

FREQUENCY OF FACTORS LEADING TO IN-HOSPITAL MORTALITY IN PATIENTS PRESENTING WITH INTRACEREBRAL HEMORRHAGE

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Abstract: *This study was designed to identify the frequency and factors of in-hospital patient mortality in intracerebral hemorrhage cases. A cross-sectional study was conducted at the Neurology and Medicine department of JPMC, Karachi, from 30-05-20 to 30-11-20. A total of 147 patients that were recently diagnosed with acute hemorrhage stroke were selected for the study. Patients' data about acute hemorrhage stroke, Hypertension, diabetes mellitus type II, smoking status, and ischemic heart disease was noted. Patients were examined, and an assessment of GCS was done. Height and weight were measured by tape measure and weight machine, respectively. The mean age of participants was 58.14±8.49 years. At the same time, our study's average duration of acute hemorrhagic stroke, BMI, height, weight, SBP, and DBP was 7.44±5.24 hours, 26.72±1.56 kg/m², 158±7. Out of 147 acute hemorrhagic stroke patients, 41 (27.9%) and 106 (72.1%) had and did not have in-hospital mortality. Hypertension, GCS score, diabetes mellitus, volume of hematoma, and intraventricular hematoma are independent variables associated with poor intracerebral hemorrhage outcomes.*

Keywords: Hospital Mortality, Intracerebral Hemorrhage, Acute Hemorrhage Stroke

Introduction

A stroke is the world's most significant cause of neurological disability (Feigin et al., 2020). Developing countries constitute 70% of the total stroke rate. South Asian countries like Pakistan have a 20% of the population affected by strokes (Debette and Markus, 2022). Individuals suffer mental and financial strain from the diagnosis and treatment of strokes.

Due to a lack of knowledge and care, individuals do not pay much attention to comorbidities and display ignorance with respect to routine checkups and screenings. In Pakistan, 72% of strokes are due to cerebral infarction, and 28% are due to cerebral hemorrhage (Musa et al., 2020). Many factors, such as Hypertension, smoking, hyperlipidemia, impairment of consciousness, and hyperglycemia, are related to the development and prognosis of stroke (Jadoon et al., 2022; Jalal-ud-din et al., 2022).

Intracerebral hemorrhage (ICH) continues to challenge treatment decisions in everyday neurology and neurosurgery practice. The clinical signs of ICH depend on multiple factors, including where the bleeding occurs in the brain, the amount present &

underlying comorbidities. However, the outcomes of intracerebral bleeding can be enormous. Therefore, an early diagnosis and prognosis evaluation is important for timely and adequate treatment and cost reduction (Caceres and Goldstein, 2012; Magistris et al., 2013). The risk for intra-cerebral hemorrhage increases significantly among those who have ceased their antihypertensive medications, are relatively young, or current smokers (Corponi et al., 2020). Young people differ in their clinical features and have different prognoses than their older counterparts. Togha et al. evaluated mortality in hospitals (46.7%), Hypertension (75 %), diabetes mellitus type II (23.2%), Smoking status (16.4%), ischemic heart disease (21.4%), and GCS = 8 (68.4%) (Togha and Bakhtavar, 2004).

This study aims to identify the frequency and factors of in-hospital patient mortality in intracerebral hemorrhage cases.

Methodology

A cross-sectional study was conducted at the Neurology and Medicine department of JPMC,

Karachi, from 30-05-20 to 30-11-20. A total of 147 patients that were recently diagnosed with acute hemorrhage stroke were selected for the study. Patients previously diagnosed with ischemic stroke, atrial fibrillation, hypothyroidism or hyperthyroidism, central nervous system disorders, asthma, renal failure, congestive heart failure, myocardial infarction, chronic obstructive pulmonary disease, chronic liver disease, and pregnant patients were excluded. All the patients provided their consent to become a part of the study.

Patients' data about acute hemorrhage stroke, Hypertension, diabetes mellitus type II, smoking status, and ischemic heart disease was noted. Patients were examined, and an assessment of GCS was done. Height and weight were measured by tape measure and weight machine, respectively. All the data was assessed by SPSS version 23. Variables were presented as percentage and frequency.

Results

The mean age of participants was 58.14±8.49 years. In our study, the average duration of acute hemorrhagic stroke, BMI, height, weight, SBP, and DBP was 7.44±5.24 hours, 26.72±1.56 kg/m2, and

158±7. Out of 147 acute hemorrhagic stroke patients, 41 (27.9%) and 106 (72.1%) had and did not have in-hospital mortality. Frequency distribution of Hypertension showed that out of 147 acute hemorrhagic stroke patients, 110 (74.8%) and 37 (25.2%) had and did not have Hypertension, respectively. The frequency distribution of diabetes mellitus type II showed that out of 147 acute hemorrhagic stroke patients, 60 (40.8%) were diabetic, and 87 (59.2%) were non-diabetic, respectively. Frequency distribution of smoking status showed that out of 147 acute hemorrhagic stroke patients, 61 (41.5%) and 86 (58.5%) were smokers and non-smokers, respectively. Frequency distribution of ischemic heart disease showed that out of 147 acute hemorrhagic stroke patients, 23 (15.6%) and 124 (84.4%) had and did not have ischemic heart disease, respectively. The frequency distribution of GCS < 8 showed that out of 147 acute hemorrhagic stroke patients, 114 (77.6%) and 33 (22.4%) had and did not have GCS < 8, respectively. Of 147 acute hemorrhagic stroke patients, 69 (46.9%) were male, and 78 (53.1%) were women. Frequency distribution of age showed that out of 147 acute hemorrhagic stroke patients, 24 (16.3%) and 123 (83.7%) patients were in the age group 30-50 years and 51-70 years, respectively (Table I). In-hospital mortality according to different variables is presented in Table II.

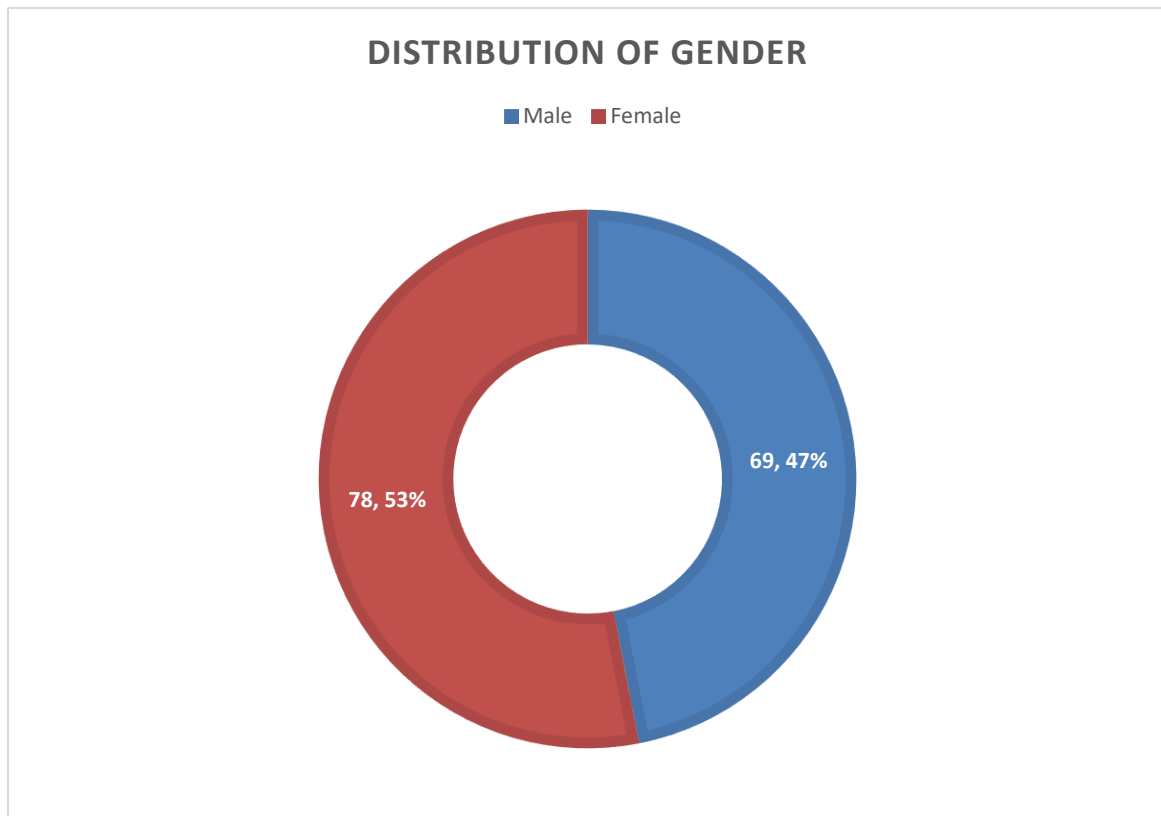


Figure 1 Gender distribution

Table I: Demographic Variables (n=147)

Variables	Frequency	Percentage
Gender		
Male	69	46.94%
Female	78	53.06%
Age		
30-50 years	24	16.33%
51-70 years	123	83.67%
Duration of Acute Hemorrhagic Stroke		
<12 hours	105	71.43%
>12 hours	42	28.57%
Obesity Status		
Yes	51	34.69%
No	96	65.31%
Educational Status		
Illiterate	12	8.16%
Primary	36	24.49%
Secondary	53	36.05%
Higher	46	31.29%
Diabetes Mellitus		
Yes	60	40.82%
No	87	59.18%
Hypertension		
Yes	110	74.83%
No	37	25.17%
Ischemic Heart Disease		
Yes	23	15.65%
No	124	84.35%
Smoking		
Yes	61	41.50%
No	86	58.50%
GCS < 8 Distribution		
Yes	114	77.55%
No	33	22.45%
In-Hospital Mortality		
Yes	41	27.89%
No	106	72.11%

Table II: In-Hospital Mortality According To Different Variables (n=147)

VARIABLE	IN-HOSPITAL MORTALITY		TOTAL	P VALUE
	Yes	No		
Gender				0.11
Male	23 (39%)	31 (51.7%)	54 (45.4%)	
Female	36 (61%)	29 (48.3%)	65 (54.6%)	
Age				0.18
30-50 years	09 (22%)	15 (14.2%)	24 (16.3%)	
51-70 years	32 (78%)	91 (85.8%)	123 (83.7%)	
Duration of Acute hemorrhagic Stroke				<0.001
<12 hours	16 (39%)	89 (84%)	105 (71.4%)	
>12 hours	25 (61%)	17 (16%)	42 (28.6%)	
Hypertension				0.37
Yes	32 (78%)	78 (73.6%)	110 (74.8%)	
No	09 (22%)	28 (26.4%)	37 (25.2%)	
Diabetes Mellitus				0.38

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Yes	18(43.9%)	42(39.6%)	60(40.8%)	
No	23(56.1%)	64(60.4%)	87(59.2%)	
Smoking				0.17
Yes	20(48.8%)	41(38.7%)	61(41.5%)	
No	21(51.2%)	65(61.3%)	86(58.5%)	
Ischemic Heart Disease				0.47
Yes	07(17.1%)	16(15.1%)	23(15.6%)	
No	34(82.9%)	90(78.3%)	124(84.4%)	
GCS < 8				0.04
Yes	36(87.8%)	78(73.6%)	114 (77.6%)	
No	05(54.2%)	28(26.4%)	33(22.4%)	
Obesity				0.02
Yes	20(48.8%)	31(29.2%)	51(34.7%)	
No	21(51.2%)	75(70.8%)	96(65.3%)	
Occupational Status				0.55
Employed	23(56.1%)	60(56.6%)	83(56.5%)	
Unemployed	18(43.9%)	46(43.4%)	64(43.5%)	

Discussion

Intracerebral hemorrhage is the most dangerous and life-threatening type of stroke. The traditional tools for estimating the mortality risk are limited as they do not explain the effects of withdrawal and functional recoverability (Al-Mufti et al., 2018). These challenges are more difficult in developing countries like ours. An early prognosis is necessary to reduce hospital costs and lead to a pleasant outcome.

Our study included a total of 147 patients. Mean age, duration of acute hemorrhagic stroke, BMI, height, weight, SBP, and DBP in our study were 58.14±8.49 years, 7.44±5.24 hours, 26.72±1.56 kg/m², 158±7.28 cm, 78.7±9.87 kg, 162±9.45 mmHg and 81±7.14 mmHg. 69 (46.9%) were male, and 78 (53.1%) were female. Out of 147 acute hemorrhagic stroke patients, 41 (27.9%) and 106 (72.1%) had and did not have hospital mortality. 78%, 43.9%, 48.8%, 17.1%, and 87.8% of patients with Hypertension, diabetes mellitus type II, smoking status, ischemic heart disease, and GCS < 8 had in-hospital mortality.

A study of the Irani population consisting of 122 intracerebral hemorrhage patients showed that a history of Hypertension was found in 67.2% as the primary cause, followed by ischemic heart disease (17.2%), diabetes mellitus (18%) and smoking status (13.1%). 46.7% of the study population died during the hospital stay. About 25% of the patients died within two days of brain injury. GCS score, diabetes, hematoma volume, and intraventricular hematoma were independently associated with mortality (Godoy et al., 2019).

In another study of 221 participants, a mortality rate of 32% was reported. In this study, half of these patients were reported dead within the first two days of injury. The mortality was directly and independently related to the GCS score, the

intraventricular extension of the primary hemorrhage, and systolic blood pressure (Javalkar et al., 2020).

Schrag et al. study conducted a study on 96 intracerebral hemorrhage cases. 53.12% of these patients had hydrocephalus, among which 35.3% died

during hospital stay (Schrag and Kirshner, 2020). This is similar to our study, as hydrocephalus was found to be associated with mortality.

Fernando et al. reported a 32.7% mortality rate in 214 ICH patients. The factors associated with mortality included GCS score, intraventricular hematoma, the need for ventilation, hematoma volume, hydrocephalus, and midline shift. At the same time, baseline hematoma volume, GCS score, ventilation, and intraventricular extension of hematoma were independent risk factors of disease outcome (Zwagemaker et al., 2021).

Another study evaluated 200 patients with ICH, 108 males, and 92 females. The prevalence of ICH was maximum in the age group of 61-70 years (34%). Hypertension was present in 68% of the patients and was the most important modifiable risk factor. The most common presenting symptom was altered sensorium in 58% of patients. The mean hematoma volume in our study was 44±/45 cm³. 45 patients with a GCS <5, and both with ICH scores of 5 expired. On multivariate analysis, mortality was significantly correlated with GCS and hematoma volume (Fernando et al., 2021)..

Conclusion

Hypertension, GCS score, diabetes mellitus, volume of hematoma, and intraventricular hematoma are independent variables associated with poor intracerebral hemorrhage outcomes.

Conflict of interest

The authors declared absence of conflict of interest.

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