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Socio Demographic profile of Intracranial hemorrhage patients - A Tertiary care hospital based study

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ABSTRACT
Tertiary care level hospitals required quick risk assessment at the time of emergency admissions. The present study was planned with the objective of assessing the association of non modifiable risk factors I.e. socio-demographic risk factors in ICH patients. So present study was plannned to study the sociodemographic factors in relation to ICH scores of patients of haemorrhagic stroke admitted in emergency of tertiary care level hospital. Total 51 patients of ICH were admitted. Study revealed that males are more admitted than females . females had more severe scores than females. It was observed that married patients sedentary workers and heavy workers were admitted with more severe ICHscores

I. INTRODUCTION

Stroke is one of the major global health problem and is also the leading cause of stroke world wide.[(1)] It has been observed that there is hundred percent rise in incidence of stroke especially in the underdeveloped countries like India from 1970-1979 to 2000-2008.[(2)] The incidence of went up from 105 to 152/100,000 persons per year, and the crude prevalence went up by almost 14 times from 44.29 to 559/100,000 persons in different parts of the country during the past decade. [3]

Intracranial haemorrhage and acute ischaemic stroke, have many causative risk factors, contributing in severity of stroke. These factors apart from causing are responsible in precipitation and in prognosis of all cerebrovascular episodes. It has been observed that if socio demographic factors are assessed for significant association in intracereberal bleed, then they it may help in making the decision for giving priority treatment of deceased at tertiary care level hospitals where the patient load is very high. Tertiary care level hospitals required quick risk assessment at the time of emergency admissions. The present study was planned with the objective of assessing the association of non modifiable risk factors I.e. socio-demographic risk factors in ICH patients

Age is a strong risk factor, but it also affects the body in numerous ways, including changes to the cardiovascular and central nervous systems that interplay with the multiple risk factors for ICH. In addition to age as a determinant of ICH outcomes, age has its effects on the maturing body in terms of changes in physiology while also increasing the risk of multiple chronic health conditions and comorbidities, including hypertension, diabetes, and anticoagulant treatment for atrial fibrillation, all of which contribute to the pathology of ICH[(4)].Along with the age , gender, and ethnicity itself affect the risk of ICH in patients independently but also play a central in affecting lifestyle habits, physical factors like BMI and biochemical factors like blood sugars and lipid levels.

II. MATERIALS AND METHODS

The present study was to assess the socio-demographic profile with severity of ICH (intracerebral hemorrhage) in adults of age above 18 years. The present study was conducted amongst of ICH bleed admitted through in the Inpatient ward of the Department of Medicine, VMMC, and Safdarjung Hospital, a tertiary care hospital in New Delhi. A complete detailed information collected on a pretested and pre-scheduled proforma from every study participants with all inclusion criteria.

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

Study Duration; The study was carried out from November 2021 to April 2022 which was used for data collection, compilation, and presentation of findings.

Study Type and collaboration: The study is a cross-sectional hospital based study.

STUDY POPULATION:

All study subjects were patients of hemorrhagic stroke that were admitted to Safdarjung Hospital. There are 6 wards in medicine located in the H block, where the analyzed subjects were admitted after their respective illness and complaints.

To assess the severity of ICH the ICH scoring criteria by Hemphill et al.[5] was used to classify. In the present study a total of 51 study subjects were included according to selection criteria as mentioned below.

SAMPLE SIZE:

The study done by Manorenj et. al[6] showed a mean ± SD of LDL 93.2±43.1 and VLDL 22.8±15.8 among hemorrhagic stroke patients, hereby keeping a confidence interval of 95% and 80% power of study the sample size came out to be 29 and 13.

Sample size formula = $\frac{(z_1 - \alpha/2 + z_1 - \beta)^2 SD^2}{m^2}$

However, for my present study, I havetaken a sample of 51 (adjusting the error) to have better power including a non-exposure rate and have better confidence interval.

INCLUSION CRITERIA

1. Adults aged 18 years and above with haemorrhagic stroke who were admitted in hospital emergency.
2. All those who gave written consent.

EXCLUSION CRITERIA:

1. Secondary Intracranial hemorrhage
2. Intracranial hemorrhage > 72 hours
3. Surgical intervention in last 1 month
4. Other Comorbidities like

a. Cancer
b. Chronic kidney disease
c. Chronic liver disease
d. Acute kidney injury

ICH score and its interpretations (5)

The ICH score (0–6) (table 1.2)will be calculated as described by Hemphill et al (5) . One point was given for age>80 years, one point for infratentorial origin, one point for ICH volume >30 ml, one point for the intraventricular extension of ICH, and one point for a GCS of 5–12, and two points for a GCS of 3–4.

After collection data there were two categorical divisions as category 1(low ICH score) and category 2 (high ICH score) for better analysis and significance in the study.

Table 1.1 Glassgow Coma scale [7]

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

Component tested	Score
Eye response	
Eyes open spontaneously	4
Eye opening to verbal command	3
Eye opening to pain	2
No eye opening	1
Motor response	
Obeys command	6
Localises pain	5
Withdraws from pain	4
Flexion response to pain	3
Extension response to pain	2
No motor response	1
Verbal response	
Oriented	5
Confused	4
Inappropriate words	3
Incomprehensible sounds	2
No verbal response	1

Table 1.2 ICH score

Feature	CT Finding	Points	ICH Score
GCS (glassgow coma sale) Table1.1	3-4	2	0
	5-12	1	1
	13-15	0	2
Age of subject	>=80 yrs	1	3
	<80 yrs	0	4
Location of bleed	Infratentorial Supratentorial	1 0	5 6
ICH volume of bleed	>=30cc <30cc	1 0	
Intraventricular extension of bleed	Yes no	1 0	

Statistical Analysis

Data will be analyzed using statistical packages for social sciences software programs.

Statistical tests will be applied as follows-

1. Quantitative variables such as age, BMI will be presented as mean ± standard deviation (SD) among hemorrhagic patients.
2. Pearson's correlation test, chi squaretest and

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

fischer exact test was used to study the relation of ICH scores with various parameters.

A p value of <0.05 will be considered statistically significant.

The data will be entered in the MS EXCEL spreadsheet and analysis will be done using Statistical Package for Social Sciences (SPSS) version 21.0.

III. OBSERVATION AND RESULTS

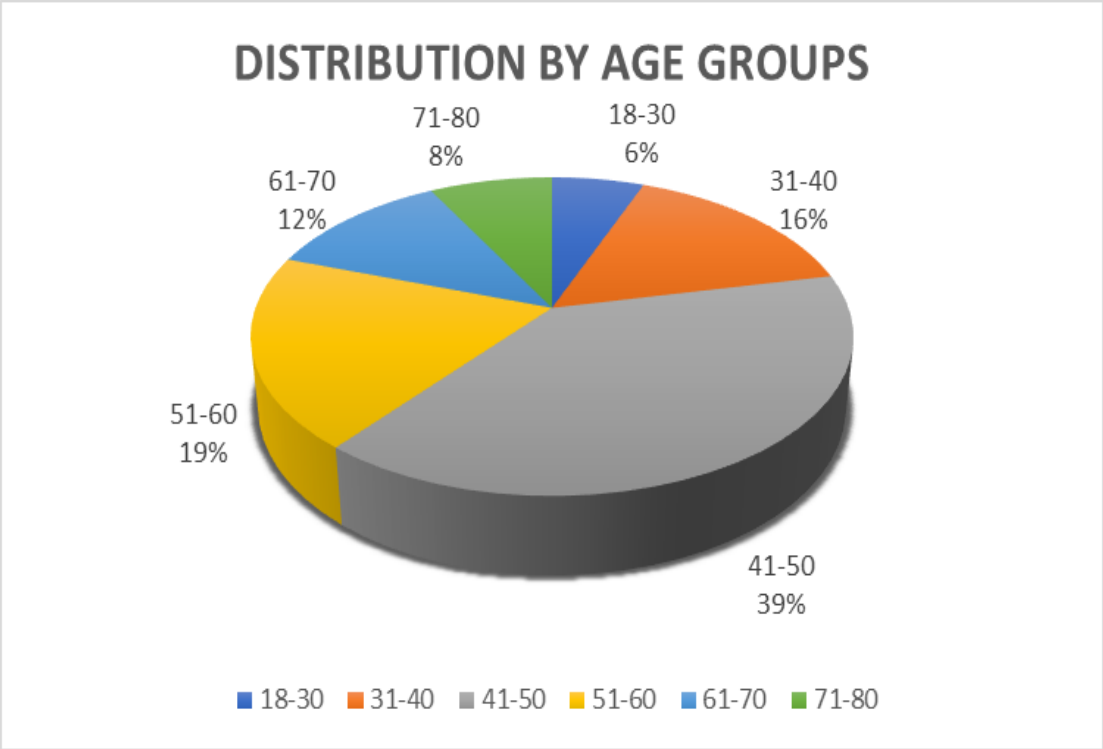
A hospital-based observational cross-sectional study was conducted in the Department of Medicine, Neurology and Clinical Biochemistry, VMMC & Safdarjung Hospital, New Delhi. The hospital is tertiary care set up which caters to patients from all over India from mix population

STUDY POPULATION

The present study shows that 51 patients were admitted to the hospital with an age >= 18 years within 72 hours of symptoms with a diagnosis of having Hypertensive Intracranial bleed with no chronic organ disease and were not on any statin or blood thinner therapy for any previous disease. After a detailed history and clinical examination, all required blood samples were sent after the episode or first symptom. Various analytic algorithms were applied to observe the following data.

Figure1 Distribution of study subjects as per Age group.

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018



As shown above the age of participants were divided as 18-30, 31-40, 41-50, 51-60, 61-70, 71-80. the distribution was assessed and was noticed that maximum stroke patients were in the age groups of 41-50 followed by 51-60 as observed in figure 1

Table 2.1: Distribution of the Participants in Terms of Age (Years) (n = 51)

Age (Years)	
Mean (SD)	49.61 (13.07)
Median (IQR)	48 (41.5-60)
Range	22 - 80

The mean (SD) of Age (Years) was 49.61 (13.07). The median (IQR) of Age (Years) was 48.00 (41.5-60). The Age (Years) ranged from 22 - 80.

Since all of the 3 criteria (skewness, kurtosis, Shapiro-Wilk test) were suggestive of normality, it appeared that the data was normally distributed (approximately followed a bell-shaped curve).

76.5% of the participants were Male. 23.5% of the participants were female. The least recorded cases were belonging to age below 30 years.

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

Table 2.2: Distribution of study subjects according to gender with age (Years) (n = 51)

Age (Years)	Gender		Wilcoxon-Mann-Whitney U Test	
	Male	Female	W	p value
Mean (SD)	49.05 (12.35)	51.42 (15.66)	208.000	0.571
Median (IQR)	47 (41.5-60)	50.5 (42.5-59.5)		
Range	22 - 77	28 - 80		

The variable Age (Years) was not normally distributed in the 2 subgroups of the variable Gender. Thus, non-parametric tests (Wilcoxon-Mann-Whitney U Test) were used to make group comparisons.

The mean (SD) of Age (Years) in the Gender: Male group was 49.05 (12.35). The mean (SD) of Age (Years) in the Gender: Female group was 51.42 (15.66). The median (IQR) of Age (Years) in the Gender: Male group was 47 (41.5-60). The median (IQR) of Age (Years) in the Gender: Female group was 50.5 (42.5-59.5). The Age (Years) in the Gender: Male ranged from 22 - 77. The Age (Years) in the Gender: Female ranged from 28 - 80. There was no significant difference between the groups in terms of Age (Years) (W = 208.000, p = 0.571). Though comparing the two groups together it was noted that the mean age of the females was slightly higher as compared to the male population as shown in Figure 2.

Figure 2: Association Between Gender and Age

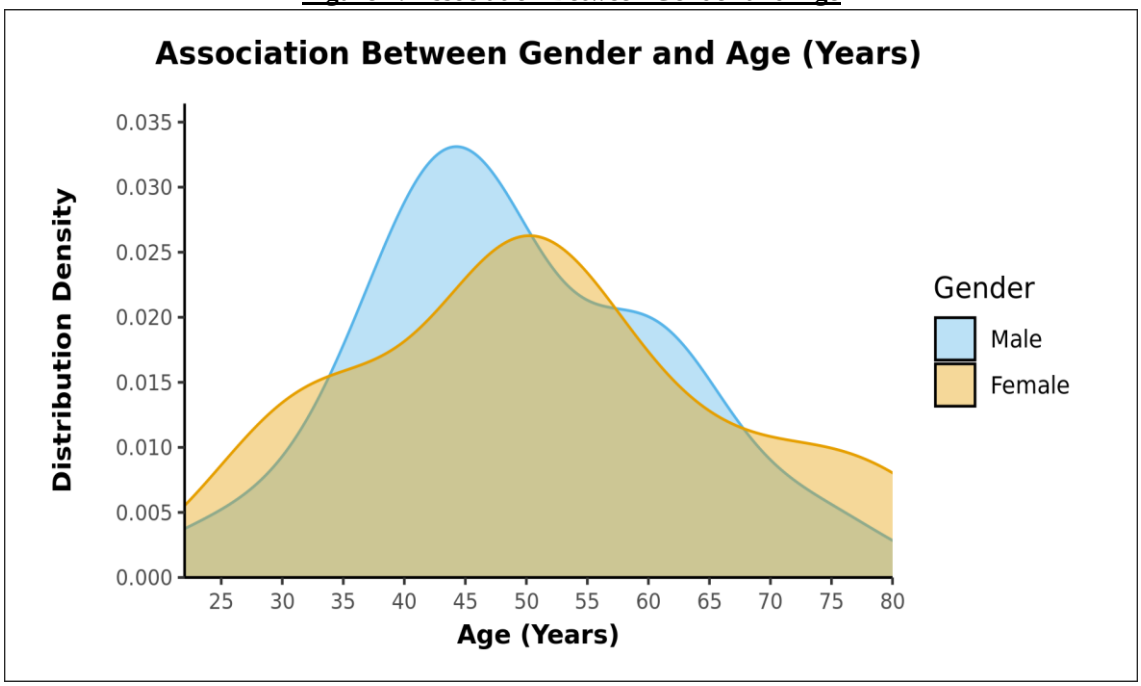


Table 2.3: Distribution of the Participants in Terms of Marital Status (n = 51)

Marital Status	Frequency	Percentage	95% CI
Married	47	92.2%	80.3% - 97.5%
Unmarried	4	7.8%	2.5% - 19.7%

92.2% of the participants had Marital Status: Married. 7.8% of the participants had Marital Status: Unmarried.

Table 2.4: Distribution of the Participants in Terms of Occupation (n = 51)

Occupation	Frequency	Percentage	95% CI

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

Unemployed	11	21.6%	11.8% - 35.7%
Unskilled /semiskilled/ Heavy Work	16	31.4%	19.5% - 46.0%
Skilled Work /sedentary	14	27.5%	16.3% - 42.0%
Housewife	9	17.6%	8.9% - 31.4%
Student	1	2.0%	0.1% - 11.8%

As shown in table no. 4 it was observed that the majority of subjects were heavy workers being 31.4% who reported ICH bleed , followed by sedentary workers (27.5%). 21.6% were unemployed , 17.6% were housewives and only one student was reported with ICH bleed.

Table 2.5: Distribution of the Participants in Terms of Socioeconomic Status (n = 51) according to Modified Kuppuswamy scale

Socioeconomic Status	Frequency	Percentage	95% CI
Lower	9	17.6%	8.9% - 31.4%
Lower Middle	22	43.1%	29.6% - 57.7%
Upper Middle	19	37.3%	24.5% - 51.9%
Upper	1	2.0%	0.1% - 11.8%

The majority of the study subjects belonged to the lower middle (43.1%) according to the modified kuppuswamy scale , followed by the upper middle class. (37.3%)

Table 2.6: Summary of Association between ICH Score Category and Parameters

Parameters	ICH Score Category		Total value
	1 to 3 (n = 38)	**4 to 6 (n = 13)**	
Age (Years)	49.16 ± 12.83	50.92 ± 14.20	51
Gender			
Male	31 (79.5%)	8 (20.5%)	39
Female	7 (58.3%)	5 (41.7%)	12
Marital Status			
Married	34 (72.3%)	13 (27.7%)	47
Unmarried	4 (100.0%)	0 (0.0%)	4

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

Occupation			
Unemployed	8 (72.72%)	3 (27.28%)	11
Heavy Work	13 (81.2%)	3 (18.8%)	16
Sedentary Work	10 (71.4%)	4 (28.6%)	14
Housewife	6 (66.6%)	3 (33.4%)	9
Student	1 (100%)	0 (0.0%)	1
Socioeconomic Status			
Lower	8 (88.8%)	1 (11.2%)	9
Upper Lower	0 (0.0%)	0 (0.0%)	0
Lower Middle	18 (81.8%)	4 (18.2%)	22
Upper Middle	11 (57.9%)	8 (42.1%)	19
Upper	1 (100.0%)	0 (0.0%)	1

International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 666-674 www.ijdmsrjournal.com ISSN: 2582-6018

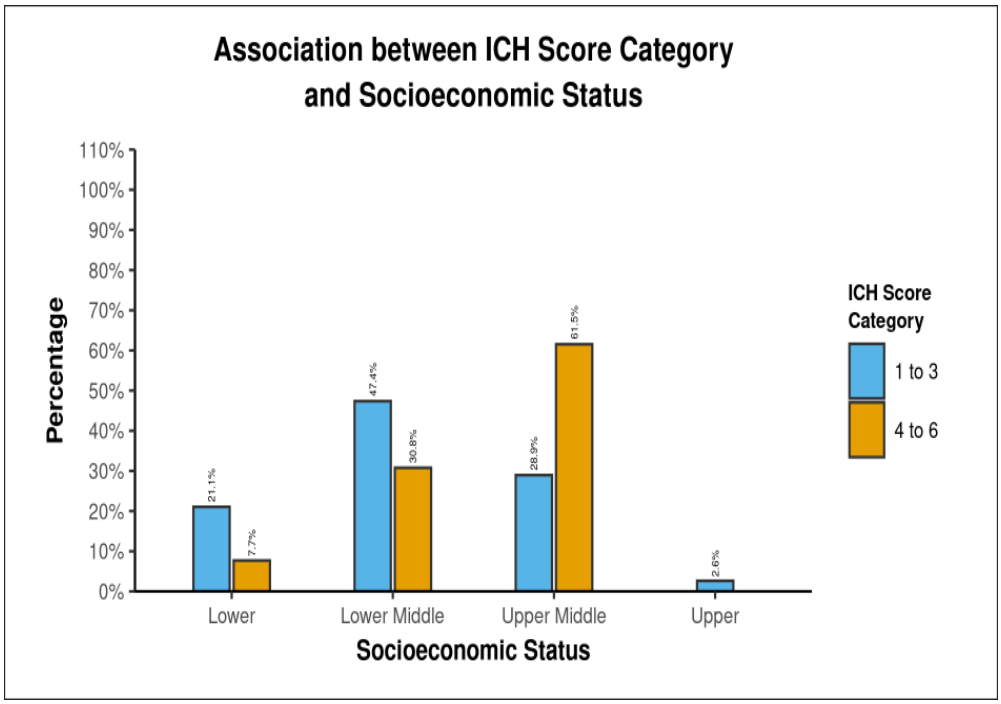


Table 2.7 Gender based risk distribution of ICH categories

Predictor/Risk Factor	Outcome	Relative Risk (95% CI)
Gender: Male	ICH Score Category: 1 to 3	1.36 (0.92-2.53)
Gender: Female	ICH Score Category: 4 to 6	2.03 (0.79-4.74)

IV. DISCUSSION

In the present study Age is a strong risk factor, but it also affects the body in numerous ways, including changes to the cardiovascular and central nervous systems that interplay with the multiple risk factors for ICH. In addition to age as a determinant of ICH outcomes, age has its effects on the maturing body in terms of changes in physiology while also increasing the risk of multiple chronic health conditions and comorbidities, including hypertension, diabetes, and anticoagulant treatment for atrial fibrillation, all of which contribute to the pathology of ICH.[8]

In the present study, it was noted that for participants with hypertensive ICH, the age found in the study participants had a mean value of 49, ranging from 22 years to 80 years. A similar result was observed in the studies by Hao Feng at el.[6,] where the mean age reached almost 57 years with a range from 50-67 years. Also noted by Sang Joon et al[9] the age varied from 35 years to 94 years, showing progression or increase in the incidence of episodes of ICH with the advancement of age.

A multi-ethnic study in an Asian population conducted by Justin T.Hsieh states that males suffer ICH at a younger age than females. The incidence of ICH was higher among males than females at all ages until 80 years old, beyond which the trend was reversed. [10]

Regarding gender, the current study also shows that the majority of the participants affected were males, 76% and 24% female. As the age of the participants, the male to female ratio in various age groups changed from 2.5:1 to 1:1 in the later ages. A similar study by Justin T. Hseih reported that Males suffered from ICH bleed at a younger

age than females. Females exhibited increased severity on admission as measured by the Glasgow Coma Scale compared to males at older ages.[10]

The current study revealed also divided and recorded that the patients in sedentary (27.5%) and heavy work or unskilled professions (31.4%) recorded a maximum no. of cases of ICH bleed. A study done by Linq Gao et al. stated that odd ratios for agriculture-laborer workers, service professionals and general workers, professional workers, and senior officials were in descending order, showing that the ICH was most commonly found in the heavy or unskilled laborers followed by skilled or clerical workers in both the studies.[11]

Various countries may have variable data and may vary in each geographical area as it's a multifactorial disorder. It was also observed that the majority of the ICH cases of heavy work and sedentary workers belonged to the lower middle (43.1%) according to the modified kuppuswamy scale , followed by the upper middle class. (37.3%)

Correlation of socio-economic status and ICH score revealed that severity of ICH bleed was maximum in lower and middle class individuals. The relative risk for severity of ICH score was 2.03 in females compared to males.

V. CONCLUSION

The present study concludes that all the patients of ICH bleed who were more than 40 years of age had higher admission rate because of severity of ICH bleed. The overall admission was higher in males as compared to female, but among all females the severity of ICH was higher in proportion than of total males. This recommends strict control of hypertension and other risk factors above 40 years of age especially males. Therefore these age group should be screened for the following risk factors by the primary physician. All known hypertensive should be informed about its control and occurrence of complication in chances of failure. Elderly females are prone for serious ICH bleed, so they should be screened more carefully and managed as per protocol along with heavy and sedentary working class individuals.

LIMITATION

Since it is an emergency situation, many participants were excluded out of the study due to lack of complete and reliable data, resulting into a smaller sample size.

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