

“Prevalence and Risks Factors of Stroke in Adult Patients: A study in a tertiary care level hospital, Jashore, Bangladesh”

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Abstract: Background: The latest data from the Global Burden of Diseases Study 2013 (GBD 2013) ranked cerebrovascular disease as the second largest contributor to death and disability adjusted life years worldwide after ischaemic heart disease.^{1,2} Cerebrovascular disease ranks the first in frequency and importance among all the neurological diseases in adult life. Stroke is the most common cause of death, after heart disease and cancer. Cerebrovascular disease is estimated to account for 7.8 million deaths yearly throughout the world and represents about 13 % of all causes of death.

Objectives: Our aim was to assess the prevalence and risk factors of stroke in adult patients in Bangladesh. Besides that, the study was conducted to know more about acute ischemic stroke in Bangladesh

Method: It was a cross sectional study and was conducted in the department of Medicine, Jashore Medical College Hospital, Jashore, Bangladesh during the period from January 2018 to December 2018. At the first stage of selection we found 3213 patients with several cardiac complications. In the second and the last step of the participant selection of the study only Two Hundred (200) patients with only first attack of acute ischemic stroke were selected as the main study participants.

Result: In our study, it was found that; hypertension which is the major risk factor for acute ischemic stroke was present in 106(53%) of patients out of total 200 participants. Hypertension were present in 58(29%)% of males & 48(24%) of females. In total 30(15%) of males were smokers and alcoholics 12(6%) in the study population. None of the women in our study had indulgence in alcohol or tobacco usage. Risk factors like dyslipidemia was present in 22(11%) of the study population respectively. Major symptoms of the participants was DM, representing 30(15%) of total participants.

Conclusion: In our study we observed that, hypertension was the major risk factor for acute ischemic stroke and it was found in near about eighty percent patients. Besides that, smoking, alcohol taking diabetes and dyslipidemia were also attracted our thinking. This was a single center study with small sample size. So, the study results might not be reflected in the whole community.

Keywords: Intracranial Atherosclerosis, Risk factors, Acute ischemic stroke.

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I. Introduction

It was a cross sectional study and was conducted in the department of Medicine, Jashore Medical College Hospital, Jashore, Bangladesh during the period from January 2018 to December 2018. At the first stage of selection we found 3213 patients with several cardiac complications. In the second and last step of the selections only Two Hundred (200) patients with only first attack of acute ischemic stroke were selected as the main study participants. Among those 200 participants 110 (55%) were male and 90 (45%) were female. Therefore, male female ratio was 1.22:1. A stroke is defined by the World Health Organization (WHO) as a syndrome of “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 for hours or longer or leading to death, with no apparent cause other than of vascular origin³. Stroke has different risk factors, which can be grouped into modifiable and non-modifiable risk factors. Major risk factors for stroke include age, history of cerebrovascular event, smoking, alcohol consumption, physical inactivity, hypertension, dyslipidemia, diabetes mellitus, cardiovascular diseases, obesity, metabolic syndrome, diet, nutrition, and genetic risk factors^{4,5,6}. Historically the first depiction of stroke may not originate from Hippocrates but from the Chinese (475-221 B.C.). Hippocrates mentioned stroke in about 400 B.C., but it was

the Roman physician Aurelius Celsus (25 B.C.-A.D. 50) who described “apoplexy” and discriminated it from “paralysis”. The term “hemiplegia”, which is still in use, was introduced by Paul of Aegina (A.D. 625-690). Gregor Nymman of Wittenberg (1594-1638) described the idea of interrupted circulation in the brain vessels as a cause of apoplexia. A Swiss physician, Johann Jakob Wepfer of Schaffhausen (1620-1695) stated that, corpulent people and those with an irregular pulse, and in addition those whose face and hands are of bluish color, are at great risk of suffering a stroke. This could indicate that persons with hypertension or cardiac failure are vulnerable. Among the first to link atherosclerosis to apoplexy was Francis Bayle (1622-1709). The English physician William Heberden (1710-1801) noted that transient ischemic attacks (TIA) often occur shortly before stroke. A description of “diseased and roughed” arteries or embolism from the heart causing neurological deficit is found in Allbutt’s System of Medicine (1899). In 1930, increased blood pressure was described as being connected to apoplexia and cerebral hemorrhage by Swartz and Goldinger⁷. Cerebrovascular disease ranks the first in frequency and importance among all the neurological diseases in adult life. Stroke is the most common cause of death, after heart disease and cancer. Cerebrovascular disease is estimated to account for 7.8 million deaths yearly throughout the world and represents about 13 % of all causes of death. Stroke remains among the five leading causes of death across every income group in most countries in the last comprehensive review by the World Health Organization. It causes significant physical, emotional, and cognitive disabilities among survivors, placing stroke within the 10 leading causes of disability irrespective of the development status of countries⁸. In our study we found that, hypertension was the major risk factor for acute ischemic stroke and it was found in near about eighty percent patients. Besides that, smoking, alcohol taking diabetes and dyslipidemia were also attracted our concentration.

II. Objectives

❖ General objective:

To evaluate prevalence and risk factors of stroke in adult patients in Bangladesh

❖ Specific objectives:

To know more about acute ischemic stroke in Bangladesh

III. Material and Methods

A cross-sectional study was conducted in the department of Medicine, Jashore Medical College Hospital, Jashore, Bangladesh during the period from January 2018 to December 2018. At the first stage of selection we found 3213 patients with several cardiac complications. In the second and last step of the selection only Two Hundred (200) patients with only first attack of acute ischemic stroke were selected as the main study participants. Among those 200 participants 110 (55%) were male and 90 (45%) were female. Therefore, male female ratio was 1.22:1. Patients enrolled within 24 hours of admission how satisfying inclusion criteria and given informed consent were included in the study. Data was collected using a pretested format meeting the objectives of the study. Detailed history, physical examination and necessary investigations will be undertaken. Clinical history was taken from either the patient or his/ her relatives or attendant. While taking history, importance was given regarding presence or absence of vomiting, headache and convulsions. Past history of HTN, DM, CAD, RHD, TIA, collagen diseases, meningitis, tuberculosis, endocrine disorders and congenital disorders were taken. Personal history regarding dietary habits, smoking, alcohol consumption and tobacco chewing were noted. We maintained two major inclusion criteria for the participants. Those are: 1. Patients aged ≥ 40 years irrespective of gender and 2. Diagnosed as having acute ischemic cerebrovascular stroke within previous 72 hours by clinical examination and confirmed by either a CT scan or by a MRI Scan were included. On the other hand we defined some exclusion criteria for our participants like, 1. Age < 40 years. 2. Presenting with hemorrhagic stroke/ subarachnoid hemorrhage/ cerebral venous sinus thrombosis. 3. Presenting with ischemic stroke after 72 hours of onset were excluded from study and 4. Patients with previous history of Transient Ischemic Attack (TIA) / Cerebro Vascular Accident.

IV. Results

The cross-sectional study was conducted in the department of Medicine, Jashore Medical College Hospital, Jashore, Bangladesh during the period from January 2018 to December 2018. At the first stage of selection we found 3213 patients with several cardiac complications. In the second and last step of selection only Two Hundred (200) patients with only first attack of acute ischemic stroke were selected as the main study participants. Among those 200 participants 110 (55%) were male and 90 (45%) were female. Therefore, male female ratio was 1.22:1. In this study, it was observed that, hypertension which is the major risk factor for acute ischemic stroke was present in 106(53%) of patients. Hypertension was present in 76(69.09%) in male & 48(24%) in female. In total 30(15%) of males were smokers and alcoholics was 38 (34.55) in the study population. None of the women in our study had indulgence in alcohol or tobacco usage. Risk factors like diabetes and dyslipidemia were present in 22(11%) & 40 (20%) of the study population respectively. Of the 200

patients in the study, nearly 75 % of the study group was hypertensive. This reinforces hypertension as the major risk factor for acute ischemic stroke. In total 169 (84.50 %) had SBP of > 140 at admission; none of the patients had BP < 120 at admission. On the other hand 153 (76.50) % of patients had recorded DBP 80-100. In BMI report we found, 85 (42.5%), 92 (46%) and 23 (11.50%) with BMI 18.5-25, 25-30 and >30 score respectively. Major symptoms of the participants was DM representing 33(15%)% of total participants.

Figure I: Sex distribution of the study participants. (n=200)

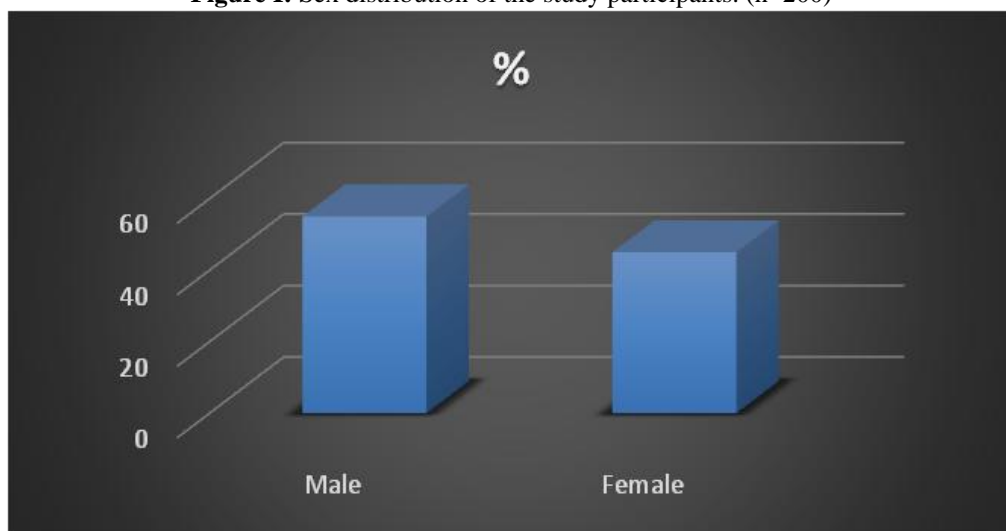


Table II: Distribution of BP on Admission of the participants. (n=200)

BP	Male (110)		Female (90)		Total (200)	
	n	%	n	%	n	%
Systolic blood pressure(mm Hg)						
<120	0	0	0	0	0	0
120-140	20	18.18	11	12.22	31	15.5
>140	90	81.82	79	87.78	169	84.5
Diastolic blood pressure(mm Hg)						
<80	9	8.18	11	12.22	20	10
80-100	84	76.36	69	76.67	153	76.5
>100	17	15.45	10	11.11	27	13.5

Table III: Distribution of BMI on Admission of the participants. (n=200)

BMI (kg/m2)	Male (110)		Female (90)		Total (200)	
	n	%	n	%	n	%
<18.5	0	0	0	0	0	0
18.5-25	55	50	30	33.33	85	42.5
25-30	46	41.82	46	51.11	92	46
>30	9	8.18	14	15.56	23	11.5
Total	110	100	90	100	200	100
Mean ± SD	24.97±3.19		25.92±2.86		25.45±3.03	

Table IV: Presenting Symptoms in Study Population. (n=200)

Symptoms	N	Male		Female		Total	
		N	%	N	%	N	%
Central Facial Palsy	19	19	9.5%	18	9%	37	18.5%
Headache	7	7	3.5%	5	2.5%	12	6%
Nausea/ Vomiting	5	5	2.5%	3	1.5%	8	4%
Motor weakness	53	53	26.5%	47	23.5%	100	50%
Altered Consciousness	4	4	2%	0	0%	4	2%
Speech Disturbance	9	9	4.5%	10	5%	19	9.5%
Vertigo	3	3	1.5%	2	1%	5	2.5%
Tingling/ Numbness	8	8	4%	4	2%	12	6%
Seizures	2	2	1%	1	.5%	3	1.5%
Total	110	110	55%	90	45%	200	100%

Figure II: Distribution of hypertensive among the participants. (n=200)

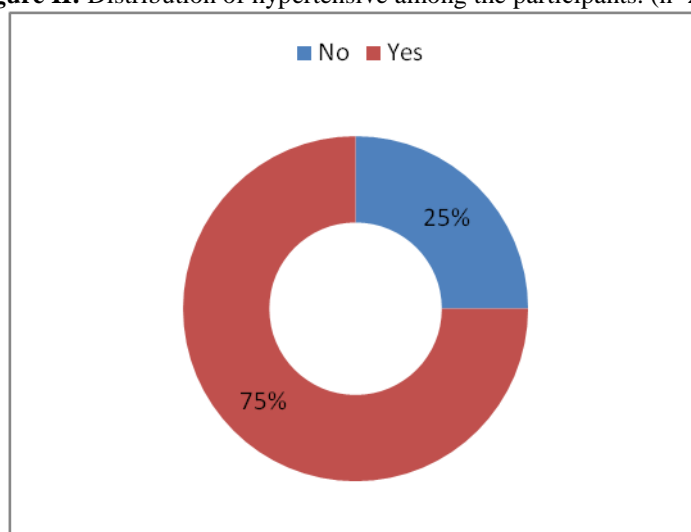


Table V: Distribution According To Lipid Profile, (n=200)

Lipids	Gender		Total (n=200)
	Male (n=110)	Female (n=90)	
Total Cholesterol			
<200	100(90.90%)	90(100%)	190(95%)
200-280	12(10.9%)	0(0%)	12(10.9%)
>280	0(0%)	0(0%)	0(0%)
Triglyceride			
<150	37(33.63%)	24(26.66%)	61(30.5%)
150-500	62(56.36%)	69(76.66%)	131(65.50%)
>500	0(0%)	0(0%)	0(0%)
HDL			
<35	27(24.54%)	18(20%)	45(22.50%)
35-60	70(63.63%)	70(77.77%)	140(70%)
>60	7(6.36%)	5(5.55%)	12(6%)
LDL			
<70	33(30%)	28(31.11%)	61(30.50%)
70-190	69(62.72%)	68(75.55%)	137(68.5%)
>190	0(0%)	0(0%)	0(0%)

Table VI: Presenting Risk Factors of the Study Participants (n=200)

Risk Factors	Male		Female		Total	
	n	%	n	%	n	%
Hypertension	58	29.00	48	24	106	53
DM	17	8.5	13	6.5	30	15
Dyslipidemia	10	5	12	6	22	11
Smoking	30	15	0	0	30	15
Alcoholism	12	6	0	0	12	6

V. Discussion

It is now established that hypertension is a major risk factor for stroke, both ischemic and hemorrhagic⁹. Stroke is the leading cause of disability worldwide, the second most common cause of dementia and the third leading cause of death¹⁰. Our cross-sectional study was conducted in the department of Medicine, Jashore Medical College Hospital, Jashore, Bangladesh during the period from January 2018 to December 2018. At the first stage of selection we found 3213 patients with several cardiac complications. In the second and last step of selection only Two Hundred (200) patients with only first attack of acute ischemic stroke were selected as the main study participants. Among those 200 participants 110 (55%) were male and 90 (45%) were female. Cerebral infarction basically comprises two pathophysiologic processes: Loss in the supply of oxygen and glucose secondary to vascular occlusion. Array of cellular metabolism consequent to the collapse of energy producing processes ultimately with disintegration of cell membranes. As the brain receives 20% of the cardiac output at rest, it is exquisitely sensitive to ischemia, such that even brief ischemic periods to neurons can trigger a complex sequence of events that may result in permanent cerebral damage¹¹. Ischemic stroke may manifest in the form of thrombotic stroke (large vessel and small vessel types); embolic stroke (with/without known cardiac

and/or arterial factor); systemic hypoperfusion (Watershed or Border Zone stroke); or venous thrombosis. Irrespective of the cause, compromised vascular supply to the brain is the primary event in majority (85–90%) of acute strokes. Low respiratory reserve and complete dependence on aerobic metabolism make brain tissue particularly vulnerable to effects of ischemia. A spectrum of severity is generally observed in the affected region of the brain, owing to the presence of collateral circulation. Thus, part of the brain parenchyma (core) undergoes immediate death, while others may only be partially injured with potential to recover (penumbra). The survival, recovery and ultimate outcome of an individual who has sustained in acute stroke may be influenced by many variables¹². Survival is found to be significantly better in men than women, young than in old, married than in the single, rural areas than urban areas and in those discharged home than in those transferred to long term care hospitals. Hypertension, diabetes mellitus, heart disease, atrial fibrillation, hyperlipidemia, obesity, past history of stroke, physical inactivity, estrogen therapy, high alcohol consumption and smoking are associated with increased likelihood of recurrent stroke and thereby would influence long term survival. Comorbidities like heart disease, COPD, peripheral vascular disease, parkinson's disease, polyneuropathy, osteoarthritis etc. have a direct effect on functional recovery and compound the patient's disabilities. Survival is better in infarction than in hemorrhage and in subarachnoid hemorrhage than in intracerebral hemorrhage. Anterior circulation infarcts have higher risk of death and so also intracerebral or subarachnoid hemorrhage. Occurrence of coma at stroke onset reflects severity and is an important predictor of 30-day survival. Bilateral pyramidal signs, generalized seizures, abnormal respiratory pattern etc. reflect brain stem dysfunction and in combination are related to a very high risk of early death. Severity of paralysis, urinary and bowel incontinence also adversely influence the outcome. Better management of respiratory and cardiac problems in acute phase may result in decreased mortality. Hyperglycemia at stroke onset even in non-diabetic patients is an adverse prognostic factor. Protein C and S have been found to be decreased in some patients with ischemic stroke and predict adverse outcome. Lipoprotein (a) is found to be an independent risk factor for arterial-vascular disease. Recent studies have suggested that presence of micro-albuminuria is associated with poor stroke outcome. Besides these, in our study we found that, hypertension was the major risk factor for acute ischemic stroke and it was found in near about eighty percent patients. Besides that, smoking, alcohol taking diabetes and dyslipidemia were also attracted our concentration.

VI. Limitations of the study

This was a single center study with a small sample size. So, the study results might not be reflected in the whole community.

VII. Conclusion and Recommendations

In our study, we found hypertension as the major risk factor for acute ischemic stroke was present in 106(53%) of patients out of total 200 participants. Hypertension were present in 58(29%) % of males & 48(24%) of females, In total 30(15%) of males were smokers and alcoholics 12(6%) in the study population. None of the women in our study had indulgence in alcohol or tobacco usage. Risk factors like diabetes and dyslipidemia were present in 22(11%) & 40(20%) of the study population respectively. In these circumstances we would recommend to conduct more study with more participants in several places to know more about the risk factors regarding stroke in adult patients.

References

- [1]. Murray CJ, Barber RM, Foreman KJ, et al. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990-2013: quantifying the epidemiological transition. *Lancet* 2015;386:2145–91. [10.1016/S0140-6736\(15\)11340-X](https://doi.org/10.1016/S0140-6736(15)11340-X)
- [2]. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;385:117–71. [10.1016/S0140-6736\(14\)61682-2](https://doi.org/10.1016/S0140-6736(14)61682-2)
- [3]. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. *J Stroke*. 2013; 15(3):128-34.
- [4]. O. Y. Bang, B. Ovbiagele, and J. S. Kim, “Nontraditional risk factors for ischemic stroke: An update,” *Stroke*, vol. 46, no. 12, pp. 3571–3578, 2015. [View at Publisher](#) · [View at Google Scholar](#) · [View at Scopus](#)
- [5]. J. C. Hopewell and R. Clarke, “Emerging Risk Factors for Stroke: What Have We Learned from Mendelian Randomization Studies?” *Stroke*, vol. 47, no. 6, pp. 1673–1678, 2016. [View at Publisher](#) · [View at Google Scholar](#) · [View at Scopus](#)
- [6]. B. von Sarnowski, J. Putaala, U. Grittner et al., “Lifestyle risk factors for ischemic stroke and transient ischemic attack in young adults in the stroke in young fabry patients study,” *Stroke*, vol. 44, no. 1, pp. 119–125, 2013. [View at Publisher](#) · [View at Google Scholar](#) · [View at Scopus](#)
- [7]. Feigin VL, Lawes CM, Bennett DA, Barker-Collo SL, Parag V. Worldwide stroke incidence and early case fatality reported in 56 population-based studies: a systematic review. *The Lancet Neurology*. 2009; 8(4):355- 69.
- [8]. Krishnan A, Gupta V, Nongkynrih B, Thakur JS. How to effectively monitor and evaluate NCD programmes in India. *Indian Journal of Community Medicine*. 2011; 36(5):57.
- [9]. W. S. Aronow, “Hypertension-related stroke prevention in the elderly,” *Current Hypertension Reports*, vol. 15, no. 6, pp. 582–589, 2013. [View at Publisher](#) · [View at Google Scholar](#) · [View at Scopus](#)
- [10]. Dalal PM, Malik S, Bhattacharjee M, Trivedi ND, Vairale J, Bhat P, et al. Population-based stroke survey in Mumbai, India: incidence and 28-day case fatality. *Neuroepidemiology*. 2008; 31(4):254-61.
- [11]. Sridharan SE, Unnikrishnan JP, Sukumaran S, Sylaja PN, Nayak SD, Sarma PS, et al. Incidence, types, risk factors, and outcome of

- stroke in a developing country the trivandrum stroke registry. *Stroke*. 2009; 40(4):1212-8.
- [12]. Nagaraja D, Gururaj G, Girish N, Panda S, Roy AK, Sarma GR, et al. Feasibility study of stroke surveillance: data from Bangalore, India.

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