hemorrhagic stroke with amphetamine and cocaine addiction. Since the study aims to analyze Dyslipidemia as a risk factor in patients of ischemic stroke in Rohilkhand region.

Objective

- 1) The objective of the study is to investigate the prevalence of dyslipidemia in patients who have experienced acute ischemic strokes.

MATERIALS AND METHODS

This is a cross sectional observational study, conducted in the Medicine Department of Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly from February 2021 to July 2022 (18 months).

Inclusion Criteria

- Clinically & radiologically proven cases of ischemic stroke
- All the cases of ischemic stroke within 1 week of onset.
- Age more than 18 years

Exclusion Criteria

- Stroke associated with neuro-infectious diseases
- Hemorrhagic stroke

- Recurrent ischemic stroke
- Known case of prothrombotic state

Sample Size

Total 98 patients presenting with the signs and symptoms of ischemic stroke admitted in IPD or evaluated in OPD were investigated for :-

- 1) Routine blood tests.
- 2) ECG
- 3) CT scan/ MRI of Brain
- 4) Lipid Profile

A detailed history which included the various risk factors along with a detailed neurological review was taken. This study was carried out after approval from the ethical committee of the institute.

Statistical Analysis

The data collected in this study were subjected to analysis using the Statistical Package for Social Sciences version 16 (SPSS v.16). The results were presented as mean $\pm$ standard deviation (SD) for continuous variables, together with the range and frequency (%) for categorical variables, using descriptive statistics to summarize the data. The Chi-square test was used to look at associations, with a P-value of less than 0.05 establishing statistical significance.

RESULT

In the present study, mean age of study subjects was 60.98 ± 14.7 years with the median age of 62 years as shown in table 1 below. Most of the cases (27%) belonged to age group 61-70 years.

Table 1: Distribution Of Age In Study Participants (N=100)

Age (years)	Frequency	Percentage
21-30	3	3%
31-40	9	9%
41-50	11	11%
51-60	23	23%
61-70	27	27%
71-80	18	18%
81-90	9	9%
Mean $\pm$ SD (age)	60.98 ± 14.7 years	
Median age (25th-75th percentile)	62 years	

Further figure 1 depicts that 71% (71) patients were males and 29% (29) patients were females.

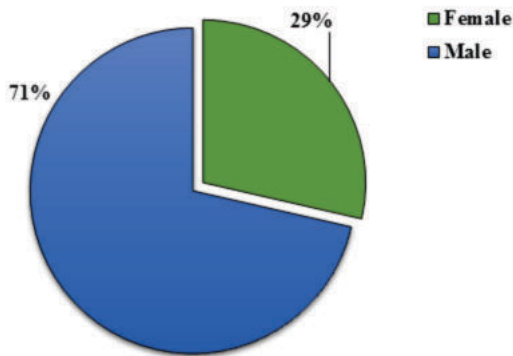


Figure 1: Gender Distribution Of Study Subjects

Table 2 provides lipid profiles provide important information about their lipid and cholesterol levels. The individuals' average total cholesterol level was 175.65 mg/dL on average, with a standard deviation of 41.61. The range was from 77 mg/dL to 252 mg/dL, and the median value (25th-75th percentile) was 173.5 mg/dL. This shows that total cholesterol levels in the study population were moderately variable, with some people having higher or lower amounts. Similarly the standard deviation of the average triglyceride level, which was 132.36 mg/dL on average, was 63.94. The range covered 41 mg/dL to 352 mg/dL, with 116 mg/dL serving as the median. According to these findings, there is a wide range of triglyceride levels among the study subjects, with some having noticeably higher levels.

LDL (low-density lipoprotein) cholesterol levels ranged from 103.34 mg/dL on average to 35.44 mg/dL on a standard deviation basis. The range encompassed 16 mg/dL to 185 mg/dL, and the median value was 104.5 mg/dL. The study population's LDL cholesterol levels varied according to this information, with the majority falling between the 25th and 75th percentile range.

Table 2:- Lipid Profile Of Study Subjects

Investigations	Mean $\pm$ SD	Median (25th-75th percentile)	Range
Total cholesterol (mg/dL)	175.65 $\pm$ 41.61	173.5(148-206)	77-252
Triglycerides(mg/dL)	132.36 $\pm$ 63.94	116(87.75-163.75)	41-352
LDL(mg/dL)	103.34 $\pm$ 35.44	104.5(85-133)	16-185
VLDL(mg/dL)	26.42 $\pm$ 12.68	23(18-33)	8-70
HDL(mg/dL)	44.52 $\pm$ 13.6	42(35-50.25)	24-88

Very low-density lipoprotein (VLDL) cholesterol levels ranged from 26.42 mg/dL on average to 12.68 mg/dL on a standard deviation basis. The range went from 8 mg/dL to 70 mg/dL, and the median value was 23 mg/dL. These findings highlight how the study participants' VLDL cholesterol levels varied, with some having higher amounts than others. Furthermore, average HDL (high-density lipoprotein) cholesterol level, which was 44.52 mg/dL with a standard deviation of 13.6. The range included 24 mg/dL to 88 mg/dL, and the median value was 42 mg/dL. A lower risk of heart disease is often linked to higher HDL cholesterol levels. In our study 64% of patients had hypertension followed by diabetes in 40%, dyslipidemia in 32% and smoking in 7%.

DISCUSSION

A total of 98 patients participated in our study comprising of 70 males and 28 females. The mean age was 60.98 $\pm$ 14.7. Men are usually more predisposed to ischemic stroke than females. In present study, majority 27% patients belonged to age group 61-70 years followed by 51-60 years (23%). In a study conducted by Michael Adeyemi Olamoyegun et al⁷ mean age was of the subjects was 56.21 $\pm$ 12.38 and 64.08 $\pm$ 10.87 years for the hemorrhagic and ischemic stroke patients respectively. A study conducted by Sasikumar P et al¹², average age of patients studied was 58 years. Hays AG et al¹³ reported mean age as 70 $\pm$ 12 years with most common age group of 51-70yrs. Study conducted in Tibetan autonomous region by Yuhua Zhao et al¹⁴ reported mean age of stroke being 60.32 $\pm$ 1.04 years while Roger X You et al¹⁵ reported the mean age of 59 years in stroke patients.

In our study about 71% patients were males and 29% were females. Men are usually more predisposed to ischemic stroke than females. This is probably because smoking and intake of alcohol is much more prevalent among men in the Indian society. Khan et al⁸ found hypertension (65%), dyslipidemia (32.7%), Diabetes (31.3%) and smoking (32%) as major risk factors for stroke. XU Tian et al⁹ reported That serum levels of TC, LDL-C, and HDL-C were significantly associated with the outcome in patients with acute ischemic stroke. Baral S et al¹⁰ reported that the prevalence of dyslipidemia among ischemic stroke patients in this study was 80% with hypertriglyceridemia being the most common finding. Similarly, Thapa A et al showed an incidence of dyslipidemia was 92.30% in Ischemic Stroke patients.

CONCLUSION

Stroke is a major public health problem worldwide. Hypertension, diabetes mellitus, dyslipidemia and smoking are some of the common modifiable risk factors in the occurrence of stroke. Evidence from this study suggests that dyslipidemia, hypertension and diabetes are the most frequent risk factor of stroke. In our sample, hypertension being the most common. Dyslipidemia is one of the modifiable risk factors for the development of stroke. Khan et al⁸ found hypertension (65%), dyslipidemia (32.7%), Diabetes (31.3%) and smoking (32%) as major risk factors for stroke. Hence, control of dyslipidemia should be targeted in the primary prevention of stroke in order to reduce the burden of stroke in our country. Based on the results of this study, we also suggest treatment for hyperlipidemia should be implemented throughout the therapeutic interventions, such as pharmacological or exercise programs, in order to restore the physical function of stroke survivors.

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