Risk factors, clinical presentations and predictors analysis of stroke in adult patients in India: A prospective observational study

ABSTRACT

Background: Stroke is the second most common cause of death and permanent disability across the world. Presently, its burden is in a growing phase, especially in high, low and medium-income countries. In India, it is considered as the common cause of admission to health care centers. However, there is a lack of information at the epidemiological (Risk factors, clinical presentations & predictors) level which might be due to the different diagnostic standards, case definitions, survey strategies, poor public awareness and inadequate medical facilities. Therefore, the present study is focused on the assessment of risk factors, clinical presentations and predictors of stroke among adult patients admitted to the stroke unit of SSB heart & multispeciality hospital, Faridabad, Haryana, India.

Methods: Prospective observational study was conducted for 3 consecutive months from April to June 2021. A total of 25 patients (>18 years of age) diagnosed with ischemic stroke and admitted to the Stroke Unit were enrolled on the basis of their CT head findings while hemorrhagic stroke patients were excluded. Data collection was done by the trained medicinal practitioners and evaluated on the basis of age, gender, risk factors and clinical presentation.

Result: The maximum patient i.e. 18 were recorded between 60- 80 years of age, males (64%) were found to be more susceptible as compared to females (36%). Further, low level of high-density lipoprotein was recorded as the most common risk factor followed by hypertension and smoking. Hemiparesis was observed as the common clinical presentation in 19 patients followed by dysarthria and ataxia.

Conclusion: The present study concluded that both modifiable and nonmodifiable factors play a crucial role in stroke conditions and further, more research is needed with the incorporation of more modifiable and nonmodifiable factors in new studies in the future for the better management and treatment of stroke patients.

***Keywords**: Stroke, Risk factors, Clinical presentation, predictors, India,*

1. INTRODUCTION

The term “Stroke” is defined as the sudden neurological disturbance due to the less or completed stoppage of blood supply in brain cells [1, 2]. In 2017, it was considered the second most common cause of death or a key cause of permanent disability across the world [3, 4]. On the basis of pathogenesis, it divides into two main types namely ischemic and hemorrhagic stroke. Ischemic stroke is the most common type of stroke which occurs due to the reduction of blood supply in the brain while a hemorrhagic stroke occurs due to

the rupture of blood vessels inside the brain [1, 5]. Its causative factors are categorized into modifiable and non-modifiable groups. Non-modifiable factors include age, family history, sex and race/ethnicity while smoking, bad eating habits, hypertension, and physical inactivity are the major modifiable risk factors [6]. The incidence of stroke in terms of morbidity and disability is rising continuously in the world. Globally, a total of 15 million people experience a stroke every year out of which approximately 5 million die and another 5 million are found with permanent disability per year and considered as a burden on their families or communities [7]. Presently, stroke has become the most common cause of early death and disability and approximately 70% of cases are recorded from low-income and middle-income countries such as India which is due to the demographic changes and enhancement in the prevalence of modifiable risk factors [8-10].

In India, the incidence of stroke is estimated to be between 108 to 172 cases per 100,000 every year with an 18- 42% fatality rate for 1 month which is very high compared to the developed countries [11, 12]. However, the information about the epidemiology of stroke (Risk factors, clinical presentations & predictors) in India is not available which may be due to the different diagnostic standards, varying case definitions, survey strategies, poor public awareness and inadequate medical facilities [13, 14]. In addition to this, underdiagnoses of hypertension, diabetes, smoking, delays in diagnosis and failure in the treatment are also the major challenges that need to be addressed for the management of stroke in India. Therefore, this study is focused on the assessment of risk factors and clinical presentation of stroke in adult patients admitted to the Stroke Unit of SSB heart & multispeciality hospital, Faridabad, Haryana, India.

2. METHODS

A prospective observational study was conducted for 3 consecutive months from April to June 2021. A total of 25 patients (>18 years of age) diagnosed with ischemic stroke and admitted to Stroke Unit were enrolled for the current study on the basis of their CT head findings and patients with hemorrhagic stroke were excluded. Data collection was done by the trained medicinal practitioners and evaluated on the basis of age, gender, risk factors and clinical presentation. The cutoffs for the evaluation of risk factors were taken from the NCEP guidelines where LDL> 130mg/dl & HDL <40 mg/dl were considered deranged [15]. 2D echocardiography was performed in all patients to look for evidence of coronary artery disease. All the patients were subjected to Holter monitoring in order to look for paroxysmal atrial fibrillation.

3. RESULTS

3.1 Age and gender analysis

The maximum number of patients i.e. 18 were recorded between 60- 80 years of age followed by the age group 40- 60 i.e. 5 patients while only 1 patient was found in <40 years and >80 years of age group each (fig. 1). The gender analysis revealed that the male adults

(64%) had a higher preponderance of the stroke incidence as compared to females i.e. 36% (fig. 2).

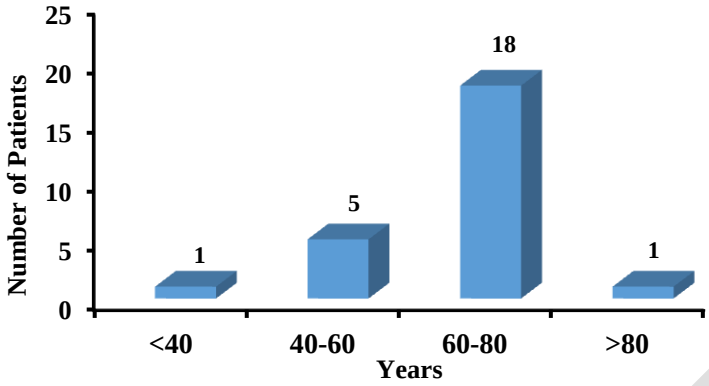

Fig. 1. Age analysis of adult stroke patients admitted to stroke unit

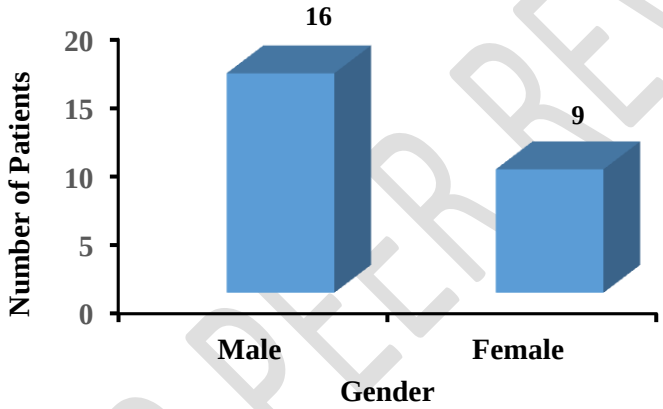

Fig.2. Gender analysis of adult stroke patients admitted to stroke unit.

3.2. Risk Factor analysis

Risk factor analysis revealed that most of the patients had one or more risk factors. Maximum patients i.e. 22 were diagnosed with low levels of high-density lipoprotein followed by smoking (16), hypertension (16) and diabetes mellitus (15) while only 3 patients were found with atrial fibrillation (fig. 3). In addition, a total of 8 patients were diagnosed with smoking, hypertension and diabetes mellitus.

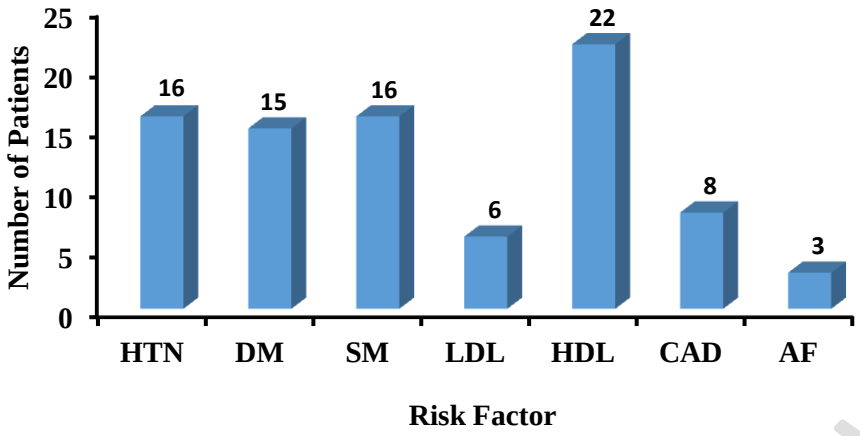

Fig. 3. Risk factor analysis of adult stroke patients admitted to stroke unit. HTN= Hypertension, DM= diabetes mellitus, SM= smoking, LDL= low-density lipoprotein, HDL= high-density lipoprotein, CAD= coronary heart disease, AF= atrial fibrillation.

3.3. Clinical presentation analysis

A total of 19 patients were found with hemiparesis followed by dysarthria, ataxia and aphasia i.e. 7, 7 and 6 patients, respectively. Only 5 patients were found with dysphagia (fig. 4).

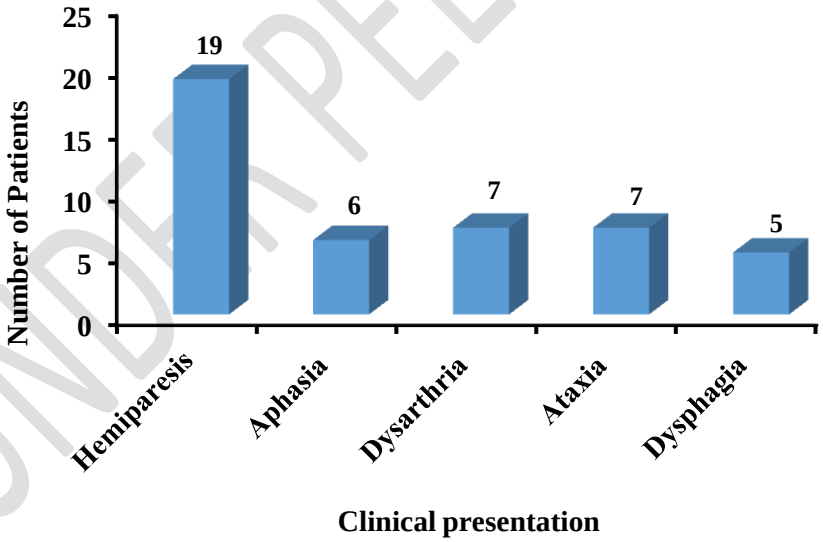

Fig. 4. Clinical presentation analysis of adult stroke patients admitted to stroke unit.

4. DISCUSSION

Low and middle-income nations are the major contributors of the burden of stroke. Presently a number of research groups are actively working on the evaluation of etiological pattern of stroke in India. This study shares several similarities with the previous study

carried out in India and other developed as well as developing nations in previously published articles of the same project [2, 16, 17]. Age is an important nonmodifiable risk factor for stroke. The mean age of stroke onset in India (i. e., 63 years) is lower than that in Western countries (68 years in the USA and 71 in Italy) [2, 13, 18, 19]. The maximum patient was recorded between 60-80 years of age which is comparable with developed nations such as the USA (69.2 years) [6], Europe (73 years) [20] and developing nations like Ethiopia [2] and India [21], Male patients had a higher percentage of stroke over female patient and similar trend was also recorded in previously published studies [19, 22]. The higher preponderance of stroke may be due to the increased risk factors such as smoking and consumption of alcohol among males [2].

Risk Factor analysis showed that low level of high-density lipoprotein is the common risk factor followed by hypertension and smoking. However, several studies from India revealed that hypertension is the dominant risk factor followed by smoking [13, 19, 23, 24]. According to Ram et al, hypertension and diabetes are the major factor of stroke should be controlled and considered as high-risk populations for stroke prevention [27]. Moreover, previous stroke history is also a major risk factor which could be due to inadequate information about secondary prevention and as a result, patient non-compliance with the treatment. Both primary as well as secondary prevention of ischemic stroke must be addressed at modifiable risk factors [28]. Clinical presentation analysis revealed that hemiparesis is the main clinical representation of stroke and similar results were also recorded in various articles [21, 25, 26].

5. CONCLUSION

The present study concluded that the increment in the incidence of stroke is directly correlated with the increasing age while males are the most susceptible to the stroke due to smoking habits which can serve as a better clue in the treatment of the particular medical condition. Moreover, hypertension, smoking, diabetes, HDL, LDL are the main modifiable risk factors that can be controlled by implementing awareness campaigns to educate north Indian society about prevention and the impact of stroke on the daily life of a patient. Finally, more research is needed with the incorporation of more modifiable and nonmodifiable factors in new studies in the future for the better management and treatment of stroke patients.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The study was carried out after approval from the Ethical committee of SSB heart & multispeciality hospital, Faridabad, Haryana, India.

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