Original Research Article

A study on socio-clinical profile and associated risk factors of stroke patients admitted to neurology department of SCB medical college, Cuttack, Odisha

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ABSTRACT

Background: Non-communicable diseases (NCDs) are ragging reality of today's world and have moved up the priority list of most countries worldwide including India. Objectives were to find out prevalence of different types of strokes among the patients admitted in neurology department of SCB medical college, to study socio-clinical profiles of admitted stroke patients and to find out associated risk factors with different types of strokes.
Methods: Cross-sectional hospital-based study in neurology ward of SCB MCH, Cuttack, Odisha in 2019-20.
Results: The mean age 60.93±12.8, males are more affected, 60-69 years were more affected, 76% were ischemic strokes, 85% cases weakness of limbs reported, hypertension, diabetes, alcoholism, smoking, dyslipidemia were major risk factors. Hypertension and smoking found to be highly significant in case of young stroke patients.
Conclusions: Major modifiable risk factors were hypertension (63.3%) followed by alcohol intake 53.9%.

Keywords: Stroke, Hypertension, Diabetes mellitus

INTRODUCTION

Non-communicable diseases (NCDs) are the ragging reality of today's world and have moved up the priority list of most countries worldwide including India.

The world health organisation (WHO) defines stroke as "rapidly developing clinical symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin.[1,2]

Stroke is an acute neurological injury occurring as a result of various pathological processes and is manifested either as brain infarction or haemorrhage.[3,4] Ischemic stroke responsible for 50-85% of all strokes worldwide.[3]

Stroke is the second-leading cause of disease burden.[5] According to the WHO, the worldwide incidence and prevalence of stroke were respectively 10.3 million and 25.7 million in 2013.[5]

Based on GBD 2017, the global incidence of new stroke events was 11.9 million in 2017. The age standardised global stroke incidence rate was 150.5 per 100000 in 2017. Prevalence of stroke in 2017 was 104.2 million and age standardised global stroke prevalence rate was 1300.6 per 100000 in 2017. Based on GBD 2016, the national incidence of new stroke events was 1.1 million in 2016.[6]

According to a report (Health of nation states report), Stroke is the fifth leading cause of disease burden in India. There has been a consistent rise in disability adjusted life years (DALYs) rate due to stroke from 1990 to 2016. However, the DALY rate of stroke varied across the states without any consistent pattern. In Odisha stroke is the second leading cause of DALYs (5.8% in 2016).

By the year 2020, stroke will become the leading cause of death and disability worldwide. The number of fatalities projected to be over 20 million by 2020 and by over 24 million by 2030.[7] According to WHO estimation, by 2050 nearby 80% of stroke cases may occur in low- and middle-income countries like China and India.[8]

The lifetime risk of stroke after 55 years of age is 1 in 5 for women and 1 in 6 for men.[9] More than four-fifth of all strokes occur in developing countries.

Recent study identified 0.9-4.5% of medical and 9.2-30% of neurological admissions in India were due to cerebrovascular accident. The case fatality rate of stroke during the time of hospital discharge is 9%. At the end of one month, fatality rate increases up to 20%.[10]

Objectives

Objectives of the study were to find out prevalence of different types of strokes among the patients admitted in Neurology department of SCB medical college, to study the socio-clinical profiles of admitted stroke patients and to find out associated risk factors with different types of strokes.

METHODS

Type of study

He study was of observational study type.

Study design

The study design was of cross-sectional study.

Study setting

The study was hospital-based study.

Place of study

The study was conducted in the neurology I.P.D. of SCBMCH, Cuttack.

Study period

The study conducted for One year duration i.e., from July 2019 to June 2020.

Study population

Diagnosed stroke cases that were registered for treatment at the inpatient department of neurology, SCB medical college and hospital.

Inclusion criteria

Stroke patients admitted to IPD of neurology department of SCBMCH, Cuttack were included in the study.

Exclusion criteria

Cases or their attendants not willing to participate in the study were excluded from the study.

Procedure of the study

Total 180 cases diagnosed with stroke were taken as final study subject. The OPD of neurology department of SCB MCH, Cuttack functions 2 days per week. The data was collected on OPD days, from the diagnosed cases of stroke who were admitted to the ward of the neurology department. The data was collected by predesigned, pretested semi-structured schedule. The scheduled was originally prepared in English and translated in the local language during the interview.

The statistical tool used for analysis was SPSS ver-21.

RESULTS

About 60% of the total stroke patients were male followed by females which were 40%, with a male to female ratio of 3:2.

Table 1: Socio-demographic profile of study subjects, (n=180).

Variables		N	%
Gender	Male	108	60
	Female	72	40
Religion	Hindu	175	97.2
	Others	5	2.8
Residence	Urban	55	30.7
	Rural	125	69.3
Education	Illiterate	13	7.2
	Primary school	61	34
	Middle school	67	37
	High school or above	39	21.8
SES (Modified B. G. Prasad 2018 classification)	Upper	64	35.5
	Upper-middle	96	53.4
	Middle	13	7.2
	Lower-middle	4	2.2
	Lower	3	1.7

In the above study males were most commonly affected by stroke than female.

As shown in the above table maximum cases were Hindus (97.2%) and 2.8% cases were of other religion.

Out of 180 stroke cases, majority of the stroke cases (69.3%) were from rural areas and only 30.7% cases were from urban areas.

In the present study 41.2% of stroke cases had studied up to primary school, 37% up to middle school, and 21.8% cases had studied high school or above.

Regarding socio-economic status (SES) majority of the cases (53.4%) belonged to upper middle class followed by upper class (35.5%), middle class (7.2%), lower middle class (2.2%) and only 1.7% cases belonged to lower class. The SES was assessed by using modified B. G. Prasad scale-2018.

The 138 (76.7%) of all stroke cases found to be ischemic whereas only 42 (23.3%) of them had haemorrhage.

Table 2: Age wise distributions of study subjects, (n=180).

Age groups (years)	N	Percentage (%)
<40	6	3.3
40-49	28	15.6
50-59	35	19.4
60-69	58	32.2
≥70	53	29.4
Total	180	100
Mean ± SD	60.93±12.87	

About 32.2% of study subjects were found to be in age group of 60-69 years followed by 29.4% in ≥70 years of age, 19.4% in 50-59-year age group, 15.6% in 40-49-year age group, and only 3.3% in age below 40 year. Youngest of them was 26 years and oldest was 95 years of age.

Mean age in study was found to be 60.93 with SD 12.8.

Table 3: Prevalence of different types of strokes in different age groups, (n=180).

Types of strokes	Young stroke, (age≤45 years) (%)	Middle-older, (age>45 years) (%)	P value
Hemorrhagic (n=42)	17 (40.5)	25 (59.5)	0.05
Ischemic (n=138)	11 (8)	127 (92)	

Middle-older age stroke has higher proportion of both hemorrhagic (59.5%) and ischemic (92%) stroke as compared to young age group and is found to be statistically significant with a p=0.05.

Table 4: Presenting clinical features at the time of admission among study subjects, (n=180).

Clinical feature	N	Percentage (%)
Weakness of limbs	153	85.4
Mouth deviation	109	61
Speech abnormality	58	32.3
Altered sensorium	38	21.2
Headache	57	31.3
Vomiting	36	20
Seizure	13	7.6
Total	180	100

In our study, most common clinical feature was hemiplegia/ hemiparesis. Eighty five percent (85%) patients had hemiplegia/hemiparesis. Among these, left sided weaknesses was more common. The 15% patients had stroke without any evidence of motor weakness. Speech disturbances were found in 32.3% of patients. Among other symptoms, about 31.3% of stroke patients presented with headache followed by altered sensorium and vomiting in 21% and 20% cases respectively. Only 13 cases (7.6%) had seizure during stroke.

Table 5: Activity at the time of stroke occurrence among study subjects, (n=180).

Activity	N	Percentages (%)
Noted on awakening	118	65.4
Rest	36	20
During activity	26	14.6
Total	180	100

More than 50% of patients, stroke was noticed immediately on awakening. The 20% of patients had stroke at rest, followed by 14.6% of patients having stroke during activities.

Circadian changes in catecholamine levels, blood pressure, platelet agreeability, blood coagulability and fibrinolytic activity could explain the increased strokes noted on awakening.

Table 6: Associated co morbidities present among study subjects, (n=180).

Co-morbidities	N	Percentages (%)
CKD	4	2.2
Parkinsonism	3	1.6
TB	2	1.1
COPD	1	0.5
Total	10	5.4

Chronic kidney disease was found in 2.2% of stroke patients followed by Parkinsonism in 1.6% of patients, TB in 1.1% and COPD in 0.5% of patients.

Table 7: Prevalence of hypertension among study subject, (n=180).

Duration	N	Percentage (%)
Absent	66	36.7
Detected now	18	10
0-1 year	20	11.3
1-5 years	33	18.5
>5 years	43	23.5
Total	114	63.3

Of the total 180 patients, 114 (63.3%) patients had hypertension. Of 114 hypertensive patients, 43 (37.7%) patients had hypertension for over 5 years. newly

detected cases during stroke were only 18 (15%). Hypertension is the most important modifiable risk factor for stroke, with a strong, direct, linear, and continuous relationship between blood pressure and stroke risk.

Table 8: Prevalence of diabetes mellitus among study subjects, (n=180).

Duration	N	Percentage (%)
Absent	113	62.8
Detected now	7	4.2
0-1 year	10	5.8
1-5 years	22	12.2
>5 years	28	15
Total	67	37.2

Diabetes mellitus (DM) which is an established risk factor for stroke was found in 67 (37%) patients. The 28 (41%) of 67 patients had diabetes for over 5 years.

Table 9: Association of various risk factors with different types of strokes, (n=180).

Risk factors	Types of strokes		P value
	Hemorrhagic (%)	Ischemic (%)	
Hypertension	30 (71.4)	84 (60.9)	0.0
Diabetes	6 (14.3)	61 (44.2)	0.0
Smoking	14 (33.3)	59 (42.7)	0.27
Alcohol	17 (40.5)	80 (58)	0.02
Obesity	1 (2.4)	23 (16.6)	0.01
Dyslipidemia	9 (21.4)	76 (55)	0.18
Family h/o stroke	1 (2.4)	20 (14.5)	0.06
Past h/o stroke/TIA	1 (2.4)	30 (21.7)	0.004
H/o CAD/ RHD/AF	1 (2.4)	5 (3.6)	0.69

Multiple risk factors were analysed in our study. Hypertension and CAD were seen in 63.3% and 3.3% of the study groups respectively. Among ischemic strokes 60.9% were hypertensive and 3.6% had CAD whereas among hemorrhagic stroke 71.4% had hypertension and 2.4% had CAD. The other different risk factors taken into consideration were diabetes, smoking, alcohol, obesity, dyslipidemia, family history of stroke, past history of stroke/ transient ischemic attack, history of coronary artery disease, rheumatic heart disease, atrial fibrillation.

The association of systemic hypertension, diabetes, alcohol intake, smoking, dyslipidemia, obesity, family history of stroke, past history of stroke/ transient ischemic attack, history of coronary artery disease, rheumatic heart disease, atrial fibrillation with respect to stroke was analysed with respect to different age groups and many risk factors were found to be significantly associated with the incidence stroke with respect to young age and middle and old age.

Table 10: Comparison of risk factors among young stroke (≤45 years) and middle-older age stroke (>45 years), (n=180).

Risk factors	Young stroke (age ≤45 years), (n=28) (%)	Middle-older age stroke (>45 years), (n=152) (%)	P value
Hypertension	13 (46.4)	101 (66.4)	0.01
Diabetes	4 (14.3)	63 (41.4)	0.006
Alcohol intake	10 (35.7)	87 (57.2)	0.03
Smoking	5 (17.8)	68 (44.73)	0.001
Dyslipidemia	2 (7.14)	83 (54.6)	0.0
Obesity	2 (7.14)	22 (14.47)	0.3
Family h/o stroke	2 (7.14)	19 (12.5)	0.004
Past h/o stroke/ TIA	1 (3.6)	30 (19.7)	0.03
H/o CAD/ RHD/AF	1 (3.6)	5 (3.3)	0.93

Chi square test used to compare the groups, p<0.05-significant.

DISCUSSION

About 60% of total stroke patients were male with a male to female ratio of 3:2. In a study done by Nagaraja et al on-stroke surveillance in Bangalore showed a greater preponderance of stroke among men (67%) with a male to female ratio of 2:1.[10] This finding was also supported by the studies conducted in western countries including studies done by Aiyar et al and Pinhero et al who found the incidence of stroke is more common in males than females.[11,12]

The study showed that majority cases (53.4%) belonged to upper-middle class and 1.7% cases belonged to lower class. Study done by Chapman et al had also found majority of people belonged to upper middle class. [13]

Our study showed that middle older age stroke patients had higher proportion of both hemorrhagic (59.5%) and ischemic (92%) stroke as compared to young age group and is found to be statistically significant with a p=0.05. In another study by Aiyar et al found higher percentage of infarction cases in age over 50 years.[11] Sotaniemi et al found in a study, 62.2% of infarction and 33.8% of haemorrhage in age above 50 years.[14] In the Bansal et al study hemiparesis was observed in 79.2% cases, speech difficulty in 39.4% cases which is very similar to the above findings.[15] The studies done by Naik et al and Eapen et al in which the mean age of the patients of stroke were found to be 58.27 years and 57 years respectively.[16,17]

Significantly higher proportion of hypertensives are having hemorrhagic stroke as compared to ischemic stroke (p<0.05).

About 37.2% of patients had diabetes and 44.2% of ischemic strokes cases were diabetics where as 14.3% of

hemorrhagic stroke patients had history of diabetes (p<0.05)

40.7% of all the cases were smokers and among ischemic and hemorrhagic stroke patients, 42.7% and 33.3% (p<0.05) were smokers respectively.

Transient ischemic attacks or past history of stroke was found in 17.2% of cases, and also found in 21.7% of ischemic stroke patients and 2.4% cases in hemorrhagic stroke subjects (p<0.004).

Dyslipidemia was seen in 47% of patients and 55% of ischemic stroke patients were dyslipidemic where as 21.4% of patients with hemorrhagic stroke had dyslipidemia.

Of the total obese subjects (13.3%), 16.6% had ischemic stroke and only 2.4% had hemorrhagic stroke.

Alcohol consumption was seen in 58% of patients with ischemic stroke and in 40.5% cases in case of patients with hemorrhagic stroke.

Chronic heavy alcohol consumption and binge drinking may exert their harmful effects through changes in blood pressure, platelet agreeability, blood coagulation and the level of triglycerides. There is evidence of a J-shaped relationship between alcohol consumption and risk of ischemic stroke, with light to moderate alcohol consumption (up to 2 drinks per day in men and up to one drink per day in women) being protective against stroke, and heavy drinking associated with an increased risk of ischemic stroke.[18-23] Alcohol consumption has a more direct linear relationship with hemorrhagic stroke, such that consumption of even small amounts of alcohol appears to increase risk of haemorrhage.

There is a significant difference (p<0.05) in association of systemic hypertension and incidence of stroke with respect to various age groups. In patients with age >45 years, systemic hypertension plays a major role in the incidence of stroke. Smoking, alcoholism, dyslipidemia also plays very important role in occurrence of stroke and also found to have a significant difference in association with incidence of stroke with respect to different age groups. There are no such association found between stroke and past history of coronary artery disease, rheumatic heart disease, atrial fibrillation and obesity with respect to age.

There is a significant difference (p<0.05) in association of diabetes and incidence of stroke with respect to various age groups. The association of stroke in relation to past history of stroke, family history of stroke was found to be significant with respect to different age groups.

Study done by Subha et al found significantly higher proportion of alcohol use and atrial fibrillation among stroke in younger age group which is contradictory to our study findings.[7]

Limitations

The conclusions drawn from this study may have limited generalisability as it was done in a tertiary care hospital set up.

Due to cross-sectional nature of the study and resource constraint, association with various risk factors could be assessed only. To confirm the same, a longitudinal analytical study needs to be performed.

The possibility of conscious falsification on the sensitive issues (i.e., alcohol consumption, tobacco usage pattern) could not be ruled out, despite the sincere efforts by the researcher to maintain privacy and confidentiality.

Dietary habits of the study subjects could not be assessed as it was difficult to obtain reliable information from attendants.

CONCLUSION

The study was carried out among 180 admitted stroke cases during the study period. Males accounted for 60% and females 40% with male to female ratio of 3:2. The highest affected age group was 60-69 years. The mean age was 60.93 year and range were 26 to 95 years. Around three fifth of males (59.2%) were in the age of 60 years and above, while two third of females (65.2%) were in the age of 60 years and above. Majority of the cases (53.4%) belonged to middle class followed by upper class (35.5%). Of all stroke cases, 76.7% were found to be ischemic whereas only 23.3% of them had haemorrhage. Both hemorrhagic (60.7%) and ischemic (39.3%) stroke found to be more common in middle-older age population compared to younger group.

The most common clinical feature found in our study was hemiplegia/ hemiparesis (in 85% cases). In more than 50% of patients, stroke was noticed immediately on awakening while, 20% of patients had stroke at rest. Various co-morbidities found in the stroke patients in our study as: CKD, parkinsonism, TB and COPD. Of 114 hypertensive patients, 43 (37.7%) patients had hypertension for over 5 years. Of the total 67 (37%) patients, 28 (41%) of 67 patients had diabetes for over 5 years. Only 37.5% (21) of the total 56 stroke patients, previously diagnosed with hypertension or diabetes or both, were found to be adherent to the prescribed medications. 39.9% of total 97 stroke patients had been consuming alcohol for over 10 years. 28.9% of the total stroke patients had a smoking history of over 10 years. The commonest modifiable risk factor in our study was hypertension found in 63.3% of patients, followed by alcohol intake (53.7%). The most common modifiable risk factor associated with both types of strokes is hypertension. Hypertension, followed by alcoholism,

plays a major role in the incidence of stroke in young as well as in middle-older age patients.

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