International Journal of Life science and Pharma Research

Pharmacology for Drug Discovery

Risk Factors Associated With Cerebro-Vascular Accident Ischemic Stroke In Young And Elderly Population.

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Abstract: Cerebral ischemic stroke is caused by a blockage in a artery that supplies blood to the brain. The blockage reduces the blood flow and oxygen to the brain leading to the damage or death of brain cells. Aim of our study is to identify and analyze the risk factors of cerebral ischemic stroke in young and elderly patients. The known Non modifiable risk factors are Age, Gender, Race,, Family history of stroke, Low birth weight. Modifiable and well documented risk facrors are Hypertension, Sickle cell disease, Atrial fibrillation symptomatic carotid stenosis, Diabetes, Post menopausal hormone therapy, Dyslipidemia. Life style factors-associated with stroke risk Cigarette smoking, Obesity, Over Alcohol consumption, Physical inactivity. Potentially modifiable but less documented risk factors are usage of Oral contraceptives, Migraine,, Drug and alcohol abuse,, Homocysteine condition, Sleep disordered breathing. A Prospective observational study on risk factors of cerebral ischemic stroke in young and elderly patients was performed from September 2018-February 2019 i.e for 6 months duration in In-patient department of General Medicine in Gandhi Hospital.140 CVA cases were collected, documented, analyzed and results are obtained as follows. Young subjects HTN (60.9%), Alcohol consumption (78%), Smoking (48%), History of stroke (36%), Diabetes mellitus (24%), Obesity (14.6%), Cardio-Vascular diseases (4.8%). Elderly subjects HTN (82.8%), Smoking (79%), Alcohol consumption (72.7), History of stroke (33.3%), Diabetes mellitus (27.2), Obesity (8.8%), Cardio-Vascular diseases (8%). Reporting of Stroke cases in young adults in India was uncommon in few years ago. But our studies now indicate that the incidence of young stroke is on the rise. It has been observed that for the past 4-5 years the occurrence of stroke is seen at age less than 45years.And lifestyle modifications can reduce the rate of risk.

Keyword: Cerebral ischemic stroke, risk factors, Age factor, life style modifications.

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1. INTRODUCTION

Developing countries like India are facing a double burden of communicable and non-communicable diseases. Stroke is one of the leading causes of death and in India. The estimated adjusted prevalence rate of stroke range is of 84-262/100,000 in rural and 334-424/ 100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies. There is also a wide variation in cases of fatality rates with the highest being 42% in Kolkata. Stroke units are predominantly available in urban areas, that too in private hospitals. Intravenous (IV) and intra-arterial thrombolysis (IA) are commonly used in India. In the on-going Indo USA National stroke registry, the rate of IV thrombolysis is 11%. Stroke rehabilitation is not well developed in India due to lack of personnel. Organized rehabilitation services are available in the country but they are mainly in private hospitals of the cities. Even though India is a leading generic drug producer, still many people can't afford the commonly used secondary prevention drugs. As a first step, the Government of India has started the National Programed for Prevention and Control of Cancer, Diabetes, Cardiovas-cular Diseases & Stroke (NPCDCS). The government is focusing on early diagnosis, management, infrastructure, public awareness and capacity building at different levels of health care for all the non-communicable diseases including stroke. An organised effort from both the government and the private sector is needed to tackle the stroke epidemic in India[1]. Cerebro-vascular diseases are one of the leading causes for death in India,[2] Identification of stroke patient with risk is critically important. Although the risk factors of stroke have been well studied, the risk factors of stroke in young patient may not be same as that in else and the entire objective of our study is to ascertain the same. The overall risk increases in a patient when multiple risk factors are present in a single patient. Someone who has already experienced a stroke is at increases risk of having another. One in three people die within a year due to stroke. Stroke kills more women than breast cancer does. Almost one in five people who experience the stroke are under the age of 55. Men are more likely to suffer a stroke at a younger age. Some risk factors such as gender, age, family history cannot be controlled but most of the stroke factors are life style related, so everyone has the power to reduce the risk of having stroke. Smoking can double or quadruple your risk of stroke, as the chemicals in cigarette smoke accelerate to form clots because of which it thickens the blood and makes clotting factors, platelets more sticky or adherent. Cigarette smoke forces arteries to constrict or get narrowed, which makes it harder for thickened blood to move through the vessels. A sedentary lifestyle / less physical activity increases the likelihood of obesity, high blood pressure, high cholesterol levels. High cholesterol levels of LDL have been uniformly linked at a higher occurrence of cerebral ischemic stroke[3]. Aim of our study is to identify and analyze the risk factors of cerebral ischemic stroke in young and elderly patients. Our objective to achieve this aim is to identify risk factors associated with young stroke (<45 years), elderly stroke (>45 years) and to create awareness in preventing stroke.[4]

2. METHODOLOGY

It is a prospective study. All procedures performed in this study involving human participants were in accordance with the ethical standards of Institutional Human Ethical Committee, CMR College Of pharmacy (CMRCP/IEC/2018-19/01). The patients have been divided into 2 groups based on their age more than 45 years (elderly stroke) less than 45 years (young's stroke) Young's Stroke occurring in patients aged less than 45 years. Data on sex, social history, previous medical history, previous medication history has been collected. Visiting general medicine ward on regular basis, Updating previous day case/ update up to discharge, Interpretation of data to generate results, Analysis of result to finalize the final report were done.

2.1 Inclusion criteria

Cases with complete information till discharge of all ages and genders, pediatric, Cases with any other co-morbid conditions.

2.2 Exclusion criteria

Pregnant women were excluded from the study.

2.3 Data collection

A special documentation form was designed for the purpose of clinical study including name, age, sex, inpatient number, date of admission, date of discharge, height, weight, BMI, patient's chief complaints on examination, laboratory findings, past medical, medication history, final diagnosis, drugs on admission and drugs on discharge. BMI was calculated from weight in kilograms (kg) divided by height in meter square. We visited inpatient general medicine ward on regular basis for case collection and the collected cases were reviewed and interpreted.

3. STATISTICAL ANALYSIS

The data was analyzed by fischer exact test by using graph pad quick calcs. The result is expressed as confidence interval and ODD's ratio. The multivariate stepwise logistic analysis was applied to know the p-values, after statistical analysis p-value of <0.0001 are considered as statistically significant.

4. RESULTS

Our study revealed that the most common risk factors in young and elderly were Alcohol consumption, Hypertension, Smoking and with a past History of CVA. In our study there was preponderance of male was observed which can be seen in Figure 1. 141 CVA cases were collected, documented, analyzed and results were obtained as follows. From 141 collected cases number of male patients were 96 and females were 45.
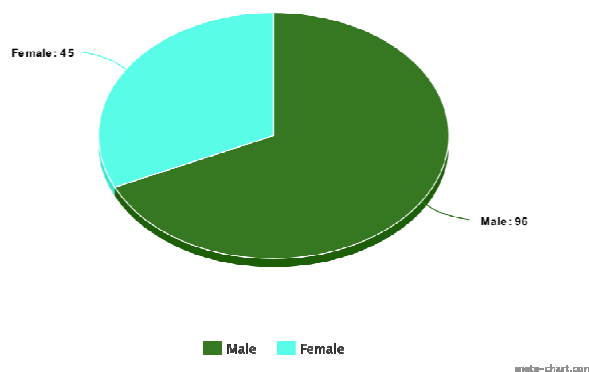
nadia.shulamite@gmail.com

Female: 45

Male: 90

■ Male   ■ Female

meta-chart.com

Fig 1. Graphical depiction of subjects based on gender

We distributed our study among young population and elder population.The subjects who are below 45 years were grouped under younger population and greater than 45 were grouped under elder population. We have further sub-divided the younger population into 0-10 years, 11-20 years, 21-30 years,31-45 years which can be seen in the Figure 2. Between the age group of 31-45 years there were more number of subjects recorded (61.9%) followed by age group of 21-30 years were (28.6%) was recorded. The elder population was further sub divided into 46-55 years, 56-65 years,65-75 years, and above 75 years, Between the age group of 56-65 years 42.4% there were more number of subjects recorded followed by age group of 46-55 years 28.3 which can be seen in Figure 3.
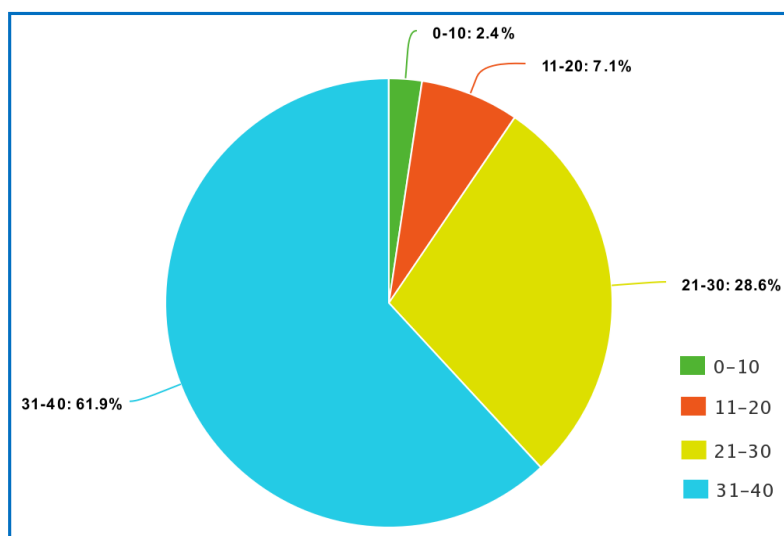

0-10: 2.4%

11-20: 7.1%

21-30: 28.6%

31-40: 61.9%

■ 0–10
■ 11–20
■ 21–30
■ 31–40

Fig 2. Graphical depiction of distribution of younger subjects based on age

>75: 4.0%

46-55: 28.3%

66-75: 25.3%

56-65: 42.4%
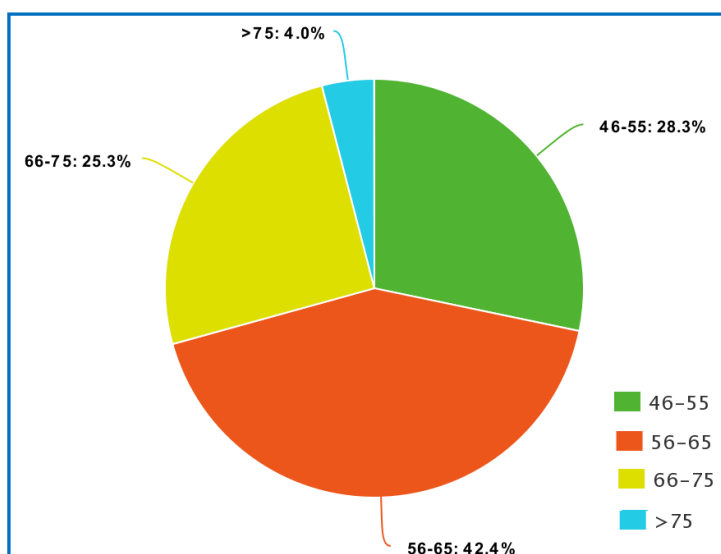
■ 46–55
■ 56–65
■ 66–75
■ >75

Fig 3. Graphical depiction of distribution of elder subjects based on age

Over all gender wise distribution of subjects based on age can be seen in Figure 4. From 41 young patients, males were 26, and females were 15. From 99 elder patients, males were 69, and females were 30.In every age group males were more in number than female which shows males are more likely to get stroke than females.
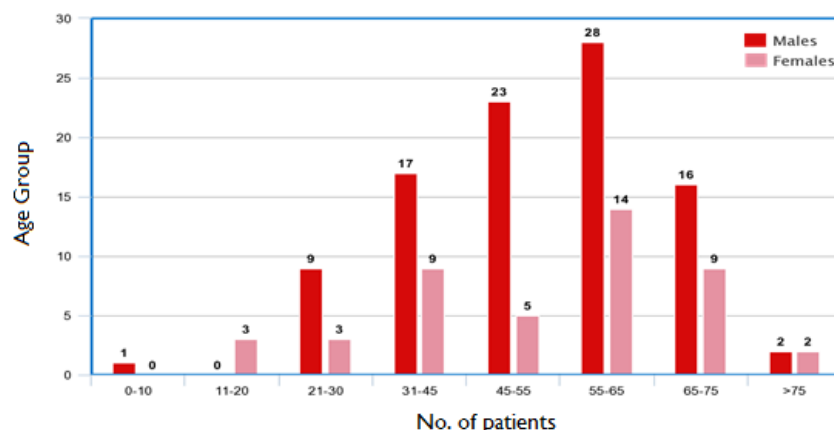

Fig 4. Age and gender wise distribution graphical representation

Distribution of younger and elder age group was done gender wise based on risk factors (Comorbidity), Most common risk factor based on comorbidity was found to be hypertension, dyslipisemia, diabetes mellitus-II, History of CVA, cardio-vascular diseases. Hypertension means that blood exerts pressure than normal which further weakens the blood vessels, hypertension may also cause thickening of the arterial walls, results in narrowing and blockage, Dyslipidemia increases the chances of clogging the blood vessels. Cholestrol is a fat like substance which contributes in forming atheroma, which sticks to arterial walls leading to atherosclerosis, A person with diabetes is twice likely to get a cerebral stroke than a normal individual as diabetes contribute in development of atherosclerosis. A person who is poor to compliance to medication after discharge is prone to get recurrent ischemic stroke which is more common. In figure 5 the graphical representation of Fig 5 shows that In younger population, males are at higher risk for HTN and on having a past history of stroke than female. The other factors both the genders are equally risky for having a stroke. In figure 6 shows that In elder population,males are at higher risk for HTN, DM and on having a past history of stroke than female.The other factors both the genders are equally risky for having a stroke.
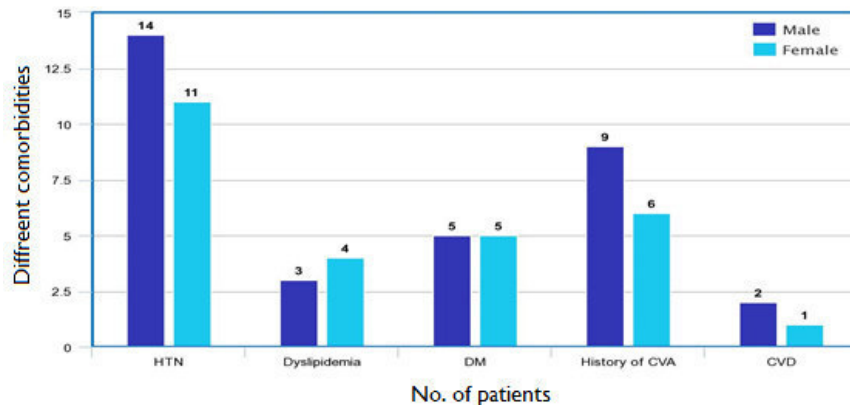

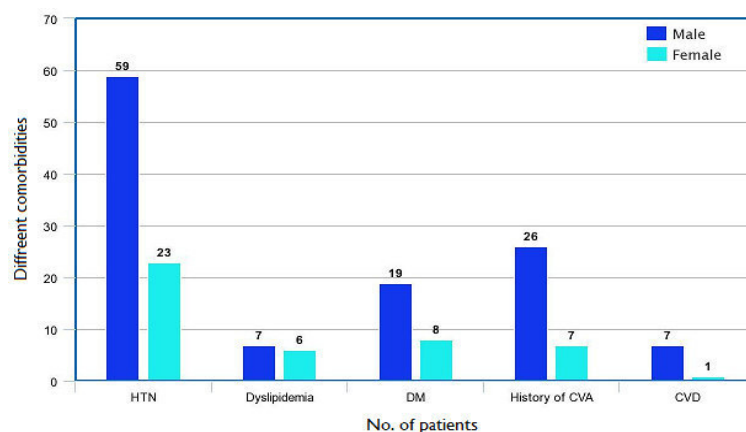**Fig 5. Graphical representation of younger subjects based on comorbidity.**

Fig 6. Graphical representation of elderly patients based on comorbidity.

Distribution of comorbidity of younger and elder group was based on life style related risk factors like smoking, alcohol consumption, and obesity. Smoking can double the risk of stroke occurence, as smoking constricts the blood vessels, and thickens blood which gets difficulty in flowing of blood in the vessels. Heavy alcohol consumption can also cause stroke. Being overweight or obese contribute to increase in risk of stroke as they increase the cholestrol levels leading to high blood pressure. In Figure 7 it is observed that in young population, male is more prone compared to female with alcohol consumption, smoking being the highest risk factor. Both the obese genders are equally risky for having a stroke. In Figure 8 it is shown that in elder population male is more prone compared to female with alcohol consumption, smoking being the highest risk factor. Both the obese genders are equally risky for having a stroke.
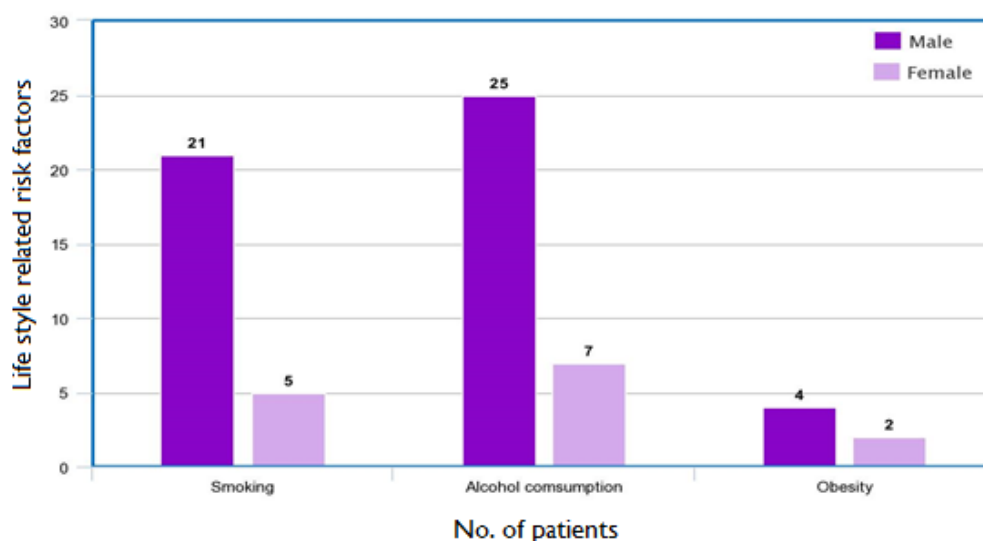

Fig 7. Graphical representation of distribution of younger age based on life-style related factor.
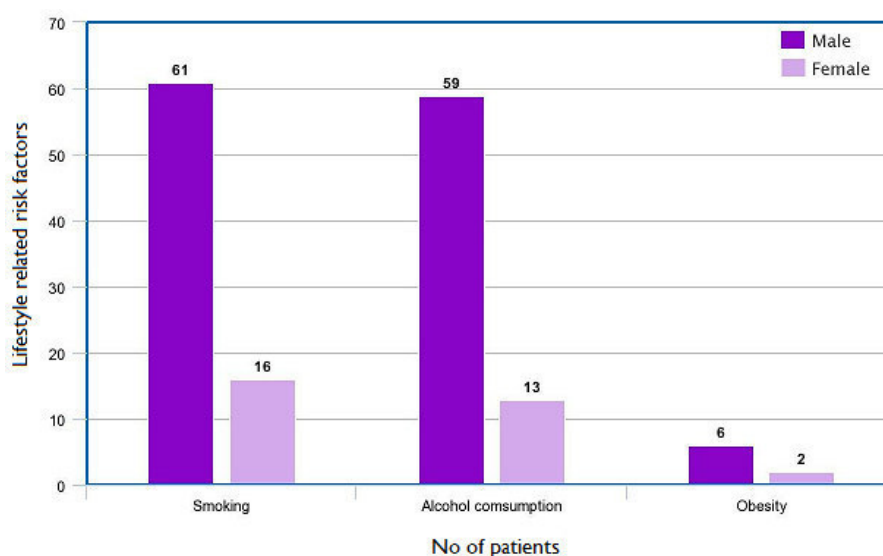

Fig 8. Graphical representation of distribution of elderly subjects based on life style related risk factors.

In Figure 9(a) it is observed that, in younger population (11-20 years) the number of subjects which had fall under this were 3 and the risk factors were Hypertension and H/O CVA. (21-30 years) the number of subjects which had fall under this were 12 and the risk factors were Hypertension, Diabetes mellitus, CVD and H/O CVA. (31-45 years) the number of subjects which had fall under this were 26 and the risk factors were Hypertension, Diabetes mellitus and H/O CVA.In Figure 9(b) shiws that,In elder population (46-55 years) the number of subjects which had fall under this were 28 and the risk factors were Hypertension and H/O CVA.(56-65 years) the number of subjects which had fall under this were 42 and the risk factors were Hypertension, Diabetes mellitus, CVD and H/O CVA. (66-75 years) the number of subjects which had fall under this were 25 and the risk factors were Hypertension, Daibetes mellitus and H/O CVA. (>75 years) the number of subjects which had fall under this were 4 and the risk factors were Hypertension.
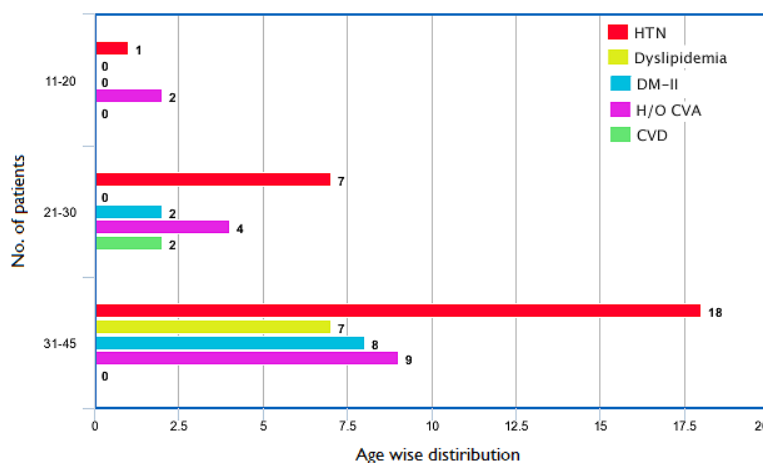
Fig 9(a). Graphical representation of age wise distribution of subjects based on comorbidities in young.
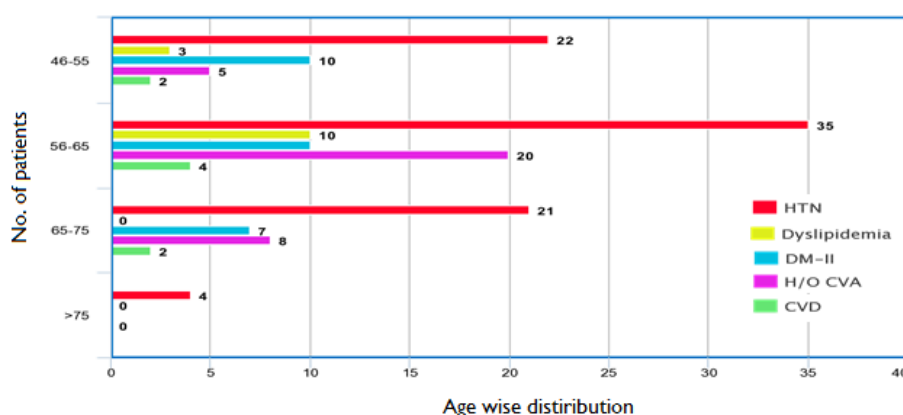

Fig : 9(b) Graphical representation of age wise distribution of subjects based on comorbidities in elder.

In figure 10 (a) , it shows that, in younger population (11-20 years) the number of subjects which had fall under this were 3 and the risk factors were Smoking and Alcoholism. (21-30 years) the number of subjects which had fall under this were12 and the risk factors were Smoking, Alcoholism and Obesity. (31-45 years) the number of subjects which had fall under this were 26 and the risk factors were Smoking, Alcoholism and Obesity. In Figure 10 (b) it shows that in elder popilation (46-55 years) the number of subjects which had fall under this were 28 and the risk factors were Smoking and Alcoholism. (56-65 years) the number of subjects which had fall under this were 42 and the risk factors were Smoking, Obesity and Alcoholism. (66-75 years) the number of subjects which had fall under this were 25 and the risk factors were Smoking, Obesity and Alcoholism. (>75 years) the number of subjects which had fall under this were 4 and the risk factors were Smoking.
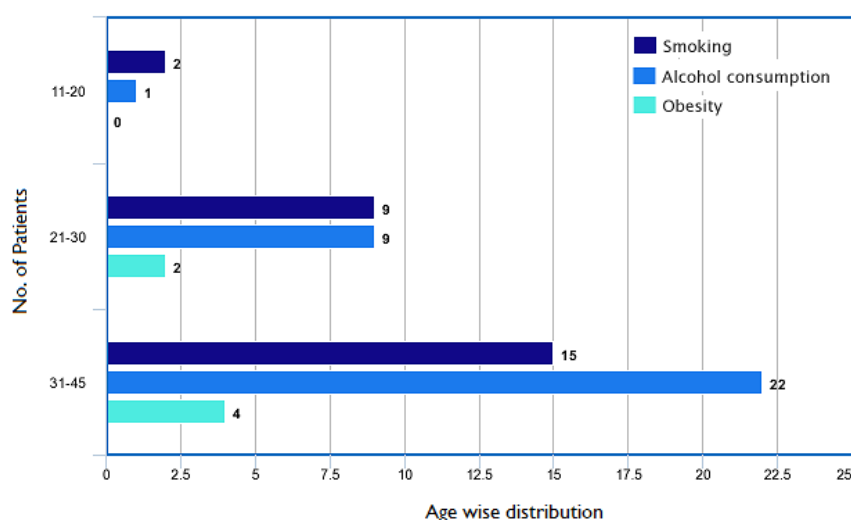

Fig 10 (a). Graphical representation of age wise distribution of Subjects based on life style related factors in young.
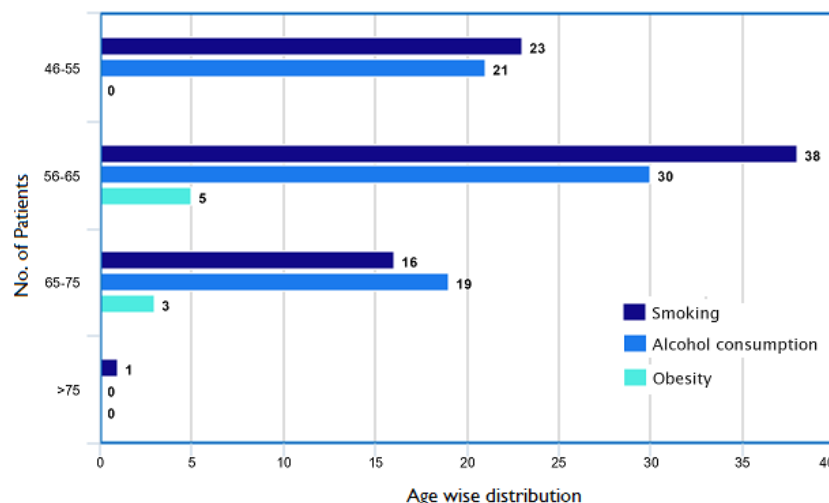
Fig 10(b). Graphical representation of age wise distribution of subjects based on life style related factors in elder.

141 CVA cases were collected, documented, analyzed and results are obtained as follows. From Table no 1 it is seen that risk factors are differentiated into non-modifiable, modifiable, age ,gender are the non-modifiable risk factors, and hypertension, smoking, alcohol consumption, history of CVA, diabetes mellitus-II, Dyslipidemia, obesity, cardio-vascular diseases, homo cysteinuria, Young subjects- HTN (60.9%), Alcoholic consumption(78%), Smoking (48%), History of stroke (36%), Diabetes mellitus (24%), Obesity (14.6%), Cardio-Vascular diseases (4.8%). Elderly subjects – HTN (82.8%), Smoking (79%), Alcoholic consumption (72.7), History of stroke (33.3%), Diabetes mellitus (27.2), Obesity (8.8%), Cardio-Vascular diseases (8%).

Table 1. Comparision on Modifiable and Non-Modifiable Risk Factors Between Young and Elder Population.			
Non Modifiable	**Male**	**Female**	**Total**
1.Gender	96	45	141
Age < 45 years	27	15	42(29%)
Age >45 years	69	30	99(70%)
Modifiable			
1.Hypertension	73(76.8%)	34(75.5%)	107(76%)
2.Smoking	84(88.4%)	20(44.4%)	104(74%)
3.Alcoholic	82(86.3%)	21(46.6%)	103(73%)
4.History of CVA	35(36.8%)	13(28.8%)	48(34%)
5.Diabetes mellitus	10(10.5%)	15(33.3%)	25(17%)
6.Dyslipidaemia	7(7.3%)	13(28.8%)	20(14%)
7.Obesity	10(10.5%)	4(8.88%)	14(10%)
8.CVD	9(9.4%)	2(4.44%)	11(7%)
9.Homocysteinuria	1(1.0%)	0	1(0.007%)

Table no 2 shows statistical analysis by using multivariate stepwise logistic analysis of fischer exact, in younger men the independent risk factors were Hypertension (Odds ratio-0.42 and CI is 0.11-0.169) in young and (Odds ratio – 1.8 and CI is 0.61-5.28) in elderly, Smoking (Odds ratio – 8.4 and CI is 1.9-35.82) in young and (Odds ratio -6.67 and CI is 2.3-18.6) in elderly. Alcoholic consumption (Odds ratio is 8.4 and CI IS 1.9-35.82) in young (Odds ratio-5.57 and CI is 3.04-28.7) in elderly. Table no 3 shows that as the p-value is 0.005 for smoking and alcoholic consumption, it shows that they were at major risk factors for males than females. The other factors were equally risky to both the genders.

Table 2. Association Between Risk Factors Between Male and Female			
S. No	**Variables**	**P –value(young)**	**P-value(elderly)**
1.	**Hypertension**	0.321	0.3843
2.	**Dyslipidemia**	0.3902	0.2049
3.	**Diabetes mellitus**	0.4527	1.000
4.	**History of CVA**	0.7485	0.2458
5.	**CVD**	0.5244	0.4289
6.	**Smoking**	0.0059	0.0003
7.	**Alcoholic**	0.0051	0.0001
8.	**Obesity**	1.00	1.00

Table 3. Association Between Risk Factors (Co-Morbidities) Between Male and Female.

Age group		Variables				
		HTN	Dyslipidemia	Diabetes mellitus	H/O CVA	CVD
< 45 years	Confidence interval	0.11-0.16	0.07-1.89	0.11-2.03	0.21-2.95	0.1-2.95
	Odds ratio	0.42	0.36	0.48	0.7	1.25
>45 years	Confidence interval	0.61-5.28	0.24-1.48	0.4-2.75	0.75-5.27	0.38-27.8
	Odds ratio	1.8	0.45	1.05	1.99	3.27

5. DISCUSSION

We have conducted a study on cerebral ischemic stroke risk factors and sub typed based on age. Patients were grouped into older (who were above 45 years) and younger (who were below 45 years) ischemic stroke. This was in concurrence with the findings of C Y WU, J D LEE et al. [5,6] In the present study a total of 140 cases were scrutinized and among them it was observed that 101 patients were males (68%) and 31 patients were females (32%). This was in concurrence with the findings of Sridhar Srimath Tirumala, Ranjan Amit (70% males and 30% females).[7,8] Out of141 patients it was found that 41 patients were< 45 years and 99 were >45 years From our study we observed that in the younger age group of < 45 years, the age between 31-45(63.4%) was at a higher risk which was comparable with the study conducted by Deepadharshan Huliyapa et al [9]. From our study it was found that the common risk factors among young were Alcohol consumption (78%), Hypertension (60.9%), Smoking (63%), in contrast to the study conducted by Masaraf Hussian, Shri Ram et al (2018). Alcohol consumption (68%), Hypertension (44.73%), Smoking (44.73%)[10,11]. From our study, in both the elderly and young population the most commonest risk factors were Hypertension (76%), Smoking (74%), Past history of CVA(34%) and found to have increased within two years to the study conducted by Amit kumar, Onkar nath rai et al Hypertension (51%), Smoking (36%), Past history of CVA (17%). patients. [12-14] From our study, the modifiable risk factors which were recorded are hypertension, cardio vascular disorder, Diabetes Mellitus, Dyslipidaemia and Life style related were Smoking, Alcohol consumption, Obesity which was comparable to the study conducted by MS Jahirul hoque choudhary et al (2015)[15-18]. From our study, one male Pediatric case was recorded. Generally the earlyonset of stroke in pediatric is less common and the risk factors are

Cardiac diseases, hematological (sickle cell disease) and metabolic (homocysteinuria) disorders, Cerebral vasculitis, Infection and nutrional deficiencies, in our case the subject risk factor was homocysteinuria, which is a metabolic disorder which was in concurrence to the study conducted by Fusan alehan, semra say et al. [19]

6. CONCLUSION

We have found that Reporting of Stroke cases in young adults in India was uncommon a few years ago. But our studies now indicate that the incidence of young stroke is on the rise. It has been observed that for the past 4-5 years the occurrence of stroke is seen at younger ages like below 45.The risk factors observed in the elderly patients were same as that for the young population indicating stroke can cause at any age. Men are more likely to suffer at a younger age from stroke. Stroke in the younger age can have large impact by leaving victims disabled for most part of their productive years. Based on our study we recommend life style changes for prevention of ischemic stroke which include control of High BP, Diabetes mellitus, avoid Smoking and Alcohol consumption, appropriate dietary regimen and regular exercise will help one to reduce the risk of stroke.

7. AUTHORS CONTRIBUTION STATEMENT

Dr.Sharadha Srikanth conceived the Idea and guided conducting the research and also reviewed the manuscript. Ms. Nadia Shulamite supervised and performed statistical analysis. Ms. Nadia Shulamite, Mr. Vamshi, Mr.Sandeep, Ms.kaveri contributed equally to the manuscript.

8. CONFLICT OF INTEREST

Conflict of interest declared none.

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