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## Prevalence of stroke in the year 2020: A retrospective study

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### Abstract

**Background:** Stroke is a rapid onset of focal neurological deficit, resulting from diseases of the cerebral vasculature and its contents. Worldwide, stroke is the 2<sup>nd</sup> most common cause of mortality. Also, it is the commonest cause of chronic adult disability. The lifetime risk of stroke after 55 years of age is 1 in 5 for women and 1 in 6 for men. This is a Retrospective study comprising of patients visiting Dr. D. Y. Patil Hospital, which were then presented in tabular and graphical manner.

**Aim:** The objective of the study was to find the number of cases of stroke, to analyze and compile the number of cases according to gender, according to their age group, according to their affected side, according to the artery involvement, days of hospital stay and cases referred and non-referred to physiotherapy.

**Result:** The result show that 61% of males and 39% of females were affected. 85% of the time the stroke resulted in hemiparesis while 13% of the times it resulted into hemiplegia. Most number of patients were from a age group ranking from 61 to 70 years with a maximum stay of 5 days in 52% of population. 72% of population were treated with physiotherapy.

**Conclusion:** According to the results, it was found out that males were more affected by stroke than females in the year 2020. 72% of the stroke patients received physiotherapy treatment, of which more than half patient received physiotherapy treatment everyday of their inpatient stay.

**Keywords:** Stroke, hypertension, diabetes mellitus, cerebrovascular accident (CVA), retrospective study

### Introduction

In stroke, sudden cessation of cerebral blood flow and oxygen-glucose deprivation sets in motion a series of pathological events. Within minutes neurons die within the ischemic core tissue, while the majority of neurons in the surrounding penumbra survive for a slightly longer time. Cell survival depends largely on the severity and the duration of the ischemic episode. For cells to survive, 20% to 25% of regular blood flow is required without timely reperfusion, cells in the penumbra will die, neuronal activity ceases, and the infarct expands. Ischemia triggers a number of damaging cellular events termed ischemic cascade. The release of excess neuro-transmitters (e.g., glutamate and aspartate) produces a progressive disturbance of energy metabolism and anoxic depolarization. This results in an inability of brain cells to produce energy, particularly adenosine tri-phosphate (ATP). This is followed by excess influx of calcium ions and pump failure of the neuronal membrane. Excess calcium reacts with intracellular phospholipids to form free radicals. Calcium influx also stimulates the release of nitric oxide and cytokines. Both mechanisms further damage brain cells.

Ischemic strokes produce cerebral edema, an accumulation of fluids within the brain that begins within minutes of the insult and reaches a maximum by 3 to 4 days. It is the result of tissue necrosis and widespread of cell membranes with movement of fluid from the blood into brain tissues. The swelling gradually subsides and generally disappears by 2 to 3 weeks. Significant edema can elevate intracranial pressures, leading to intracranial hypertension and neurological deterioration associated with contra-lateral and caudal shifts of brain structures (brainstem herniation). Clinical signs of elevating intracranial pressure (ICP) include decreasing level of consciousness (stupor and coma), widened pressure, increased heart rate,

irregular respirations Cheyne-Stokes respirations), vomiting, unreacting pupils (cranial nerve [CN] III signs), and papillo edema.

Cerebral edema is the most frequent cause of death in acute stroke and is characteristic of large infarcts involving the middle cerebral artery and the internal carotid artery.

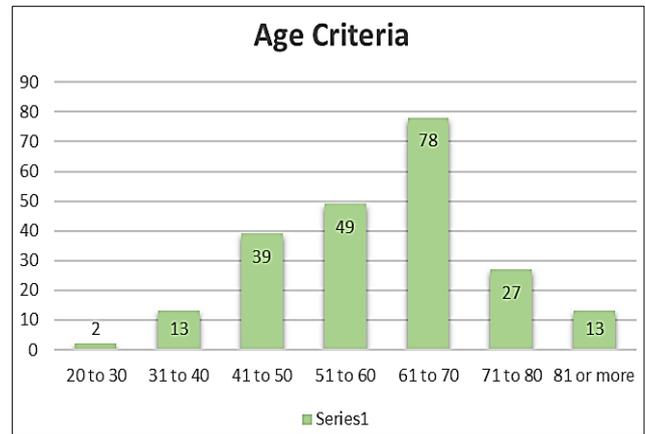
Taking into account all the factors about the stroke a need to carry out the retrospective study by taking into consideration patients suffered from stroke and got admitted to the hospital in the year 2020.

**Materials and Methodology**

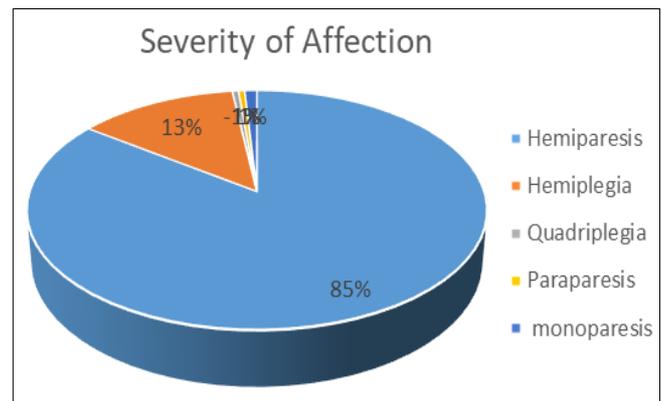
The study done was retrospective in nature and was carried in Dr. D. Y. Patil Hospital setting. Patients were selected based on the diagnosis criteria. Patients suffering from stroke were included in the study irrespective of the gender. Only patients diagnosed in Dr. D. Y. Patil Hospital were considered for the study. Diagnosis of stroke outside the hospital setting were not considered. Case Record of the patients who have visited Dr. D. Y. Patil Hospital from 1<sup>st</sup> January 2020 to 31<sup>st</sup> December 2020 was been reviewed. Case records of the patients diagnosed with stroke was identified.

The identified were patients were entered in the data and were segregated based on their age and gender. The data compiled information regarding the rural and urban setting, different age groups suffering from stroke, severity of the affection side, number of the hospital stay days, were the patients treated or not-treated with the physiotherapy treatment when they were in hospital and even after the discharge. It will tell us about the whether the patient suffering from stroke has hypertension or diabetes mellitus. The above compiled data was statistically analysed and presented further.

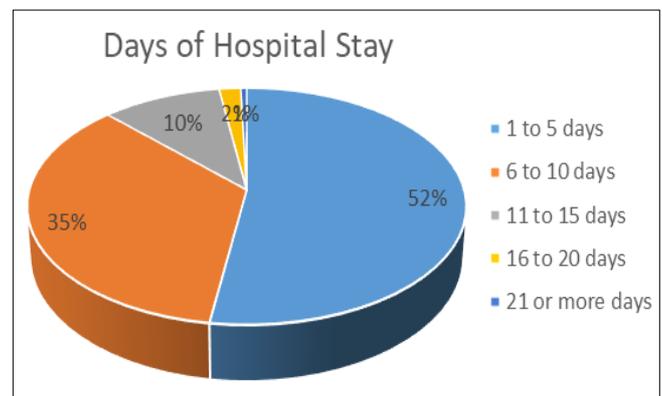
**Results**



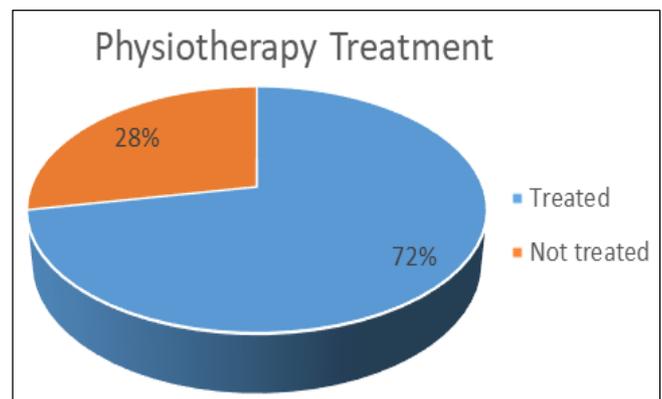
**Graph 3:** Represents the data of age criteria.



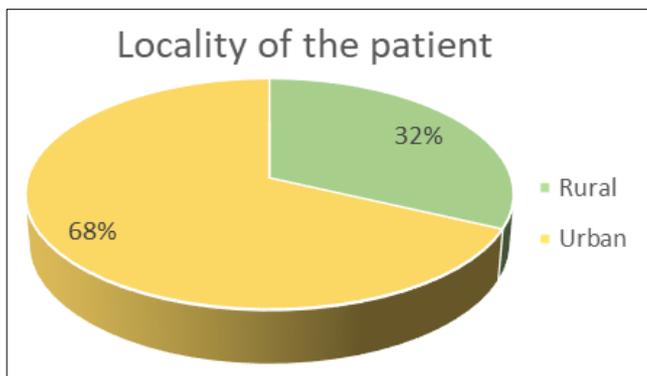
**Graph 4:** Represents the data according to the severity of affection.



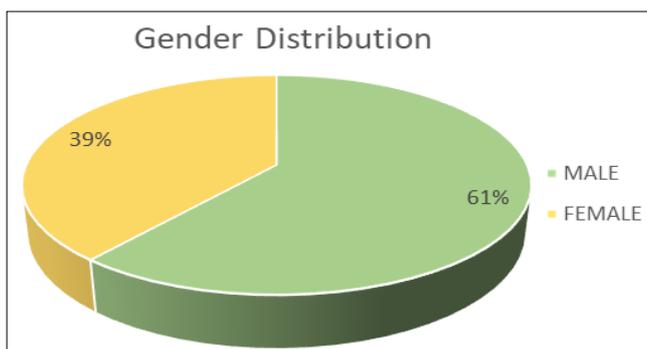
**Graph 5:** Represents the data according to the days of hospital stay.



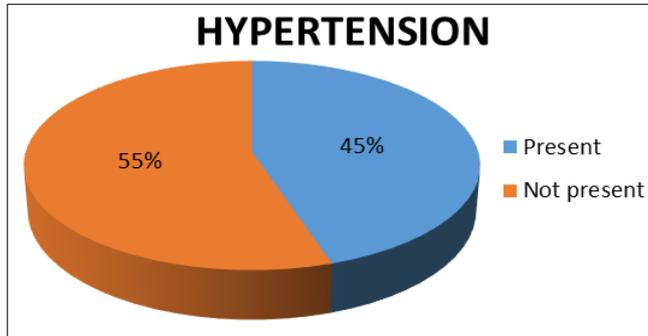
**Graph 6:** Represents the data of patients receiving the physiotherapy treatment.



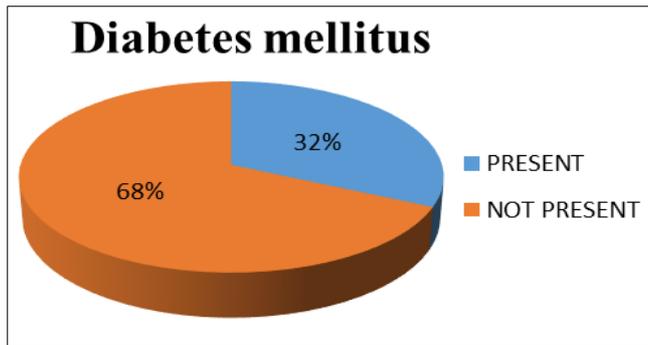
**Graph 1:** Represents the data based on locality of the patient.



**Graph 2:** Represents the data with gender distribution.



Graph 7: Represents the data of patients having hypertension.



Graph 8: Represents the data of patients having diabetes mellitus.

**Graph 1**

**Interpretation:** The chart represents 32% of patients came from rural areas and the other 68% of the patients were from urban areas.

Table 1:xxxxx

Locality of the patients	
Rural	32%
Urban	68%

**Graph 2**

**Interpretation:** The chart represents gender distribution were among the affected individuals 61% were Male and remaining 39% were Females.

Table 2:xxxxx

Gender Distribution	
Male	61%
Female	39%

**Graph 3**

**Interpretation:** The graph represents most number of patients suffering from stroke according to age were in between the age of 61 to 70 followed by 51 to 60 and 41 to 50

Table 3: Xxxxxx

Age Criteria	
20-30	2
31-40	13
41-50	39
51-60	49
61-70	78
71-80	27
81 and more	13

**Graph 4**

**Interpretation:** The chart shows that 85% of the time the stroke resulted in hemiparesis while 13% of the times it resulted into hemiplegia while quadriplegia and paraparesis were the least common conditions associated with stroke

Table 4:xxxxx

Severity of Affection	
Hemiparesis	85%
Hemiplegia	13%
Quadriplegia	0.50%
Paraparesis	0.50%
Monoparesis	1%

**Graph 5**

**Interpretation:** The chart represents that 52% of patients stayed for 1 to 5 days in the hospital another 35% of the patients stayed for 6 to 10 days. 10% of patients stayed for 6 to 10 days, 1% for 16 to 20 days and 0.5% for more than 21 days.

Table 5: xxxxxx

Days of Hospital Stay	
1 to 5 days	52%
6 to 10 days	35%
11 to 15 days	10%
16 to 20 days	1.80%
21 or more days	0.50%

**Graph 6**

**Interpretation:** The chart represents that total of 72% of patients were treated with physiotherapy treatment

Table 6: xxxxxx

Physiotherapy Treatment	
Treated	72
Not treated	28

**Graph 7**

**Interpretation:** The chart represents that 45% of stroke patients had hypertension and 55% did not have hypertension.

Table 7: xxxxxxxx

Hypertension	
Present	45%
Not Present	55%

**GRAPH 8**

**Interpretation:** The chart represents that Diabetes mellitus was present in 32% of patients

Table 8: xxxxxx

Diabetes mellitus	
Present	32%
Not Present	68%

**Conclusion**

In the year 2020, there were a total of 222 cases of stroke in DR. D Y Patil Hospital, the average age of a patient affected with stroke was 61 & the most number of individuals affected with stroke belonged to the age group of 61 to 70

It was found that Diabetes Mellitus & Hypertension plays determining role in the occurrence of stroke as diabetes mellitus and hypertension was present in 32% and 55% of patients respectively

The fatality rate was 0.5% as only one death occurred due to stroke in the IPD in 2020

- 61% of all the affected individuals were Male and remaining 39% were females
- The most number of patients were in between the age of 61 to 70 followed by 51 to 60 and 41 to 50 years of age
- 2% of patient were affected on both the sides of the body
- 47% patients were affected on their right side and another 51% of patients were affected on their left side
- 47% of the time the stroke resulted in left hemiparesis and 37% of the time it resulted into right hemiparesis while 11% of the times it resulted into right hemiplegia while quadriplegia and paraparesis were the least common conditions associated with stroke
- 52% of patients stayed for 1 to 5 days in the hospital. Another 35% of the patients stayed for 6 to 10 days.
- total of 72% of patients were treated with physiotherapy treatment
- Hypertension was present in 45% of the cases of stroke

#### Diabetes mellitus was present in 32% of patients

In a study of stroke done in Japan by Kazuo Suzuki, it was seen that most number of cases of stroke was between the age group of 60 to 69<sup>(1)</sup> and prior studies have shown that males were more affected than females<sup>(1)</sup>. The results of data obtained on patients who had come to Dr. D Y Patil Hospital with stroke condition in the year 2017 have been analysed, it was seen that most of these patients were in the age group of 61 years to 70 years of age, also the males were more affected than females with stroke conditions. Factors leading to brain strokes such as smoking, high blood pressure and vasoconstriction are more common in men than in females, and estrogen helps the health of brain capillaries in women which he added lowers the risk of stroke. Atrial fibrillation (AF) is the most common, potent, and independent risk factor for ischemic stroke<sup>(5)</sup> the incidence of which increases with age<sup>(6)</sup>

In the study done by Carl V. Granger on Discharge outcome after Stroke Rehabilitation it was seen that paresis was more on the left side than that of right side<sup>(2)</sup>. In our study it was found that 51% of the patients were affected on left side and 47% were affected on their right side of body with 2% being affected on both the sides of their body.

The study showed that paraparesis and monoparesis were the least common conditions. 52% of patient stayed in Inpatient department for less than 5 days, with 35% staying for 6 to 10 days. The average stay of patients was 6 days. As the hemiparesis is slight paralysis of limbs the more severe condition which is hemiplegia was less commonly seen

Our study shows that 72% of all patients affected with stroke were treated with physiotherapy of which more than half the patients were treated on each and every day of their inpatient stay.

Hypertension and diabetes mellitus are the two major causes of stroke which was clearly seen in our study as 45% of the patients with stroke condition had hypertension & 32% of patients had Diabetes mellitus. Only 7% of the time an individual was affected with stroke without having hypertension or diabetes mellitus, and 12% of time patient

was affected with both diabetes mellitus and hypertension. Prior studies showed that diabetes mellitus is a risk factor in stroke with 27% in all cases of stroke in 1994, 29% in 1999 & 32% in 2005<sup>(3)</sup>. And according to research done by MacMahon S, in December 1994 on "blood pressure and stroke risk" states that hypertension is directly and continuously related to the risk of stroke<sup>(4)</sup>. diabetes end up with too much glucose in their blood, while their cells don't receive enough energy. Over time, diabetes mellitus can lead to increased fatty deposits or clots on the insides of the blood vessel walls. These clots can narrow or block the blood vessels in the brain or neck, cutting off the blood supply, stopping oxygen from getting to the brain and causing a stroke. high blood pressure can lead to by damaging and weakening your brain's blood vessels, causing them to narrow, rupture or leak. High blood pressure can also cause blood clots to form in the arteries leading to your brain, blocking blood flow and potentially causing a stroke

It was found that males were more affected by stroke than females in the year 2020. 72% of the stroke patients received physiotherapy treatment, of which more than half patient received physiotherapy treatment everyday of their inpatient stay.

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