

Pattern of Stroke in Adult Population: a cross sectional hospital based study in Dhaka City (Bangladesh)

MD. NAFIS KHAN

Clinical Physiotherapist

Protibondhi Seba-O-Sahajjo Kendro, Debiganj, Panchagarh

MOHAMMAD SHAHADUR RAHMAN¹

Monitoring Officer

USAID-DFID, NHSDP, SSKP Project, Sylhet

MD SHAH BILLAL MASUM

Consultant

Center for Neuro & Orthopedic Rehabilitation (CNOR)

MOHAMMAD DELWAR HOSSAIN

Senior Physiotherapist

Jalalabad Ragib Rabeya Medical College, Sylhet

MD MONOARUL HAQUE

Coordinator, Research, Bangladesh Stroke Association

ROKSHANA IRIN

Consultant Physiotherapist

The Barakah Hospital Ltd., Dhaka

MD. MOHSIN KABIR

Head

Department of Physiotherapy, Institute of Geriatric Medicine

SYED MOHAMMED ZAKARIA FARUQ

Consultant Physiotherapist

Al Razi Islami Hospital, Bonosri, Dhaka

MD SHAFIULLAH PRODHANIA

Chief Consultant

DPRC Specialized Hospital & Research Center

Abstract:

Background: Stroke is the second leading cause of death worldwide and the leading cause of long-term disability. A worldwide study shows that per year 15 million people faces the event 'stroke' which causes in 5 million deaths and a further 5 million patients

¹ Corresponding author: munna371@yahoo.com

*living with permanent cognitive and physical disability. **Objective:** The aim of this study was to assess pattern of stroke among adult population in Bangladesh. **Methods:** This was a cross sectional descriptive study with a sample size of 350. The samples were selected purposively on the basis of inclusion and exclusion criteria. A pretested semi structured questionnaire was used to collect data and consent was taken prior interview. SPSS version 11.5 was used to analyze data. **Result:** Most of the male respondents (43.5%) were in 55-64 age groups and female participants (39.2%) constituted 45-54 age groups. Mean monthly family income was 26311.4±28551.6 BDT. About 61.4% strokes was ischemic and 38.6% hemorrhagic. Among the ischemic stroke 75.3% strokes were non-embolic and 24.7% stroke were embolic. On the other hand 63.7% strokes were Intra-cranial hemorrhagic and 36.3% strokes were sub-arachnoids hemorrhagic among the hemorrhagic stroke. Data showed that 33.7% stroke involved the cortical area of brain followed by basal ganglia (22.0%), sub cortical area (21.1%), brain steam (12.0%), cerebral (10.9%) and Bilateral (0.3%). About 58.9% of the study subjects faced headache prior to stroke. **Conclusion:** Ischemic stroke was quite double than hemorrhagic. Non-embolic stroke was four fold than embolic stroke.*

Key words: Stroke, Pattern, Adult

Introduction

Stroke is widely recognized as a major cause of disability among adults and is the most common cause of dependence in activities of daily living (ADLs) among the elderly. Approximately 90% of stroke survivors have permanent neurological deficits¹. Disability caused by stroke has a massive impact on the patient, with social consequences and physical consequences of stroke being equally devastating². Recent studies suggest that between one-fourth and one-third of stroke patients experience persistent dependency in one or more activities of daily living (ADL's) by 6 months after their strokes.

Stroke survivors are often greatly challenged by post stroke depression, which can lengthen rehabilitation and recovery time considerably. Apart from having a deep impact on the survivors themselves, post-stroke depression also affects family and friends³. However, patients with a history of stroke are at risk of a subsequent event of around 10% in the first year and 5% per year thereafter⁴. The gap in knowledge on stroke epidemiology between developed and developing countries is also widening. Despite apparent differences in the patterns of stroke types between developed and developing countries, most occurrences of stroke and cardiovascular disease can be attributed to conventional risk factors⁵⁻⁶. A population-based case-control study of 1250 stroke deaths in rural Bangladesh present that risk of stroke death have significantly increased with hypertension, diabetes mellitus betel consumption when adjusted for age and sex⁷. Bhopal et al propose that the explanation for high rates of stroke in Bangladeshis lies in their heavier burden of some established risk factors, their socioeconomic deprivation, and some novel risk factors that are yet to be characterized. There is a high modifiable burden of risk factors for adult stroke deaths in rural Bangladesh, most notably including hypertension. Betel consumption may be an under-recognized risk factor for stroke death⁸. In Bangladesh Stroke constitute 8.9% of the hospital admissions among those aged 30 or above⁹. To lessen the financial burden of stroke in a low income country like Bangladesh prevention could be the best way. The current study was conducted to assess pattern of stroke in adult population of Bangladesh based on the attended stroke patient in some tertiary level hospital in Dhaka city.

Methodology

Study design: The study was a descriptive type of cross sectional.

Study duration: The duration of this study was six month

Place of study: The study was conducted in the indoor and outdoor of Department of Neurology (Neuro medicine and surgery) in Dhaka Medical College and Hospitals (DMCH), Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), National Institute of Neuroscience and Hospital (NINH), Centre for the Rehabilitation of the Paralysed (CRP) (Savar & Mirpur) in where strokes patient attended.

Study population: Adult stroke (age \geq 25) patients attended in indoor and outdoor of neurology (Neuro-medicine and surgery) department of DMCH, BSMMU, BIRDEM, NINH and CRP (Savar & Mirpur) were study population.

Inclusion criteria

- Indoor and outdoor strokes (age \geq 25) stroke patient
- Strokes confirmed by CT scan
- Patient who are medically stable for interviewing

Exclusion criteria

- Patient who are not interested to participate
- Patient who are medically unstable for interviewing
- Patient who are not well documented

Sample size: In this study 383 participants were interviewed but due to some incomplete data 8.61% participants were excluded in data cleaning process. For that reason, information of 350 participants was finally selected for data analysis.

Sampling technique: The samples were selected purposively. The respondents who fulfilled the inclusion criteria and

admitted in indoor and presented in outdoors of Neuro-medicine and surgery departments of DMCH, BSMMU, BIRDEM, NINH and CRP (savar, mirpur),

Data collection instrument: Data were collected through face to face interviews by the semi - structured questionnaire and checklist which was pretested before finalization.

Data collection techniques: The interview was done in the outdoor and indoor department from stroke patient who attended in DMCH, BSMMU, BIRDEM, NINH and CRP (Savar & Mirpur) hospital in a suitable time for the respondent. Face to face interview was taken by using questionnaire and filling up checklists on observation in a comfortable environment in which the respondent could free to disclose their information. Before interviewing the patients, inform consent was taken. Relevant information was collected from medical record.

Result

Among the 350 respondents, the majority of the participants were male 230(65.7%) and rests of them were female 120(34.3%). Age group distribution of the participants showed that 141 (40.3%) number of participants were in 55-64 age group followed by 115(32.9%), 45(12.9%), 36(10.3%), 13(3.7%) of 45-54 age group, 35-44 age group, ≥ 65 age group and 25-34 age group respectively. Most of the male respondents (43.5%) were in 55-64 age groups followed by 45-54 age groups (29.6%). On the other hand, most the female participants (39.2%) constituted 45-54 age groups followed by 55-64 age groups (34.2%). About 139(39.7%) participants completed HSC education followed by 110(31.4%) graduation and post graduation. Remaining 40(11.4%) participants were illiterate. Majority (31.7%) of the respondents were service holder

followed by 27.7% housewives, 24.0% business. Among the female participants 80.8% were housewives. Most of the participants (72.9%) comprised upper income group followed by middle income group (25.4%) and low income group (1.7%). Mean monthly family income was 26311.4±28551.6. Almost half (50%) of the participants were from urban area (Table 1). Based on hospital records of CT scan of the respondent's showed that 61.4% stroke was ischemic and 38.6% hemorrhagic. Among the ischemic stroke 75.3% strokes were non-embolic and 24.7% stroke were embolic. On the other hand 63.7% strokes were intra-cranial hemorrhagic and 36.3% strokes were sub-arachnoids hemorrhagic among the hemorrhagic stroke. It was remarkable that among the hemorrhagic stroke, most of the female participants (80%) suffered from ICH and 20% suffered from SAH. On the other hand among the male participants 55.6% were ICH and 44.4% were SAH in hemorrhagic group. According to hospitals records, data showed that 33.7% stroke involved the cortical area of brain followed by basal ganglia (22.0%), sub cortical area (21.1%), brain steam (12.0%), cerebral (10.9%) and bilateral (0.3%). Data shows that almost three quarter of the respondent's suffered from hemiplegias (72.6%), followed by quadriplegia (18%) and monoplegia (9.4%). About 47.8% respondents were right sided hemiplegic and 52.2% were left sided hemiplegia (Table-2). Table-3 showed that 27.4% suffered from dehydration prior to stroke occurrence. About 65.7% subjects were in mental pressure prior to stroke. About 58.9% of the study subjects faced headache prior to stroke. Visual problem was present in 54.9% respondents. Data also presented that 44.6% subjects experienced stroke while working followed by excitation, rest and during sleep by 32.6%, 16.6% and 6.3% respectably (Table 3).

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Table -1: Socio demographic characteristics of the respondents (n=350)

Variables	Male n (%)	Female n (%)
Gender	230(65.7)	120(34.3)
Age group		
25-34 years	13(5.7)	0(0)
35-44 years	16(8.3)	26(21.7)
45-54 years	68(29.6)	47(39.2)
55-64 years	100(43.5)	41(34.2)
≥65 years	30(13)	6(5)
Education level		
Illiterate	21(9.1)	19(15.8)
Primary level	14(6.1)	11(9.2)
SSC	16(7)	20(16.7)
HSC	95(41.3)	44(36.7)
Graduation and above	84(36.5)	26(21.7)
Occupation		
Housewife	0(0)	97(80.8)
Retired	31(13.5)	2(1.7)
Service Holder	93(40.4)	18(15)
Business	81(35.2)	3(2.5)
Day labor	16(7.0)	0(0)
Farmer	8(3.5)	0(0)
Others	1(0.4)	0(0)
Monthly income		
≤5000 TK.	2(0.9)	4(3.3)
5000-15000 TK	62(27.8)	27(22.5)
≥15000 TK	166(72.2)	89(74.2)
Residence		
Rural	45(19.6)	23(19.2)
Urban	116(50.4)	59(49.2)
Semi urban	69(30)	38(31.7)

Table -2: Pattern of stroke

Variables	Male n (%)	Female n (%)
Type of stroke		
Ischemic	140(60.9)	75(62.5)
Hemorrhagic	90(39.1)	45(37.5)
Type of Ischemic stroke		
Non embolic	105(75)	57(76)
Embolic	35(25)	18(24)
Type of hemorrhagic stroke		
ICH	50(55.6)	36(80)
SAH	40(44.4)	9(20)
Area of brain involvement		
Cortical	86(37.4)	32(26.7)
Sub cortical	50(21.7)	24(20)
Brain steam	27(11.7)	15(12.5)
Bilateral	0(0)	1(0.8)
Cerebral	19(8.3)	19(15.8)

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Basal ganglia	48(20.9)	29(24.2)
Type of paralysis		
Quadriplegia	52(22.6)	11(9.2)
Hemiplegia	161(70)	93(77.5)
Monoperesis	17(7.4)	16(13.3)
Type of Hemiplegia		
Right	80(49.4)	42(45.2)
Left	81(50.6)	51(54.8)
Type of speech problem		
Aphasia	39(17)	2(19.2)
Disarthria	151(65.7)	79(65.8)
Normal	40(17.4)	18(15)

Table -3: Condition prior to occurrence of stroke

Variables	Male n (%)	Female n (%)
Dehydration		
Present	74(32.2)	22(18.3)
Absent	156(67.8)	98(81.7)
Mental pressure		
Present	153(66.5)	77(64.2)
Absent	77(33.5)	43(35.8)
Headache		
Present	139(60.4)	97(55.8)
Absent	80(34.4)	46(38.3)
Don't know	11(4.8)	7(5.8)
Vomiting		
Present	162(70.4)	72(60)
Absent	68(29.6)	48(40)
Visual problem		
Present	124(53.9)	68(56.7)
Absent	106(46.1)	52(43.3)
Season of occurrence		
Summer	79(34.3)	55(45.8)
Winter	151(65.7)	65(54.2)
Mood of occurrence		
Sleep	16(7)	6(5)
Work	95(41.3)	61(50.8)
Exited	85(37.0)	29(24.2)
Rest	34(14.8)	24(20.0)

Discussion

The greater prevalence of stroke in men is well known¹⁰. In this study male and female distribution was 65.7% and 34.3% which was similar with the study of Hossain AM et al¹¹ and Chowdhury et al¹². Age is the single most important risk factor

for stroke¹³. Frequency of stroke rises exponentially with increasing age¹⁴. The risk of stroke doubles for each successive decade after age 55 years¹⁵⁻¹⁶. This study showed pick stroke incidence (40.3%) occurred at the 55-64 year age group followed by 45-54 year age group (32.9%). It estimates that almost 73% stroke occurred in age 45-64 age group in Bangladesh which was golden years of active population. This study was slightly different from the Mollah AS et al¹⁷ study, in which mean age of the stroke patients was 60.0 ±13.7 years. Almost half of the respondents lived in urban area. Bashar et al¹⁸ showed similar finding. According to Ferri CP et al¹⁹ stroke prevalence was inversely proportional to the education levels of stroke survivors which was dissimilar to present study. This study found similar finding as the study of Chapman et al²⁰ which showed the incidence of stroke was high among the high-income group. Hart-CL et al²¹ concluded that poor socio-economic circumstances was associated with greater risk of stroke. Based on hospital records CT scan of the respondent's showed that 61.4% stroke was ischemic and 38.6% hemorrhagic. Findings of this study supported by Badiuzzaman M et al²². Among ischemic stroke 75.3% strokes were non-embolic and 24.7% stroke were embolic. On the other hand 63.7% strokes were intra-cranial hemorrhagic and 36.3% strokes were sub-arachnoids hemorrhagic among the hemorrhagic stroke. It was remarkable that among the hemorrhagic stroke, most of the female participants (80%) suffered from ICH and 20% suffered from SAH which was contradictory with the findings of Badiuzzaman M et al²². About 28% respondents suffered from dehydration prior to stroke occurrence, 65.7% subjects were in mental pressure prior to stroke and 58.9% of the study subjects experienced headache prior to stroke. This study found similarity with the study of Miah AH et al²³.

Conclusion:

Most of the stroke incidence occurred in 45-64 years of age. So it needs to give attention about the age onset of stroke to reduce the stroke burden in Bangladesh. The study found that urban residents were more prone to stroke occurrence. Study also found a new trend in relation to education level. Stroke incidence was more in high income group. Ischemic stroke was quite double than hemorrhagic. Non-embolic stroke was four fold than embolic stroke.

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REFERENCES

1. Mary I. Dallas, PhD; Shari Rone-Adams, DBA; John L. Echternach, EdD; Lawrence M. Brass, MD, Dawn M and Bravata, MD., (2008), Dependence in Prestroke Mobility Predicts Adverse Outcomes Among Patients With Acute Ischemic Stroke, *Stroke*, 39, 2298-2303.
2. Donnan GA, Fisher M, Macleod M, Davis SM. *Stroke*. *Lancet*. 2008; 371:1612–1623.
3. Raju, et al, 2010. Psychosocial Problems, Quality of Life, and Functional Independence among Indian Stroke Survivors, *stroke* 2010, 41:2932-2937 .
4. Burn J, Dennis M, Bamford J, Sandercock P, Wade D, and Warlow C. Long-term risk of recurrent stroke after a first-ever stroke. The Oxfordshire Community Stroke Project. *Stroke* 25, 333-337. 1994.
5. Chandra V et al. *Disease Control Priorities in Developing Countries*. 2nd edn. New York: Oxford University Press and World Bank, 2006: 627–43.

6. Hankey GJ. Potential new risk factors for ischemic stroke: what is their potential? *Stroke* 2006; 37: 2181–88.
7. Mateen FJ, Carone M, Alam N, Streatfield PK, Black RE. A population-based case-control study of 1250 stroke deaths in rural Bangladesh. *Eur J Neurol.* 2012 Feb 16. doi: 10.1111/j.1468-1331.2012.03666.x.
8. Bhopal R, Rahemtulla T, Sheikh A. Persistent high stroke mortality in Bangladeshi Populations. *BMJ* 2005; 331; 1096-1097. doi:10.1136/bmj.331.7525.1096.
9. Zaman MM, Nargis N Perucic AM, Rahman K. (editors) (2007). *Impact of Tobacco-related illnesses in Bangladesh.* SEARO, WHO, New Delhi.
10. Bousser MG. Stroke in women. *Circulation.* 1999;99:463–467.
11. Hossain AM, Ahmed NU, Rahman M, Islam MR, Sadhya G, Fatema K. Analysis of Sociodemographic and Clinical Factors Associated with Hospitalized Stroke Patients of Bangladesh. *Faridpur Med. Coll. J.* 2011;6(1):19-23.
12. Chowdhury SGM, Ahmed Q, Dhan FD, Alam MR, Arif SM, Roy PK. Stroke in patients having inadequate or irregular antihypertensive therapy. *Bangladesh Med Res Coun Bull.* 1990;16:53-20.
13. Mohammad QD, Habib M, Hoque A, Alam B, Haque B, Hossain S, Rahman KM, Khan SU. Prevalence of stroke above forty years. *Mymensingh Med J.* 2011 Oct;20(4):640-4.
<http://www.ncbi.nlm.nih.gov/pubmed/22081183>.
14. Heart disease and stroke statistics -2005 update. Dallas: American Heart Association, 2005.
15. Brown RD, Whisnant JP, Sicks JD, O'Fallon WM, Wiebers DO. Stroke incidence, prevalence, and survival: secular trends in Rochester, Minnesota, through 1989. *Stroke.* 1996;27:373–380.

16. Wolf PA, D'Agostino RB, O'Neal MA, Sytkowski P, Kase CS, Belanger AJ, Kannel WB. Secular trends in stroke incidence and mortality: the Framingham Study. *Stroke*. 1992; 23:1551–1555.
17. Mollah AS, Rahman SW, Das KK, Hassanuzzaman M. Characteristics of patients admitted with stroke. *Mymensingh Med J*. 2007 Jan; 16(1):20-4. <http://www.ncbi.nlm.nih.gov/pubmed/17344774>.
18. Bashar A. A dissertation on "Study of risk factor of stroke" 1995: p. 78-80.
19. Ferri CP, Acosta D, Guerra M, Huang Y, Llibre-Rodriguez JJ, et al. Socioeconomic Factors and All Cause and Cause-Specific Mortality among Older People in Latin America, India, and China: A Population-Based Cohort Study. *PLoS Med* 2012 9(2): e1001179.
20. Chapman J. Epidemiology of vascular lesions affecting the central nervous system: The occurrence of stroke in a sample population under observation for cardiovascular disease. *Am J Public Health* 1966; 55:191-201.
21. Hart-CL, Hole DJ, Smith-GD. Influence of socioeconomic circumstance in early and later life on stroke risk among men in a Scottish cohort study. *Stroke* 2000; 31(9):2093-7.
22. Badiuzzaman M, Mohammed F R, Chowdhury F R, Bari M S, Alam m B, Ahasan H A M N. Prevalence of Modifiable Risk Factors among Stroke Patients in a Tertiary Care Hospital in Dhaka. *J MEDICINE* 2009; 10 (SUPPLEMENT 1): 18-21.
23. Miah AH, Sutradhar SR, Ahmed S, Bhattacharjee M, Alam MK, Bari MA, Tariquzzaman M, Mondol GD, Khan NA, Bari MS, Sarker CB. Seasonal variation in types of stroke and its common risk factors. *Mymensingh Med J*. 2012 Jan; 21(1):13-20.