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Relationship between Serum Triglyceride Level and Ischaemic Stroke among the Adult Patients Attending in a Tertiary Level Hospital in Bangladesh

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Abstract:
Introduction: *Stroke is the most significant public issue facing around the world. Now a days, stroke is the leading cause of death and disability. Research survey demonstrated that ischaemic stroke is the most common subtype of stroke and it is well recognized that stroke is not only a heterogeneous disease but also a multifactor related disease. Early detection and prevention of related risk factors was an important measure in the prevention and treatment for stroke.* ***Objective:*** *The aim of this study was to determine the relationship between serum triglyceride Level and ischaemic stroke among the adult patients attending in a tertiary level hospital in Bangladesh.* ***Methods:*** *This cross-sectional observational study was conducted at the Department of Neurology in Cox's Bazar Medical College and Hospital, Cox's Bazar, Bangladeshi from January 2021 to January 2022. Purposive sampling technique was used and a total of 200 diagnosed ischaemic stroke patients aged above 35 years were enrolled in this study. The collected data were analyzed using Statistical Package for Social Sciences (SPSS) software, version, 23.0. The ethical clearance of this study was obtained from the Institutional Review Board of Cox's Bazar Medical College, Cox;s Bazar, Chattogram, Bangladesh.* ***Results:*** *A total of 200 diagnosed ischaemic stroke patients aged above 35 years were enrolled in this study. The most frequent age group was (66-80) years which includes 65(32.5%). The majority of the patients were male 120(60%). The maximum patients were from urban area 140(70%). The most of the patients were from upper class family 86(43%).Among the healthy level (<150 mg/dl) of serum triglyceride, the prevalence of ischaemic stroke patients were observed to be 5(3.52%) while in the border level high of serum triglyceride (150-199 mg/dl), the prevalence of ischaemic stroke patients were observed to be 21(14.78%) which was statistically significant(P=0.001).Similarly, in the high level of serum triglyceride (200-499 mg/dl), the prevalence of ischaemic stroke patients were observed to be 76(53.52%) whereas in the very high level of serum triglyceride, the prevalence of ischaemic stroke was observed to be 11(5.5%) patients which was statistically significant (p=0.001).* ***Conclusion:*** *This study investigated that there is a significant relationship between elevated serum triglyceride levels and the prevalence of ischaemic stroke in southeastern population of Bangladesh and at the same time the elevated serum triglyceride level is an independent risk factor for the development of ischaemic stroke.*

Key words: *Relationship, serum, triglyceride, ischaemic, stroke*

I. INTRODUCTION

Stroke is the most significant public issue facing around the world. Now a days, stroke is the leading cause of death and disability. Research survey demonstrated that ischaemic stroke is the most common subtype of stroke and it is well recognized that stroke is not only a heterogeneous disease but also a multifactor related disease. Early detection and prevention of related risk factors was an important measure in the prevention and treatment for stroke [1-3]. The more risk factors a person has, the greater the chance that he or she will have a stroke [4]. However, some of these risk factors cannot be controlled such as increasing age and race, but there are also some risk factors that could be controlled and improved, such as hyperlipidaemia and lifestyle[5].Studies have shown that lipid disorder was closely related to ischaemic stroke and was an independent risk factor for ischaemic stroke[6,7]. However, stroke is an acute neurologic condition that occurs due to a disruption of cerebral perfusion, resulting in focal or global neurological impairment [8]. Strokes can be broadly classified into ischemic strokes (IS) and hemorrhagic strokes (HS). Approximately 84.4% of strokes are

ischemic in origin. Annually, over 13.7 million strokes occur globally and cause 5.5 million deaths per year as well, with a predilection for the elderly population, though increasing prevalence is being reported in younger adults [9]. As stroke causes death, dementia, and disability worldwide, this common condition decreases quality of life and incurs high economic and societal burdens [10]. Despite the improvement of strategies and techniques towards the management of stroke patients in recent years, recurrence of strokes continue to account for nearly 30% of all strokes and this high rate likely represents unsuccessful secondary prevention [11]. Researchers have recognized that identifying stroke-prone individuals and targeting them effectively remains an important part of stroke management; Triglyceride is an important part of blood lipid composition, and elevated triglyceride is a part of dyslipidemia [12]. Previous studies have shown that triglyceride levels were an independent risk factor for ischaemic stroke [13] However, some studies have also shown that triglyceride was not significantly related to ischaemic stroke. At present, the relationship between triglyceride and ischaemic stroke is controversial [14]. There are very few studies and limited data regarding the relationship between serum triglyceride level and ischaemic stroke among the adult patients in a tertiary level hospital in Bangladesh Therefore, the researcher has designed this study. The aim of this paper was to determine the relationship between serum triglyceride level and ischaemic stroke among the adult patients in a tertiary level hospital in Bangladesh.

II. OBJECTIVE

General Objective:

- To determine the relationship between serum triglyceride Level and ischaemic stroke among the adult patients attending in a tertiary level hospital in Bangladesh.

Specific Objectives

- To know the socio-demographic characteristics of the ischaemic stroke patients.
- To identify the risk factors of ischaemic stroke.
- To determine the triglyceride level of the ischaemic stroke patients.
- To determine the relationship between triglyceride and ischaemic stroke.

III. METHODS

This cross-sectional observational study was conducted at the Department of Neurology in Cox's Bazar Medical College and Hospital, Cox's Bazar, Bangladeshi from January 2021 to January 2022. Purposive sampling technique was used and a total of 200 diagnosed ischaemic stroke patients aged above 35 years were enrolled in this study and patients without stroke and other types of stroke were excluded from this study. Clinical examination and CT scan were conducted to diagnosis ischaemic stroke and at the same time blood samples were collected and sent to the central lab of the hospital to diagnose lipid profile of the study patients to determine the serum triglycerides level of the patients. The data were collected using a pre structured questionnaire and a case record form. Collected data cleaned, edited, coded and analyzed using Statistical Package for Social Sciences (SPSS) software, version, 23.0. Descriptive statistical analysis were performed and the results were presented in tables and charts as percentage and frequency. Chi-square test were performed to determine the relationship between serum triglyceride level and the prevalence of ischaemic stroke, where $p<0.05$ considered as the level of significance with 95%CI. The ethical clearance of this study was obtained from the Institutional Review Board of Cox's Bazar Medical College, Cox;s Baxar, Chattogram, Bangladesh.

Table-1: Baseline characters tics of the patients of ischaemic stroke (n=200).

Age (years)	Frequency	Percent
<35	20	10
36-50	45	22.5
51-65	55	27.5
66-80	65	32.5
>80	15	7.5
Total	200	100
Sex		
Male	120	60
Female	80	40
Total	200	100
Residence		

Urban	140	70
Rural	60	30
Total	200	100
Socio-economic condition		
Upper class	86	43
Middle class	77	38.5
Lower class	37	18.5
Total	200	100

Table-1 shows the baseline characters tics of the patients of ischaemic stroke. The most frequent age group was (66-80) years which includes 65(32.5%) of the study patients and followed (51-65) years 55(27.5%),(36-50) years 45(22.5%),<35 years 20(10%) and >80 years 15(7.55). The majority of the patients were male 120(60%). The majority of the patients were from urban area 140(70%). The most frequent patients were from upper class family 86(43%).

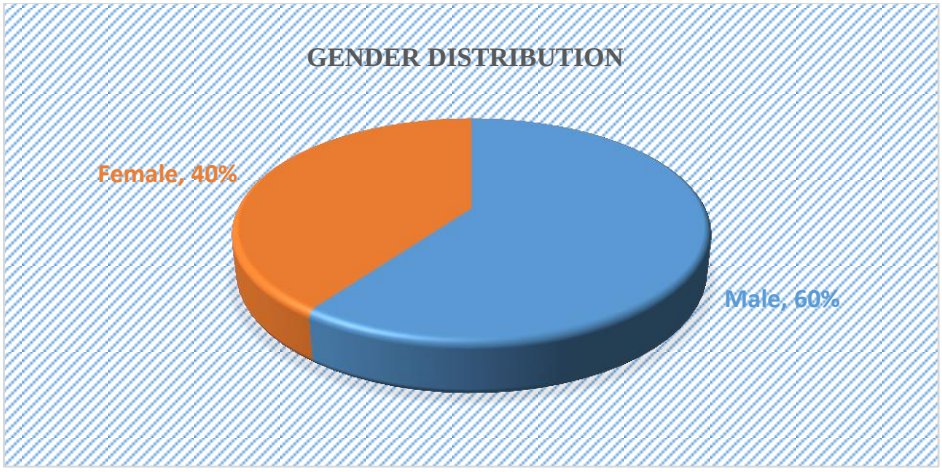

Fig-1 shows the gender distribution of the study patients (n=200).

Table-2: Distribution of risk factors related to ischaemic stroke (n=200).

Risk Factors	Frequency	Percent
Diabetes Mellitus(DM)	175	85.5
Alcohol consuming	12	6
Hypertension(HTN)	190	95
Chronic Kidney diseases(CKD)	30	15
Smoking	118	59
Coronary heart disease(CAD)	20	10
High-density lipoprotein cholesterol(HDL-C	140	70
Obesity	120	60

Table-2: shows the distribution of risk factors related to ischaemic stroke. The most frequent related risk factors of ischaemic stroke was hypertension (HTN) 190 (95%) followed Diabetes Mellitus (DM) 175(85.5%), High-density lipoprotein cholesterol (HDL-C 140(70%), obesity 120(60%), smoking 118(59%), Chronic Kidney diseases (CKD) 30(15%), Coronary heart disease (CAD) 20(10%) and alcohol consuming 12(6%).

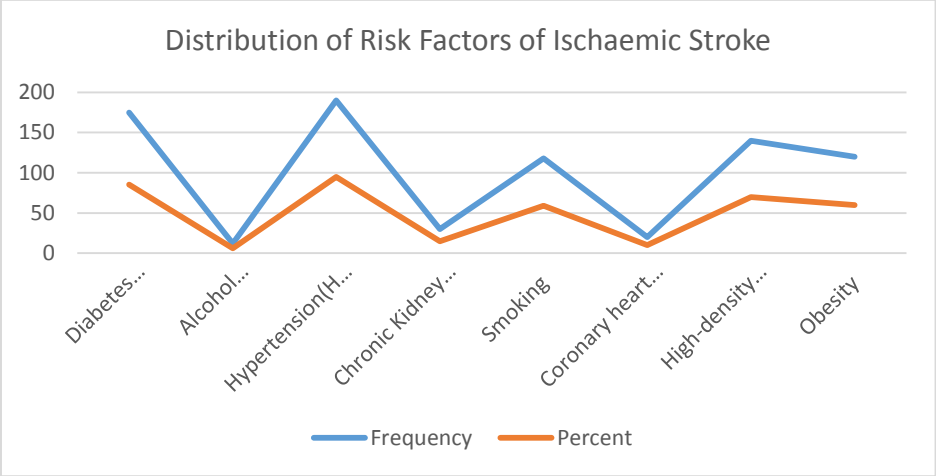

Fig-2 shows the distribution of risk factors of ischaemic stroke (n=200).

Table-3: Distribution of observed triglyceride level among the ischaemic stroke patients (n=200).

Serum Triglyceride level	Frequency	Percent
Healthy(<150 mg/dl)	30	15
Border line high(150-199 mg/dl)	40	20
High(200-499 mg/dl)	80	40
Very high(>500)	50	25
Total	200	100

Table-3 shows the distribution of observed serum triglyceride level among the ischaemic stroke patients. The most frequent serum triglyceride level was observed high (200-499 mg/dl) in 80(40%) patients followed very high (>500) in 50(25%) patients, border line high (150-199 mg/dl) in 40(20%) patients and healthy (<150 mg/dl) in 30(155) patients,

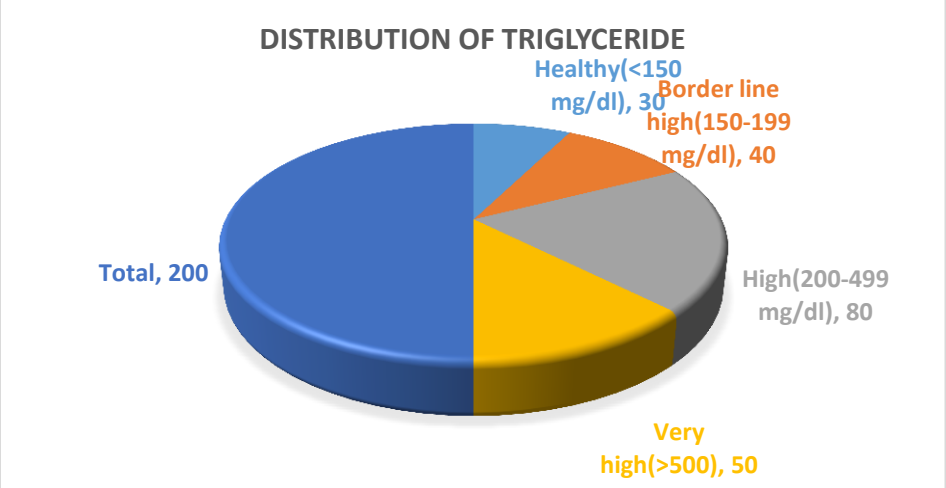

Fig-3 shows the distribution of triglyceride of the patients (n=200).

Table-4: Relation between serum triglyceride and ischaemic stroke (n=200).

Level of Serum Triglyceride	Prevalence of Ischemic stroke (N)	Percent (%)	P-value
(<150 mg/dl)	5	3.52	<0.001
(150-199 mg/dl)	21	14.78	
(200-499 mg/dl)	76	53.52	<0.001
(>500)	11	5.5	
Total	113	56.5	

Table-4 shows the relation between serum triglyceride and ischaemic stroke. Among the healthy level (<150 mg/dl) of serum triglyceride, the prevalence of ischaemic stroke patients were observed to be 5(3.52%) while in the border level high of serum triglyceride (150-199 mg/dl), the prevalence of ischaemic stroke patients were observed to be 21(14.78%) which was statistically significant(P=0.001).Similarly, in the high level of serum triglyceride (200-499 mg/dl), the prevalence of ischaemic stroke patients were observed to be 76(53.52%) whereas in the very high level of serum triglyceride, the prevalence of ischaemic stroke was observed to be 11(5.5%) patients which was statistically significant (p=0.001).

IV. DISCUSSION

This present study observed that the most frequent age group of the ischaemic stroke patients was (66-80) years which includes 65(32.5%) of the study patients and followed (51-65) years 55(27.5%),(36-50) years 45(22.5%),<35 years 20(10%) and >80 years 15(7.55). This study also observed, the majority of the patients were male 120(60%) and the majority of the patients were from urban area 140(70%). The most frequent patients were from upper class family 86(43%). These findings indicate that the male gender, upper class family, and urban residential status dominant in the prevalence of ischaemic stroke. These findings of this present study are partially persistent with another study by Feroz Memon T et al,(2016). They observed that two-thirds of the ischaemic stroke patients were male and the highest number of patients were within the age group of 60-80 years.(n=310). These present study observed that The most frequent related risk factors of ischaemic stroke was hypertension (HTN) 190 (95%) followed Diabetes Mellitus (DM) 175(85.5%), High-density lipoprotein cholesterol (HDL-C 140(70%), obesity 120(60%), smoking 118(59%), Chronic kidney diseases (CKD) 30(15%), Coronary heart disease (CHD) 20(10%) and alcohol consuming 12(6%). These findings indicate that the patients who has the associated diseases like hypertension, diabetes mellitus, chronic kidney diseases, cardio-vascular diseases and smoking and alcohol habit are more vulnerable to ischaemic stroke. These findings of our study are comparable with another study by R. Sridharan et al,(1992). They observed, the risk was considerably higher when there was any combination of hypertension, heart disease and HDL cholesterol level lower than 45 mg/dl. Logistic regression revealed hypertension, heart disease of any type, lower HDL cholesterol and uric acid and higher ratio of TC/HDL to be significant factors. This present study found that the most frequent serum triglyceride level was observed high (200-499 mg/dl) in 80(40%) patients followed very high (>500) in 50(25%) patients, border line high (150-199 mg/dl) in 40(20%) patients and healthy (<150 mg/dl) in 30(155) patients. This study also observed the relation between serum triglyceride and ischaemic stroke. Among the healthy level (<150 mg/dl) of serum triglyceride, the prevalence of ischaemic stroke patients were 5(3.52%) while in the border level high of serum triglyceride (150-199 mg/dl), the prevalence of ischaemic stroke patients were 21(14.78%) which was statistically significant(P=0.001).Similarly, in the high level serum triglyceride (200-499 mg/dl), the prevalence of ischaemic stroke patients were observed to be 76(53.52%) whereas in the very high level of triglyceride, the prevalence of ischaemic stroke was observed to be 11(5.5%) patients which was statistically significant (p=0.001). These findings of this present study prevailed that the significant relation between triglyceride level of the patients and the prevalence of ischaemic stroke. Another study also claimed that elevated triglyceride levels were an independent risk factor for the development of first ischaemic stroke by Yu-Qing Huanget al,(2020) although another study did nor observed significant relation between triglyceride level and the prevalence of ischaemic stroke. This might be happened due to socio-demographic characteristics and life style of the patients.[18].

V. CNCLUSION

This study investigated that there is a significant relationship between elevated serum triglyceride levels and the prevalence of ischaemic stroke in southeastern population of Bangladesh and at the same time the elevated serum triglyceride level is an independent risk factor for the development of ischaemic stroke.

LIMITATIONS OF THE STUDY

This was a single center study with a purposive limited sample size over a short study period time. So, the results of this study may not reflect the whole country.

RECOMMENDATION

To justify the results of this study, a multicenter study may be conducted with an adequate sample size on a national scale.

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