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Clinical Profiles of Dyslipidaemia in Stroke Patients Attending a Tertiary Care Center

***Dr. A.K.M. Asad-Ud-Doza[1], Dr. Sabbir Jashim Ahmed[2], Dr. Md. Asif Zaman[3], Dr. Md. Nur Nabi Shuvo[4], Dr. Tasnuva Tabassum[5], Dr. Tania Nargis[6], Dr. Nadia Siddiquee[7], Dr. Nafiza Alam[8], Dr. Sumayia Sultana[9]**

[1]Registrar, Department of Physical Medicine and Rehabilitation, BIRDEM General Hospital, Dhaka, Bangladesh

[2]Resident Physician, Department of Emergency and Casualty, BIRDEM General Hospital, Dhaka, Bangladesh

[3]Registrar, Department of Medicine, East West Medical College and Hospital,Dhaka, Bangladesh

[4]Medical Officer, Emergency and Casualty, BIRDEM General Hospital, Dhaka, Bangladesh

[5]Registrar, Department of Medicine, United Medical College Hospital, Dhaka, Bangladesh

[6]Junior Consultant, Department of Neurology, Mugda Medical College and Hospital, Dhaka, Bangladesh

[7]Assistant Professor, Department of Physical Medicine and Rehabilitation, BIRDEM General Hospital, Dhaka, Bangladesh

[8]Intern Doctor, Department of Dental Surgery, BIRDEM General Hospital, Dhaka, Bangladesh

[9]Resident, Department of Internal Medicine, BIRDEM General Hospital, Dhaka, Bangladesh

Corresponding Author: Dr. A.K.M. Asad-Ud-Doza, Registrar, Department of Physical Medicine and Rehabilitation, BIRDEM General Hospital, Dhaka, Bangladesh

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ABSTRACT:

Background: Stroke remains a leading cause of mortality and disability worldwide, with dyslipidaemia recognized as a major modifiable risk factor. Identifying lipid abnormalities among stroke patients is essential for prevention and long-term management, particularly in developing countries like Bangladesh where population-specific data are limited.

Methods: This observational study was conducted among hospitalized patients in the Medicine and Neurology Departments of Dhaka Medical College Hospital, Dhaka, from July 2008 to December 2008. A total of 100 consecutive stroke patients were included. Patients presenting with acute or recurrent stroke and not on anti-lipid drugs were enrolled after obtaining informed consent. Detailed clinical evaluation, including neurological and cardiovascular examination, was performed. Serum lipid profile was measured using the spectrophotometric method with the RA–50 Chemistry Analyzer.

Results: Male predominance was observed, with a male-to-female ratio of 2.55:1. Most patients were above 60 years of age. Based on waist circumference, 32% were obese. Clinical signs of dyslipidaemia included arcus lipidus in 10% and xanthoma in 9%. Only 33% had optimal LDL levels, while 77% had abnormal LDL, among whom 47% were ischaemic stroke. Elevated total cholesterol was found in 44% and low HDL in 30% of patients, of whom 38% and 22% respectively had ischaemic stroke.

Conclusion: The study demonstrates a high prevalence of dyslipidaemia among stroke patients, particularly those with ischaemic stroke. Routine lipid screening and aggressive management are recommended to reduce stroke risk.

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Introduction

Stroke remains one of the leading causes of death and long-term disability worldwide. It represents a major public health challenge, particularly in developing countries where the burden of non-communicable diseases is rising rapidly [1, 2]. Stroke is broadly classified into ischaemic and haemorrhagic types, with ischaemic stroke accounting for the majority of cases [3]. The occurrence of stroke is influenced by a number of modifiable and non-modifiable risk factors such as hypertension, diabetes mellitus, smoking, obesity, and dyslipidaemia. Among these, dyslipidaemia plays a crucial role in the pathogenesis of atherosclerosis, which is a major underlying mechanism in ischaemic stroke [4].

Dyslipidaemia refers to an abnormal lipid profile characterized by elevated total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), or reduced high-density lipoprotein cholesterol (HDL-C) [5]. These lipid abnormalities contribute to endothelial dysfunction, plaque formation, and arterial occlusion, thereby increasing the risk of cerebrovascular events [6]. Previous studies have demonstrated that elevated serum cholesterol and LDL-C levels are associated with an increased risk of ischaemic stroke, while low HDL-C is a strong predictor of recurrent vascular events. Conversely, the relationship between lipid levels and haemorrhagic stroke is less clear, with some studies suggesting a possible inverse association between cholesterol levels and the risk of intracerebral haemorrhage [7].

Understanding the pattern and prevalence of dyslipidaemia among stroke patients is important for several reasons. Firstly, it helps identify high-risk individuals who may benefit from early intervention [8]. Secondly, it provides essential data for developing preventive strategies, especially in populations with limited access to healthcare resources. Thirdly, it guides clinicians in implementing appropriate secondary prevention measures, including lipid-lowering therapy, dietary modifications, and lifestyle interventions [9].

In Bangladesh, despite the growing burden of stroke, there is limited data on the lipid profiles and dyslipidaemic patterns among stroke patients [10]. Most available studies focus on traditional risk factors such as hypertension and diabetes, while dyslipidaemia remains underexplored. Identifying the clinical profile of dyslipidaemia in stroke patients can contribute to a better understanding of its role in cerebrovascular diseases and inform evidence-based management strategies tailored to the local population [11, 12].

Therefore, this study was undertaken to assess the clinical profiles and lipid abnormalities among stroke patients admitted to a tertiary care center in Dhaka. It aimed to determine the prevalence and pattern of dyslipidaemia and its association with stroke subtypes and demographic variables. The findings of this study are expected to contribute valuable information toward improving prevention and management of stroke through early detection and control of lipid abnormalities.

Methodology & Materials

This observational study was conducted among hospitalized patients in different wards of the medicine and neurology departments of Dhaka Medical College Hospital, Dhaka, from July 2008 to December 2008. The total sample size of the study was 100 stroke patients. The study population consisted of one hundred stroke patients admitted to the department of neurology and department of medicine during the study period. Inclusion criteria were patients presenting with acute or recurrent stroke, with blood samples collected before starting any anti-lipid drug. Exclusion criteria included patients dying before recording the information, patients and or party refusing to give consent to take part under the study, and patients who were already on anti-lipid drugs. Case sampling was done consecutively, and informed written consent was obtained from all participants. Medical history was taken from each patient with emphasis on finding out the relations of stroke with dyslipidaemia. Thorough physical examination, especially neurological examination and examination of the cardiovascular system, was carried out. All relevant information from history, clinical findings, and investigation results were recorded in a pre-designed questionnaire and data collection sheet. The main tool of the study was serum lipid profile, which was done in the laboratory by spectrophotometric principle using the "RA–50 Chemistry Analyzer.

Results

Table - I: Age distribution according to sex (n=100)

Age	Male	Percentage	Female	Percentage
<20	04	04%	0	0%

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20-29	0	0%	0	0%
30-39	04	04%	02	02%
40-49	14	14%	06	06%
50-59	12	12%	08	08%
>60	38	38%	12	12%
Total	72		28	

Table I shows male predominance. Male Female Ratio is 2.55:1. Majority of the patients are above 60 years of age.

Table - II: Physical finding of Dyslipidaemia (n=100)

Points	No. of Patient	Percentage
Waist Circumference (Male>40inch & Female>35inch)	32	32%
Xanthelesma	4	4%
Tendon xanthoma	1	1%
Arcus lipidus	10	10%
Locomotor brachii	9	9%

Table II shows that 32% were obese by measuring waist circumference. Other findings are less remarkable.

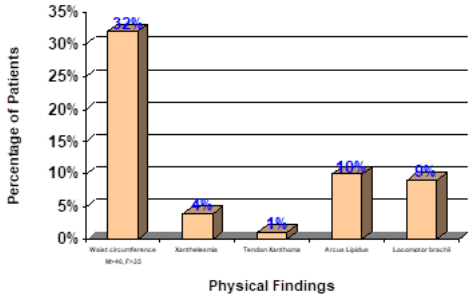

Figure - 1: Physical findings of Dyslipidaemia in stroke patients

Figure 1 shows that 32% patients had increased waist circumference, 10% patients had arcus lipidus and 9% patients had locomotor brachii.

Table - III: Showing relation of elevated LDL with stroke (n=100)

LDL Level (mg/dl)	No. of Patient	Percentage	Type of Stroke
Optimal < 100	33	33%	H - 2 I - 31
Near Optimal 100 - 129	25	25%	H - 2 I - 23
Border Line High 130 - 159	32	32%	H - 18 I - 16
High 160 - 189	8	8%	H - 2 I - 6
Very High > 190	2	2%	H - 0 I - 2

(H-Hemorrhagic, I-Ischemic)

Table III shows only 33% of stroke patients had optimal LDL level. 25% had near optimal, 32% had border line high, 8% had high and 2% had very high LDL level. Among the other 77% stroke patients (who did not have optimal LDL level), 47% had ischemic stroke.

Table - IV: Showing relation of elevated total cholesterol with stroke (n=100)

Total Cholesterol (mg/dl)	No. of Patient	Percentage	Type of Stroke
Desirable < 200	56	56%	H - 20 I - 36
Border Line High 200 - 239	30	30%	H - 4 I - 26
High ≥ 240	14	14%	H - 2 I - 12

(H-Hemorrhagic, I-Ischemic)

Table IV shows 44% of all stroke patients have elevated total cholesterol level. Out of them 38% are ischemic stroke.

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Table - V: Showing relation of low HDL with stroke (n=100).

HDL Level (mg/dl)	No. of Patient	Percentage	Type of Stroke
Low < 40	30	30%	H - 8 I - 22
Normal 40 - 59	46	46%	H - 14 I - 32
High > 60	24	24%	H - 4 I - 20

(H-Hemorrhagic, I-Ischemic)

Table V shows 30% of all stroke patients have low HDL level. Out of them 22% are Ischemic stroke.

Discussion

In this study, dyslipidaemia was found to be highly prevalent among stroke patients, particularly those with ischaemic stroke. The male predominance (male-to-female ratio 2.55:1) and the majority being above 60 years of age are consistent with findings reported by Vurumadla et al., who also noted a higher incidence of stroke in older men due to greater exposure to modifiable vascular risk factors such as hypertension, diabetes, and smoking [13]. Similar demographic patterns were observed by Mehndiratta et al., in a North Indian cohort, where male predominance and advanced age were major contributors to ischaemic stroke [14].

In our study, 32% of patients were obese as assessed by waist circumference, supporting the growing recognition of central obesity as a cardiovascular risk factor. Amarasekara et al., emphasized that unhealthy lifestyle habits and poor awareness of cardiovascular risks contribute significantly to the prevalence of obesity and related metabolic abnormalities in South Asian populations [15].

Clinical markers of dyslipidaemia, including arcus lipidus (10%) and xanthoma (9%), were observed in a subset of patients. Although these features are less frequently reported in recent hospital-based series, their presence reflects long-standing lipid abnormalities that often go undiagnosed in resource-limited settings.

Regarding biochemical findings, only 33% of stroke patients in our study had optimal LDL levels, while 44% showed elevated total cholesterol and 30% had low HDL cholesterol. These results are comparable to the study by Borle et al., which reported dyslipidaemia in 68% of type 2 diabetic patients, with low HDL and high LDL being the most frequent abnormalities [16]. Similarly, Blebil et al., demonstrated gender-based differences in lipid patterns, showing higher LDL and lower HDL among males, consistent with the male predominance and lipid distribution observed in our study [17].

Among patients with abnormal LDL levels (77%), 47% had ischaemic stroke, reinforcing the strong link between atherogenic lipid profiles and cerebral infarction. Plengvidhya et al., in the Thailand Diabetes Registry Project, also reported that elevated total cholesterol and LDL were independent risk factors for stroke among diabetic patients [18]. Rawdaree et al., further supported this by demonstrating that dyslipidaemia significantly contributes to long-term vascular complications, including cerebrovascular disease [19].

Our findings align with Potdar and Jadhav, who emphasized the importance of cardiovascular risk profiling in early detection of dyslipidaemia and hypertension to prevent vascular events [20]. Likewise, Raja et al., observed that prescription patterns for hypolipidaemic drugs in tertiary care hospitals were largely guided by the high prevalence of elevated LDL and total cholesterol among cardiovascular patients [21].

The observed 44% prevalence of elevated total cholesterol in our cohort closely resembles that reported by Tungsubutra et al., among patients with myocardial infarction in Thailand, highlighting the shared lipid-related pathophysiology between cerebrovascular and coronary artery diseases in South and Southeast Asian populations [22]. Furthermore, Raval et al., emphasized that metabolic disturbances such as dyslipidaemia frequently coexist with other vascular risk factors like diabetes and depression, which may compound the risk of stroke recurrence and poor outcomes [23].

Taken together, these findings indicate that dyslipidaemia is a common and potentially modifiable risk factor among stroke patients in Bangladesh. The predominance of elevated LDL and reduced HDL mirrors patterns seen across South and Southeast Asia. Given that 77% of stroke patients in our study had

suboptimal LDL levels and 44% had elevated total cholesterol, routine lipid screening and aggressive management through statins, dietary changes, and lifestyle modification are warranted.

Limitations of the study

Limitations of this study include its relatively small sample size and single-center design, which may limit generalizability. Nonetheless, the consistency of our findings with regional and international studies strengthens their validity.

Conclusion

In conclusion, the high prevalence of dyslipidaemia among stroke patients, especially in ischaemic subtypes, underscores the critical need for early identification and control of lipid abnormalities as part of comprehensive stroke prevention and management strategies.

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Conflicts of interest

There are no conflicts of interest.

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