

## Analysis of Mortality in Neuro ICU Admitted Between 2017-2021 in EMCH, Savar, and Dhaka, Bangladesh

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### Abstract

### Original Research Article

**Background:** Mortality in the intensive care unit (ICU) has been associated to an array of risk factors. Identification of risk factors potentially contributes to predict and reduce mortality rates in the ICU. **Objective:** To evaluate the mortality in Neuro ICU admitted in Enam Medical College & Hospital (EMCH), Savar, and Dhaka, Bangladesh. **Method:** This was a cross-sectional study in clinical and surgical Neuro intensive care units of the Enam Medical College & Hospital, Bangladesh. ICU patients admitted between 2017 to 2021 were considered for the study. Data were collected using a structured questionnaire containing all the variables of interest. Data was processed and analyzed with the help of computer program SPSS for windows version 25. **Results:** This study shows majority (51.2%) were age group >50 years. Majority were male (65.6%) and 34.4% were female. Morbidity pattern of neurological patients were traumatic brain injury (52.5%), RTA with poly trauma (33.8%), haemorrhagic stroke (26.9%), ischemic stroke (26.9%), aspiration pneumonia (13.8%), poly trauma due to assault (12.5%), intracerebral haemorrhage (10.6%), MCA territory infarct (10%), capsule ganglionic haemorrhage with pan ventricular extension (8.13%). **Conclusion:** It concluded that preventable morbidities (Traumatic brain injury, RTA, hemorrhagic stroke, ischemic stroke, aspiration pneumonia, poly trauma, intracerebral hemorrhage, MCA territory infarct and haemorrhagic pan ventricular extension) accounted for fatality among neurological patients in the ICU. Mortality was higher among those that required significant intensive interventions, improved public awareness.

**Key words:** Risk factors, hemorrhagic stroke, ischemic stroke, traumatic brain injury.

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## INTRODUCTION

Mortality has been a key quality measure of a hospital ever since Florence Nightingale first created a league table to compare mortality rates of various London hospitals in the mid-19th century. Death is a prominent and undesirable outcome in medical institutions and increased mortality rates compared to other similar units denotes poor quality care of the unit concerned. It shows the need of self-assessment and introspection to formulate measures to bring changes in level of care [1].

Patients with life-threatening conditions are treated in the intensive care unit (ICU). Treatment success and mortality rates in the ICU depend on the

adequate utilization of human and technological sources [2]. ICU mortality has been associated with the length of hospitalization, patients' clinical condition, immobility [3], sedation, neurological disease, agitation, coma, intubation, and mechanical ventilation, use of vasopressor drugs, glycemic index, sociodemographic characteristics and delirium [2]. Prolonged ICU hospitalization seems to double the risk of death. However, about 47% of ICU patients die within 48 hours of admission [4]. A multi country study identified that the majority of people in the ICU come from emergency wards and need mechanical ventilation, vasopressor medication and hemodialysis [5]. Sociodemographic changes impact ICU mortality with aging and associated comorbidities increasing the risk of death [3].

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Thus, providing the best care encompasses the appropriate assessment of patients' condition. Selecting essential instruments to evaluate patients and determine standards of care is vital to ensure the quality of healthcare in the ICU. Several surveys can be employed to assess comorbidities and estimate mortality risk in this context [3, 6]. For instance, the Charlson comorbidity index (CCI) identifies potential risk factors and contributes to a safe healthcare plan [2]. In the intensive care environment, it is essential to accurately identify patient's characteristics, provide the best care, detect and prevent modifiable risk factors, and reduce mortality risk [7]. This study assessed the mortality in

Neuro ICU admitted in EMCH, Savar, Dhaka, Bangladesh.

## MATERIALS AND METHODS

This was a cross-sectional study in clinical and surgical intensive care units of the Enam Medial College & Hospital, Bangladesh. NICU patients admitted between 2017 to 2021 were considered for the study. Data were collected using a structured questionnaire containing all the variables of interest. Data was processed and analyzed with the help of computer program SPSS for windows version 25.

## RESULTS

**Table-I: Age distribution of the study subject (n=160)**

Age in years	Frequency	Percentage (%)	Mean±SD
≤15	11	6.9	45.56±21.98
15-25	23	14.4	
26-35	28	17.5	
36-45	16	10.0	
46-55	25	15.6	
56-65	25	15.6	
>65	32	20.0	

**Table-II: Sex distribution of the study subjects (n=160)**

Sex	Frequency	Percentage (%)
Male	105	65.6
Female	55	34.4

**Table-III: Comorbidity of the study subjects (n=160)**

Comorbidity	Frequency	Percentage (%)
HTN	23	14.4
DM	15	9.4
CKD	2	1.2
IHD	1	0.6

**Table-IV: Diagnosis of the study subjects (n=160)**

Diagnosis	Frequency	Percentage (%)
Severe TBI	84	52.5
Severe Head Injury with poly trauma due to RTA	54	33.8
Haemorrhagic stroke	43	26.9
Ischaemic stroke	43	26.9
Aspiration pneumonia	22	13.8
Poly trauma due to physical assault	20	12.5
Intracerebral haemorrhage	17	10.6
Rt MCA territory infarction	16	10
Thalamic Hg with Pan ventricular extension	13	8.13
Subdural hematoma (SDH)	7	4.38
Sub Arachnoid Haemorrhage	5	3.13
Multiple Rib fracture with pneumothorax	4	2.5
Hanging with pontine haemorrhage	4	2.5
Massive capsulo ganglionic bleeding with Hypertension	4	2.5
AKI due to Haemorrhagic shock	3	1.88
Severe Bi frontal and Occipital contusion	3	1.88
Rupture ACOM Aneurysm	3	1.88
Severe capsulo ganglionic Hg (Rt)	3	1.88
Depressed occipital fracture	3	1.88
Electrolyte imbalance ( Severe Hyponatremia)	3	1.88

**Table-V: Management of the study subjects (n=160)**

Management	Frequency	Percentage (%)
Conservative	155	96.9
Post Decompressive craniectomy	4	2.5
During operation	1	0.6

## DISCUSSION

Mortality in the intensive care unit (ICU) has been associated to an array of risk factors. Neurological disorders accounted for between 65% and 71.6% of the morbidities in intensive care units, though there are reports with lower rate [2]. Identification of risk factors potentially contributes to predict and reduce mortality rates in the ICU. The objectives of the study were to determine the analysis of mortality in Neuro ICU in EMCH, Savar, and Dhaka, Bangladesh.

This study shows majority (51.2%) were age group >50 years. Similar study Karmacharya *et al.*[1] reported 11.9% were <16 years, 50% were 16-55 years and 38.1% were >55 years. The average age was 45.56±21.98 years in this study. Similar study Filha *et al.* [8] shows the mean age 44 years.

In this study show majority were male (65.6%) and 34.4% were female. Similar to other studies, observed higher mortality among male patients (62.1%) [9-11].

In this study, morbidity pattern of our neurological patients was found to be mainly due to preventable causes such as traumatic brain injury (52.5%), RTA (33.8%), haemorrhagic stroke (26.9%), ischemic stroke (26.9%), aspiration pneumonia (13.8%), poly trauma due to assault (12.5%), intracerebral haemorrhage (10.6%), MCA territory infarction (10%), capsuloganglionic haemorrhage with pan ventricular extension (8.13%). Similar Adudu *et al.* [12] study Traumatic injury and road traffic accident were found mortality. Another study Karmacharya *et al.* studies Trauma and Intracerebral hemorrhage are the commonest admissions in NS-ICU. Hammers *et al.* and Sandeman R *et al.* [13] also report similar pattern of ICU. In the United States, trauma is the fourth leading cause of death among intensive care patients [14]. In Nigeria, although specific figures for causes of death are unknown, trauma still ranks high [15]. Guillain Barre Syndrome [16] and encephalopathy [17] admitted into the ICU but these disorders were not common among our intensive care patients. On comparison of our data with two similar studies from Nepal we found the pattern comparable with series from Roka *et al.*, which represent the exact picture of most of the peripheral units of Nepal [18]. However the study from TUTH report tumors as the commonest neuro ICU admissions 32%, followed by trauma 27.6% and

aneurysms 25% [19]. This is because of the fact that most of the patients with tumor do not present as emergency and fly or travel to the capital city Kathmandu which is few hours by flight or road from most of the peripheral centers.

Early onset of chronic noncommunicable diseases among the population, associated with comorbidities, increase health system demand. Thus, countries lacking an effective health models in primary and secondary care almost always overload the tertiary sector with hospitalizations. This problem contributes to increased mortality particularly among individuals in critical condition [15, 16]. Further investigation is warranted expanding the study population and exploring other potential predictions and comorbidities that may increase the mortality risk in the ICU.

## CONCLUSION

This study revealed that traumatic brain injury, RTA, haemorrhagic stroke, ischemic stroke, aspiration pneumonia, poly trauma, intracerebral haemorrhage with pan ventricular extension, MCA territory infarction were the leading causes of death among neurological patients. It also showed that causes of neurological morbidity are preventable and had high case fatality rates. This study suggested that health education of the public to improve awareness on adequate immunization, appropriate drug management including antihypertensive therapy. There is also a need for improved enforcement of appropriate traffic legislation such as wearing of seat belts, standard secured helmets and other safety measures for all bikers to reduce head and spinal cord injuries. The establishment of a neurosurgical unit with provision of appropriate monitoring for efficient care will improve the outcome of these patients. There should be National Guideline for transferring poly trauma patient from peripheral to central specialized hospital to reduce morbidity and mortality due to secondary assault.

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