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Risk factors associated with stroke among the clients attending Neuro and Allied Clinic, Bhairahawa

Mahesh Raj Ghimire[1*]
Binita Soti[2]
Sakuntala Prajapati[3]
Lekhjung Thapa[4]
Sulochana Ghimire[5]
Shakti Shrestha[6]

[1]Department of Internal Medicine, Devdaha Medical College, Rupandehi; [2]Meditech International Academy, Butwal, Rupandehi; [3]Bir Hospital Nursing Campus, Kathmandu; [4]Department of Neurology, National Institute of Neurological and Allied Sciences, Kathmandu, Nepal; National Academy of Medical Sciences, [5]Universal College of Medical Science, Bhairahawa; [6]Research Unit, Neuro and Allied Clinic, Bhairahawa, Nepal

***Correspondence:** Dr. Mahesh Raj Ghimire, Department of Internal Medicine, Devdaha Medical College, Devdaha, Rupandehi, Nepal
Tel.: +977–9851149999
Email: ghimiremaheshraj@gmail.com

ABSTRACT

Introduction: Stroke is a preventable and treatable disease. Prevention of risk factors is the key point to decrease mortality and morbidity related with stroke. This study aims to determine the risk factors of stroke among Nepalese population of Mid–Western part of Nepal at Neuro and Allied Clinic, Bhairahawa.

Materials and methods: A cross sectional, descriptive study was carried out from 22/10/2017 to 11/11/2017 among 52 patients with stroke. Data were collected by using semi–structured interview, schedule on outpatient department at Neuro and Allied Clinic, Bhairahawa. All patients above 18 years, diagnosed clinically and radiologically as stroke, were included in this study.

Results: In this study, among 52 patients, 73.1%patients were male and 26.9% were female. Mean age of occurrence was 56.12 years (56.12±13.35). Most (86.5%) of the patients were literate and 94.2%were ischemic stroke type. Among the risk factors 67.3%were hypertensive, 65.38%were obese with mean BMI (26.1kg/m^2±4.0), 50%were alcoholic, 25%were smokers, 28.8%were diabetics, 17.3% patients were not involved in physical activities, 9.6%had dyslipidemia, and 9.6% had cardiac diseases. Likewise, 9.6% had stressful lifestyle, 5.8% patients had a positive family history of stroke, 17.3%were taking fruits every day and 78.8%were taking vegetables every day. Among 14 female patients 14.2% patients had taken oral contraceptive pills. Among hypertensive patient 28.57%were not taking antihypertensive and 17.1%were identified at the time of stroke attack.

Conclusion: This study concludes that most common risk factors of stroke in study population were hypertension, obesity, alcohol consumption and smoking which is comparable with western data. Significant number of risk factors were only identified at the time of stroke, due to lack of regular general checkup practices in Nepal. Change of lifestyle and regular use of medicines for risk factors like hypertension, diabetes, dyslipidemia should be encouraged to prevent stroke. So, awareness program for early diagnosis and treatment of vascular disorder like stroke is the priority intervention.

Key Words: Stroke, ischemic stroke, hemorrhagic stroke, risk factors, hypertension

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INTRODUCTION

Stroke is a medical emergency which occurs when blood flow is interrupted to part of the brain. Without blood supply brain cells are deprived of oxygen and nutrients along with unable to remove the waste products. So, brain cells quickly begin to die. Depending on the region of the brain affected, a stroke may cause paralysis, speech impairment, loss of memory, reasoning ability, coma, or death. A stroke is sometimes called a brain attack or a cerebrovascular accident (CVA). It has been defined as rapidly developing clinical signs of focal (at times global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Transient episode of cerebral ischemia were excluded by definition.[1]

Stroke is a significant public health problem both in developed and developing world. Stroke caused 11% of global deaths in 2011 and was the second most frequent cause of death.[2] The trends have shown that number of stroke cases decreased by 10% in developed world but increased by 10% in the developing world between 1990 and 2010, which has serious repercussions for the least developed and the developing nations.[2]

Stroke was the second leading global cause of death behind heart disease in 2013, accounting for 11.8 % of total deaths worldwide.[3] In 2013, worldwide prevalence of stroke was 25.7 million, with 10.3 million people having a first stroke. According to World Health Organization estimates in 2001, 86% of deaths related to stroke worldwide occurred in developing countries. South Asia is thought to be the highest contributor to stroke mortality in the world, probably accounting for more than 40% of global stroke deaths. Someone in the US has a stroke about once every 40 seconds. Stroke kills someone in the US about every minutes. Stroke accounts for 1 in every 20 deaths in the US.[3] Stroke is a leading cause of serious long–term disability in the US. Each year, about 795,000 people experience a new or recurrent stroke. Approximately 610,000 of these are first attacks, and 185,000 are recurrent attacks.[3]

Although stroke is a world–wide problem, the burden of stroke is particularly serious in Asia; its mortality is higher than in Europe or North America. The situation in Asia is dichotomized. Stroke mortality and case fatality has been declining in northern–eastern countries such as Korea, Japan, Taiwan, and urbanized areas of China.[4] This is attributed to both the risk factor control and stroke care improvement. However, declining stroke incidence is rarely observed, which is in part due to rapidly aging population. As a result, there is an increase in the number of stroke survivors who require long–term, costly care. The extremely low birth rate and relatively insecure social health system markedly increases the caregiver burden. The problem in southern Asian countries, such as India, Pakistan, Bangladesh, and Indonesia is more fundamental. With the improving control of infectious diseases, life expectancy is prolonged. However, risk factors such as hypertension, diabetes, obesity and cigarette smoking become prevalent, and are poorly controlled. Stroke neurologists, organized stroke centers, and diagnostic tools are insufficient, which has resulted in high stroke fatality and mortality. Throughout Asia, the most urgent priority should be the primary stroke prevention through promoting a healthy lifestyle, e.g. low salt intake, regular physical exercise, and stop smoking. So, government sectors should take a stronger initiative to accomplish this. The rapidly aging populations and stroke burden will shrink the economy and destabilize the society, not only in Asia but also globally unless appropriate efforts are promptly initiated, this may result in a global disaster. [5]

It is that about 90 percent of stroke risks are Modifiable. According to the international study published in August 2016 in the Lancet, "INTERSTROKE TRIAL", researcher from 32 countries identified 10 modifiable risk factors and the percentage of strokes attributable to them.[6] The study identified high blood pressure (48%), physical inactivity (36%), abnormal lipid levels (27%), poor diet (23%), abdominal obesity (19%), psychosocial disorder (17%), smoking (12%), heart problems (9%), alcohol use (6%), and diabetes (4%) as modifiable risk factors.[6] Having some of these same risk factors before a first stroke can make stroke survivors more vulnerable to

having a second or third one within five years, finds a report in the August 2016 issue of stroke. A year after recovery, first–time stroke survivors with pre–stroke risk factors were three times more likely to have another stroke than those who never had one. Non–Modifiable stroke risk factors are Age: after age 55, the risk of a stroke doubles with each decade, Gender: women are more likely than men to have a stroke, Race: African Americans and Hispanics are more likely to have a stroke than whites. Genes: if both of parents had a stroke, the risk increases in their children.[6,7]

A study of 118 young patients (aged 15–45 years) with stroke from Pakistan showed that hypertension and diabetes were the most frequent risk factors (45% and 30% of cases, respectively).[5] Cerebral venous thrombosis (CVT) and rheumatic heart disease have also been shown to be important causes of stroke in younger individuals. Other reported risk factors among the young include coagulopathy, elevated lipoproteins, and elevated anti–cardiolipin antibodies. Stroke in women is poorly reported in South Asia, despite being a leading cause of death in females above the age of 60 years in this region. 43 Hospital–based studies have suggested a lower prevalence of stroke in women than in men, although this figure could be skewed by the fact that women with stroke or cardiac arrest in this part of the world are less likely to be taken to hospital than are men with these conditions.[8]

Based on disability–adjusted life years, stroke is one of the major causes of death and is among the top five diseases in Nepal. Despite this fact, information on the prevalence, morbidity, and mortality of stroke in Nepal is limited to urban areas, with no official reports published on the epidemiology of stroke throughout the country. The mean age of stroke patients in Nepal is between 59 and 62 years, with males affected more frequently. Hypertension, cigarette smoking, alcohol consumption, and diabetes are the main predisposing factors for stroke. Ischemic stroke is more common (63%) than hemorrhagic stroke (37%). Because of a lack of facilities and specialists, most stroke patients, especially in the rural areas, seek traditional healers to treat their conditions. More governmental and non–governmental organizations should be involved in improving facilities and implementing prevention strategies.[9]

Strokes can be fatal, but the risk can be reduced. Many stroke risk factors are lifestyle related, so everyone has the power to reduce their risk of having a stroke. Some stroke risk factors can't be controlled. These include gender, age and family history. However, many stroke risk factors are lifestyle related. Everyone can reduce their risk of having a stroke by making a few simple lifestyle changes. Lifestyle–related factors that increase your risk of stroke include: high blood pressure, cigarette smoking, diabetes, high blood cholesterol levels, heavy drinking, a diet high in fat (particularly saturated) and salt, but low in fiber, fruit and vegetables, lack of regular exercise and obesity. Overall risk increases when multiple risk factors are present.

In Nepal, the number of deaths due to stroke reached 15,333 or 9.67% of the total deaths per years.[10] Stroke accounts 16% of non–communicable disease. Prevention begins with awareness of risk factors by patients and health care providers. The number of stroke would be practically cut off if the risk factors were eliminated. Exploring the risk factors is the key in prevention of stroke so the researcher is interested to explore the commonly associated risk factors for stroke which would really help for the awareness and prevention of stroke.[10]

MATERIALS AND METHODS

Study design: The descriptive cross–sectional study design, quantitative method was used to find out the risk factors of stroke among the clients attending Neuro and Allied clinic Bhairahawa.

Setting: The study was conducted at Neuro and Allied Clinic Bhairahawa. The Neuro and Allied Clinic provides an integrated health care with exceptional outpatient medical care to local and surrounding communities. The clinic is situated in the Siddharthanagar metropolitan area, close to Lumbini.

Study population: All the regular patients of stroke attending Neuro and Allied Clinic,

Bhairahawa with the clinical and radiological diagnosis of stroke and age above 18 years were included in this study.

Sample size: Sample size was estimated on the basis of patient flow in the Neuro and Allied Clinic Bhairahawa. As there were approximately 20–25 stroke case flow per week. So researcher took52 samples for this study.

Sampling Technique: Non–Probability, purposive sampling technique was adopted for this study.

Inclusion criteria: Stroke (ischemic and hemorrhagic) patients aged 18 years and above, of both sex, willing to participate were included in the study.

Instrumentation: The development of the instrument was based on the objectives of the study to answer the research questions. A semi–structured interview schedule was developed based on literature review and consultation with subject matter specialist. The instrument consisted of demographic information, 12 itemed semi–structured questionnaire related to risk factors of stroke. All the questions were developed in both English and Nepali language and all the patients were asked in Nepali language. Data was collected by face to face interview.

Validity: Content validity was assessed by doing review of literature and consultation with concerned research advisor and subject experts. Pre–testing of instrument was done on 10% of total estimated sample population in Bir Hospital Neuro OPD. Necessary modification was done before finalizing the instrument. Current laboratory values of blood sugar, lipid profile, body mass index, and blood pressure were deducted from the instrument before finalizing the instrument because current laboratory values did not have any significance in this study.

Data Collection: Before collecting the data, approval and formal permission were taken from the research committee of National Academy of Medical Sciences, Bir Hospital Nursing Campus. Also, a formal letter was submitted to Neuro and Allied Clinic Bhairahawa for the formal permission. Data collection was carried out within 21 days (22/10/2017 to 11/112017). Purpose and objective of the research were explained to each client. Informed written consent was taken from each patient before starting an interview. The data was collected by face to face interview according to designed semi–structured questionnaire. In average it took 15–20 minutes to collect data from each respondent. Each week 20–25clients were interviewed. In total 52 samples were collected.

Ethical Consideration: The researcher maintained the rules and regulations of the research and did not harm anyone. The study was conducted only after getting the formal approval from research committee of the campus. Permission was taken from Neuro and Allied Clinic Bhairahawa. Objectives of the study was well explained and informed written consent was taken from each respondent. Dignity of the respondent was highly considered. Privacy and confidentiality of information from all the respondents were maintained.

Data processing and analysis: Collected data were checked immediately after collection, for its completeness. Data entry was done by using Microsoft Excel. Data processing and analysis were done by SPSS version 20 statistical software. Analysis and interpretation of data were completed on the basis of objectives of the study using different statistical techniques such as mean, median, frequency and percentage. Findings were presented on the tabulated form. References and citation were managed by Endnote software.

RESULTS

As shown in the table 1; Among the 52 patients, 73.1% were male and 26.9% were female and patients age were range from 27 to 87 with the mean age of 56.2 years. Age group of 50 to 59 years was affected the most followed by age group 60–69 years. Literacy rate was 86.5% and the rest (13.5%) were illiterate. Among them housewife, farmer, retired client were affected commonly. Other occupations include Banker, Driver, Housemaid, Lab technician, and Student. Among 52 patients, 94.2% were ischemic stroke type and 5.8% were hemorrhagic type. 42.3%were categorized in overweight, 34.6% were in healthy

weight, and 21.2% were in obesity class I and 1.9% patients were categorized in obesity class–II.

Table 1. Demographic characteristics and diagnosis (n=52)

Characteristics	Categories	n(%)
Sex	Male	38(73.1)
	Female	14(26.9)
[a]Age in years	35 to 87	59.2±11.5
[a]BMI in kg/m^2	20 to 35	26.1±4.0
BMI class	Healthy weight	18(34.6)
	Overweight	22(42.3)
	Obesity class–I	11(21.2)
	Obesity class–II	1(1.9)
Education	Illiterate	7(13.5)
	Literate	45(86.5)
Occupation	Housewife	12(23.1)
	Farmer	10(19.2)
	Business	8(15.4)
	Retired	9(17.3)
	Security guard	7(13.5)
	Others	6(11.5)
Stroke type	Ischemic	49(94.2)
	Hemorrhagic	3(5.8)
[a]Duration of illness (months)	2 to 48	21.2±11.5

[a]Mean±SD and the values in categories signify minimum to maximum.

In table 2, among the 52 client 67.3%were hypertensive. Among the hypertensive patient who were within the 1st year of diagnosis had highest frequency of stroke i.e. 25.7%, among the hypertensive client (total 35 patients), 71.42% were taking antihypertensive medicine and 28.57% were not taking antihypertensive drugs. Fifteen clients (28.8%) had have the history of diabetes and among diabetic 86.6% were taking under medicine. More than 60 months of diabetic history have significantly higher rate (i.e.40%) of stroke. Five clients (9.6%) were affected by dyslipidemia and among them 80%patients were not taking lipid lowering agent and only 20% patient were receiving lipid lowering agent. Again five clients (9.6%) were affected by cardiac disease and among them 60%were identified at the time of stroke attack.

Table 3 shows that among 52 patients, 50%patients were alcohol consumer, 25% patients were smoker, 17.3% patients were physically inactive, 9.6%patients had stressor, 5.8% had similar history in family members, 17.3% patients ate fruits every–day and 21.1% patient ate vegetable every–day in their diet. Among females (total 14), 14.2% were taking oral contraceptive pills.

Table 2. Cardiovascular characteristics (n=52)

Characteristics	Categories	n(%)
Hypertension	No	17(32.7)
	Yes	35(67.3)
Duration of hypertension (months) (n=35)	Identified at the time of attack	6(17.1)
	1–12 months	9(25.7)
	13–24 months	2(5.7)
	25–36 months	3(8.6)
	37–48 months	5(14.3)
	49–60 months	2(5.7)
	>60 months	8(22.9)
Antihypertensive	No	27(51.9)
	Yes	25(48.1)
Diabetes	No	37(71.2)
	Yes	15(28.8)
Duration of diabetes (months) (n=50)	Identified at the time of attack	37(71.2)
	1–12 months	2(3.8)
	13–24 months	1(1.9)
	25–36 months	1(1.9)
	37–48 months	1(1.9)
	49–60 months	2(3.8)
	>60 months	6(11.5)
Antidiabetic	No	39(75.0)
	Yes	13(25.0)
Dyslipidemia	No	47(90.4)
	Yes	5(9.6)
Duration of dyslipidemia(months) (n=50)	Identified at the time of attack	49(94.2)
	13–24 months	1(1.9)
Lipid lowering	No	51(98.1)
	Yes	1(1.9)
Cardiac disease	No	47(90.4)
	Yes	5(9.6)
Duration of cardiac diseases (months)	Identified at the time of attack	50(96.2)
	13–24 months	1(1.9)
	>60 months	1(1.9)

Table 3: Lifestyle characteristics (n=52)

Characteristics	Categories	n(%)
Smoking	Non–smoker	37(71.2)
	Current smoker	13(25.0)
	Ex–smoker	2(3.8)
Alcohol	Yes	26(50.0)
	No	26(50.0)
Family history	Yes	3 (5.8)
	No	49(94.2)
Physical activity	Yes	43(82.7)
	No	9(17.3)
Stress	Yes	5(9.3)
	No	47(90.4)
Diet	Yes	42(80.8)
	No	10(19.2)
Eat fruits everyday	Yes	9(17.3)
	No	43(82.7)
Eat vegetables everyday	Yes	41(78.8)
	No	11(21.2)
Oral contraceptive pills	Yes	2(3.8)
	No	12(23.1)
	Not applicable (males)	38(73.1)

DISCUSSION

In this study the majority of the patients were from 50 to 59 years. The mean age and standard deviation of the respondents was 56.12±13.35. Male were 73.1% and female were 26.9%. This result is comparable with the study,' Standard method for developing stroke registers in low–income and middle–income countries: experiences from a feasibility study of a stepwise approach to stroke surveillance (STEPS Stroke) by Truelsen et al., in which the mean age and standard deviation was 64.2 ±14.2. At this age group more incidence of stroke is possible because of high prevalence of risk factors like hypertension, obesity, alcohol consumption, diabetes, smoking.[11]

Also, 94.2% was ischemic stroke and 5.8% was hemorrhagic stroke. This result is different from the large western multi–centered landmark study like, "the INTERSTOKE" study by O'Donnell et al., which reported that 78% was ischemic stroke and 22% was hemorrhagic stroke. The reason behind less percentage of hemorrhagic stroke is that the hemorrhagic cases have high mortality rate in relation to ischemic so the stroke survivors included in this study are more ischemic.[6]

In this study, patients with hypertension was 67.3%. This was the most common risk factors followed by, obesity (65.3%), alcohol intake (50%), diabetes (28.8%), smoking (25%), poor diet (19.2%), physical inactivity (17.3%), stress (9.6%), dyslipidemia (9.6%), cardiac disease (9.6%), positive family history of stroke (5.8%), and OCP intake 3.8%. Almost all possible risk factors were considered in this study. This research results were comparable with "INTERSTROKE" study by O'Donnell et al[5]which reported that frequency of hypertension (55% and 60%), smoking (37% and 31%), obesity (33% and 41%), diet (37% and 41%), regular physical activity (8% and 7%), diabetes (21% and 10%), alcohol intake (15% and 18%), stress factors (20% and 19%), cardiac causes (14% and 4%) in ischemic and hemorrhagic stroke respectively. Above data shows the occurrence of risk factors in study population were comparable with western population.[6]

Comparing this study findings with another large multicenter trial, "INTERHEART Modifiable risk score study" by McGorrian et al., prevalence of hypertension 39.02%, smoking 45.17%, obesity 30.21%, alcohol intake 24.01%, diabetes 18.45%, vegetables and fruits daily 39.79%, exercise 14.27% were also comparable with our study.[12]

Similar study done in India, done by Sridharan et al., "incidence, types, risk factors, and outcome of stroke in a developing country", frequency of hypertension 81.6%, diabetes 48.7%, smoking 22.8%, dyslipidemia 25.3%, cardiac disease 8.7% were determined, these data were also close to our findings.[13]

Considering hypertension, majority had illness from either within one year was 25.7% or from more than 5 years was 22.9%. Interestingly in the 17.1% population, hypertension was found at the time of attack and 28.57% of population were not taking antihypertensive. Likewise, majority of diabetic patient had diabetes from more than 5 years of duration of illness and 13.33% of diabetic patients were not taking any anti–diabetic medication. Similarly, among 5 patients with

dyslipidemia, only one (20%) patient was taking lipid lowering drug.

This study was intended to explore the frequency of risk factors present in stroke patients in Nepalese population. Our study consist of twelve elements which are hypertension, smoking, dyslipidemia, obesity, stress, diet (vegetables and fruits), alcohol consumption, similar illness in other member of family (family history), diabetes, physical activities, cardiac disease, and intake of oral contraceptive pills in female. Where ischemic stroke was 94.2% and hemorrhagic was 5.8%, and among them hypertension (67.3%) was the leading risk factors followed by obesity (65.3%), alcohol intake (50%), diabetes (28.8%), smoking (25%), physical activity (17.3%), stress (9.6%), dyslipidemia (9.6%), cardiac disease (9.6%), positive family history of stroke (5.8%), poor diet (19.2%) and OCP intake (3.8%). Almost all possible risk factors were considered in this study. This research results were comparable with western study INTERSTROKE and INTERHEART studies. We found higher prevalence of non–communicable diseases such as hypertension, obesity and diabetes along with life style habits such as alcohol intake, smoking, poor diet and physical activities in our study population of stroke. Therefore, measures to control non–communicable cardiovascular diseases and life style modification might possibly be useful means for prevention of stroke.

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CONCLUSION

In conclusion, this study shows that hypertension is the most common risk factor in our population followed by obesity and alcohol intake. Significant number of risk factors were only identified at the time of stroke attacks, and another reason of having stroke is people were not taking medicine as per treatment for hypertension, diabetes and dyslipidemia though these are the main reason for stroke attack. Change of lifestyle and regular use of medicines for risk factors like hypertension, diabetes, dyslipidemia should be encouraged to prevent stroke. This will also reduce the financial burden to the patients. So, goals to minimize the morbidity should be focus on the awareness program for early diagnosis and treatment of vascular disorder and adherence to healthy lifestyle. Government should be focus on control of risk factors to reduce the mortality and morbidity due to stroke.

COMPETING INTEREST

The authors declare that there are no competing interests regarding the publication of this paper.

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