ejpmr, 2022,9(5), 455-461

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

TO EVALUATE THE PARTIAL DEMOGRAPHIC VARIABLES AND IMPORTANT RISK FACTORS OF STROKE PATIENTS

Dr. Proshanta Kumar Pondit[1]*, Dr. Al Fatah Al Adiluzzaman[2], Dr. Purabi Barman[3], Dr. Muhammad Anamul Hoque[4], Dr. Md. Montashim Morshed[5]

[1]Assistant Professor, Dept. of Neurology, Rangpur Medical College, Rangpur, Bangladesh.
[2]Assistant Professor, Dept. of Medicine, Rangpur Medical College, Rangpur, Bangladesh.
[3]Lecturer, Dept. of Biochemistry, Sir Salimullah Medical College, Dhaka, Bangladesh.
[4]Junior Consultant, Dept. of Nephrology, Shaheed Syed Nazrul Islam Medical College Hospital, Kishoregonj, Bangladesh.
[5]Assistant Registrar, Dept. of Neurology, Rangpur Medical College Hospital, Rangpur, Bangladesh.

***Corresponding Author: Dr. Proshanta Kumar Pondit**

Assistant Professor, Dept. of Neurology, Rangpur Medical College, Rangpur, Bangladesh.

Article Received on 24/03/2022 **Article Revised on 13/04/2022** **Article Accepted on 03/05/2022**

ABSTRACT

Background: The high number of disability-adjusted life-years lost due to stroke (485 per 10000 people) shows that stroke severely impacts the economy of Bangladesh. Stroke is broadly classified as ischaemic and haemorrhagic which constitute approximately 80 and 20 percent of total stroke patients respectively. **Objectives:** To access the partial demographic variables and important risk factors of stroke patients. **Methods:** This was a hospital based observational follow up study conducted on one hundred patients with spontaneous intracerebral haemorrhage, admitted into Dhaka Medical College and Hospital. **Results:** Mean age of the patients was 66,9 ± 11.9 years. Fifty seven percent were males, forty three percent were females. Majority of the patients were from rural areas, muslims and monthly income of Taka 10,000 or less. Headache and hemiparesis/plegia were the most frequent presenting features. Most of the cases were hypertensive haemorrhages (71 percent). Regarding outcome, disability (mRS >2) at the end of first week was 71%. Overall mortality within this period was twenty two (22%). Some important risk factors of spontaneous ICH detected in this study. Hypertension was found in 71% of patients. Smoking was a major risk factor in males (66.7%). History of DM, family history of stroke and IHD were found in both sexes. Of the risk factors, History of DM was observed to significantly higher in highest tertile of blood glucose compare to lowest and mid-tertile (p=0.004) and HTN was also observed to considerably higher in highest tertile of blood glucose compare to lowest and mid-tertile, although the differences were not statistically significant (p=0.09). The groups were almost homogenous in terms of IHD (p= 0.897) and smoking habit (p=0.780). **Conclusion:** The ratio of male hemorrhagic stroke patient is higher. Although living area, economic status and residence area may not be correlated with hemorrhagic stroke, age, habit of smoking and HTN may be arise as some potential risk factors for hemorrhagic stroke.

KEYWORDS: Hypertension, stroke, ischaemic, haemorrhagic.

INTRODUCTION

Stroke is a huge burden on society.[1] At least half of the patients with a neurologic disorder attending general hospitals suffer from stroke.[2] Stroke is broadly classified as ischaemic and haemorrhagic which constitute approximately 80 and 20 percent of total stroke patients respectively.[3] Haemorrhagic stroke is further divided into intracerebral and subarachnoid haemorrhages (SAH), accounting for 80 and 20 percent of cases respectively. Stroke due to intracerebral haemorrhage is known as spontaneous intracerebral haemorrhage (sICH).[4] Spontaneous intracerebral haemorrhage (ICH) accounts for approximately 10 to 15 percent of all strokes.[5] Case fatality has not changed in spontaneous ICH over the past few decades.[6] Overall incidence of spontaneous ICH is approximately 0.25 per 1000 person-years, higher among Asians, 0.5 per 1000 person. Prevalence of stroke in Bangladesh is approximately 3 per 1000 person-year overall and 10 per 1000 person-year in people aged 70 years or more.[7] Spontaneous ICH comprised 31 and 28 percent of all stroke patients in studies conducted in Bangladesh and Pakistan respectively.[8]

Hypertension is responsible for 70 to 80 percent of spontaneous ICH.[9] Spontaneous ICH associated with hypertension and amyloid angiopathy, is grouped as primary intracerebral haemorrhage.[10] Hyperglycemia has a detrimental effect in several acute neurological conditions and worsens neurological outcome with and

without preexisting diabetes mellitus. High concentrations of blood glucose are associated with a worse outcome in traumatic brain injury, ischemic stroke in patients with cerebral infarctions treated with thrombolytic drugs and subarachnoid hemorrhage.[11,12] Recently, a strict association between the presence of hyperglycemia at hospital admission and poor outcome was been reported from different cohorts in developed countries. Because hyperglycemia can adversely affect vascular function and neuronal cell metabolism the concept that normoglycemia be maintained during the acute phase seems plausible professional organizations have recommended rigorous glycemic control in hospitalized stroke patients and strict glycemic control should be routine practice.[13]

Immediate prognosis for sICH is grave, 30 to 35 percent die within 30 days; Twenty percent died in the first two days, 50.5% in one week and 90% in two weeks after admission. In addition to high mortality, 66.3% patients having moderate to severe disability after sICH.[14] Metabolic disturbances, especially hyperglycaemia and electrolyte imbalance are associated with worse outcome. In sICH, admission hyperglycemia to be an independent risk factors for early mortality and disability. High blood glucose levels upon admission may be a predictor of mortality in patients with sICH. A meta analysis conducted by Xingrong Tan et al showed that sICH patients with hyperglycemia had an increased risk of mortality 3.65 fold compared with patients without hyperglycemia.[15] Recovery is usually rapid during the first few weeks as oedema subsides, and gradual thereafter as the clot takes time to be removed. About half of the survivors become dependent on others for the rest of their lives.[16]

OBJECTIVE

General objectives: To evaluate the partial demographic variables and important risk factors of stroke patients.

Specific objectives

1) To record mortality, if any, within the first week .
2) To record the extent of disability, if any, at the end of first week.

METHODOLOGY

Study design : Hospital based observational follow up study.

Study place : Department of Neurology, Dhaka Medical College Hospital, Dhaka, Bangladesh

Period of study : From July, 2012 to June, 2014

Study population : Patients with spontaneous intracerebral haemorrhage admitted into the departments of Neurology, Neurosurgery and Internal Medicine, Dhaka Medical College and Hospital.

Sample size : Due to limitation of the time, logistic support, availability of patient and lack of sufficient fund sample size was reduced to 100.

Sampling method : Non-randomized convenience sampling.

Selection Criteria

Inclusion criteria

1) Age ≥ 18 years, both sexes.
2) Patients with first ever spontaneous intracerebral haemorrhage.
3) Hospital admission within 48 hours of onset.

Exclusion criteria

1) Head injuries.
2) Tumour haemorrhages, haemorrhagic infarcts or haemorrhagic diathesis.
3) Serious co-morbidity like chronic kidney disease, heart failure, decompensated chronic liver disease, respiratory failure, metabolic encephalopathy.
4) Patients undergoing neurosurgical procedure.
5) Patients or attendants unwilling to give consent.
6) No prior neurologic disability from previous neurologic or other diseases.

Sample Collection

After selection of subjects, the objectives, nature, purpose and potential risk of all procedures used for the study were explained in details and informed written consent from the patient or attendance of the patient was taken. Detailed history, clinical examination, and all information were taken in a prescribed data collection form.

Data collection method

Data was collected by face to face interview of the patient or relatives of patient in Inpatient Departments Neurology, Neurosurgery and Internal Medicine, DMCH.

Data analysis

The data analysis was done manually using standard statistical procedures. Statistical Products and Service Solutions (SPSS) version 20 was used whenever required and also to crosscheck the results. Qualitative and quantitative data were be analyzed with chi-square and anova test respectively. Associations were expressed in terms of relative risk and considered statistically significant if p-value was < 0.05.

RESULTS

Table I shows the age and sex distribution of the patients under study. Total one hundred patients of spontaneous intracerebral haemorrhage were included in the study. Fifty seven (57%) were males and forty three (43%) were females. Majority of cases aged more than 60 years (73%), in both sexes (70% and 78% among males and females respectively).

Table I: Age and sex distribution (n=100)

Age (years)	Male	Female	Total
≤ 30	1(1.75)	1(2.32)	2(2.0)
31 – 40	2(3.50)	0(0.0)	2(2)
41 – 50	3(5.26)	1(2.27)	4(4)
51 – 60	10(19.29)	7(16.27)	17(17)
61 – 70	20(35.08)	15(34.09)	35(35)
71 – 80	13(24.56)	13(30.23)	26(26)
>80	7(10.44)	6(13.95)	13(13)
Total	57(100)	43(100)	100(100)
Mean (years)	65.68±12.47	68.26±11.34	66.9 ±11.9
Range (years)	22 – 88	29 – 90	22 – 90

(Percentages are mentioned within the parentheses)

Table II shows some basic demographic variables of the patients in this study. Majority of the patients were from rural areas (66%), muslims (81%) and married (93%) and monthly income of Taka 10,000 or less (81%).

Table II: Other demographic variables (n=100)

Variables	Data	Frequency	Percentage
Residence	Rural	66	66
	Urban	34	34
Marital status	Married	93	93
	Unmarried	07	07
Religion	Islam	81	81
	Hinduism	18	18
	Christianity	01	01
	Buddhism	00	00
Monthly income (Taka)	≤ 10,000	81	81
	>10,000	19	19

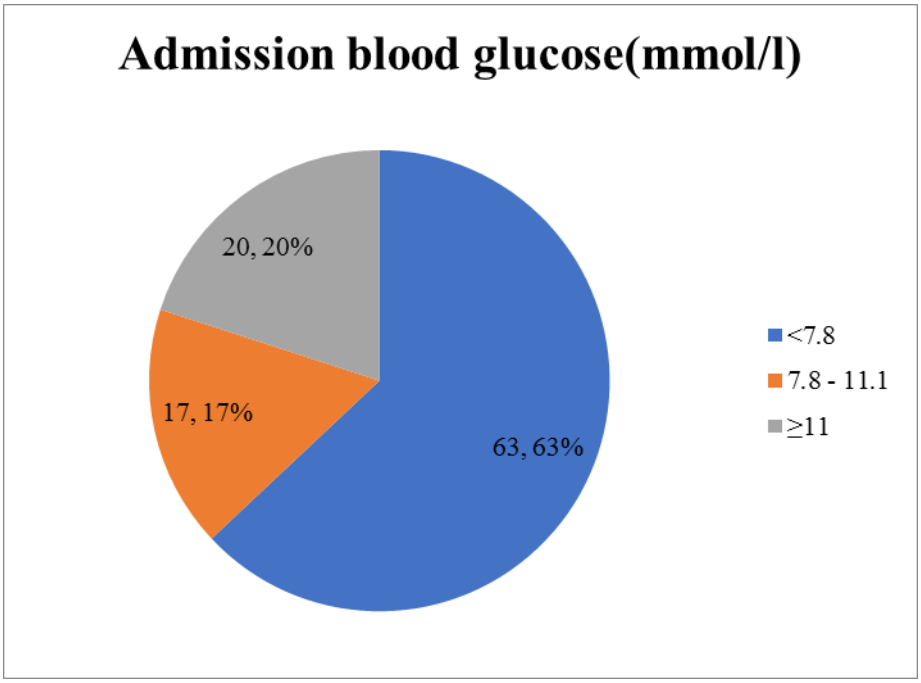

Figure 1: Distribution of admission blood glucose (mmol/L).

Figure 5 shows that admission blood glucose of 63% of the patients were <7.8 mmol/L. Percentages of patients having admission blood glucose level 7.8 –11.1mmol/L and ≥11.1mmol/L were 17 and 20 respectively.

Table III shows some important risk factors of spontaneous ICH detected in this study. Hypertension was found in 71% of patients. Smoking was a major risk factor in males (66.7%). History of DM, family history of stroke and IHD were found in both sexes.

Table III: Risk factors and co-morbidities (n = 100).

Risk factors and co-morbidities	Male	Female	Total
Hypertension	40 (70.17)	31 (72.09)	71 (71)
Smoking	38 (66.7)	2 (4.64)	40 (40)
Family history of stroke	9 (15.79)	7 (16.27)	16 (16)
History of DM	8 (14.03)	7 (16.27)	15 (15)
History of IHD	7 (12.28)	5 (11.62)	12 (12)
Alcoholism	5 (8.77)	0 (0)	5 (5)

(Percentages are mentioned within the parentheses)

Table IV shows the locations of spontaneous ICH found in this study. Putamen is the favoured site for hypertensive ICH (71%). On the other hand lobar ICH was found mainly in non-hypertensive ICH (89.65%).

Table IV: Location of ICH (n = 100).

Location	Hypertensive ICH	Non hypertensive ICH	Total
Supratentorial: Putamen	48 (67.6)	1 (3.44)	49 (49)
Lobar	12 (16.90)	26 (89.65)	38 (38)
▪ Frontal	5 (7.05)	10 (34.48)	15 (15)
▪ Temporal	4 (5.63)	10 (34.5)	14 (14)
▪ Parieto-occipital	3 (4.2)	6 (20.68)	9 (9)
Thalamus	2 (2.8)	0 (0.0)	2 (2.1)
Ifratentorial: Cerebellum	6 (8.45)	1 (3.45)	7 (7)
Brain stem	3 (4.22)	1 (3.45)	4 (4)
Total	71 (100)	29 (100)	100 (100)

(Percentages are mentioned within the parentheses)

Table V shows the overall outcome of spontaneous ICH patients in this study. Disability (mRS>2) at the end of first week was found in seventy one (71%) patients. Overall mortality within that period was twenty two (22%).

Table V: Overall outcome (n = 100).

Admission blood glucse (mmol/L)	Total	Disability (mRS >2) (at the end of first week)	Mortality (during first week)
<7.8	63	38	8
7.8 – 11.1	17	15	6
≥11.1	20	18	8
Total	100 (100)	71 (71)	22 (22)

(percentages are mentioned within the parentheses)

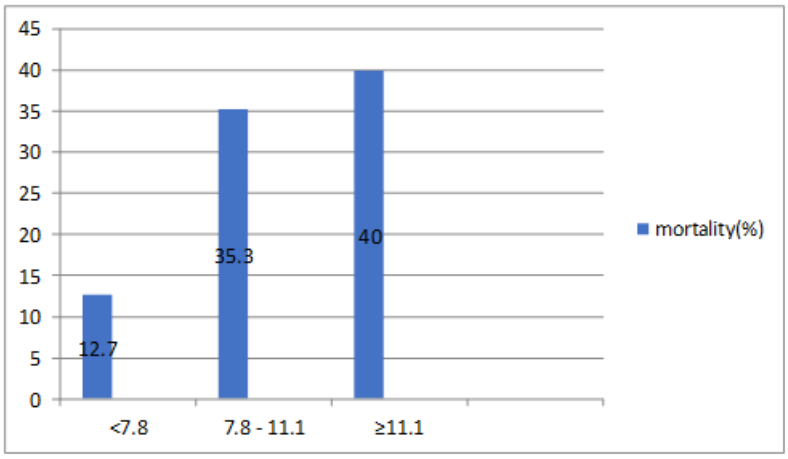

Figure 2: Distribution of mortality rate of interest.

Figure 2 shows mortality rate among the patients with admission blood glucose <7.8 mmol/L , 7.8 – 11.1 mmol/L , ≥11.1mmol/L were 12.7%, 35.3% and 40% respectively.

Table VI: Both age and sex were almost identically distributed among the three tertiles of admission blood glucose (p= 0.42 and p= 0.779 respectively). Of the risk factors, History of DM was observed to significantly higher in highest tertile of blood glucose compare to lowest and mid-tertile (p=0.004) and HTN was also observed to considerably higher in highest tertile of blood glucose compare to lowest and mid-tertile, although the differences were not statistically significant (p=0.09). The groups were almost homogenous in terms of IHD (p= 0.897) and smoking habit (p=0.780).

Table VI: Association of admission blood glucose level with demographic factors, risk factors and co-morbidities.

Variable	Blood glucose level (mmol/L)			P value
	<7.8 (n=63)	7.8- 11.1 (n=17)	≥11.1 (n=20)	
Age (yrs)	65.87±12.93	68.29±9.86	69.65±10.06	0.42**
Sex (male)	37(58.73)	10(58.82)	10(55.5)	0.779*
Hypertension	40(45)	14 (58.8)	17(60.4)	0.09*
Smoking	28(43)	6(35.3)	9(35.3)	0.780*
History of DM	4(6.34)	4(23.52)	7(35)	0.004*
History of IHD	7(10.7)	2(11.7)	3(16.6)	0.897*

(Percentages are mentioned within the parentheses)
* Chi-square test
**Anova test

DISCUSSION

This observational follow up study was carried out in the Department of Neurology, Dhaka Medical College Hospital, Dhaka. In this study, short term hospital outcome in patients with spontaneous intracerebral haemorrhage was assessed.

One hundred patients of spontaneous intracerebral haemorrhage were included in this study. Most (73%) of the patients were of 60 years or more age. Mean age was 66,9 ± 11.9 years. The age distribution was similar to that of most of the previous studies conducted in Bangladesh and India.[17] The youngest and oldest patients were of 22 and 90 years respectively. Number of males (57%) was more than that of females (43%). Similar sex distribution was found in the study on spontaneous ICH patients in Heerlen, Netherlands.[18]

Majority of the cases were hypertensive intracerebral haemorrhages (71%). The cause could not be revealed in the rest of the patients as the study was done within the first week of stroke and the more extensive investigations were deferred during that period. However, exclusion of tumour haemorrhages, haemorrhages in bleeding disorders and anticoagulant and fibrinolytic therapy, and haemorrhagic infarcts, was rationally suggestive of amyloid angiopathy and vascular malformations as the cause in non-hypertensive patients.

Both age and sex were almost identically distributed among the three tertiles of admission blood glucose. The groups were almost homogenous in terms of IHD and smoking habit. History of DM was observed significantly higher in highest tertile of blood glucose compare to lowest tertile. This finding is consistent with that of Yannick Bejot et al.[19]

In this study, it was found that location of haematoma (supratentorial versus infratentorial) did not show any statistically significant association with various level of admission blood glucose.

Regarding outcome, disability (mRS >2) at the end of first week was 71%. Overall mortality was twenty two (22%) which almost similar to E Woo et al.(1988).[20] But higher than that of other studies.[21] Small sample size and insufficient advanced stroke care facilities might be the reason behind higher mortality in this series.

Salman R.A (2006) showed that smoking as a risk factor of stroke in a multivariate analysis, this study had given more emphasis in ischemic stroke than hemorrhagic stroke.[22] All these studies are not consistent with the present study result. So, it needed further studies with large sample size to establish this factor.

CONCLUSION

The ratio of male hemorrhagic stroke patient is higher. Although living area, economic status and residence area may not be correlated with hemorrhagic stroke, age, habit of smoking and HTN may be arise as some potential risk factors for hemorrhagic stroke. For getting more specific informationregarding this issue we would like to recommend for conducting more studies in several places with larger sized samples.

REFERENCE

1. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med*, 2006; 3: e442.
2. Ropper, A.H. and Samuels, M.A. (2009) *Adams and Victors's principles of neurology.* 9th edn. New York: McGraw-Hill Medical Publishing Division.
3. Siddique, M.A.N, Nur, Z., Mahbub, M.S., Alam, M.B. and Miah, M.T. (2009), 'Clinical presentation and epidemiology of stroke – a study of 100 cases'. *Journal of Medicine*, 10(2): 86-89.
4. Pendelbury, S.T., Matthew, F.G. and Rothwell, P.M. (2009) 'Epidemiology, risk factors, pathophysiology andcauses of transient ischemic attacks and stroke'. *Transient ischemic attack and stroke.* Cambridge: Cambridge University Press, 1-10.
5. Dennis, M.S., Burn, J.P., Sandercock, P.A., Bamford, J.M., Wade, D.T. and Warlow, C.P. (1993) 'Long term survival after first week of stroke'. *Stroke*, 24(6): 796-800.
6. Van Beijnum, J., Lovelock, C.E., Cordonnier, C., Rothwell, P.L., Clijin, C.I. and Salman, A. (2009) 'Outcome after spontaneous and arteriovenous malformation-related intracerebral hemorrhage: population based studies'. *Brain*, 132(2): 537-543.
7. Mohammad Q.D., Habib, M., Hoque, A., Alam, B., Haque, B., Hossain, S., Rahman, K.M. and Khan, S.U. (2011) 'Prevalence of stroke above forty years'. *Mymensingh Medical Journal*, 20(4): 640-644.
8. Amanullah, Shah, N., Rehman, S. and Ataullah, S. (2009) 'Frequency of infarction and haemorrhage in patients of stroke'. *General Ayub Medical College Abottabad*, 2(4): 102.
9. Kase, C.S. (2008) 'Vascular diseases of the nervous system: Intracerebral hemorrhage'. In *Neurology in clinical practice* ed. by Bradley, W.B., Daroff, R.B., Fenichel, G.M. and Jankovic, J. 5th edn. J. Philadelphia: Elsevier.
10. Hill, M.D., Silver, F.L., Austin, P.C. and Tu J.V. (2000) 'Rate of stroke recurrence in patients with primary intracerebral haemorrhage'. *Stroke*, 31(1): 123-127.
11. Demchuk AM, Morgenstern LB, Krieger DW, Linda CT, Hu W, Wein TH, et al. Serum glucose level and diabetes predict tissue plasminogen activator-related intracerebral hemorrhage in acute ischemic stroke. *Stroke*, 1999; 30: 34–9.
12. Frontera JA, Fernandez A, Claassen J, Schmidt M, Schumacher HC, Wartenberg K, et al. Hyperglycemia after SAH: predictors, associated complications, and impact on outcome. *Stroke*, 2006; 37: 199–203.
13. Adams HP Jr, del Zoppo G, Alberts MJ, Bhatt DL, Brass L, Furlan A, et al. Guidelines for the early management of adults with ischemic stroke: *Stroke*, 2007; 38: 1655–711.
14. Yannick Be´jot, ; Corine Aboa-Eboule; Marie Hervieu, Agne`s Jacquin, Guy-Victor Osseby, Olivier Rouaud, Maurice Giroud, The Deleterious Effect of Admission Hyperglycemia on Survival and Functional Outcome in Patients With Intracerebral Hemorrhage. *Stroke*, 2012; 43: 243-245.
15. Chen Wanshan, Xianglong Pan. Hyperglycemia and outcome in acute spontaneous intracerebral hemorrhage:a retrospective analysis . *Medical innovation of China*, 2009; 32: 8-11.
16. Kelly, P.J., Furie, K.L., Shafqat, S., Rallis, N., Chang, Y. and Stein, J. (2003) 'Functional recovery after rehabilitation following hemorrhagic and ischemic stroke'. *Archive of Physical Medicine and Rehabilitation*, 84: 968-972.
17. Mollah, A.S., Rahman, S.W., Das, K.K. and Hassanuzzaman, M. (2007) 'Characteristics of patients admitted with stroke'. *Mymensingh Medical Journal*, 16(1): 20-24.
18. Franke, C.L., van Swieten, J.C., Alagra, A. and van Gijin, J. (1992) 'Prognostic factors in patients with intracerebral haematoma'. *Journal of Neurology Neurosurgery and Psychiatry*, 55(8): 653-657.
19. Sagar Basu, Debashish Sanyal, K Roy, KB Bhattacharya, DM is post-stroke hyperglycemia a marker of stroke severity and prognosis: A pilot study *Neurology Asia*, 2007; 12: 13–19
20. E Woo, Y W Chan, Y L Yu and C Y Huang, Admission glucose level in relation to mortality and morbidity outcome in 252 stroke patients. *Stroke*, 1988; 19: 185-191.
21. Sami Tetri, Seppo juvela,Pertti Saloheimo, Juhani Pyhtinen. Hypertension and Diabetes as predictor of

early death after spontaneous ICH.J Neurosurg, 2009; 110: 411–417.
22. Salman R.A., White, P.M., Davenport, R.I. and Lindsay, K.W. (2006) 'Subarachnoid hemorrhage'. *British Medical Journal*, 333: 234-240.