

# EVALUATION OF PREVALENCE OF RISK FACTORS IN STROKE

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**Abstract:** **AIM:** To determine the prevalence of Hypertension, Diabetes Mellitus and Hyperlipidaemia in stroke patients, 2) to identify, educate and control various risk factors associated with episodes of stroke. 3) To improve patient Adherence towards stroke risk management. **METHOD :** It is a prospective study design involving 150 patients which has been conducted in Mediciti Institute of Medical Sciences for 5 months i.e. (January 2018-May 2018). **RESULT:** Out of 150 stroke patients enrolled in the study, 52% were males and 48% were females. Males are predominantly at higher risk in developing stroke than females Out of 150 patients, stroke was recorded mostly in alcoholics with 51(34%), followed by both 32(21.3%) and then smokers 16(10.6%). **CONCLUSION:** According to our study 114 (76%) were Hypertensives, 64(42.66%) were Hyperlipidemic and 59(39%) were diabetic. These parameters were found to be the highest in the age groups of 50-65yrs, whereas the mean age is 55yrs. With reference to the above data, it can be inferred that the common people are unaware of the prevailing risk factors in their daily life styles. Therefore a better understanding of stroke risk factors and outcome may help guide efforts at reducing the community burden of stroke.

**Key words:** Prevalence, Stroke, Adherence, Hyperlipidemia

## INTRODUCTION

Stroke is a term used to describe an abrupt-onset focal neurologic deficit that lasts at least 24hr and is of presumed vascular origin. 2 types of disturbances cause stroke. Stoppage of blood flow due to block, no passage resulting in decreased blood supply-Ischemic stroke Rupture of blood cells, leaking of blood into surrounding spaces and in between layers of brain. So, layers bulge out and the parts behind have no blood supply and experience Hypoxia and lack glucose-Hemorrhagic stroke. There are currently 4.6 million stroke survivors in the United States, and stroke is the leading cause of adult disability.<sup>2</sup> Approximately 20% of patients in nursing homes have had a stroke, and stroke is also a leading diagnosis in inpatient rehabilitation. Current projections are that death caused by stroke will increase exponentially in the next 30 years owing to aging of the population and our inability to control risk factors.<sup>3,4</sup> In addition, geographic disparity in stroke incidence exists, such that several areas of the India have stroke varied incidence and mortality rates.

*REVIEW OF LITERATURE*

01.	From the study conducted by Blas Gil-Extremera, Juan Vicente Gómez-González based on the retrospective study among 433 patients with CVA disease	Concluded that the most frequent risk factor found was hypertension which was 64.7% followed by diabetes 54.7% and dyslipidemia 28.5%.
02.	From the study conducted by Azra Zafar, Syed Khurram Shahid, Maimoona Siddiqui, Farrukh Shohab Khan study conducted among 50 diabetes and non diabetes,	Concluded that 80% are found to be at risk of ischaemic stroke
03.	According to studies conducted by Watila M. M.1*, Nyandaiti Y. W.1, Ibrahim et al., a total of 524 patients of university were ascertained with risk factor	Concluded hypertension as history of illness in 87% patients followed by hypercholesterolemias 15% and diabetes as 10%.
04.	Population based study conducted by Tapas Kumar BANERJEE, *Shyamal Kumar DAS ,during the last decade	Prevalence rate of stroke was between 250-300/100000 and the rate of cerebral rate of infarct to haemorrhage was 2.2 in which hypertension was major risk factor.
05.	Study conducted by Dr. C. Sreenivasulu, Dr. S. Lakshmi Bai to find the association of one common risk factor of cardio vascular complication namely lipid profile levels in stroke patients	Out of 100 cases 84 patients were Ischemic stroke and 16 patients were Hemorrhagic stroke. Total cholesterol was elevated in 34.5% of Ischemic stroke patients and 31.2% of Hemorrhagic stroke patients. Decreased HDL cholesterol was founding 53.5% of ischemic stroke patients and 31.2% hemorrhagic stroke patients

*AIMS:*

1. This study aims at creating awareness among the people about the risk factors and Treatment outcomes with stroke.
- 2.To determine the prevalence of Hypertension, Diabetes Mellitus and Hyperlipidemia in stroke patients.

*OBJECTIVES:*

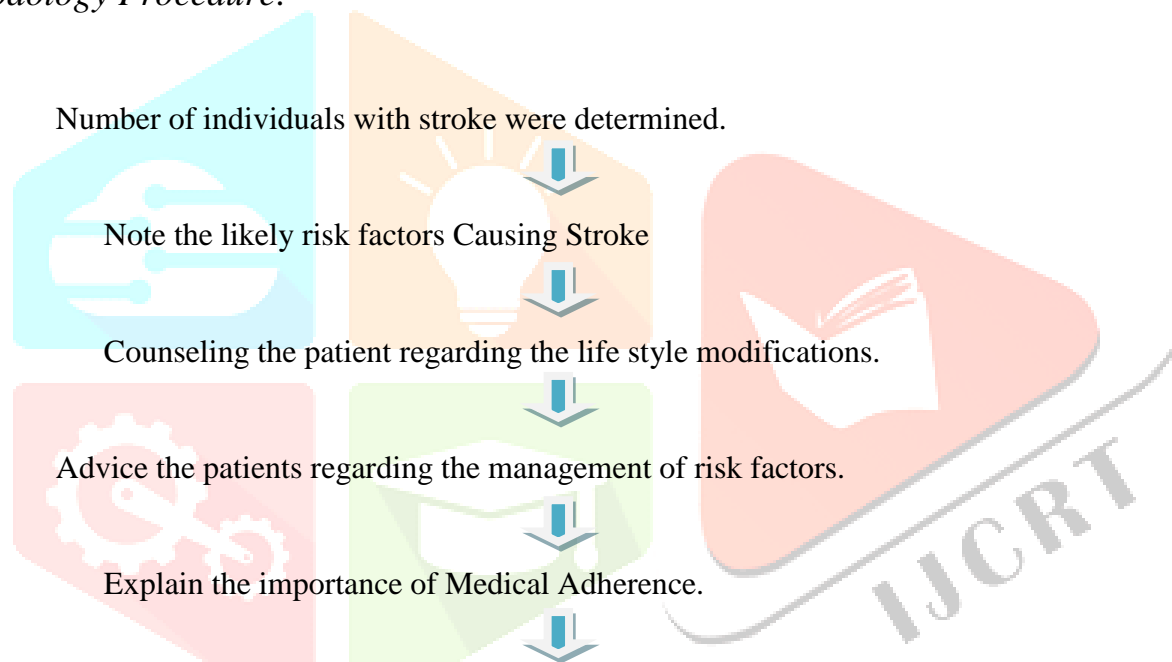
- To identify the number of individuals with risk factors like Hypertension, Diabetes and Obesity in stroke.
- To identify, educate and control various risk factors associated with episodes of stroke.
- To improve patient Adherence towards stroke risk management.

- To identify the treatment outcomes after completion of course.

### *METHODOLOGY:*

*It is a Prospective Study done of Mediciti institute of medical sciences in a 5 months duration (November 2016-March 2017) with inclusion criteria includes Age between 18-80yrs for Both male and female and exclusion criteria include Age above 80,Pregnant women, Multiple disorders.*

### *Methodology Procedure:*



To Analyse and Report the Prevalence of HYPERTENSION, DIABETES, HYPERLIPIDEMIA in stroke.

**RESULTS&DISCUSSION:****RESULTS:**

- In this study, 150 subjects who were undergoing stroke treatment were enrolled, risk factors involved along with treatment outcomes and safety parameters were assessed.
- Patients were counseled about the importance of medication adherence and life style modification in managing their risk factors.
- Total no of patients enrolled in the study = 150

**1) Gender distribution in Stroke:**

Out of 150 stroke patients enrolled in the study, 52% were males and 48% were females. Males are predominantly at higher risk in developing stroke than females.

**Table 2: Distribution of patients based on Gender**

<i>S.No</i>	<i>Sex</i>	<i>No of patients (%)</i>
1	Males	78(52%)
2	Females	72(48%)

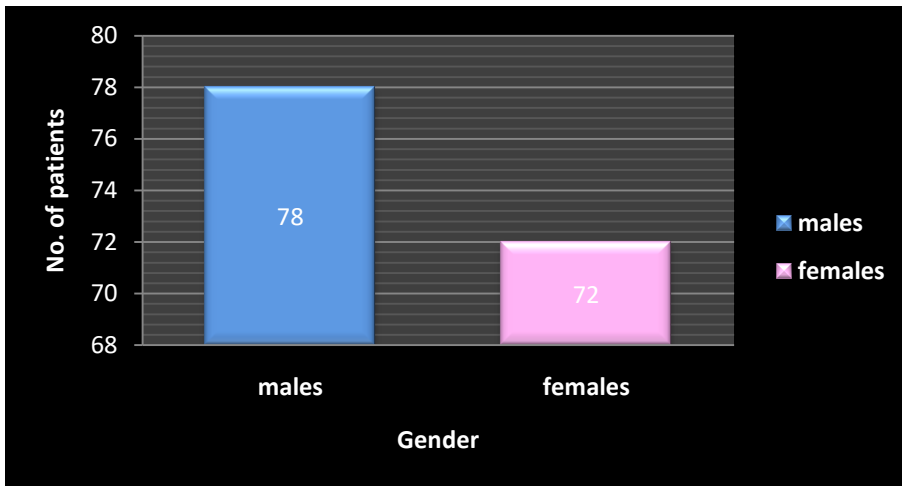


Fig 12: Distribution of patients based on gender

## 2) Age Wise Distribution In Stroke:

Patients in between 61 – 65 years age group have the highest incidence rate, followed by 56 – 60 years compared to other age groups, whereas the mean age was 55yrs. 25 – 30 years age group patients are recorded to have the lowest incidence rate.

Table 3: Distribution of patients based on age group

AGE	NUMBER	PERCENTAGE
25-30 yrs	7	4.6%
31-35yrs	8	5.3%
36-40 yrs	14	9.3%
41-45yrs	16	10.6%
46-50 yrs	11	7.3%
51-55yrs	15	10%
56-60yrs	19	12.6%

<b>61-65yrs</b>	27	18%
<b>66-70yrs</b>	18	12%
<b>71-75yrs</b>	8	5.3%
<b>76-80yrs</b>	7	4.6%

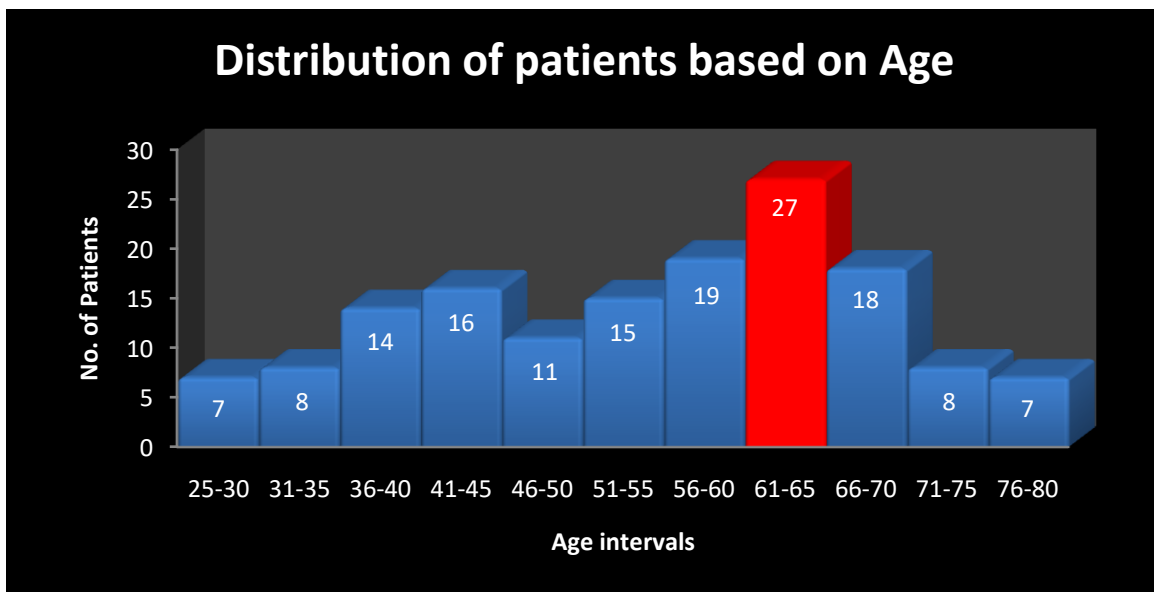


Fig 13: Distribution of patients based on age group

3) *Predominance Of Stroke Gender Wise :*

It was proved in the study that male sex are mostly prone to the development of Stroke than female until menopause or until the age of 50 following which the predominance is same or sometimes higher in females.

<i>AGE</i>	<i>FEMALES</i>	<i>MALES</i>
<b>25-30 yrs</b>	1	6

31-35yrs	4	4
36-40 yrs	5	9
41-45yrs	9	7
46-50 yrs	2	9
51-55yrs	5	10
56-60yrs	10	9
61-65yrs	15	12
66-70yrs	13	5
71-75yrs	7	5
76-80yrs	2	3

*Table 4: Predominance of stroke Age-wise*

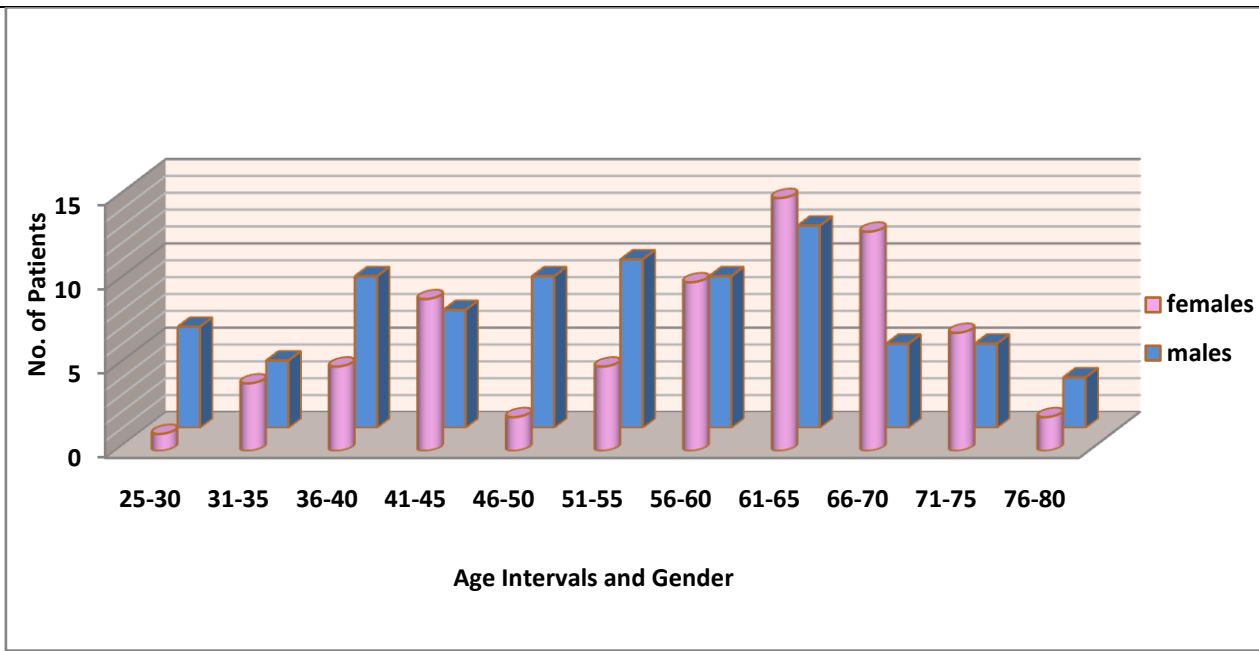


Fig 14: Distribution of patients based on age and gender

4) Social History:

Out of 150 patients, stroke was recorded mostly in alcoholics with 51(34%), followed by both 32(21.3%) and then smokers 16(10.6%).

Table 5: Distribution of patients based on social history

Parameters	Smokers	Alcoholics	Both	None
No of patients (%)	16(10.6%)	51(34%)	32(21.3%)	51(34%)



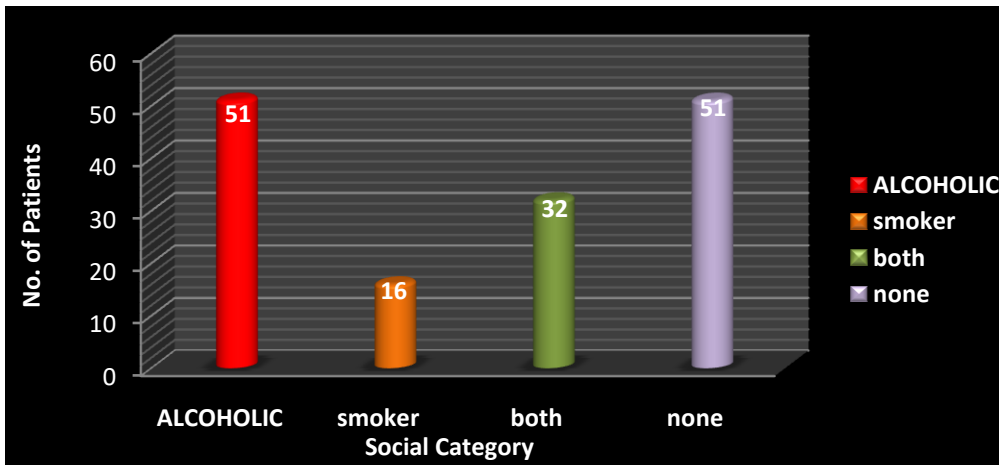


Fig 15: Distribution of patients based on social history

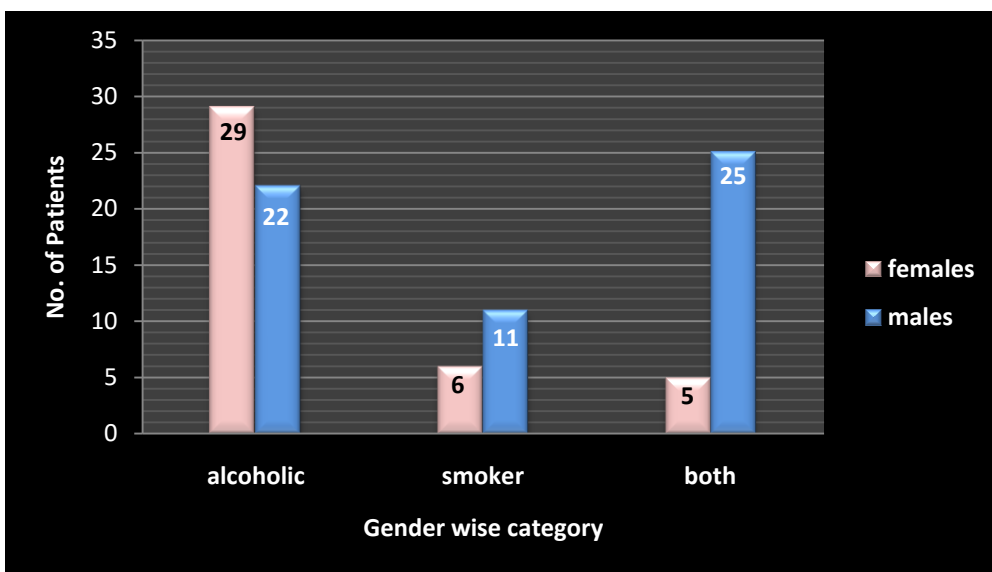


Fig 15.1: Gender-wise distribution based on social history

5) Medical History:

Out of 150 patient 6 patients had CAD, 1 had COPD, 1 had CRHD, 5 had PAH, 6 had seizures and 34 patients were previously diagnosed with a CVA attack.

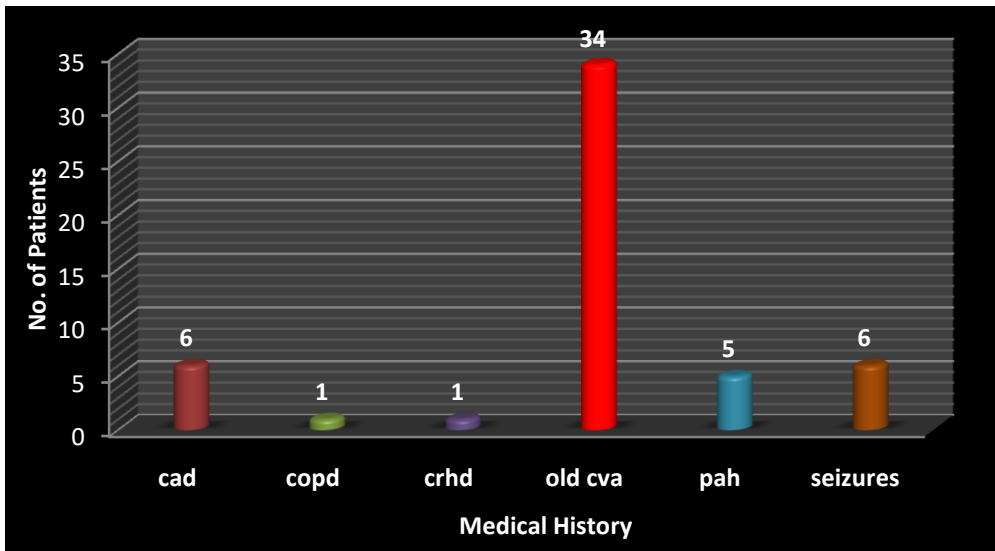


Fig 16: Distribution of patients based on medical history

6) Family History:

Out of 150 patients in the study, 34 patients (22.6%) have a family history of Hypertension, 22 patients(14.6%) have a history of Diabetes.

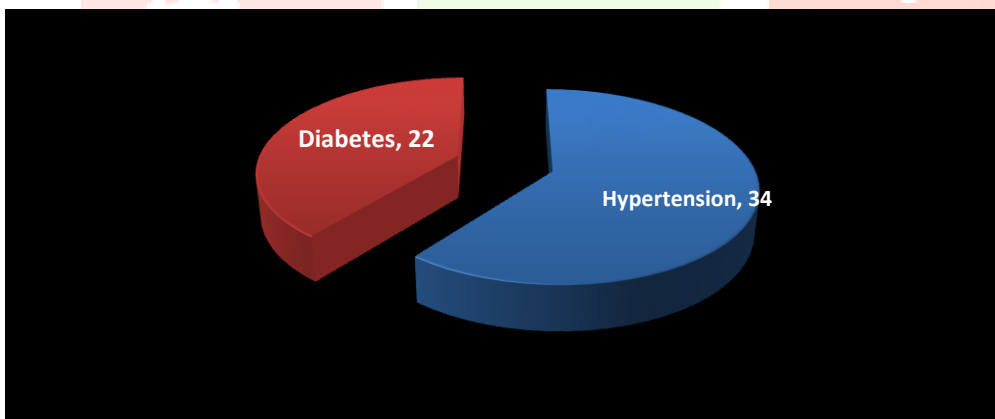


Fig 17: Distribution of patients based on Family history

7) Type of stroke:

Out of 150, 133(88.6%) patients were of ischemic stroke and 17(11.3%) were of hemorrhagic stroke.

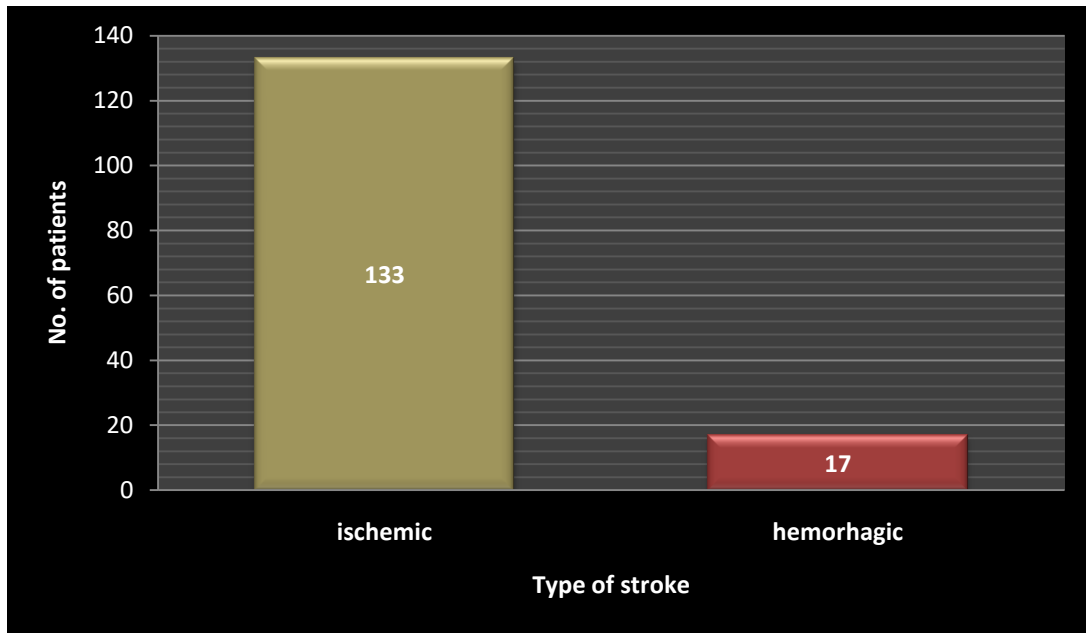


Fig 18: Distribution of patients based on Type of Stroke

8) Awareness Of Risk Factors:

Out of 150 patients enrolled in the study, 114(76%) patients had underlying Hypertension. Among them 96(84%) patients had a history of Hypertension, while 18(16%) were not aware of their Hypertension.

Table 6: Distribution of patients based on awareness of Hypertension(HTN)

Known HTN	96(84%)
Unknown HTN(De novo)	18(16%)

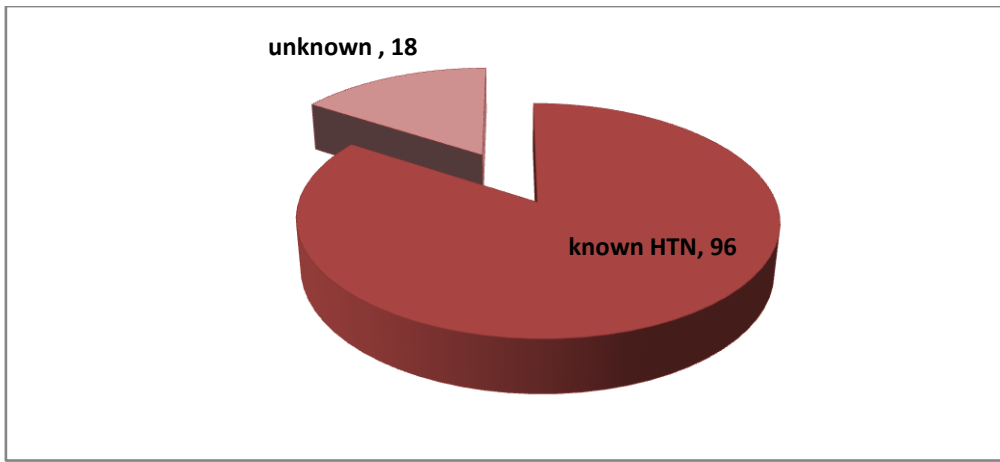


Fig 18.1: Distribution of patients based on awareness of Hypertension

Out of 150 patients enrolled in the study, 64(42%) patients had underlying Hyperlipidemia. Among them 52(34.6%) patients had a history of Hyperlipidemia, while 12(8%) were not aware of their Hypertension.

Table 7: Distribution of patients based on awareness of Hyperlipidemia(HYP)

Known HYP	52(34.6%)
Unknown HYP	12(8%)

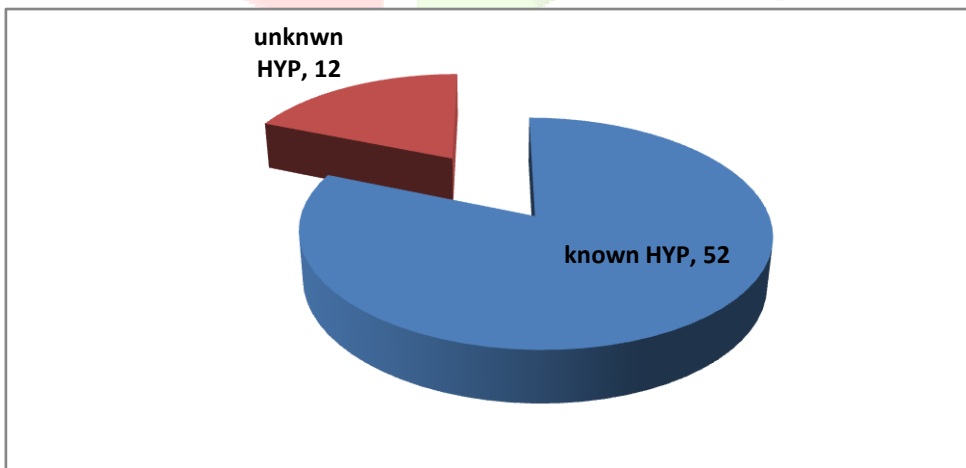
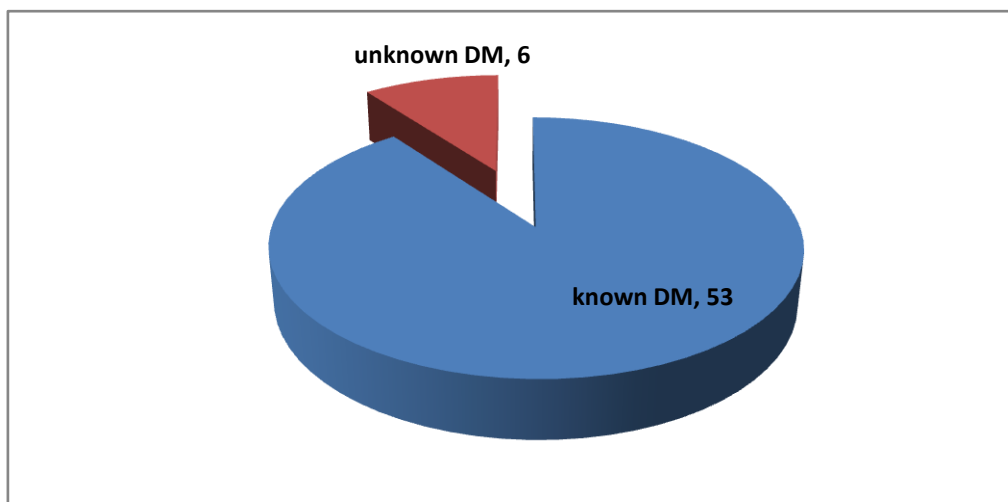


Fig 18.2: Distribution of patients based on awareness of Hyperlipidemia

Out of 150 patients enrolled in the study, 59(39.3%) patients had underlying Diabetes. Among them 53(35.3%) patients had a history of Diabetes, while 6(4%) were not aware of their Diabetes.

*Table 8: Distribution of patients based on awareness of Diabetes Mellitus(DM)*

Known DM	53(35.3%)
Unknown DM	6(4%)



*Fig 18.3: Distribution of patients based on awareness of Diabetes*

#### 9) Importance of symptoms:

Out of 150 patients in the study, as more as 30(20%) patients felt the occurrence of TIA(transient ischaemic stroke), but none of them approached the dispensary until full blown stroke was seen.

*Table 9: Distribution of patients based on TIA*

TIA	APPROACHED
30(20%)	0

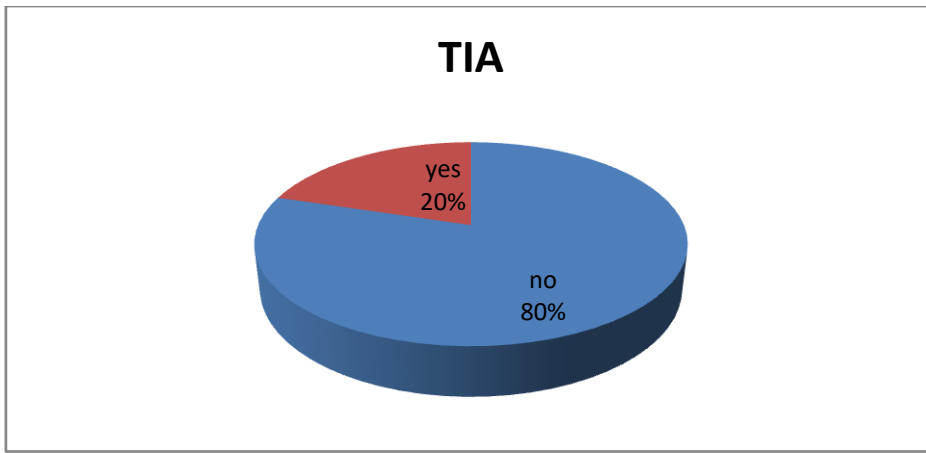


Fig 19: Distribution of patients based on TIA

10) MEDICATION ADHERENCE IN PATIENTS:

Out of 150 patients, 96 patients were aware of their underlying Hypertension i.e., they already had a history of Hypertension, but medication adherence was seen only in 39 patients. While the remaining 57 patients did not follow the medication regularly.

Table 10: Distribution of patients based on medication adherence

Regular	39(41%)
Irregular	57(59%)

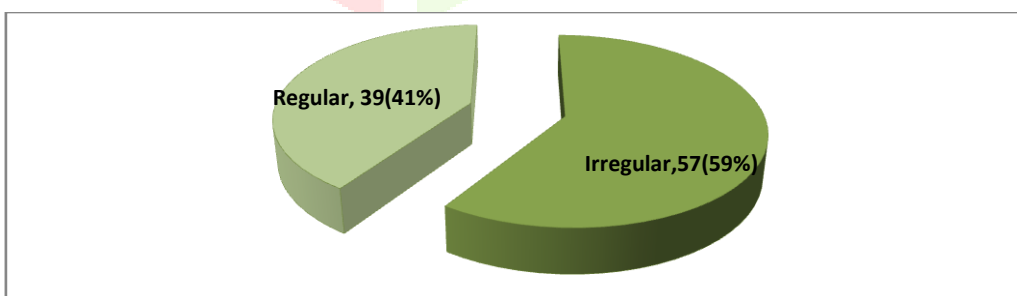


Fig 20: Distribution of patients based on medication adherence

11) Predominantly effected side:

In 150 patients, 71(47.3%) were left sided, 75(50%) were right sided and 4(2.6%) were completely paralysed.

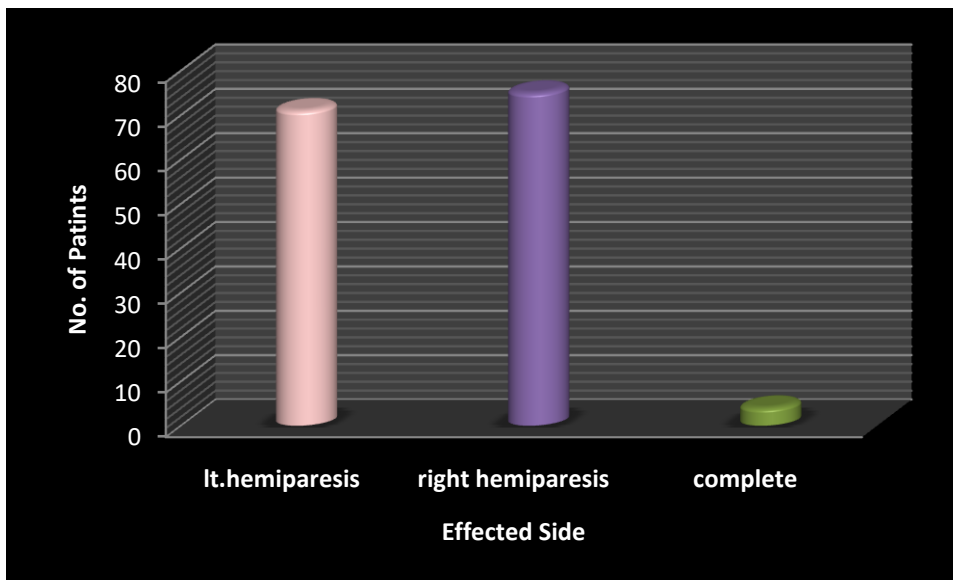


Fig 21: Distribution of patients based on the side effected

#### 11) Prevalence Of Risk Factors:

- Considering the normal blood pressure  $130/80 \pm 10/5$  mm Hg, high blood pressures according to the age groups were calculated, similarly for Diabetes and Hyperlipidemia where the normal value considered was  $150 \pm 10$  mg/dl and  $200 \pm 10$  mg/dl respectively.

Age Groups	Hypertension	Diabetes	Hyperlipidemia
25-30 yrs	0	0	0
31-35yrs	5	6	2
36-40 yrs	9	3	5
41-45yrs	12	4	1
46-50 yrs	7	2	6
51-55yrs	12	6	3
56-60yrs	11	11	6

61-65yrs	14	9	10
66-70yrs	6	3	6
71-75yrs	3	2	5
76-80yrs	5	5	4

Table 11: Comparative prevalence of Risk factors

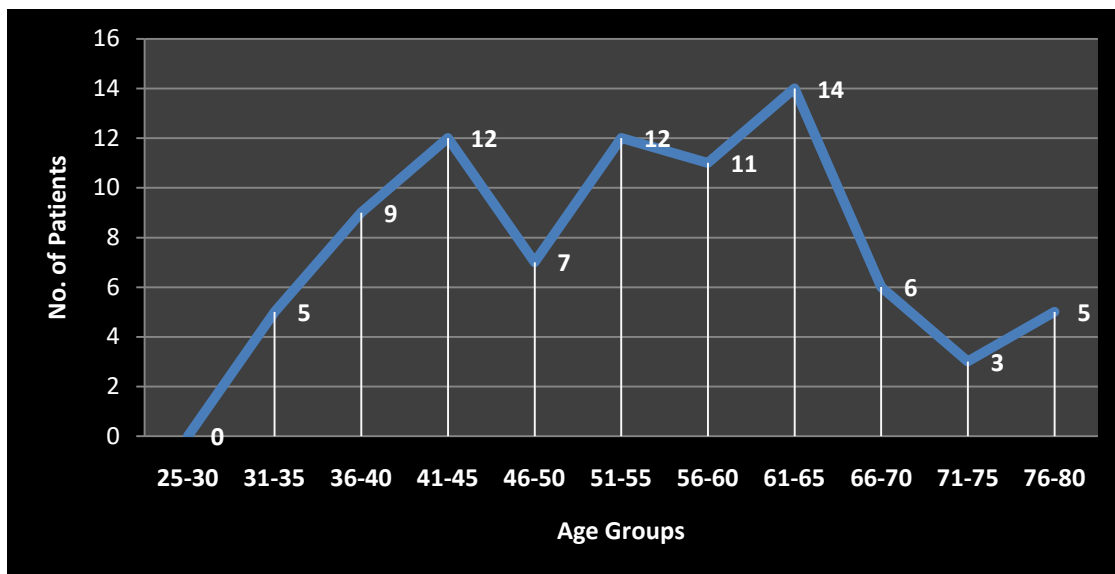


Fig 22.1: Distribution of patients based on prevalence of Hypertension

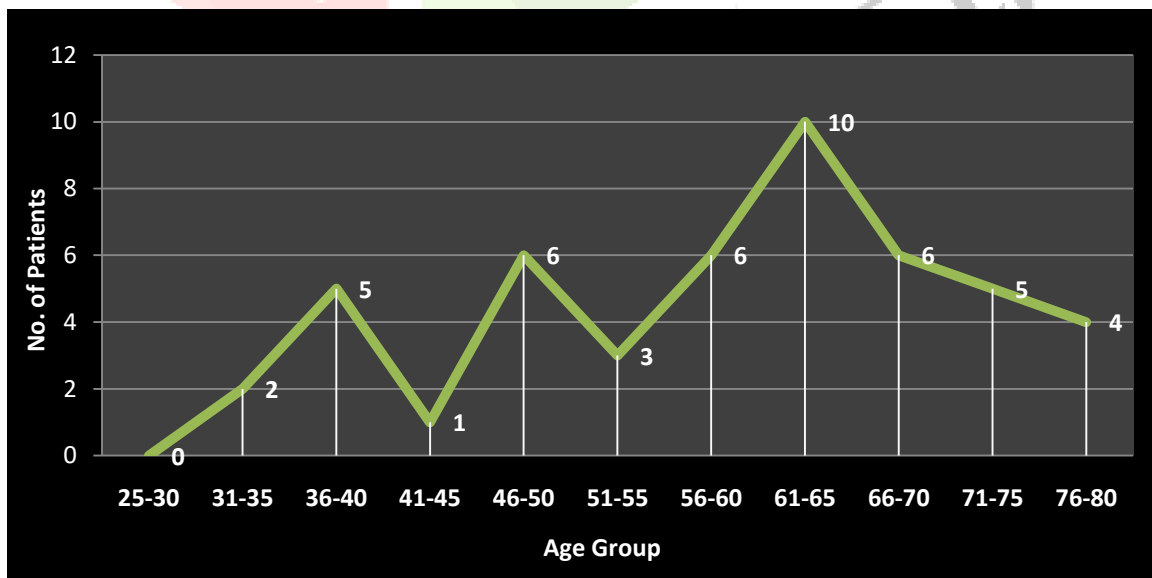


Fig 22.2: Distribution of patients based on prevalence of Hyperlipidemia



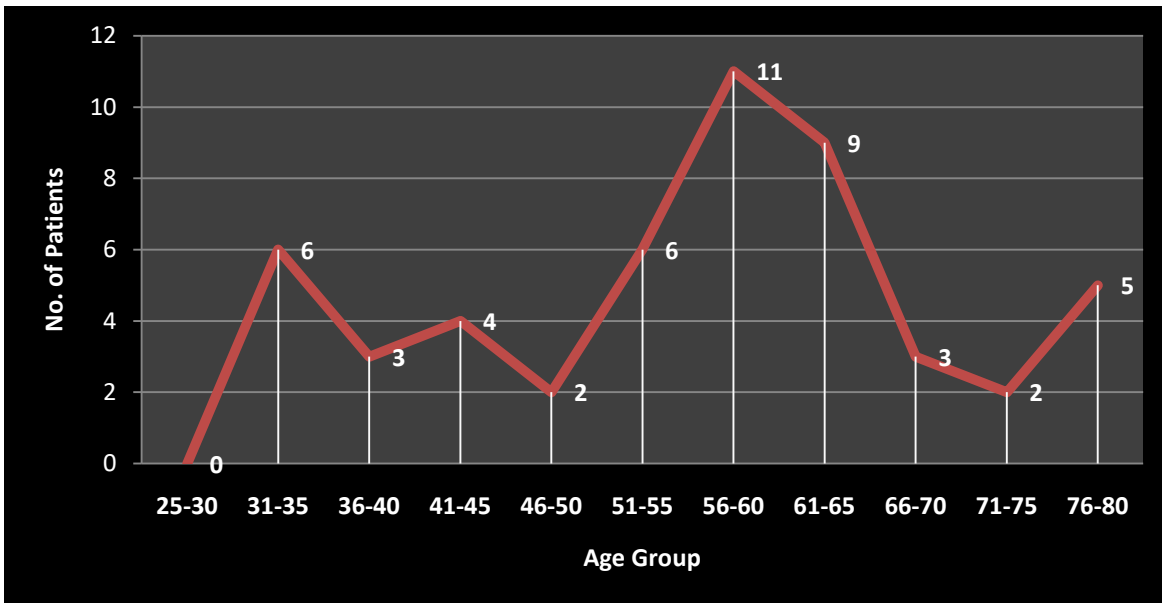


Fig 22.3: Distribution of patients based on prevalence of Diabetes

- With reference to the above data, maximum risk factors are present in the age group 50-65yrs which correlates with the maximum no. of stroke patients.

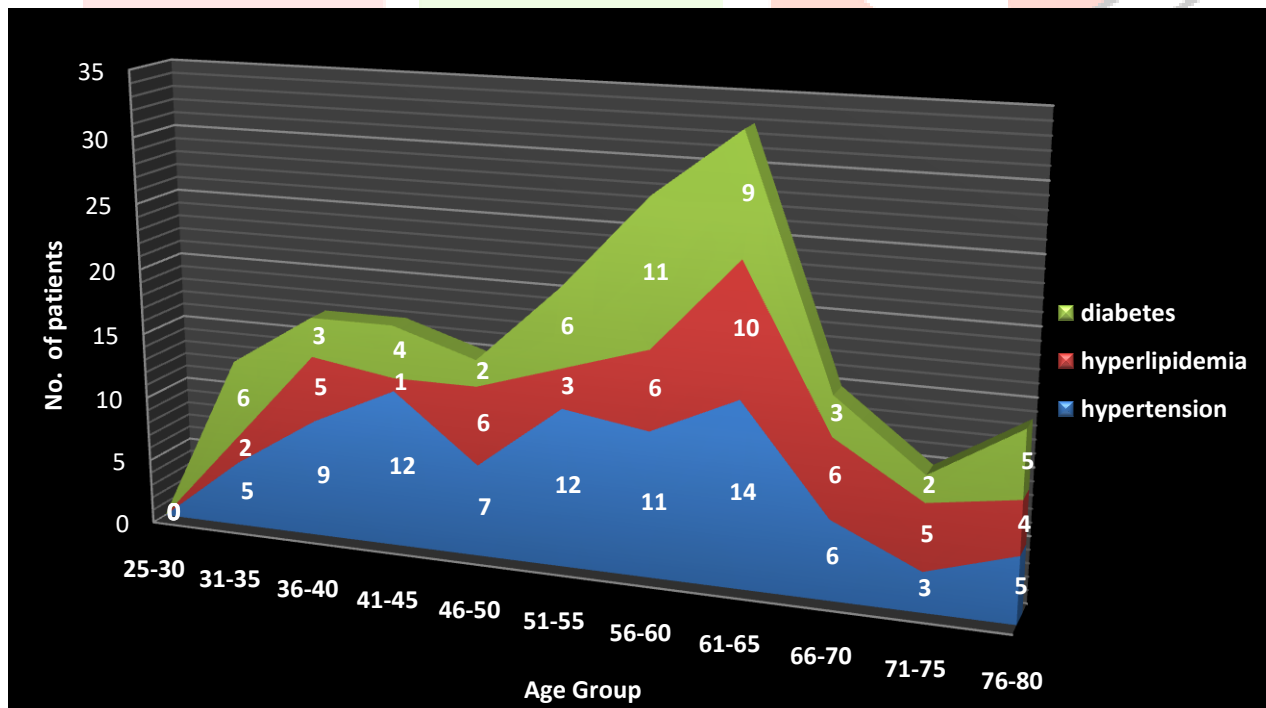


Fig 18:

Comparative distribution of Patients based on Risk Factors

## DISCUSSION:

Stroke is the second most frequent cause of death worldwide in 2011 accounting for 6.2 million deaths according to India stroke factsheet updated in 2011. It is ranked after heart disease and before cancer. Hence it needs better understanding about the demographics, Socioeconomics, Family and Social history and risk factors for the development of the Stroke.

People of age above 50 years are at higher risk for developing stroke which is in accordance with many studies done globally. It was proved in the study that males are mostly prone to the development of Stroke than female until menopause or until the age of 50 because of hormonal changes, multiple pregnancies, obesity, decreased physical activity and life style changes as seen in the study. Males are still more prone to stroke due to their socioeconomic factor or social habits like alcohol consumption, smoking and/or smokeless tobacco use. Their working environment may also provoke them to the development of stroke on account of the stress and social habits which were turned out to be true from our study where patients with habits of alcohol consumption are high of 34% followed by smokers 10.6% and 21.3% both alcoholic and smoker.

Of the 150 patients involved in the study, 22.6% had a previous history of CVA and 4% had seizures, this infers that most of them were at higher risk of recurrent CVA because of poor medication adherence, lack of awareness of the underlying comorbidities. This was also seen according to the study conducted by. The patients family history also contributed to the development of hypertension, consequently increasing the risk for stroke and other Cardiovascular problems, which is in accordance to the study conducted by. The primary reason for the majority of Ischemic cases was correlated with the high diabetic prevalence in most of the studies. However the present study showed higher Hypertensive predominance. Based on the study, considering Hypertension to be the predominant risk factor, out of the 96(64%) patients with previous Hypertension, only 39(40.6%) were on regular medication.

On counseling the patients, the reason noted for irregular Rx was the unawareness of future consequences, lack of remembrance and knowledge, work and travelling etc.

Like the saying goes “prevention is better than cure”, awareness of risk factors is crucial in avoiding serious health issues related to brain, heart and other major organs. In the present study 16% of the patients were unaware of their high blood pressure. This could also lead to various cardiovascular issues and kidney failure.

Based on our study, 47.3% were effected with left sided hemiparesis, 50% were right sided and 2.6% were completely paralysed.

According to our study 114 (76%) were Hypertensives, 64(42.66%) were Hyperlipidemic and 59(39%) were diabetic which is in accordance with the studies And these parameters were found to be the highest in the age groups of 50-65yrs.

Patient counseling was done regarding the awareness of risk factors, their management, importance of medication adherence and queries related to the therapy and its clinical outcome.

### *CONCLUSION:*

According to our study 114 (76%) were Hypertensives, 64(42.66%) were Hyperlipidemic and 59(39%) were diabetic. These parameters were found to be the highest in the age groups of 50-65yrs, whereas the mean age is 55yrs. With reference to the above data, it can be inferred that the common people are unaware of the prevailing risk factors in their daily life styles. Therefore a better understanding of stroke risk factors and outcome may help guide efforts at reducing the community burden of stroke.

### *FUTURE DIRECTIONS:*

More studies need to be done regarding the relation between various risk factors associated with stroke taking larger sample to achieve accurate results.

More Focus should be on Patient education, in the direction to improve Medication Adherence, lifestyle modifications.

Further studies to be done to understand high predominance of right sided hemiparesis than the left.

## REFERENCES

1. <http://www.sanecd.org/Updated%20Stroke%20Fact%20sheet%202012.pdf>.
2. Joseph T. Dipiro, Robert L. Talbert, Gary C. Yee, Barbara G. Wells, L. Michael Posey. Pharmacotherapy- A Pathophysiologic Approach SEVENTH EDITION
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3841586/#ref16>
4. Timothy Ingall, MD. Stroke—Incidence, Mortality, Morbidity and Risk: JOURNAL OF INSURANCE MEDICINE Copyright Q 2004 Journal of Insurance Medicine J I Med 2004;36:143-152.
5. Pushendra Nath Renjen, Mirza Atif Beg, Kamal Ahmad ,etal., Epidemiological study of incidence and risk factors of Ischemic stroke subtypes according to Trial of ORG 10172 in acute stroke treatment criteria: A 3 years, hospital-based study. International Journal of Medicine and Public Health | Jan-Mar 2015 | Vol 5 | Issue1.
6. Tapas Kumar BANERJEE , Shyamal Kumar DAS. Epidemiology of stroke in India: Neurology Asia 2006; 11 : 1 – 4
7. Gil-Extremuera B, Gómez-González JV (2015) Hypertension as the Major Cause of Stroke: University of Granada. J Clin Trial Cardiol 2(2): 1-4.
8. Dr.Sreenivasulu. C, Dr. Lakshmi Bai S. Study of Serum Lipid Profile in Stroke Patients:-INDIAN JOURNAL OF APPLIED RESEARCH X 385, Volume : 6 | Issue : 2 | FEBRUARY 2016 | ISSN - 2249-555X Research.
9. Madhu Basavegowda, Kavitha Hanumanahally , Shankarappa, Ashok Nagaralu Channabasappaetal; Magnitude and pattern of hypertension among diabetics; risk prediction for stroke and myocardial infarction: Journal of Mahatma Gandhi Institute of Medical Sciences March 2014 | Vol 19 | Issue 1

10. R.P. Eapen, J.H. Parekh et al., the cerebro vascular stroke are common in males (67%) females (37%) and most common age group was 51-60 years, common risk factor was hypertension (40%). alcoholism (35%), smoking (28%) and hyperlipidemia (17%), the over all clinical diagnosis was correlation with CT scan, in hemorrhagic stroke common site was thalamus followed by basal ganglia. mortality rate was higher in hemorrhagic stroke (69%) as compared to ischemic stroke (31%).
11. Watila. M, Nyandaiti Y. W, Ibrahim. A, Balarabe S. Risk factor profile among black stroke patients in Northeastern Nigeria: Journal of Neuroscience and Behavioural Health Vol. 4(5), pp. 50-58, May 2012.
12. Hassan H. Musa<sup>1</sup>, Idriss H et al; Risk factors, electrolyte disturbances and lipid profiles in sudanese patients with stroke: Vol. 7(10), pp. 324-330, October 2015 DOI: 10.5897/JPHE2015.0757 .
13. Faculty of Public Health Briefing Statement. Hypertension – the ‘Silent Killer’ royal college of physician united kingdom.
14. Samy I. McFarlane, Domenic A. Sica et al, Stroke in Patients With Diabetes and Hypertension: Medical College of Virginia, Richmond, 2005 Le Jacq Communications, Inc.
15. Sylvan lavy, Eldad melamed et al; Hypertension and Diabetes as Risk Factors in Stroke Patients: Stroke, Vol. 4, September-October 1973.
16. DAVID S.H. BELL. Stroke in the Diabetic Patient: DIABETES CASE, VOLUME 17, NUMBER 3, MARCH 1994.
17. Azra Zafar, Syed Khurram Shahid, Maimoona Siddiqui. Pattern of Stroke in type 2 Diabetic subject versus non Diabetic subject: J Ayub Med Coll Abbottabad 2007; 19(4)
18. Richard Sicree, Jonathan Shaw, Paul Zimmet et al; Diabetes and Impaired Glucose Tolerance: Baker IDI Heart and Diabetes Institute. IDF Diabetes Atlas fourth edition Diabetes and IGT | 2.
19. K Ghanachandra Singh, Sachin Deba Singh, K Bijoychandra et al; A study on the clinical profile of stroke in relation to glycaemic status of patients: Department of Medicine, Regional Institute of Medical Sciences (RIMS), Imphal (West). JIACM 2014; 15(3-4): 177-
20. The Kang Law MRCP, Ramesh Sahathevan, et al; High prevalence of diabetes in stroke patients and its association with lacunar infarction: Neurology Asia 2015; 20(2) : 121 – 127

21. Carlo Bruno Giorda, Angelo Avogaroetal, Marina Maggini,etal; Incidence and Risk Factors for Stroke in Type 2 Diabetic Patients ,The DAI Study in Italy.DOI: 10.1161/01.STR.0000260100.71665.2f.
22. Fatima Zahra, SaeraSuhailKidwai.Frequency of Newly Diagnosed Diabetes Mellitus in Acute Ischaemic Stroke Patients: Journal of the College of Physicians and Surgeons Pakistan 2012, Vol. 22 (4): 226-229.
23. Muhammad Nazim Khan, HinaDilruba Khan etal; Serum Total and HDL-Cholesterol in Ischemic and Hemorrhagic Stroke:Serum Total and HDL-Cholesterol in Ischemic and Hemorrhagic Stroke.Ann. Pak. Inst. Med. Sci. 2014; 10(1)22-26.
24. Carlene M.M. Lawes, Stephen Vander Hoornetal. High cholesterol: Comparative Quantification of Health Risks 392-451.
25. Lewis H. Kuller, MD, DrPH. stroke and diabetes:
26. Rosalind Lees, MA, Patricia Fearonetal.,Cognitive and Mood Assessment in Stroke Research Focused Review of Contemporary Studies: 2012 American Heart Association, Inc.D3we+ OI: 10.1161/STROKEAHA.112.653303.
27. [www.webmd.com/hypertension-high-blood-pressure/guide/hypertension-high-blood-pressure-stroke&grquid](http://www.webmd.com/hypertension-high-blood-pressure/guide/hypertension-high-blood-pressure-stroke&grquid).
28. [www.stroke.org/files/diabetesBrochure](http://www.stroke.org/files/diabetesBrochure).
29. [www.heart.org/HEARTORG/conditions/cholesterol/Aboutcholesterol/Hyperlipidemia/article](http://www.heart.org/HEARTORG/conditions/cholesterol/Aboutcholesterol/Hyperlipidemia/article).
30. [www.stroke.org.uk/sites/default/files/alcohol\\_and\\_stroke.pdf](http://www.stroke.org.uk/sites/default/files/alcohol_and_stroke.pdf).
31. [www.stroke.org.uk/sites/default/files/smoking\\_and\\_the\\_risk\\_of\\_stroke.pdf](http://www.stroke.org.uk/sites/default/files/smoking_and_the_risk_of_stroke.pdf).
32. [www.khanacademy.org/science/healthcare-and-medicine](http://www.khanacademy.org/science/healthcare-and-medicine).
33. DR. AUGUSTINO MAKENYA.Prevalence, Predictors And Outcomes Of Stroke Among Adult Patients Admitted At BMC:The Catholic University Of Health And Allied Sciences Tanzania – Bugando, October 2013.
34. [www.mayoclinic.com/stroke/treatment](http://www.mayoclinic.com/stroke/treatment)
35. [www.khanacademy.org/test-prep/mcat](http://www.khanacademy.org/test-prep/mcat).
36. [www.medscape/stroke/treatment\\_medications](http://www.medscape/stroke/treatment_medications).

- 37. <http://sciencenetlinks.com/science-news/science-updates/born-for-strokes/>
- 38. <https://patient.info/in/doctor/hormone-replacement-therapy-including-benefits-and-risks>
- 39. Marisa McGinley, DO; Sarkis Morales-Vidal, MD; and Jose Biller, MD of Loyola University Medical Center and Loyola University Chicago Stritch School of Medicine. 2014; 10(1)22-26.

