

Demographic Profile and Risk Factors of Stroke Patients in a Tertiary Care Centre of Nepal

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Abstract:-

Background : Stroke has a high burden in the society causing mortality and disability worldwide. After ischemic heart disease it has the highest mortality. It can be prevented by modification of various risk factors like diabetes, hypertension, heart disease, obesity, atrial fibrillation, smoking and alcoholism. We aimed to measure the demographic profile and associated risk factors of stroke in patients admitted to Bir hospital, Kathmandu, Nepal.

Methods: This study was a single center based cross-sectional observational study conducted at Bir hospital from 1st of June 2019 to 1st of December 2019. A total of 60 patients with Stroke were enrolled in the study. The data analysis was done with SPSS version 20.

Results: Out of 60 patients 39(65%) were male and Female 21(35%) with mean age of 64.57 years \pm 15.88 years. Ischemic Stroke was seen in 46(76.67%) patients and hemorrhagic Stroke was seen in 14(23.33%). Middle cerebral artery territory was the most commonly involved in ischemic stroke 22(47.82%) whereas Intracerebral hemorrhage was seen in 11(78.57%) of the cases. Smoking and hypertension were seen in 69% and 60 % percent in cases of ischemic stroke whereas in hemorrhagic stroke it was 85% and 78% respectively. Physical Inactivity (54%), alcohol (52%) and central obesity (50%) and dyslipidemia (21.73%) were more commonly associated with Ischemic Stroke whereas significant alcohol consumption (64%) was more associated with hemorrhagic Stroke.

Conclusions: Stroke was predominant in males and older age groups. Ischemic Stroke was more common than hemorrhagic Stroke. Smoking and hypertension were the most common risk factors of stroke.

Keywords:- Stroke; Risk Factors; Demography; Hemorrhagic Stroke; Ischemic Stroke.

I. INTRODUCTION

Stroke is a global health concern with high morbidity world wide. After ischemic heart disease, stroke is the second most common leading cause of mortality and third most common cause of disability. Annually, about 15 million people worldwide suffer from stroke. Of these, around one third loses their life and two-thirds become disable, posing a burden to the family, society and economy of the country.¹

Stroke can be prevented by early modification of certain risk factors like hypertension, diabetes mellitus, dyslipidemia, heart disease, atrial fibrillation, smoking, obesity and alcoholism. Haemorrhagic stroke seems to be more associated with hypertension but ischaemic stroke is more related with factors such as smoking, hyperlipidemia, cardiac disease, and atherosclerosis.²

Hypertension (61.2%), cigarette smoking (59.4%), alcohol use (26.9%), left ventricular hypertrophy (27.5%), atrial fibrillation (23%), elevated triglyceride (23%), diabetes mellitus (9.3%) and elevated total cholesterol (7.5%) was the most common modifiable risk factor. Multiple risk factors \geq 2 were seen in (76.5%) cases.³ This study was proposed to know the demographic profile and different risk factors associated with stroke in our population so that it could aid in formulating preventive strategies.

II. METHODOLOGY

It was a cross-sectional observational study conducted in Bir Hospital, Kathmandu from June 2019 to December 2019 AD. Ethical clearance for the research was obtained from the Institutional Review Board (IRB) of the National Academy of Medical Sciences (NAMS). This study included all the subjects with first stroke diagnosed by development of sudden onset neurological deficit pertaining to a vascular territory with sustained deficit for more than 24 hours with the evidence of stroke on MRI or Non-contrast CT scan confirmed by neurologist. A total of 60 patients were enrolled in this study. Stroke secondary to infection, structural brain lesions (such as Tumours) and connective tissue disorders were excluded from the study. A detailed proforma of the participants including name, age, gender, occupation, educational status, site and types of lesion, duration of lesion, family history, and any systemic illness were collected. The data analysis was performed with statistical software SPSS version 20.

III. RESULTS

A total of 60 patients with Stroke were enrolled in this study out of which 39(65%) were male and 21(35%) were female with a M:F ratio of 1.86:1. The mean age of the patients was in the mid 60s. The mean age was 64.57 \pm 15.88, in which mean age of male was 63.21 \pm 15.59 whereas mean age of female was 67.10 \pm 16.48.

Table 1. Gender wise Distribution of Stroke Patients

Type of stroke	Male	Female	Total
Hemorrhagic	12	2	14
Ischemic	27	19	46

Table 2. Age distribution of Stroke Patients

Age wise Distribution (Years)	Type of Stroke		Total
	Ischemic	Hemorrhagic	
<30	1	0	1
31-40	2	2	4
41-50	7	0	7
51-60	12	3	15
61-70	7	4	11
71-80	10	4	14
>80	7	1	8

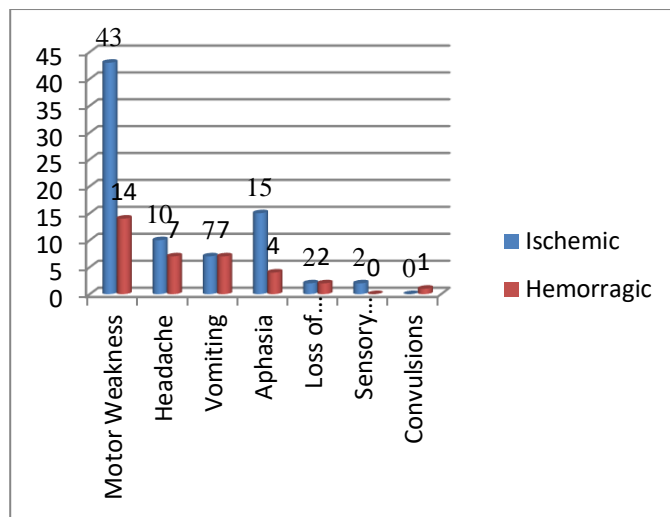


Figure 1. Clinical Presentation in Stroke Patients

Table 3. Site of Lesions in Stroke Patients

Site Of Lesion in Ischemic Stroke	Frequency	Percentage (%)
Middle Cerebral Artery	22	47.82
Lenticulostriate branches	13	28.26
Anterior Cerebral Artery	6	13.04
Posterior Circulation Stroke	4	8.69
Anterior Choroidal Artery	1	2.17
Site of Lesion in Hemorrhagic Stroke		
Intracerebral Hemorrhage	11	78.57
Subarachnoid Hemorrhage	3	21.43

Table 4. Relation of various Risk Factors with Stroke

Hypertension	Types of Stroke		Total	P Value
	Ischemic	Hemorrhagic		
Present	28(46.66%)	11(18.33%)	39(65%)	0.129
Absent	18(30.00%)	3(5.00%)	21(35%)	
Total	46(76.66%)	14(23.33%)	60(100%)	
Diabetes Mellitus				
Present	9	2	11	0.293
Absent	37	12	49	
Total	46	14	60	
Physical Inactivity				
Present	25(41.66%)	1(1.66%)	26(43.33%)	0.001
Absent	14(18.33%)	20(21.66%)	34(56.66%)	
Total	39	21	60	
Dyslipidemia				
Present	10	2	12	0.079
Absent	36	12	48	
Total	46	14	60	
Central Obesity				
Present	33	4	37	0.005
Absent	13	10	23	
Total	46	14	60	

Table 5. Relation of Smoking, alcohol intake and heart disease in stroke patients

Smoking	Type of Stroke		Total
	Ischemic	Hemorrhagic	
Non Smoker	14	1	15
Non Significant Smoker	0	1	1
Significant Smoker	32	12	44
Alcohol			
Non Alcoholic	16	4	20
Non Significant Alcohol Consumption	6	1	7
Significant Alcohol Consumption	24(40%)	9(15%)	33(55%)
Heart Disease			
Absent	31	9	40
RHD	5	0	5
LVH	10	5	15

IV. DISCUSSION

Stroke is a matter of public health concern leading to significant morbidities and mortalities world wide. It occurs predominantly in males at older years of life. Hypertension, diabetes, hyperlipidemia, ischemic heart disease, atrial fibrillation, smoking and long standing alcohol intake are risk factors for stroke. The prevalence of stroke differs from society to society. These minor differences in the prevalence of stroke risk factors may be related to the different cultural practices, local disease patterns, living habits and ethnicity. We analyze various modifiable and non-modifiable risk factors in this study.

Age and Stroke Incidence:

Men have a higher incidence of stroke than women at younger age but at older ages, 75 years and above females were predominant.⁴ In this study the stroke patient's age ranges between 26 to 99. It was observed that 80% of the patients were in the age group >50 years and incidence increased with increasing age. The mean age in this study was 64.57±15.88 years. It closely resembled the Sridharan et al⁵ study done in Trivandrum, India in 2005 which revealed the average age of the stroke patients was 67 years.

Gender and Stroke Incidence

Gender distribution of acute stroke patients differs from countries to countries. Prospective hospital-based stroke registries in China, Germany, India & Iran showed a very high preponderance of males for nearly all age categories in Asian countries due to fewer female cigarette smokers.⁶

Stroke Subtypes

Ischemic Stroke (76.67%) was more common than hemorrhagic Stroke(23.33%) in this study. Shaik et al. performed a study on Burden of Stroke in Nepal which showed incidence of Ischemic Stroke was more common (63%) than hemorrhagic stroke (37%).⁷

Joseph R Shiber et al. Study showed 41.9% patients had hemorrhagic Stroke and 58.1% had ischemic stroke.⁸ A study done in China revealed that ischemic stroke was more predominant and had higher proportion than that of hemorrhagic stroke.⁹

Site of lesion

The most common vascular territory involved in the Ischemic Stroke was MCA territory(61%) followed by Lenticulostriate branch of Middle Cerebral Artery(36%) among all the Ischemic Stroke. Similarly in hemorrhagic stroke, the most common site was Intracerebral space. The most common ischemic stroke were in MCA territory (39.4%) and small vessel stroke (17.2%) and the most common type of hemorrhagic stroke was in basal ganglia with 15% of patients.¹⁰ Biswas M et al.¹¹ study showed that the Indian-American stroke patients had a higher percentage of lacunar and partial anterior circulation infarcts as compared to White American stroke patients in the hospital based study done in New Jersey, USA.

Risk Factors in Stroke

In our study hypertension was associated with 60% of all ischemic stroke and 46 % of all hemorrhagic stroke. The study of Feigin et al.¹² on risk factors for ischemic Stroke in a Russian Community was associated with 84.8% of Ischemic Stroke. Similarly, a study done by Sridharan R.¹³ in Risk factors for Ischemic Stroke in 1998 has similar findings (68.7%). A hospital based study on ischemic strokes in young patients North India by D Dash¹⁴ showed hypertension as the most common risk factor in 34.4% of the patients. Study done by Banerjee¹⁵ in Epidemiology of stroke in India also found that hypertension was the most important risk factor in ischemic Stroke. Somarajan et al.¹⁶ study done in 2011 showed that hypertension was present in 65.9% of Intracranial hemorrhage and 48.8% of Ischemic Stroke in North Indian Population.

In this study cigarette smoking was a common risk factor seen in both of the subtypes of the stroke. It was present in >80% of the ischemic stroke and 50% of the hemorrhagic stroke. The association between smoking and stroke subtypes was not significant. A prospective study done by Tobias K. et al.⁸ revealed that the risk of hemorrhagic stroke, ICH, and SAH was increased in women who were current cigarette smokers. The risk raised proportionately with the number of cigarettes smoked. Significant alcohol consumption was seen in both subtypes of stroke. It was 67% in patients of ischemic stroke and 38% in that of hemorrhagic stroke. It was also statistically nonsignificant. A similar study

done by Danial S.¹⁷ also found alcohol as a common risk factor for hemorrhagic stroke.

Diabetes was seen in both of the Stroke subtypes however it was more common in the Ischemic Subtypes (25%) than Hemorrhagic subtypes. Studies done in various groups showed that Diabetes was associated with ischemic Stroke.¹⁸ This Study showed only 5% of the cases of ischemic stroke were associated with atrial fibrillation and no cases were seen with hemorrhagic stroke. A Similar study done by Emmanuel Sangui in 2005 in Senegal, West Africa found that only 14.7% of ischemic stroke were associated with atrial fibrillation however there were no cases of hemorrhagic stroke associated with atrial fibrillation.¹⁹

Our study showed that physical inactivity was statistically significant with ischemic stroke. Biswas M. et al performed a hospital based Study done in New Jersey, USA, 2009 conducted over 3 years that showed that ischemic stroke patients had high prevalence of diabetes & physical inactivity which was statistically significant.¹¹ Three patients (5%) had a family history of ischemic stroke in the present study, this was much lower than the Feigin's²⁰ study which had 18% of the cases related to family history of Stroke. Obesity was also a significant risk factor in the Ischemic Stroke in this study, which was consistent with Davia Rastenyte study.²¹

V. CONCLUSIONS

Male sex and advancing age above 60 were found to be more prevalent group of stroke. Ischemic stroke was more common than hemorrhagic stroke. Commonest modifiable risk factors in stroke were hypertension, smoking, diabetes, physical inactivity, dyslipidemia, obesity and alcohol consumption.

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Conflicting Interest : None

REFERENCES

- [1]. Group GBDNDC. Global, regional, and national burden of neurological disorders during 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet Neurol.* 2017;16(11):877-97.
- [2]. Kim HC, Nam CM, Jee SH, Suh I. Comparison of blood pressure-associated risk of intracerebral hemorrhage and subarachnoid hemorrhage: Korea Medical Insurance Corporation study. *Hypertension.* 2005;46(2):393-7.
- [3]. Maskey A, Parajuli M, Kohli SC. A study of risk factors of stroke in patients admitted in Manipal Teaching Hospital, Pokhara. *Kathmandu Univ Med J (KUMJ).* 2011;9(36):244-7.
- [4]. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. Heart Disease and Stroke Statistics-2017 Update: A Report From the American Heart Association. *Circulation.* 2017;135(10):e146-e603.
- [5]. Sridharan SE, Unnikrishnan JP, Sukumaran S, Sylaja PN, Nayak SD, Sarma PS, et al. Incidence, risk factors, and outcome of stroke in a developing country: the Trivandrum Stroke Registry. *Stroke.* 2009;40(4):1212-8.
- [6]. Foerch C, Ghandehari K, Xu G, Kaul S. Exploring gender distribution in patients with acute stroke: A multi-national approach. *J Res Med Sci.* 2013;18(1):10-6.
- [7]. Shaik MM, Loo KW, Gan SH. Burden of stroke in Nepal. *International journal of stroke : official journal of the International Stroke Society.* 2012;7(6):517-20.
- [8]. Kurth T, Kase CS, Berger K, Gaziano JM, Cook NR, Buring JE. Smoking and risk of hemorrhagic stroke in women. *Stroke.* 2003;34(12):2792-5.
- [9]. Zhang LF, Yang J, Hong Z, Yuan GG, Zhou BF, Zhao LC, et al. Proportion of different subtypes of stroke in China. *Stroke.* 2003;34(9):2091-6.
- [10]. Dhungana K. Demographic characteristics of stroke in a tertiary care hospital in Nepal. *Nepal Journal of Neurosciences.* 2018;15(2018):54-8.
- [11]. Biswas M, Sen S, Simmons J. Etiology and risk factors of ischemic stroke in Indian-American patients from a hospital-based registry in New Jersey, USA. *Neurology Asia.* 2009;14(2).
- [12]. Feigin VL, Wiebers DO, Nikitin YP, O'Fallon WM, Whisnant JP. Risk factors for ischemic stroke in a Russian community: a population-based case-control study. *Stroke.* 1998;29(1):34-9.
- [13]. Sridharan R. Risk factors for ischemic stroke: a case control analysis. *Neuroepidemiology.* 1992;11(1):24-30.
- [14]. Dash D, Bhashin A, kumar Pandit A, Tripathi M, Bhatia R, Prasad K, et al. Risk factors and etiologies of ischemic strokes in young patients: a tertiary hospital study in north India. *Journal of stroke.* 2014;16(3):173.
- [15]. Banerjee TK, Das SK. Epidemiology of stroke in India. *Neurology asia.* 2006;11:1-4.
- [16]. Somarajan B, Kalita J, Mittal B, Misra U. Evaluation of MTHFR C677T polymorphism in ischemic and hemorrhagic stroke patients. A case-control study in a Northern Indian population. *Journal of the neurological sciences.* 2011;304(1-2):67-70.
- [17]. Daniel S, Bereczki D. Alcohol as a risk factor for hemorrhagic stroke. 2004.
- [18]. Arvanitakis Z, Schneider J, Wilson R, Li Y, Arnold S, Wang Z, et al. Diabetes is related to cerebral infarction but not to AD pathology in older persons. *Neurology.* 2006;67(11):1960-5.
- [19]. Sagui E, M'Baye PS, Dubecq C, Ba Fall K, Niang A, Gning S, et al. Ischemic and hemorrhagic strokes in Dakar, Senegal: a hospital-based study. *Stroke.* 2005;36(9):1844-7.
- [20]. Thapa N, Maharjan M, Petrini MA, Shah R, Shah S, Maharjan N, et al. Knowledge, attitude, practice and barriers of cervical cancer screening among women living in mid-western rural, Nepal. *Journal of gynecologic oncology.* 2018;29(4):e57.
- [21]. Mukherjee D, Patil CG. Epidemiology and the global burden of stroke. *World Neurosurg.* 2011;76(6 Suppl):S85-90.