

Association of Cardiac Risk Factors with Socio Demographic Profile in Young Stroke Patients in a Tertiary Care Hospital in Bangladesh. An Observation Study of 100 Patients.

Sami Nazrul Islam¹, Farhana Zaman², Nazia Afrin Siddiqui³, Atiquzzaman⁴, Marufa Yasmin⁵ Mushrefa Chowdhury⁶, Sayeedur Rahman Khan⁷

Abstract:

Background: Young people who avoid strokes live longer and have more productive lives than their senior counterparts. The prevalence of the main vascular risk factors in atherosclerosis patients rises with age, starting in early middle age, and declines beyond 70–80 years. The majority of studies on young people are small and single-center, which makes generalization challenging. Stroke risk factors differ between men and women, and vascular risk factors are more prevalent in older age groups of young adult stroke patients.

Objective: The aim of the study is to find out the association of cardiac risk factors in young patients.

Methods: This hospital-based cross-sectional study was carried out in the indoor patients in the Shaheed Suhrawardy Medical College Hospital, Dhaka, from April 2015 to October 2015. Young stroke patients (15–45 years old) admitted to the hospital were used as the study's sample size.

Results: According to this study, the majority of patients (36.0%) were between the ages of 41 and 45. The percentages of patients in the 26–30-year-old, 31–35-year-old, and 36–40-year-old age groups were fairly close to one another (18.0%, 20.0%, and 22.0%, respectively). Just 4.0% of the population was under 25. The majority of the patients (64.0%) suffered from valvular heart disease. In addition, 10.0% had ischemic heart disorders, 16.0% had myocardial infarction, and 8.0% had atrial fibrillation. More over 75.0% of stroke patients also had some type of heart illness, according to the Framingham Heart study risk calculation.

Conclusion: Young adults from Bangladesh who suffered an ischemic stroke exhibited a high incidence of known cardiac risk factors, significant sex disparities, and alarmingly rising trends with age in both sexes. Regardless of where a person lives in the nation, preventive actions must be more aggressive and customized to each individual's specific risk profile.

Keywords: Stroke, Young patients, Cardiac diseases, Ischemic stroke, Risk Factors.

(Bangladesh Heart Journal 2023; 38(1): 81-87)

Introduction:

Strokes in young people (18–50 years old) are on the rise and make up 15–18% of all strokes at this time.^{1,2} These young adults are particularly vulnerable to

repeated strokes, with many of them considering whether or not to start families.³ Cerebral infarction, arteriovenous malformation, cardiogenic emboli, and intracranial

-
1. Assistant Professor Department of Cardiology, US Bangla Medical College & Hospital, Narayanganj
 2. Assistant Professor Respiratory Medicine, Aichi Medical College & Hospital, Demra, Dhaka
 3. Assistant Professor Department of Nephrology, US Bangla Medical College & Hospital, Narayanganj
 4. Associate Professor Department of Internal Medicine, US Bangla Medical College & Hospital, Narayanganj
 5. Associate Professor Department of Radiology & Imaging, US Bangla Medical College & Hospital, Narayanganj
 6. Assistant Professor Department of Gynae & Obstetrics, US Bangla Medical College & Hospital, Narayanganj
 7. Medical Officer, National Institute of Cardiovascular Diseases, Dhaka, Bangladesh.

Address of Correspondance: Dr Sami Nazrul Islam, Assistant Professor Department of Cardiology, US Bangla Medical College & Hospital, Narayanganj, email saminazrulislam1@gmail.com , mob 01720319975

DOI: <https://doi.org/10.3329/bhj.v38i1.67222>

Copyright © 2017 Bangladesh Cardiac Society. Published by Bangladesh Cardiac Society. This is an Open Access articles published under the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC). This license permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

hemorrhage are all symptoms of stroke in people aged 15 to 45. The most frequent causes in young people are atherosclerosis and cardiogenic emboli. Younger people experience ischemic strokes for different reasons than older people. The most frequent causes of ischemic stroke in young people were arterial dissections and cardiac embolism.⁴ Rarely do other known causes of stroke exceed atherosclerosis in the large and small arteries. Atherosclerotic cerebral infarction is predisposed by hypertension, previous TIA, and hyperlipidemia. Up to one-third of young stroke sufferers experience cardiogenic cerebral embolism. Emboli are prevented from entering the systemic circulation by the pulmonary capillary bed.⁵ Paradoxical embolism occurs when venous blood crosses the pulmonary capillary bed.⁷⁻⁸

Arteriovenous malformation and hypertension are the two main causes of intracerebral hemorrhage. Aneurysms, intraventricular hemorrhage, and arteriovenous malformations are the three main causes of SAH. Users of oral contraceptives had a ninefold higher risk of stroke.⁹ Cardiac arrhythmias and structural Heart diseases cause an increased risk of cerebral embolism.¹⁰⁻¹¹ Patients with an undiagnosed cerebral infarction can have cardiac emboli origins found via transesophageal echocardiography.¹² Young adult strokes with ambiguous risk factors may be detected via transesophageal echocardiography and angiography. features of the etiology and predictability of stroke in young persons related to age. It is crucial to understand the risk factors for stroke in the general population in order to develop primary and secondary prevention strategies that are affordable. Younger people with ischemic stroke are more likely than older people to have a long-term effect on quality of life.^{13,14} Stroke prevention in young individuals is more likely to result in more productive years and a higher level of life than in older people. In patients with ischemic stroke, the prevalence of main vascular risk factors rises with age, beginning in early middle life, and diminishes after the age of 70 to 80.¹⁵ Most studies that focus on young people are small and represent single-center cohorts, which makes them challenging to generalize. Several research have demonstrated that the distribution of stroke risk factors differs between men and women.¹⁶⁻¹⁹, indicating that vascular risk factors are more prevalent in older age groups of young adult stroke patients.^{16,19-24} For instance, larger-scale research on gender and age-specific disparities are required to gather more helpful and general information for the prevention of young-onset stroke. So, this cross sectional study at Shaheed Suhrawardy Medical College will look at the

association of cardiac risk factors with socio demographic profile in young individuals.

Objectives

- To find out the at the association of cardiac risk factors with socio demographic profile in young individuals.

Methodology

This was carried out in the Department of Medicine of Shaheed Suhrawardy Medical College Hospital, Dhaka, from April 2015 to October 2015 on indoor patients who were admitted to the hospital during this period. The study's sample size consisted of patients with stroke who were between the ages of 15 and 45 when they were admitted to the hospital..

Inclusion criteria-

- Stroke patients of both sex between 15-45 years.
- Patients who have given informed written consent.

Exclusion criteria-

- Patient having associated chronic infections or illness
- Patients of cancer and immunosuppressive illness.

Sample Size

Purposive sampling technique was adopted in this study. All the available subjects during the data collection period who fulfilled the study selection criteria were included in the study. As in this study purposive sampling technique was used and due to the time constraint, 100 samples were taken.

Data Collection and Analysis

A semi-structured survey was created. The questionnaire was created using the desired variables. The questionnaire asked about socio-demographics, disease features, and other information. A check list was also created. A pre-test session preceded the actual data gathering. Modifications were made before to the survey. Interviews and document reviews were used to acquire data. We examined and modified all data collected. Then the data were entered into the computer using SPSS. Chi-square was done after frequency run.

Results:

Most of the patients were between the ages of 41 and 45. (36.0 percent). The percentage of patients aged 26 to 30 years, 31 to 35 years, and 36 to 40 years was relatively similar (18.0 percent , 20.0 percent and 22.0 percent respectively). Only 4.0 percent of participants were under the age of 25.

Table-I
Distribution of the patients according to residence

Residence	No. of the patients	Percent (%)
Urban	45	45.0
Rural	55	55.0
Total	100	100.0

Majority of the patients lived in rural area (55.0%). This may be due to the fact that urban patients are usually referred to Tertiary Government Hospitals for further care.

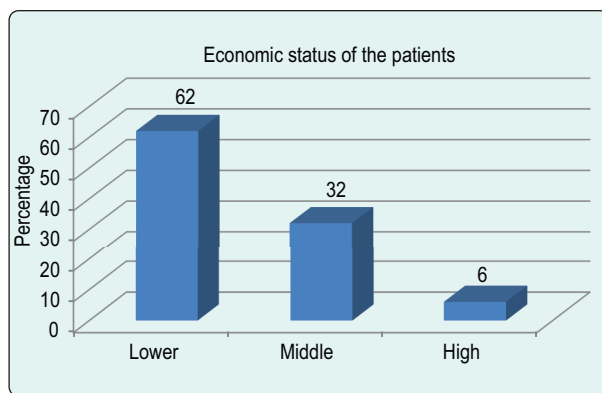


Fig.-1: Economic status of the patients

Among the patients majority were from lower economic status(62.0%). Less than one third were from middle class (32.0%). Only 6.0% were from high economic status.

Table-II
Distribution of patients by occupation

Occupation	No. of the patients n=100	Percent (%)
Student	16	16.0
Service	12	12.0
Business	8	8.0
Laborer	8	8.0
Farmer	6	6.0
Housewife	28	28.0
Unemployed	16	16.0
Others	6	6.0
Total	100	100.0

More than one fourth of the patients were housewife (28.0%). The proportion of student and unemployed were equal (16.0%) which were near about the proportion of

service holder (12.0%). The result shows that most of the patients were house wives this could be because the stay at home and lead a sedentary life style.

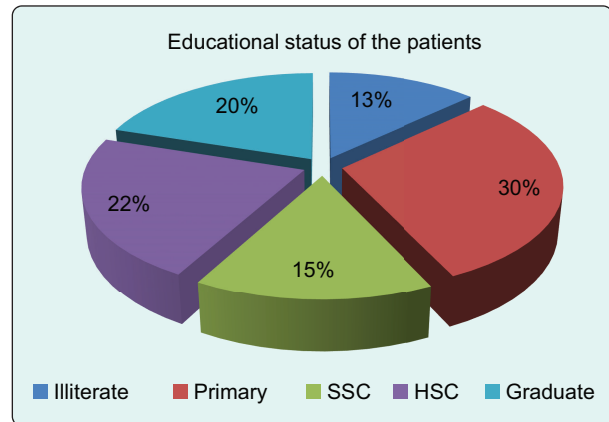


Fig.-2: Educational status of the patients

Among the patients the proportion of primary education level was highest (30.0%) followed by H.S.C. (22.0%) and Graduate (20.0%) patients. Fifteen percent patients were in S.S.C. level and 13.0% were illiterate. The result shows that most of the patients were educated up to primary school. It could be that these people were not aware about the causes and risk factors of stroke.

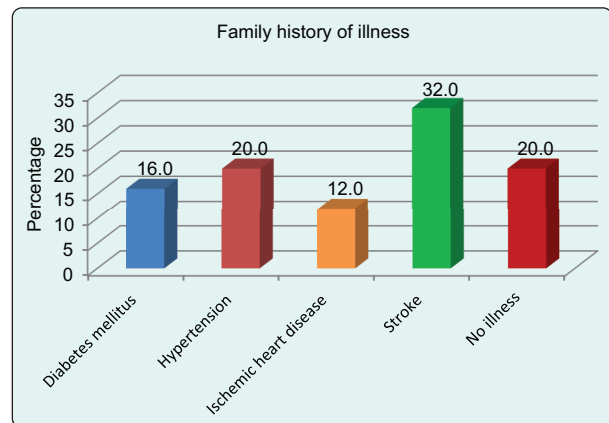


Fig.-3: Family history of illness

Near about one third of the patient had family history of stroke (32.0%) followed by hypertension (20.0%), diabetes mellitus (16.0%) and ischemic heart disease (12.0%). The study shows that most of the patients who have family history of stroke suffer from stroke. This could mean that people with family history of stroke should be more careful as the have higher chances of developing stroke.

Table-III
Past history of stroke and TIA (Transient Ischemic Attack)

Past History	No.of patients n=100	Percent (%)
Stroke	8	8.0
TIA	10	10.0
No illness	82	82.0

Past history of Transient ischemic attack was 10.0% and stroke was 8.0%. This table shows that the patients who had no previous history of stroke or TIA suffered stroke. This could be probably due to the fact that those who have previously suffered stroke or TIA lead a healthier life style than those who have not suffered stroke or TIA.

Table-IV
Proportion of the patients with hypertension

HTN		No. of the patients n=100	Percent (%)
Previously Known	Regularly treated	12	25.0
	Irregular/no treatment	20	41.7
Diagnosed on admission		16	33.3
Total		48	100.0

Among the patients with HTN, 66.7% was known case and 33.3% was diagnosed on admission. This shows that patients with no treatment or irregular treatment of hypertension were the highest category to suffer stroke.

Table-V
Proportion of different heart diseases

Diseases		No. of the patients n=100	Percent (%)
Myocardial infarction	Anterior	12	12.0
	Inferior	4	4.0
Myocardial Ischemia	Inferior ischemia	2	2.0
	Anterior ischemia	8	8.0
Valvular heart disease	Mitral stenosis	48	48.0
	Mitral stenosis with mitral regurgitation	14	14.0
	Mitral stenosis with aortic stenosis	3	3.0
Atrial fibrillation		9	9.0
Total		100	100.0

Most of the patients had ischemic type of stroke (91.0%). Only 9.0% had stroke due to intracerebral haemorrhage. In the study it was seen that the patients who suffered stroke a greater number suffered ischaemic stroke.

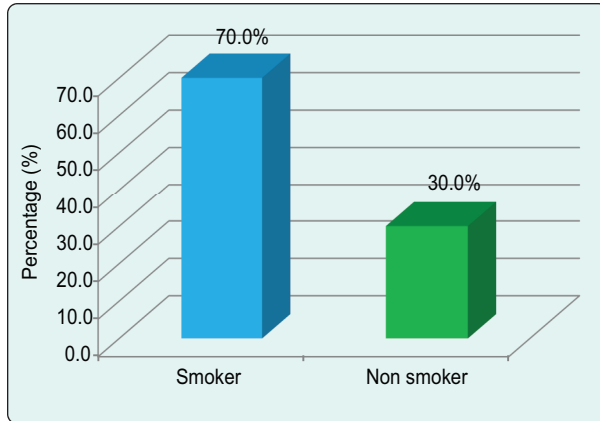


Fig.-4: Smoking status of the patients

Smokers comprised 70.0 percent of all patients, while non-smokers comprised the remainder (30.0 percent). A greater incidence of stroke is found among smokers compared to nonsmokers because smoking is a risk factor for atherosclerosis.

Table-VI

Proportion of oral contraceptive user in female patients

Use of contraceptive	No. of patients n=100	Percent (%)
Current contraceptive user	26	56.5
Contraceptive used previously	4	8.7
Never used	16	34.8
Total	46	100.0

Among the female patients more than half were current contraceptive user (56.5%). Only 8.7% were past contraceptive user. Incidence of stroke was higher in patients who were current contraceptive users.

Discussion

A cross sectional study was conducted to find out the relation of stroke with cardiac diseases in young patients, identify the risk factors associated with stroke in the young age group and socio demographic factors with stroke among the young stroke patients.

This study showed that among the patients majority were in 41 to 45 years age group (36.0%). The proportion of 26

to 30 years, 31 to 35 years and 36 to 40 years age group patients were very close (18.0%, 20.0% and 22.0% respectively). Only 4.0% were less than 25 years age. Majority of the patients lived in rural area (55.0%). Stroke incidence rose exponentially with increasing age.²⁵ in his study of stroke in young adults also found similar picture & showed that only 4% occurred in <20 years & 36% in 41-45 years. Bell D et al²⁶ (1990) studied 50 patients with stroke and found most of the incidence of stroke was between the ages of 50-69 years. Razzaq A A et al²⁷ (2002) studied in 118 young stroke patient in South Asia. About three quarters of the patients were in the 35-44 years of age. The highest incidence of stroke was between 5th to 7th decades. A study done by Chowdhury S. Z.M²⁸ also found peak incidence between 5th to 7th decades.

In this study more than half of the patients were male (54.0%). The present study coincides with study of Kurzke J F et al [18] where it showed that frequency of stroke is 30.0% higher in men than women. This study also differs with a previous study of Mannan & Alamgir²⁸, male : female ratio 4:1 and showed that stroke incidence in male is 22.0% higher than the female in South Asia.

Near about one third of the patient had family history of stroke 32.0% followed by hypertension in 20.0%, diabetes mellitus in 16.0% and ischemic heart disease in 12.0% of the patients. Past history of Transient ischemic attack was in 10.0% and stroke was in 8.0% of the patients.

Current study showed that more than two thirds of the patients were smokers (70.0%) and rests were non smoker (30.0%). Multiple individual studies have demonstrated that the risk of stroke was increased among the cigarette smokers Donan et al have shown strong association between cigarette smoking and stroke. Similar study in Copenhagen and Finland had shown increase risk of stroke in smoker. An analysis from 32 studies, found that relative risk of ischemic stroke from smoker was 1.9 times more than that of non smoker.

In this study among the female patients more than half were current contraceptive user (56.5%). Only 8.7% used contraceptives previously. There is little doubt that, regular use of estrogen is associated with increase risk of stroke. According to sex variation study with two different variable the research found that out of 24 female patients, about 58.3% patients suffered from stroke who had strong history of regular use of oral contraceptive. The use of oral contraceptive pill is associated with nine fold increase risk of cerebral infarction in women.

Conclusion

Young adults from Bangladesh who suffered an ischemic stroke exhibited a high incidence of known cardiac risk factors, significant sex disparities, and alarmingly rising trends with age in both sexes. Regardless of where a person lives in the nation, preventive actions must be more aggressive and customized to each individual's specific risk profile. It is imperative that our cross-sectional findings are replicated in a prospective study using uniform procedures.

References

1. Kissela, BM, Khoury, JC, Alwell, K Age at stroke: temporal trends in stroke incidence in a large, biracial population. *Neurology* 2012; 79: 1781–1787.
2. Singhal, AB, Biller, J, Elkind, MS Recognition and management of stroke in young adults and adolescents. *Neurology* 2013; 81: 1089–1097.
3. Arntz, RM, van Alebeek, ME, Synhaeve, NE The very long-term risk and predictors of recurrent ischaemic events after a stroke at a young age: The FUTURE study. *Eur Stroke J* 2016; 1: 337–345.
4. Virani S.S., Alonso A., Benjamin E.J., Bittencourt M.S., Callaway C.W., Carson A.P. Heart disease and stroke statistics—2020 update: A report from the American Heart Association. *Circulation*. 2020:E139–E596.
5. Krishnamurthi R.V., Moran A.E., Feigin V.L., Barker-Collo S., Norrving B., Mensah G.A., Taylor S., Naghavi M., Forouzanfar M.H., Nguyen G., Johnson C.O. Stroke prevalence, mortality and disability-adjusted life years in adults aged 20-64 years in 1990-2013: Data from the global burden of disease 2013 study. *Neuroepidemiology*. 2015;45(3):190–202.
6. Ekker M.S., Boot E.M., Singhal A.B., Tan K.S., Dabette S., Tuladhar A.M., de Leeuw F.E. Epidemiology, aetiology, and management of ischaemic stroke in young adults. *Lancet Neurol*. 2018 Sep 1;17(9):790–801.
7. George M.G, Tong X., Bowman B.A. Prevalence of cardiovascular risk factors and strokes in younger adults. *JAMA neurology*. 2017 Jun 1;74(6):695–703
8. Kwon SU, Kim JS, Lee JH, Lee MC. Ischemic stroke in Korean young adults. *Acta Neurol Scand* ; (2000);101(1): 19–24.
9. Rosengren A, et al. Optimal risk factors in the population: prognosis, prevalence, and secular trends: data from Gothenburg population studies. *Eur Heart J* 2001;22:136–44.
10. Yonemura K, Kimura K, Hasegawa Y, Yokota C, Inematsu K, Yamaguchi T. Analysis of ischemic stroke in patients aged up to 50 years. *Rinsho Shinkeigaku* 2000; 40(9): 881–6.
11. Delvigne M, Vermeersch P, van den Heuvel P. Thrombus-in-transit causing paradoxical embolism in cerebral and coronary arterial circulation. *Acta Cardiol* 2004; 59:669–72.
12. Grau AJ, Weimar C, Buggle F, Heinrich A, Goertler M, Neumaier S, et al.. Risk factors, outcome, and treatment in subtypes of ischemic stroke: the German stroke data bank. *Stroke*. 2001; 32:2559–2566.
13. Naess H, Waje-Andreassen U, Thomassen L, Nyland H, Myhr KM. Health-related quality of life among young adults with ischemic stroke on long-term follow-up. *Stroke*. 2006; 37:1232–1236.
14. Andersen KK, Andersen ZJ, Olsen TS. Age- and gender-specific prevalence of cardiovascular risk factors in 40,102 patients with first-ever ischemic stroke: a Nationwide Danish Study. *Stroke*. 2010; 41:2768–2774.
15. Putaala J, Metso AJ, Metso TM, Konkola N, Kraemer Y, Haapaniemi E, et al.. Analysis of 1008 consecutive patients aged 15 to 49 with first-ever ischemic stroke: the Helsinki Young Stroke Registry. *Stroke*. 2009; 40:1195–1203
16. Lanzino G, Andreoli A, Di Pasquale G, Urbinati S, Limoni P, Serracchioli A, et al.. Etiopathogenesis and prognosis of cerebral ischemia in young adults. A survey of 155 treated patients. *Acta Neurol Scand*. 1991; 84:321–325.
17. Haapaniemi H, Hillbom M, Juvela S. Lifestyle-associated risk factors for acute brain infarction among persons of working age. *Stroke*. 1997; 28:26–30.
18. Spengos K, Vemmos K. Risk factors, etiology, and outcome of first-ever ischemic stroke in young adults aged 15 to 45—the Athens young stroke registry. *Eur J Neurol*. 2010; 17:1358–1364.
19. Carolei A, Marini C, Ferranti E, Frontoni M, Prencipe M, Fieschi C. A prospective study of cerebral ischemia in the young. Analysis of pathogenic

- determinants. The National Research Council Study Group. *Stroke*. 1993; 24:362–367.
20. Bogousslavsky J, Pierre P. Ischemic stroke in patients under age 45. *Neurol Clin*. 1992; 10:113–124.
 21. Musolino R, La Spina P, Granata A, Gallitto G, Leggiadro N, Carerj S, et al. Ischaemic stroke in young people: a prospective and long-term follow-up study. *Cerebrovasc Dis*. 2003; 15:121–128.
 22. Rasura M, Spalloni A, Ferrari M, De Castro S, Patella R, Lisi F, et al. A case series of young stroke in Rome. *Eur J Neurol*. 2006; 13:146–152.
 23. Telman G, Kouperberg E, Sprecher E, Yarnitsky D. Distribution of etiologies in patients above and below age 45 with first-ever ischemic stroke. *Acta Neurol Scand*. 2007; 117:311–316.
 24. Bell DA, William B, Vladimir H, Keefe B. Antiphospholipid syndrome: Prevalence among patients with stroke & TIA. *Am J Med* 2000;88:593-97.
 25. Razzaq A, Khan B, Baig SM. Ischemic stroke in young adults of South Asia. *JPMA*. 2002;52:417.
 26. Chowdhury SZM. Study of Risk Factors in Cerebrovascular Disease- A study of 100 case. Dhaka:BCPS, 2001:48.
 27. Kurzke JF. Epidemiology of cerebrovascular disease. *Merritt's Neurology*. Philadelphia: LL W.2000;135-176.
 28. Alamgir SM, Mannan MA. Cerebrovascular disease (A report of 53 cases). *Bangladesh Med Res Coun Bull* 2005; 1 :45-50.