

A Clinicoepidemiological Study of Stroke Patients Admitted in MB Hospital, RNT Medical College, Udaipur

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Abstract:

Introduction: Stroke, a significant global health concern, poses a substantial burden on healthcare systems worldwide. In India, stroke remains a major contributor to mortality and disability-adjusted life years, especially in regions with limited healthcare resources.

Objectives: This research aims to comprehensively analyze the clinicoepidemiological profile and outcomes of stroke patients in South Rajasthan, India.

Materials and Methodology: A cross-sectional observational study was conducted at the stroke unit of M.B. Hospital, Udaipur, over a six-month period. A total of 323 confirmed stroke cases were included, and various sociodemographic and clinical parameters were assessed.

Results: Findings revealed a high incidence of stroke in the 60-69 age group, predominantly affecting males. Hypertension emerged as the most prevalent risk factor, followed by diabetes and dyslipidemia. The majority of stroke patients presented with weakness or paresis alone, with a significant number discharged within seven days. Notably, a considerable proportion of patients had neurological deficits at discharge, emphasizing the need for continuous monitoring and rehabilitation.

Conclusion: This study contributes valuable insights into stroke epidemiology in a region lacking population-based information, highlighting key demographic trends and clinical factors associated with stroke occurrence and management.

Keywords: Stroke, Epidemiology, Clinicodemographic profile, Risk factors, Outcome, India.

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Introduction

Stroke, a major global health issue, ranks as the second leading cause of death and the fourth cause of disability worldwide [1]. Annually, approximately 20 million people suffer a stroke, with 5 million resulting in fatalities [2]. In developed nations, stroke holds a significant place as a leading cause of disability, dementia, and death. It not only affects the individual but also burdens families and caregivers. Developing countries bear a substantial portion of stroke deaths and disability-adjusted life years, with limited resources for stroke care, especially evident in countries like India [3].

A stroke occurs due to an interruption in brain blood supply, leading to brain tissue damage. It is categorized into ischemic strokes caused by artery blockages and hemorrhagic strokes due to bleeding

in the brain. The severity and location of brain injury determine the stroke's effects, which can range from sudden weakness or numbness to severe impairment.

In India, stroke remains a significant health concern, contributing to a high percentage of deaths and disability-adjusted life years. Prevalence and incidence rates vary across regions with a higher occurrence in urban areas. Age, education levels, and ethnic backgrounds (such as the Parsi population) influence stroke prevalence. Notably, a substantial number of strokes occur in younger individuals in India compared to developed nations.

Risk factors like hypertension, tobacco use, physical inactivity, diabetes, and high cholesterol play a crucial role in stroke occurrence. Men are at higher

risk, and lifestyle transitions, including dietary changes and reduced physical activity, contribute to the rising stroke burden in India.

Stroke imposes a considerable economic burden, with projected increases in disability-adjusted life years lost and significant financial losses. Early recognition and acute management, including thrombolysis and stroke unit care, significantly improve the outcomes. Primary prevention strategies targeting lifestyle modifications and secondary prevention involving medication and risk factor control are crucial in reducing stroke occurrence and recurrence.

In India, several stroke research programs like WHO Steps, Inter-Stroke, Inspire, Pure, and initiatives by the Indian Council of Medical Research aim to understand stroke epidemiology, etiology, and outcomes. However, stroke remains neglected in India's healthcare policy, leading to higher case fatality rates and inadequate access to acute stroke care.

The National Programme on Prevention and Control of Cardiovascular Diseases, Diabetes, and Stroke (NPCDCS) initiated by the Indian government aims to address risk reduction and promote early diagnosis and management of stroke and related diseases. The program includes health promotion, screening, treatment, capacity building, and regular monitoring and review at various levels.

Aims and Objectives:

1. To assess the clinicoepidemiological profile of patients of stroke.
2. To assess the socio-demographic profile of patients of stroke.
3. To assess the outcome of these stroke patient.

Material and Methodology:

This observational cross-sectional study was conducted at the stroke unit of M.B. Hospital, Udaipur, over one year. A total of 323 confirmed stroke cases were included, adhering to specific inclusion and exclusion criteria with Nature and intention of the study was fully explained to the study participants in details before commencement of study and written consent was obtained. Sociodemographic parameters including age, gender, residence, religion, educational status, occupation, family type, dietary habits, and socioeconomic status were assessed. Clinical parameters such as risk factors (hypertension, diabetes, dyslipidemia, etc.), type of stroke, symptoms, time of reporting to the hospital, and duration of hospital stay were also evaluated. A modified, pretested and semi-structured Proforma of WHO STEPS stroke instrument for stroke surveillance was used for data collection in the present study. Data was entered and analyzed by using Micro soft excel version 2007 and Statistical Package for social science ver.16 (SPSS.16). Appropriate test of significance were applied, P value less than 0.05 was considered statistical significant.

Results and Observations:

Table 1: Distribution of Stroke patients according to Age Group

Age Group	Number	Percentage
<30	8	2.5
30-39	15	4.3
40-49	40	12.4
50-59	62	19.2
60-69	100	31.0
70-79	58	18.0
80-89	35	10.8
>90	5	1.5
Total	323	100

A total of 323 patients were involved in the current study. Majority (31%) of these stroke patients were in age group 60-69 years, with a mean age of 62.1±14.8 years. (Table 1)

Out of 323 patients, 64.1% were male, 57.6% belonged to Rural areas, 68.4% stroke patients belonged to Hindu religion and 28.2% were Muslims, 24.1% were educated up to primary and

upper primary. 29.1% were educated up to Secondary and Sr. Secondary while 33.4% of stroke patients were Graduate, 13% were Professional, 18% were engaged in some kind of Business. Majority of stroke patients were from Joint family (78.6%), 62.2% stroke patients were vegetarian, and majority of stroke patients belonged to Class-III (39.6%) followed by Class-II (21.7%) socioeconomic class by Modified Kuppaswamy scale.

Table 2: Distribution of Stroke patients (n=323) according to sociodemographic parameters

Gender	Number	Percentage (%)
Male	207	64.1
Female	116	35.9
Area of residence		
Rural	186	57.6
Urban	137	42.4
Religion		
Hindu	221	68.4
Muslim	91	28.2
Others	11	3.4
Educational status		
Illiterate	43	13.3
Primary and Upper primary	78	24.1
Secondary and Sr. Secondary	94	29.1
Graduate and above	108	33.4
Occupation		
Professional	42	13.0
Business	58	18.0
Laborer	22	6.8
House wife	105	32.5
No occupation	96	29.7
Type of family		
Joint	254	78.6
Nuclear	69	21.4
Dietary habit		
Vegetarian	201	62.2
Non Vegetarian	122	37.8
Socio- Economic Status		
Class-I	60	18.6
Class-II	70	21.7
Class-III	128	39.6
Class-IV	32	9.9
Class-V	33	10.2

When talking of clinical parameters, hypertension was the most common risk factor (59.8%) present in the patient followed by Diabetes (38.1%) and Dyslipidemia (28.8%) and majority (83.3%) of stroke patients in the current study were of Ischemic stroke. Maximum patients presented with common

weakness/paresis alone (64.1%) whereas 8.7% patients also had speech disturbances. And majority of patients reported to hospital within 24 hours (57.9%) after onset of symptoms. Also, majority (91.6%) of stroke patients got discharged within 7 days. (Table 3)

Table 3: Distribution of Stroke patients according to Clinical parameters

Risk factors	Number	Percentage
Hypertension	193	59.8
Diabetes	123	38.1
Dyslipidemia	93	28.8
Ischemic heart disease	67	20.7
Tobacco	73	22.6
Anemia	101	31.3
Past history of stroke	29	9.0
Type of stroke		
Ischemic	269	83.3
Hemorrhagic	54	16.7
Symptoms		
Disturbed consciousness	12	3.7
Weakness/Paresis	207	64.1
Speech disturbances	28	8.7

Disturbed consciousness +Weakness /Paresis	7	2.2
Disturbed consciousness +Speech disturbances	14	4.3
Weakness/Paresis +Speech disturbances	55	17.0
Time of reporting to Hospital		
<3 hrs	6	1.9
3 hrs- 1 day	181	56.0
>1day – 1week	124	38.4
>1 week	12	3.7
Duration of hospital stay		
Upto 7 days	296	91.6
8-15 days	23	7.1
16-30 days	4	1.2

Table 4: Correlation of Stroke patients with Risk factors and gender

Risk factor*	Male (n=207)	Female (n=116)	Total	P value
Hypertension	140 (67.6)	53(45.7)	193(59.8)	<0.001
Diabetes	71(34.3)	52(44.8)	123(38.1)	0.06
Dyslipidemia	55(26.6)	38(32.8)	93(28.8)	0.23
IHD	45(21.7)	22(19)	67(20.7)	0.55
Tobacco	68(32.9)	5(4.3)	73(22.6)	0.04
Anemia	42(20.3)	59(50.9)	101(31.3)	0.051
Past history of stroke	18(8.7)	11(9.5)	29(9)	0.79

*Multiple Responses (Figures in parenthesis indicate percentages)

While trying to find the correlation between various risk factors, it was observed that the proportion of Hypertension and Tobacco consumption was significantly higher ($p<0.05$) among male patients as compared to female patients (Table 4). It was also

observed that Hypertension and IHD were more common among stroke patients aged 50 years and more ($p<0.05$). However, Tobacco use was more seen in patients aged less than 50 years as a contributory factor ($p>0.05$) (Table 5).

Table 5. Correlation of Stroke patients with Risk factors and Age group

Risk factor	Age Group		P Value
	<50 years (n=63)	≥50 years (n=260)	
Hypertension	24(38.1)	169(65)	<0.001
Diabetes	18(28.6)	105(40.4)	0.08
Dyslipidemia	14(22.2)	79(30.4)	0.19
IHD	6(9.5)	61(23.5)	0.01
Tobacco	18(28.6)	55(21.2)	0.20
Anemia	18(28.6)	83(31.9)	0.60
Past history of stroke	3(4.8)	26(10)	0.19

*Multiple Responses (Figures in parenthesis indicate percentages)

Discussion

In this part of south Rajasthan there is absence of population based information about the occurrence and the sociodemographic profile of stroke patients.

The highest stroke incidence was observed in the age-group of 60-69 years, only population-based incidence studies would be able to clarify whether our results reflect the actual situation in the source population or if it is due to the fact that elderly stroke patients are less likely to be admitted to healthcare facilities. Our study results were similar to study done by Deepak Arjundas et al (2007) [4] who also reported 77.8% patients belonged to 50- 79 years of age group. Study by Alkali et al (2013) [5] also reported mean age of stroke patients to be 55.1 ±3.6

years and majority of patients were in age group 45-54 (28.7%). Ravi Yadav et al (2012) [6] reported 45.6% patients were in the age group <60 years. Tomar Nyodu et al (2013) [7] reported that majority of patients belong to age group 61-80 years of age i.e. 50%.

In the present study the overall sex ratio was 1.8 : 1. In India this may be because of the gender bias where by males get priority in getting access to healthcare facility for treatment in such illnesses over females. This was also true for studies conducted by Deepak Arjundas et al (2007) [4], Harsha Kumar HN et al (2011) [10] who reported the overall sex ratio of patients showed a sex ratio of

2.1 in favour of males. Ekeh B et al (2014) [11] also reported same results with male/female ratio 1.6:1.

In our study 68.4% stroke patients belonged to Hindu religion. 28.2% were Muslims while rest belonged to other religions (Christian, Sikh, Jain etc). Whereas, Abraham et al (1970) [13] reported in their study somewhat dissociated figures like 91.17% Hindus, 6.32% Muslims, 2.15% Christians and 0.29% Jains, and other religions which is not in tune with the results of our study or might be there was some geographical variation.

The relationship between poverty and health inequality has been demonstrated in many different countries and at different levels of national healthcare coverage. What drives this relationship is unclear because comparisons between published studies are difficult to make due to the heterogeneity of the studies, including the choice of which indicator of SES to measure (income, education, occupation, class, and so forth).

In our study, 39.6 % belonged to Class-III (Per Capita Monthly Income Rs 1739-2898) followed by Class-II (21.7%) and Class-I (18.6%). Only 9.9% and 10.2% belonged to Class-IV and Class-V respectively. Yadav et al [6] in their study Socioeconomic status and stroke outcome in India reported that maximum number of patients belonged to the middle class (58.9%) followed by lower class (38.1%).

In our study most common risk factor associated with stroke was found to be hypertension (59.8%) followed by Diabetes (38.1%). These results were similar to study done by Deepak Arjundas et al (2007) [4], Harsha Kumar HN et al (2011) [10], Ravi Yadav et al (2012) [6], A.K. Srivastava et al (2001) [14], Angelo V. Vasiladis et al (2014) [14].

In our study we found increasing age to be an important non-modifiable risk factor for the development of hypertension. In our study 65% cases were from ≥ 50 yrs age group. Several studies have consistently demonstrated a positive relation between increasing age and blood pressure. Thus, findings of our study compare well with other studies. In US (1993), where the prevalence rate varied from 4% in the age group 18-24 yrs to 60% in the age group 65-74 yrs. A national survey conducted by Saeed et al (2011) among Saudi adult population found age to be significant risk factor for hypertension. Findings of our study are comparable with B.Valliyot et al (2013) where age was found to be a significant contributor.

Patients with stroke present with various focal and diffuse neurological signs and symptoms. Many a times patients have silent strokes without any overt neurological signs and symptoms, hence may remain undiagnosed. The most common symptoms among stroke patient in our study were

weakness/paresis alone (64.1%) followed by Weakness/Paresis +Speech disturbances (8.7%).

Majority (91.6%) of stroke patients got discharged within 7 days with a mean duration of stay 4.27 days, results comparable to Tham H.E. et al, Sani A. Abubakar et al.

The importance of the results lies in the fact that 70% patients had neurological deficit at the time of discharge. Outcome depends on various factors such as time delay in presentation, clinical suspicion and initial evaluation, neuroimaging and diagnosis along with delay in start of specific treatment measures. The present study didn't evaluate the effect of these factors on the outcome. However an effort was made to assess the delay. It is advised that all patients must be under strict follow up for recurrence and rehabilitation.

Conclusion

This research provides crucial insights into the epidemiology and clinical aspects of stroke among patients in South Rajasthan, India. The study underscores the significance of understanding demographic trends, risk factors, and clinical presentations for effective stroke prevention, management, and rehabilitation strategies in resource-limited settings. Further studies involving larger populations and longitudinal follow-ups are recommended to enhance our understanding of stroke in this region and devise targeted interventions for better patient outcomes.

References

1. Strong K, Mathers C, Bonita R. Preventing stroke: saves lives around the world. *Lancet Neurol* 2007; 6: 182-7.
2. Dalal P, Bhattacharjee M, and Vairale J, Bhat P. UN millennium development goals: can we halt the stroke epidemic in India? *Ann Indian Acad Neurol* 2007; 10: 130-6.
3. Marc Fisher MD, Bo Norrving. 1st Global Conference on Healthy. Lifestyles and Non communicable diseases Control. Moscow, April 28-29, 2011.
4. Deepak Arjundas, Uma Pandiyan, G. Arjundas, Baux Henry. Surveillance of stroke: WHO STEP-wise approach: A Chennai stroke unit report. *Ann Indian Acad Neurol* 2007; 10:154-9.
5. Alkali NH, Bwala SA, Akano AO, Osi-Ogbu O, Alabi P, Ayeni OA. Stroke risk factors, subtypes, and 30-day case fatality in Abuja, Nigeria. *Niger Med J* 2013; 54:129-35.
6. Yadav R, Prasad K, Padma VM, Srivastava AK, Tripathi M, Bhatia R. Influence of socioeconomic status on in-hospital mortality and morbidity after stroke in India: Retrospective hospital-based cohort study. *Indian J Community Med* 2013; 38:39-41.

7. Nyodu T, Singh K, Singh J, Kenny S, Singh C, Singh MK. A comparison of clinical diagnosis with Computed Tomography findings in stroke patients. *J Med Soc* 2013; 27:216-21.
8. OwolabiLukman Femi, Nagoda Mansur. Factors associated with death and predictors of one-month mortality from stroke in Kano, Northwestern Nigeria December 28, 2014, IP: 117.200.243.18.
9. Deepak Arjundas, Uma Pandiyan, G. Arjundas, Baux Henry. Surveillance of stroke: WHO STEP-wise approach: A Chennai stroke unit report. *Ann Indian AcadNeurol* 2007; 10:154-9.
10. Harsha Kumar HN, Kalra B, Goyal N. A study on stroke and its outcome in young adults (15-45 Years) from coastal South India. *Indian J Community Med* 2011; 36:62-5.
11. B Ekeh, EI Isamade. Time of presentation of stroke patients in a tertiary hospital in Northern Nigeria, West Africa. *J Med InvestigPract* 2014;9:1-4
12. Yesilot N, Koyuncu BA, Çoban O, Tuncay R, Bahar SZ. Gender differences in acute stroke: Istanbul medical school stroke registry. *Neurol India* 2011; 59:174-9.
13. J. Abraham, P. S. S. Rao, S. G. Inbaraj, G. Shetty and C. J. Jose. An Epidemiological Study of Hemiplegia due to Stroke in South India. *Stroke*. 1970; 1:477-481.
14. A.K. Srivastava, K. Prasad. A Study of Factors Delaying Hospital Arrival of Patients with Acute Stroke. *Neurol India*, 2001; 49: 272-276.