

## **Emerging principles in neurocritical care: An analytical study of pharmaceuticals for mental health disorders**

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### **Abstract**

In India, neurocritical care drugs are a promising choice for treating mental health conditions. Understanding the neurochemical imbalances that take place in diverse mental diseases forms the foundation for the concepts guiding the administration of these medications. One of the guiding concepts is the use of SSRIs (selective serotonin reuptake inhibitors) in the management of anxiety and depressive disorders. Serotonin availability in the brain is increased by SSRIs, which may decrease the symptoms of various diseases. Atypical antipsychotics being used to treat schizophrenia and other psychotic diseases is another crucial idea. The brain's dopamine receptors are blocked by these medications, which can lessen the severity of psychotic symptoms. Additionally, the use of mood stabilizers for the treatment of bipolar disorder is gaining popularity. These medications support the management of mood fluctuations and the avoidance of manic or depressive periods. The growing ideas in neurocritical care medicines for mental health disorders in India generally stress the significance of focusing on certain neurochemical imbalances to address mental illnesses.

**Keywords:** Neurocritical Care Drugs, Selective Serotonin Reuptake Inhibitors (SSRIs), Atypical antipsychotics, Dopamine receptors, Mood stabilizers, Mental Health disorders.

### **Introduction**

There have been substantial improvements in the management of neurological diseases using drugs in the field of neurocritical care. The use of "Selective serotonin reuptake inhibitors (SSRIs)" to treat anxiety and depressive disorders has become one of the guiding principles in medicine. The effects of these illnesses can be lessened by SSRIs since they increase the brain's serotonin availability. In order to treat schizophrenia and other psychotic diseases, various drugs have also been employed, such as atypical antipsychotics (Bonifacio et al., 2011). The effectiveness of these medications can lessen the severity of psychotic symptoms because they block dopamine receptors in the brain.

The open ICU model has been highlighted as a helpful strategy. Effective communication and collaboration amongst healthcare personnel are vital in neurocritical care. Greater provider collaboration made possible by this model may result in more effective management of patients with neurological conditions, including the use of the proper medications. To reduce the risk of harmful drug interactions and associated difficulties, standardised protocols and

recommendations for pharmaceutical usage in the ICU have been devised (Chowdhury & Duggal, 2017).

The administration of medications is a crucial part of managing patients with neurological disorders in neurocritical care. However, there is a high risk of drug interactions in this situation, so medical professionals must take precautions to ensure the safe and efficient use of medications. To reduce the danger of harmful medication responses and toxicity, it is important to carefully analyze the pharmacokinetics and pharmacodynamics of drugs. This entails keeping an eye on drug levels and vital signs to see any potential side effects and making the necessary corrections (Spoelhof et al. 2017). Aside from pharmacokinetic and pharmacodynamic factors, comorbid conditions' effects on drug metabolism and clearance also need to be taken into account. In addition to neurological disorders, patients may also have other medical issues that influence how well they respond to treatment. Patients with renal or liver illness, for instance, may have reduced drug metabolism and clearance, which might result in drug buildup and toxicity. Due to variations in blood flow and oxygenation, patients with cardiac or respiratory problems may potentially have different medication reactions. To obtain the best results, healthcare professionals must choose and deliver medications with careful consideration of the patient's entire health situation.

### **Literature Review**

Pharmaceutical use in neurocritical care was regarded as a crucial component of treating individuals with neurological disorders. For the best possible outcomes for patients, proper nutrition and coordinated TBI care strategies were also crucial. Innovative trial design strategies were required to overcome the difficulties that came with designing clinical trials for TBI medications in order to increase the trials' effectiveness and efficiency. In the neurocritical care unit, good nutrition was thought to be crucial for patients with neurological conditions to recover and perform at their best. Early nutrition therapy was started, and each patient's demands were taken into consideration. Depending on the patient's state of consciousness and capacity for oral ingestion, enteral or parenteral feeding was used in this situation. To guarantee the best results, nutritional support was also combined with other facets of patient care, such as the control of intracranial pressure and the avoidance of infections (Tripathy 2015).

A comprehensive strategy was necessary for the optimal therapy of individuals with traumatic brain injury (TBI), which was a major cause of morbidity and mortality globally. Pharmaceutical interventions, such as the application of medications in neurocritical care, were seen as a crucial component of TBI management. However, because of the condition's complexity and the diversity of patient populations, designing clinical trials for TBI medications posed special difficulties. The efficiency and effectiveness of TBI clinical trials were recommended to be improved by novel trial design strategies, including as adaptive trial designs and the use of biomarkers (Roozenbeek et al. 2012). For patients with TBI, improved prevention, clinical care,

and research strategies were thought to be crucial to enhancing patient outcomes. They emphasised the necessity for future study to deepen our understanding of this complicated disorder, the significance of prevention measures, and the early and aggressive therapy of patients with TBI. A crucial component of managing TBI was believed to be the efficient use of medications in neurocritical care, and continued research was required to find novel and efficient therapies (Maas et al. 2017).

Pharmacological treatment of mental health issues in India is a developing area of study and practice in the realm of neurocritical care. According to Myburgh et al. (2016), it is crucial to provide end-of-life care in the critical care unit, including the appropriate use of medications to treat pain and other symptoms. The World Federation of Societies of Intensive and Critical Care Medicine Task Force suggested that healthcare practitioners should prioritize giving patients and families a voice in decision-making and patient-centered care. This method involves managing mental health disorders in critically ill individuals with the right use of medications. Fluid management is a concept that Monteiro and Goraksha (2017) presented, and it is relevant to neurocritical care for patients with mental health issues. The idea emphasized the significance of individualized fluid management, taking into account elements including hemodynamics, brain edema, and electrolyte imbalances. This method may be especially helpful in treating people with mental health issues who are simultaneously dealing with neurological issues. Additionally, Edlow et al. (2014) emphasized the significance of prompt and accurate diagnosis of coma causes that are treatable, including those connected to mental health issues. This covers the proper administration of medications to treat ailments such as status epilepticus, metabolic encephalopathy, and drug overdose. The prognosis for people with mental health illnesses can be improved by the early and proper use of medication to help prevent additional brain damage.

The treatment of mental health disorders is now being included in the use of drugs in neurocritical care in India. The use of pharmacological therapies in the treatment of patients with neurological illnesses, including mental health issues, was discussed during a conference conducted by the Indian Society of Neuroanaesthesiology and Critical Care in Lucknow in 2015. The conference placed a strong emphasis on the value of early therapy start-up and the demand for therapies that are customized to each patient's specific needs. The necessity of early therapy commencement to improve patient outcomes was one of the conference's main topics of discussion. Furthermore, the value of treatments that are specially designed to address each patient's individual needs was acknowledged. This reveals how the demand for a personalised approach to drugs in neurocritical care for mental health problems is developing in India (Mishra et al., 2015).

The most common complication of traumatic brain injury is intracranial hypertension, which can exacerbate already existing brain damage. Traumatic brain injury is also a major source of morbidity and mortality globally. A comprehensive strategy, including the use of medications, is

needed to manage intracranial hypertension. Emerging concepts in neurocritical care medicines for traumatic brain injury have centred on the use of osmotherapy drugs, such as mannitol and hypertonic saline, to lower intracranial pressure and enhance cerebral blood flow (McCullagh & Andrews, 2012). Pharmaceuticals are used in neurocritical care to treat mental health conditions in addition to traumatic brain injury. Brain resuscitation procedures have been created that make use of neuroprotective substances like melatonin and hypothermia in drowning instances, which can result in hypoxia and subsequent brain injury. However, more investigation is required to fully comprehend the effectiveness of these medications in treating neurological conditions (Topjian et al. 2012).

### Objective of the Study

To measure the emerging principles in neurocritical care, an analytical study of pharmaceuticals for mental health disorders

### Methodology

This study utilized a structured questionnaire to conduct a survey, and statistical methods such as mean & t-test were used to analyze the responses from 229 participants. The sampling method used in this research was convenience sampling, where individuals were selected based on their accessibility & willingness to participate.

**Table 1 Emerging Principles in Neurocritical Care**

Serial No.	Statement of Survey	Mean Value	t-value	p-value
1	Multimodal monitoring is becoming increasingly important in the management of patients with neurological injuries.	4.12	7.981	0.000
2	Targeted temperature management has been shown to improve outcomes in patients with hypoxic-ischemic encephalopathy.	4.36	10.411	0.000
3	Early initiation of seizure prophylaxis in patients with traumatic brain injury can reduce the risk of post-traumatic seizures.	4.50	11.806	0.000
4	Aggressive management of intracranial pressure can improve outcomes in patients with severe traumatic brain injury.	4.04	5.445	0.000
5	Adequate nutrition is critical in the management of critically ill neurological patients.	3.83	3.492	0.000
6	Early mobilization can help prevent complications associated with prolonged bed rest in critically ill neurological patients.	4.44	11.218	0.000

7	Infection prevention measures are essential in reducing the risk of secondary brain injury.	4.06	6.944	0.000
8	Early recognition and treatment of delirium is important in improving outcomes in critically ill neurological patients.	4.14	8.777	0.000
9	Greater provider collaboration made possible by this model may result in more effective management of patients with neurological conditions.	3.75	3.263	0.001
10	For individuals with neurological illnesses and mental health disorders to have better results, more research and development in these areas is required.	4.43	12.215	0.000

Table 1 demonstrates the mean values for each of the statement of the study done on the “emerging principles in neurocritical care”, examining the average scores, the statement that obtains the highest mean score can be described as “Early initiation of seizure prophylaxis in patients with traumatic brain injury can reduce the risk of post-traumatic seizures”, which has the mean score of 4.50, Looking at the next statement which is “Early mobilization can help prevent complications associated with prolonged bed rest in critically ill neurological patients” the mean score is found to be 4.44. Looking at the mean value of 4.43 for the statement “For individuals with neurological illnesses and mental health disorders to have better results, more research and development in these areas is required” shows that mental health disorders is also responsible for neurocritical care. Looking at the other benefit of neurocritical care is, “Targeted temperature management has been shown to improve outcomes in patients with hypoxic-ischemic encephalopathy” which displays the mean score of 4.36, and the statement “Early recognition and treatment of delirium is important in improving outcomes in critically ill neurological patients” showcase the mean value of 4.14. Then the statement “Multimodal monitoring is becoming increasingly important in the management of patients with neurological injuries” obtains mean value of 4.12 and the statement “Infection prevention measures are essential in reducing the risk of secondary brain injury” has 4.06. The statement “Aggressive management of intracranial pressure can improve outcomes in patients with severe traumatic brain injury” showcase the mean value of 4.04. Therefore, the last two statements fall within the lowest category or level, “Adequate nutrition is critical in the management of critically ill neurological patients” mean value of 3.83, the statement “Greater provider collaboration made possible by this model may result in more effective management of patients with neurological conditions” has 3.75. The significance of the t-value for each statement in the investigation on the emerging principles in neurocritical care is significant. The t-value statements were positive, and their significance value was less than 0.05, indicating a significant relationship between the two variables.

### **Conclusion:**

The discipline of neurocritical care has made great strides in the management and treatment of seriously ill individuals with neurological disorders. The significance of creating and implementing successful pharmaceutical therapies for mental health issues in India has become increasingly clear. Numerous new ideas in neurocritical care have grown in significance over time, particularly in the field of mental health. The application of personalized medicine for problems of mental health is one of the most important new themes in neurocritical care. Personalized medicine entails adjusting a patient's care to take into account their unique genetic, environmental, and lifestyle characteristics in order to improve their chances of a positive outcome. The efficacy and security of pharmacological therapies for mental health issues may be enhanced by this strategy. The utilization of combination medicines that target various brain circuits is another developing idea in neurocritical care. Bipolar illness, anxiety, and various other mental health disorders have all been successfully treated using this strategy. Targeting various modes of action is a benefit of combination medicines, enhancing the likelihood of effective treatment results. Transcranial magnetic stimulation (TMS), one form of neuromodulation, has been increasingly significant in neurocritical care for mental health illnesses in recent years. TMS uses magnetic fields to activate particular brain regions, and it has shown promising results in treating mental health conditions like anxiety and depression. In conclusion, the creation of efficient pharmaceutical treatments for mental health issues is crucial in India. The developing concepts in neurocritical care, including personalised medicine, combination therapy, and neuromodulation techniques, have the potential to completely alter how mental health illnesses are treated and managed. For individuals with neurological illnesses and mental health disorders to have better results, more research and development in these areas is required.

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