

# Patient Safety Risks and Measures for Pediatric Neurosurgery Nursing

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**Abstract:** The aim of this study was to determine the patient safety risks and measures for pediatric neurosurgery nursing. A total of 564 pediatric patients admitted to the hospital from June 2020 to June 2023 under the neurosurgery department were included in this study. We analyzed the safety incidents in pediatric neurosurgery nursing and their causes and proposed corresponding measures for pediatric neurosurgery nursing in hope to reduce the occurrence of patient safety incidents in pediatric neurosurgery nursing and establish harmonious nurse-patient relationships.

**Keywords:** Neurosurgery; Pediatric patients; Patient safety risks; Countermeasures

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## 1. Introduction

With the progress of modern medical technology and people's higher demand for health, the nursing of neurosurgical patients has gained widespread attention. Safe nursing is the basis to guaranteeing high-quality nursing services and an important index to measure the quality of nursing work. Neurosurgery is a department that deals with many critical and emergency cases. The majority of patients in neurosurgery have complex problems, are unstable, and are in critical conditions, accompanied by varying degrees of consciousness and limb movement disorders, as well as prolonged bed rest, all of which would increase the patient safety risks. Younger age patients, *i.e.*, pediatric patients, pose a greater challenge to neurosurgical care<sup>[1]</sup>. For example, a child's reaction to narcotic drugs is more unpredictable than an adult's reaction, so special care is needed. Close monitoring of breathing, heart rate, and blood pressure is necessary in pediatric neurosurgery cases, and nurses must ensure that these patients remain stable during procedures. In neurosurgery, bleeding and thrombosis may occur; therefore, blood loss and clotting indicators should be closely monitored, so that timely measures can be taken to prevent bleeding or thrombosis. It is of great significance to analyze the patient safety risks in pediatric neurosurgery and take appropriate nursing measures.

## **2. Data and methods**

A total of 564 pediatric patients admitted to the hospital from June 2020 to June 2023 under the neurosurgical department were included in this study. We conducted a retrospective analysis of patient safety incidents in pediatric neurosurgery nursing and proposed corresponding measures.

## **3. Patient safety risks in pediatric neurosurgery nursing**

### **3.1. Choking**

Children who are unconscious or intubated may develop asphyxia due to aspiration of sputum. Once asphyxia is noted, the child's head should be tilted backward, while lifting the chin up, to open the airway. Oxygen should be given via artificial respiration, which helps maintain breathing, to improve oxygenation [2]. Foreign bodies or secretions blocking the respiratory tract should be removed immediately. The patient's vital signs, including heart rate, respiration, and blood pressure, should be closely monitored, along with the patient's state of consciousness. Drugs or tracheal intubation should be considered depending on situation.

### **3.2. Skin injury**

Skin injury is one of the common patient safety issues in pediatric neurosurgery. The reasons for skin injury in children undergoing neurosurgery are as follows: (i) friction or compression during surgery (since incisions are made on the skin during surgery, there may be friction or compression on the skin, resulting in skin injury) [3]; (ii) prolonged bed rest after surgery (since patients are required to rest in bed for a period of time after surgery, especially in neurosurgery, skin damage may occur as a result of pressure on certain parts of the body); (iii) malnutrition (patients may be malnourished due to improper diet or complications after surgery, which may also affect their skin health, thus increasing their risk of skin damage); (iv) skin infection (patients are prone to infection after surgery due to decreased immunity; a delay or neglect in cleaning or disinfecting the skin may cause infection and lead to skin damage).

### **3.3. Falls**

Falls, especially falls from the bed, are common patient safety issues in pediatric neurosurgery. Children with neurological disorders, such as those with brain tumor and cerebral hemorrhage, which may affect their balance and gait, are prone to falls [4]. Following neurosurgery, patients are required to stay in bed for extended periods of time, which may cause muscle atrophy and decreased muscle strength due to prolonged immobility, thus making the patient more likely to lose balance when standing or walking. Certain drugs, such as sedatives, anesthetics, *etc.*, which affect balance and reflexes, are often administered to children undergoing neurosurgery. These drugs increase the risk of falls among children. If care is not provided, such as failing to check patient's position on bed, not fixed bedpan or urinal pot, it may also lead to patients falling down.

## **4. Analysis of the causes of patient safety risks in pediatric neurosurgery nursing**

### **4.1. Nursing staff lack nursing skills**

The lack of nursing skills among nurses in neurosurgery is one of the main reasons leading to the occurrence of patient safety incidents in pediatric neurosurgery nursing. The diseases are more complex in pediatric neurosurgery, which requires nurses to have certain professional knowledge and skills to carry out effective nursing. If the nursing staff lacks understanding of the disease, misdiagnosis and mistreatment are bound to occur, leading to the deterioration of the patient's condition [5]. In addition, neurosurgical care requires the use of special equipment and instruments, such as ventilators, monitors, electroencephalograph, *etc.* The lack of skills in operating these devices among the nursing staff may lead to improper operations,

equipment failure, and other adverse situations, which may affect the safety of these patients. When nursing pediatric patients in neurosurgery, emergency situations, such as sudden loss of consciousness and difficulty in breathing, may occur, and without proper training, the nursing staff may not be able to handle these emergencies quickly and correctly, thus putting patients' lives at risk.

#### **4.2. Disease factors**

Disease factors are also one of the important reasons leading to patient safety incidents in pediatric neurosurgery nursing. Firstly, neurosurgical diseases are often accompanied by severe neurological damage, including increased intracranial pressure, cerebral hemorrhage, *etc.* These conditions pose a threat to the life of children and thus require timely and effective nursing and monitoring <sup>[6]</sup>. Secondly, neurosurgery often involves complex operations and excision; thus, various complications may occur after surgery, such as infection and cerebral edema. These complications require timely observation and treatment; otherwise, the recovery and rehabilitation of patients may be affected. Thirdly, neurosurgical conditions, such as brain injury, epilepsy, *etc.*, often require long-term care and monitoring. Such conditions require continuous observation and care by the nursing staff to ensure the safety and health of patients.

#### **4.3. Behavioral factors**

Children's own behavior may also lead to certain patient safety risks. Patients with neurosurgical problems may have cognitive impairment, movement disorders, and other issues, resulting in poor awareness of self-protection. Thus, if the nursing staff do not pay adequate attention to these patients, injury or accidents may occur. Neurosurgical conditions may affect the behavioral and emotional control of children, making them susceptible to external stimuli; thus, they may elicit symptoms of anxiety and irritability <sup>[7]</sup>. In this context, if the nursing staff do not carry out timely and effective intervention and control, accidental injuries or other life-threatening concerns are bound to happen.

In addition, some children may elicit improper behaviors, such as self-extubation, removal of monitoring instruments, and other behaviors that may pose a threat to their own health and safety.

### **5. Measures for nursing in pediatric neurosurgery**

#### **5.1. Improve the nursing staff's nursing skills**

The nursing staff should be trained and educated to enhance their understanding and skills in pediatric neurosurgical care, *i.e.*, their knowledge of neurological diseases, common neurosurgical procedures, *etc.* The nursing staff should improve their communication skills, so as to help caregivers understand the needs of patients and their families; in addition, they should work with physicians and other caregivers as a team to develop the best care plan for patients. Other than that, they should ensure an effective shift and record-keeping system <sup>[8]</sup>. The condition and treatment of each patient should be recorded in a timely and detailed manner in order to better track and evaluate the patient's progress. In addition, nursing operation procedures and standards of practice should be standardized to ensure compliance to correct operating procedures and hygiene measures. It is also necessary to strengthen the training of nursing staff in the management of drug therapy, including the proper use and storage of drugs, in order to prevent the occurrence of safety incidents caused by improper use or storage of drugs. In order to strengthen risk assessment and prevention, the nursing staff must identify and deal with the possible risks of patients as quickly as possible to prevent adverse events from occurring.

#### **5.2. Improve the nursing staff's attitude**

It is important to strengthen the training of nurses' service attitude and professional ethics by establishing a professional ethics and service awareness training plan; implement nursing quality control; develop strict

nursing standards and process specifications; improve the nursing quality; and reduce medical errors. Medical institutions should implement scientific and reasonable medical nursing management systems, establish scientific nursing plans and demonstrations, as well as guide nurses in carrying out nursing operations. The nursing staff should strengthen communication with the patients and their parents, establish a close relationship with them, and provide timely and comprehensive nursing services. It is necessary to evaluate the nursing effect on a regular basis, improve the quality of nursing service, provide timely feedback on the nursing effect, continuously improve on the basis of the feedback, and provide optimization measures. Establishing a scientific nursing research and education system, improving the professional skills and nursing level of the nursing staff, as well as strengthening the nursing quality and service attitude of the nursing staff would also be beneficial.

### **5.3. Establish a prevention mechanism for patient safety risks**

(i) Establish a comprehensive risk assessment system

A comprehensive risk assessment system should be developed based on the characteristics of pediatric neurosurgery nursing to investigate and evaluate the potential safety risks in pediatric neurosurgery.

(ii) Develop standardized nursing norms

In view of the particularity of pediatric neurosurgery patients, standardized nursing norms and operating procedures that require the compliance of the nursing staff should be formulated in order to ensure that nursing operations are standardized, scientific, and reasonable.

(iii) Strengthen nursing staff training

It is important to provide special training for pediatric neurosurgery nursing staff and strengthen the knowledge and skills of the nursing staff to ensure that the patients receive safe and effective services.

(iv) Improve the information exchange mechanism

Various forms of information exchange, including regular meetings, safety prevention notification, experience sharing, *etc.*, should be carried out. The communication and exchange among pediatric neurosurgery nursing staff should be strengthened, along with their ability to identify and solve patient safety risks in their nursing work.

(v) Strengthen supervision and management

A scientific and standardized supervision mechanism should be established. With this mechanism, it is possible to supervise the work of the nursing staff, and timely corrections can be made in cases of violations, thus guaranteeing the safety and safeguarding the rights of pediatric patients in neurosurgery.

## **6. Conclusion**

With the advancements in modern medical technology, the demand for safety in nursing is increasing. There are difficulties and risks in pediatric neurosurgery nursing. In this study, we analyzed the causes of patient safety incidents in pediatric neurosurgery and put forward corresponding measures to provide better nursing services for patients.

## **Disclosure statement**

The authors declare no conflict of interest.

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