

Evidence indicates that nurses often employ implicit safety practices, such as optimizing medication preparation sequences and repeatedly cross-checking actual procedures against established protocols, to maintain process stability (Pérez et al., 2025). Furthermore, comprehensive verification strategies-including dual identity checks and cross-verification of critical medication parameters-are directly associated with significant reductions in medication errors. These findings underscore that medication verification is not merely a routine pre-administration task but a core safety function deeply embedded in nursing practice (Nursery and Chrismilasari, 2024).

### **3.2 Continuous identification of medication-related risks and nursing responses**

Nursing staff remain at the patient's bedside for extended periods, enabling continuous assessment of clinical status and medication responses and allowing timely identification of newly emerging risks during the medication process. When patient conditions deteriorate or therapeutic effects are unsatisfactory, nurses may temporarily withhold, delay, or even discontinue medication administration and raise professional concerns regarding the appropriateness and safety of medical orders (Li, 2025). In clinical practice, nurses routinely conduct line-by-line verification of electronic medical records and physician orders. When inconsistencies or potential allergy risks are identified, double-check procedures are implemented and physicians are contacted for confirmation, thereby effectively bridging the gap between institutional requirements and real-world practice (Uramatsu et al., 2024).

Moreover, medication-related risks are not confined to the individual patient level. Environmental and organizational factors-such as workflow interruptions, ambiguous order wording, and procedural changes-also contribute to an increased risk of errors. Studies indicate that nurse-led improvement strategies, including the establishment of critical checkpoints and the use of cognitive aids, can significantly reduce verification and administration errors. Cross-sectional research further highlights structural factors such as insufficient training, inappropriate night-shift scheduling, and excessive workload as important contributors to medication errors. Accordingly, systematic countermeasures are required at the levels of process design, staff training, and working conditions. In daily practice, nurses proactively mitigate medication risks by repeatedly verifying dosages, clarifying ambiguous documentation, and appropriately utilizing pre-prepared medications, thereby transforming potential hazards into actionable solutions and reducing medication-related risks in a forward-looking manner.

### **3.3 Key control strategies for high-risk drugs and special populations**

For high-risk drugs and susceptible populations (including pediatric patients, newborns, elderly patients, and critically ill patients, etc.), more stringent nursing supervision strategies and individualized verification plans need to be implemented. The incidence of medication errors in children and newborns has remained high, and such errors are particularly concentrated in dosage calculation, dilution ratio, infusion rate, nasal-gastric tube administration, etc. Educational intervention, double verification, application of intelligent infusion pumps, and prevention of interference during the operation process, etc., can significantly reduce the incidence of medication errors in this group, with the maximum reduction rate reaching 64%. In the intensive care unit, medication errors mainly occur in the use of antibiotics and the infusion of high-risk drugs. The insufficient knowledge of common drugs by nursing staff is an important cause of such errors, highlighting the importance of mastering solid pharmacology knowledge, carefully verifying drug concentrations and infusion rates, and strictly following operating procedures.

Some research findings indicate that the insufficient professional drug knowledge of nursing staff, coupled with the lack of adequate safety medication support conditions in clinical work scenarios, are the core factors that lead to clinical medication errors. Only by strengthening the professional knowledge level of nursing staff and creating a more suitable working environment for safe medication can the practical operational ability of nursing staff be effectively improved and help them develop a standardized and rigorous safety medication operation habit (Bibi et al., 2025). Throughout the entire process from drug dispensing to administering medication to patients, nursing staff should actively implement various safety control measures, such as strictly following the double-checking system, completing the final confirmation of medication administration at the bedside, conducting dose conversion work in accordance with norms, promoting standardized drug identification and storage management