A Descriptive Observational Studies on Assessment of Risk Factors in Patients with Cerebrovascular Event in Vidarbha Region of Maharashtra

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ABSTRACT:

Objectives: The objective of present study was to access the epidemiological risk factors in patients suffering from cerebrovascular stroke, analyze the distribution and diseases states. Methodology: Descriptive observational study using a structured questionnaire was conducted at district general hospital, Amravati for six months after the ethical clearance. A validated questionnaire was used to collect information on socio-demographic features, dietary habit, family history, co-morbidities, sleeping pattern, past medical and medication history of patient, duration of hospitalization and other relevant information. The factors influencing cerebrovascular event were assessed with descriptive statistics by distribution of the opinion of the respondent. Results: 80 patients of medicine department were enrolled in the study. Out of 80 patients, identified the most common risk factors associated with cerebrovascular event or stroke were hypertension (65%) followed by high fatty diet (50%), migraine (45%), alcoholic (40%), tobacco (40%), trauma (21.25%) and diabetes (15%).The occurrence of stroke was high in males (75%) than females (10%) which could be due to lifestyle factors such as tobacco, smoking and alcohol consumption. There is a no significant difference of incidence between two comparative studies in different region of patients (p<0.05). Knowledge of risk factors of stroke among stroke survivors helps in secondary prevention of stroke. Conclusion: Hypertension was the leading cause of stroke followed by high fatty diet, alcohol, tobacco, trauma and diabetes. These findings will help to reduce the incidence of stroke and stroke-related mortality.

Keywords: Cerebrovascular event, Hypertension, Diabetes mellitus, Incidence, Co-morbidity, Risk factor.

1. INTRODUCTION

Cerebrovascular disease includes a variety of medical conditions that affect the cerebral circulation and the blood vessels of the brain. Arteries are often damaged or deformed in these disorders that responsible to supply oxygen and nutrients to the brain. Acute cerebrovascular diseases or strokes are the consequence of an alteration of blood flow within the brain, which causes a transient or permanent deficit of the functioning of one or several areas of the brain [1]. Cerebrovascular disease includes all disorders during which an area of the brain is temporarily or permanently suffering from ischemia or bleeding and one or more of the cerebral blood vessels are involved in the pathologic process. Restrictions in blood flow may occur from stenosis, thrombosis, and blockage or vessel rupture [2]. Lack of sufficient blood flow affects brain tissue and may cause a stroke. In the event of a possible stroke presentation, a particular history and physical must be performed alongside emergent neurological imaging before administering any treatment. With early, focused treatment supported the stroke etiology, rehabilitation programs and long-term lifestyle changes; one can maximize their chances for a meaningful recovery [2].Stroke is the second commonest cause of death and fourth leading cause for disability worldwide. Approximately 20 million people annually will suffer from stroke and of those five million won't survive. In developed countries, stroke is that the first leading cause for disability, second leading cause of dementia and third leading cause for death. The stroke is a

global health problem. In India, although a system for recording cause of death was introduced in 1998; only 14% of deaths are ever classified. Over the past for decades in worldwide, the annual age standardized stroke incidence rate has decreased by 1.1% in high income countries but it has increased by 5.3% in low to middle income countries [3]. In India, the ICMR estimates in 2004, indicates that stroke contributed 41% of deaths and 72% of disability adjusted life years amongst the non-communicable diseases. The adjusted annual incidence of stroke per 100,000 is 124 in rural area and 145 in urban area. In India, nearly one-fifth of patients with first ever stroke admitted to hospitals are aged <40yrs. Recently, it has been estimated that 12% of all strokes occur in those less than 40 yrs: previous stroke is a major risk factor for those aged more than 65. Higher proportions of younger individuals are affected in India as compared to developed countries. Ischemic stroke is the most common subtype followed by hemorrhagic and embolic stroke and 21-48% of stroke in young is caused by atherosclerotic occlusive artery disease. Men have more likely to have stroke than women: male/female sex ratio for India is 7:1. The mean onset of stroke for men ranges from 63-65 and 57-68 for women. In South East Asia alone, where India comprises 81% of the population, 6.36 million daily are estimated to be lost due to stroke. India is estimated to have lost 8.7 billion dollars in 2005 due to coronary heart disease, stroke and diabetes [3]. Identification of risk factors for stroke is complicated by the very fact that strokes are available many varieties. Risk factors for hemorrhagic and ischemic stroke are similar, but there are some notable differences; there also are differences in risk factors among the etiological categories of ischemic stroke. There are numerous risk factors, including both modifiable and non-modifiable [1]. Non-modifiable risk factors also called risk markers include age, gender, race- ethnicity and genetics are identified as markers of risk for stroke. Although these factors can't be modified, their presence helps identify those at greatest risk, enabling vigorous treatment of these risk factors which will be modified. The modifiable risk factors are of utmost importance, as intervention strategies aimed toward reducing these factors can subsequently reduce the risk of stroke. Early identification and modification of risk factors is imperative [4]. The most important risk factors for stroke are hypertension, heart disease, diabetes and cigarette smoking. Others include heavy alcohol consumption, high blood cholesterol levels, illicit drug use and genetic or congenital conditions, particularly vascular abnormalities. People with quite one risk factor have what is called 'amplification of risk'. This suggests that the multiple risk factors compound their destructive effects and make an overall risk greater than the simple cumulative effect of the individual risk factors [5].Various lifestyle factors have been associated with increased stroke risk. These include obesity, physical inactivity, diet and acute triggers such as emotional stress.

Obesity has been associated with higher levels of blood pressure, blood glucose and atherogenic serum lipids, which are independent risk factors for stroke. Obesity was identified as an independent factor related to stroke incidence. The pattern of obesity may be important; central obesity manifested by abdominal deposition of fat, rather than obesity involving the hips and thighs, has been related to the occurrence of atherosclerotic disease. Increased consumption of fish, green tea and milk were protective of stroke, while diets high in fat and cholesterol could be deleterious [6, 7]. The few studies are reported on stroke and to identify its risk factors [8], the gender-specific association between stroke risk [9] and lifestyle, assess the awareness factors and promote stroke prevention strategies in different region [10, 11].

The community-based epidemiological studies are helpful in understanding the magnitude of burden due to stroke in a defined population, different risk factors, better insight of disease pathogenesis, standard of care and population-based strategies to reduce the incidence of stroke. Finally, the population-based studies related to stroke are desperately required in India, so as to have effective population-based strategies, especially control of risk factors, which will help to reduce the incidence of stroke and stroke-related mortality. The purpose of the present research was to identify the epidemiological risk factors in patients suffering from cerebrovascular event or stroke, analyze the sex distribution and diseases states as risk factors of stroke at Amravati of Vidarbha region. The stroke due to risk factors can be reduced with the help of this study and its findings.

2. MATERIALS AND METHODS

This descriptive observational study using a structured questionnaire was carried out in medicine department, Amravati of Vidarbha region in the state of Maharashtra to review current risk factors of cerebrovascular event among population for the period of six month. Research ethics approval was received from research ethics committees of the participating hospital at district general hospital, Amravati and pharmacy practice centre (PD003/GCOPA/2018-19), Government College of Pharmacy Amravati, Maharashtra.

2.1. Criteria for study design

Patient was informed about the purpose of the study and written consent was taken prior to their participation in the study. An informed consent to participate in research of samples, ensure the confidentiality of the information received and used only for research purposes were fully met. Patients of either sex of any age groups inpatient of medicine department, profound diagnosis given by physician were included for this study. Patients with impaired consciousness, patient not willing to sign consent, early discharged and unable to verbalize response to the interview questionnaire were excluded.

2.2. Subjects, data collection, analysis and statistical methods

Sample size was 80 populations of medicine department over a period of six months from October 2018 to March 2019 in district general hospital, Amravati. Interview questionnaires and prompts intended to elicit participant's views about cerebrovascular events. Observational and reflexive notes taking were conducted throughout the study. Patient data relevant to the study has been collected from treatment charts/case sheets, laboratory reports and patient or patient's care giver's interview by using patient data collection form. It includes the patient socio-demographics data, dietary habit, family history, co-morbidities, sleeping pattern, past medical and medication history of patient and other relevant information. The data was collected on prevalidated case record proforma. The result about various parameters was screened gender wise and age wise distribution, dietary habit and comorbid diseases. The data have been summarized by routine descriptive statistics, namely mean and standard deviation, correlation from numerical variables, counts and percentages for categorical variables.

3. RESULTS AND DISCUSSION

The morbidity and health care burden may increase based upon high prevalence and complications in cerebrovascular disease patients. In our study, 80 patients were fulfilling the inclusion criteria and all subjects were enrolled for this present study.

3.1. Demographic factors

In demographic factors; age, gender, educational level, residence and occupation were investigated. The detailed age distribution is demonstrated in table 1.

**Table 1: Demographic distribution of cerebrovascular event patients**

Demographic Status	Age/status	Count of Subject	% of Subject
Age Group	<29	-	-
	30-39	2	2.5
	40-49	11	13.75
	50-59	14	17.5
	60-69	27	33.75
	>70	26	32.5
Residence	Rural	34	42.5
	Urban	46	57.5
Occupation	Farmer	26	32.5
	House wife	24	30
	Labor	25	31.25
	Other	1	1.25
	Servant	4	5
Educational level	Illiterate	36	45
	Aware	17	21.25
	Unaware	19	23.75
	Literate	44	55
	Aware	36	45
	Unaware	8	10

Among total 80 subjects, 51 (63.75%) were male and 29 (36.25%) female. The study was conducted on both genders with male participants (51) being slightly more than female participants (29). The majority of participants (27) were between 60-69 yrs old, while 26 of them were between >70 yrs old and 14 were in between 50-59 yrs of age. According to age group distribution, no subjects were found in age group of <29 and only 2 subjects were in age group of 30-39 yrs. The mean age of population was 41.25±12.63 (Mean ± SD). Fu-Liang Zhang et al. 2017 stated that the prevalence of stroke increased with age [8]. The similar correlation was observed with the present study as it showed similar results. It was found less number of individuals in below 50 y of age and as the age increases, more number of individuals were observed. Thus, from the observation, occurrence of stroke was greater in the age group of 60-69 yrs. This is because of increasing age increases elasticity of blood vessels carrying blood towards brain decreases and hardness in the arterial wall increases.

For residence, among the total patients of cerebrovascular events (CVE), the prevalence of urban population were predominant than rural population (table 1). Among population, 34 (42.5%) patients was belong to rural area followed by 46 (57%) patients belong to urban area. This indicates the incidence of stroke is predominant in urban area. It may be possible that low income population patients are favored government hospital for both cases of rural and urban. By considering occupational status, it was found that most of patients were farmer (32.5%), followed by labor (31.5%). Most of female patients were house wife (30%) and remaining 6% servants and others. In the study, it is found that no specific relation between occurrence of stroke and occupation.

3.2. Social factors

Social factors of patients included information regarding social habits such as tobacco consumption, smoking and alcoholism. In this studies, the distribution social habits in the patients participated in the study were 32 (40%) alcoholic, 32 (40%) tobacco chewer and 4 (6%) smokers (figure 1).
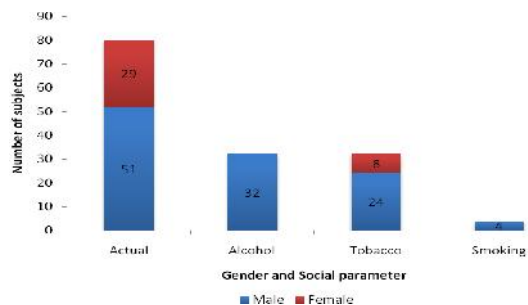

Fig 1: Gender wise social distribution

The social habits in the patients of 32 (40%) alcoholic and 4 (5%) smokers which comprised of all male while in patients of 32 (40%) tobacco chewer comprised by both male (30%) and female (10%).The occurrence of stroke was high in

males than females which could be due to lifestyle factors such as tobacco, smoking and alcohol consumption. The similar findings were observed in the study done by Gouri Diwan *et al*. in which among total 70 patients, 24% were alcoholic and 33 % were tobacco chewer [12]. Thus, alcohol and tobacco consumption were found to be major risk factor among stroke patients. An increase in alcohol consumption leads to an increase in blood pressure and decreases clotting ability of platelets.

3.3. Gender wise weakness

Out of 80 patients of cerebrovascular event, 46 and 34 patients were left side and right side weakness respectively. The majority of patients were observed left side weakness as depicted in figure 2.Out of 46 patients affected with left side, 32 and 14 patients were male and female respectively while 35 patients affected with right side, 19 and 15 patients were male and female respectively. Thus, the prevalence of male over female and left side weakness was commonly observed than right side weakness in the CVE patients.
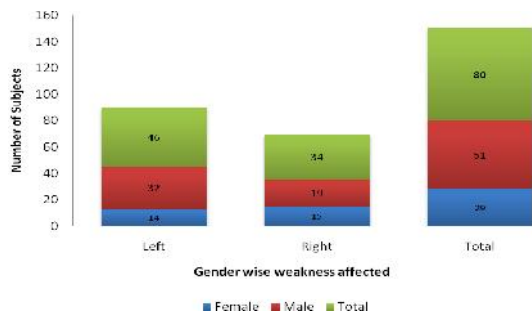

Fig 2: Gender wise Weakness Distribution

3.4. Patient awareness and family history factors

Family history of CVE includes medical history of any known disease or disorder (co- morbidities), previous hospitalizations, if any and then reason for hospitalization was identified. During the study period, total number of subjects were 36 (45%) of illiterate patients where 17 (21.35%) individuals were aware about their condition and 19 (23.75%) individuals were not aware about events. In literate group of 44 (55%) individuals, 36 (45%) and 8 (10%) were aware and unaware respectively about their condition. It shows that there was greater awareness among literate patients. Frequency and percentage distribution of patient awareness of stroke according to educational status is depicted in table 1. Out of 80 patients, maximum number of patients 76(95%) were no family history of cerebrovascular event. This type of risk was observed in 4 patients; all were female and increased the risk of stroke.

3.5. Co-morbidity factor

Hypertension (HTN) was observed as leading risk factor along with age in case of patients with stroke or cerebrovascular event (CVE). Among total 80 patients, 40 (50%) patients were affected with hypertension as depicted in figure 3. Out of 40 patients, there were 7 patients of age < 50 y, 24 patients of age group 50-70 y and 9 patients of >70

y age group. Hypertension is the most important potential risk factor for all stroke subtypes, particularly for intracerebral hemorrhagic stroke as observed previously from study by Javed Akhter Rathor *et al*. 2013.
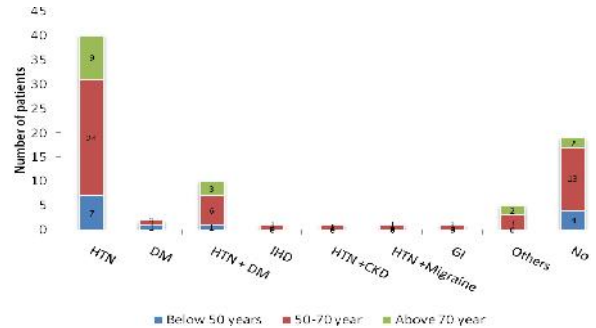
Fig 3: Distribution by age group of demographic and affective diseases

Diabetes mellitus was another stressing risk factor for stroke [13]. Hypertension along with diabetes mellitus was found in 10 patients as a major co-morbid condition. Diabetes mellitus (DM) is an independent risk factor for stroke. People with diabetes have three times the risk of stroke compared to people without diabetes [6]. Various cardiac diseases have been shown to increase risk of cerebrovascular stroke. In data of patients, 53 patients were associated with hypertension while only 2 were with ischemic heart disease (IHD). Kidney problems were found to be less associated with cerebrovascular event (CVE). Only 1 patient was found with chronic kidney disease (CKD) along with hypertension. Migraine headache has been most consistently associated with stroke in women [13]. In the study, 6 individuals were with co-morbidity like gastric intestinal (GI) complications, infectious diseases and others. There were 20 individuals did not having any significant co-morbidity. However, many cases were newly discovered of cerebrovascular event.

3.6. Other risk factors

Head and neck injury may damage the cerebrovascular system and cause a small number of strokes, especially in young adults. This type of risk was observed in 17 female individuals. There were 3of age <50, 12 of age group 50–70 yrs and 2 of age >70 yrs. The risk was highly observed in age group 50–70 yrs as given in table 2.

Table 2: Incidence of subjects for other factors of trauma and diet distribution

Age (Year)	Number of subject of trauma history		Type of Diet	
	Present	**Absent**	**Mixed**	**Vegetarian**
<50	3	10	8	5
50-70	12	39	23	28
>70	2	14	4	12
-	17	63	35	45

Various lifestyle factors associated with increasing the risk of stroke. These include obesity, physical inactivity and diet. Diet was classified as vegetarian and mixed diet. Patients were asked about consumption of diet high in saturated fat,

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sweetened beverages, salt and/or excess calories and classified accordingly. Diet high in fat and cholesterol could trigger stroke. During the study of 80 individuals, 35 were mixed diet and 45 individuals were vegetarian diet (table 2). High daily dietary intake of fat is associated with obesity and acts as an independent risk factor or may affect other stroke risk factors such as hypertension, diabetes, hyperlipidemia and cardiac disease.

3.7. Assessment of risk factors

Knowledge of risk factors of stroke among stroke survivors helps in secondary prevention of stroke. The risk factors based on study included hypertension, diabetes mellitus (DM), cardiovascular disease (CVS), family history, trauma, migraine, tobacco, smoking, alcohol and high fatty diet is given in figure 4. Out of 80 patients, 52, 40, 36 and 64 patients were hypertensive, high fatty diet, migraine and alcoholic as well as tobacco chewer respectively. Trauma, diabetes and smoker or family history was associated 17, 12 and 4 patients respectively.
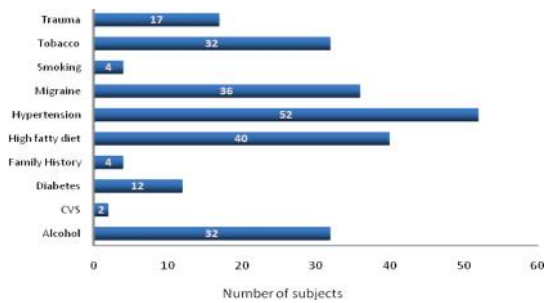
Fig 4: Risk factors associated with cerebrovascular event

In the present study, identified the most common risk factors associated with cerebrovascular event or stroke were hypertension (65%) followed by high fatty diet(50%), migraine(45%), alcoholic (40%), tobacco(40%), trauma(21.25%) and diabetes(15%). Hypertension, alcoholism, smoking and dyslipidemia are commonest causes of stroke among the elderly. Gouri Diwan *et al*. 2018 stated that among the modifiable risk factors hypertension(61%) followed by tobacco consumption (32%), alcoholism (24%), diabetes (20%) and IHD (4.2%) were associated with the stroke.[12]Thus, the study shows hypertension was the leading cause of stroke followed by high fatty diet, alcohol, tobacco, trauma and diabetes. These findings suggest that the modifiable risk factors were responsible for increased incidence of stroke in population.

In the present study, hypertension was found to be the major risk factor for cerebrovascular event. It was also found hypertension with other risk factors like alcohol, diabetes mellitus, tobacco, smoking, diet high in fat and trauma in different age groups as given in table 3. From the results, no any patients were observed in the age <29 yrs and only 1 patient observed in age group 30-39yrsassociated hypertension along with alcohol and no patients found in

other risk factors in the same group. In the next group 40-49 yrs, 3 patients were observed in hypertension with alcohol, 1 patient observed in hypertension with diabetic and trauma each. In the patients >70 yrs, majority 11, 9, 3 and 1 patients were observed in hypertension with tobacco, hypertension with alcohol and diet each, hypertension with diabetes mellitus and trauma each and hypertension with smoking respectively.

Table 3: Incidence of subjects with combined risk factors

Age Group (yrs)	<29	30-39	40-49	50-59	60-69	>70
Hypertension+Alcohol	-	1	3	4	7	9
Hypertension+Diabetes	-	-	1	-	3	3
Hypertension+Tobacco	-	-	2	3	8	11
Hypertension+Smoking	-	-	-	2	-	1
Hypertension+Diet	-	-	2	4	13	9
Hypertension+Trauma	-	-	1	1	5	3

Therefore, from the observational studies, the number of patients in the combination with hypertension was high in age group 60-69 and >70 yrs and the most of affected patients were co-morbidity of hypertension with diet high in fats. The similar studies are conducted by Konduru *et al*. in 2018 and found hypertension was the leading cause for stroke [14]. The comparison is taken into account to point out the equivalence of two studies for the risk factors impact on cerebrovascular stroke event. It is validated by the equivalence between the two studies for the risk factors for chi-square statistical analysis using MS-excel. In the majority of analyses, an alpha of 0.05 is employed the cutoff for significance. If the *p-value* is less than 0.05, then reject the null hypothesis that concludes a significant difference does exist. For comparison of risk factor, use current observed data with previous observational data for hypertension frequency indifferent age group (table 4).

Table 4: Comparative observational studies of hypertensive patients with co-morbidity for stroke

Age Group (yrs)	Number of subject (Previous study)	Number of subject (Present study)
21- 30	1	-
31-40	3	2
41-50	8	4
51-60	24	6
61-70	25	25
71-80	7	13
81-90	-	2

The hypertension risk factor was significant affected on stroke event in population distribution ($p<0.01$). There was possibility to more prone hypertensive subjects in different age group between both studies. The population distribution for hypertension was different due to different region consider, but similar patient were observed for >61 age group in both study. The above age 61 yrs, prevalence rate was 40 % and no significance ($p>0.05$) between both studies. It indicates based on both studies more hypertension risk is greater stroke event and both observations were equivalence. Lack of reliable data on mortality among population, certain follow up could have given better

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relationship about morbidity and mortality among individuals. More risk associated factors were not observed due to lack of clinical laboratory test findings.

4. CONCLUSION

Among the cardiovascular complications, an incidence of stroke was high in age between 60-69 yrs (33.75%) and >70 yrs (32.5%) which comprised about 66.25% of entire study population. The occurrence of stroke was increases with increasing age. Males (63.75%) were more affected than females (36.25%). The co-morbid conditions such as hypertension, diabetes mellitus and migraine were greater risk factor on cerebrovascular stroke. Hypertension was found to be major risk factor for stroke event. Alcohol and tobacco consumption was found another leading risk factor for stroke event in male.

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