

2.3 Impact of adverse events on prognosis and nursing quality in older patients

The occurrence of adverse events during hospitalization has a substantial negative impact on outcomes in older patients and is closely associated with prolonged length of stay, functional decline, and increased mortality risk. Prospective studies indicate that older patients experiencing medical adverse events have nearly double the length of hospital stay and significantly higher in-hospital mortality; even after adjustment for disease severity and functional status, adverse events are associated with an approximately threefold increase in mortality risk. Review studies further suggest that adverse events often trigger unnecessary interventions and complications, resulting in marked prolongation of hospitalization, with rates of functional disability or death ranging from 5% to 27% among injured older patients. Among geriatric trauma patients, the incidence of nursing-sensitive adverse events is approximately 30% and is associated with significantly longer hospital stays (17 days vs. 6 days), greater frailty, and higher injury severity, underscoring their prognostic significance (Järbrink et al., 2025). Hospitalizations related to ADEs in older adults are also associated with higher healthcare costs and increased need for post-discharge care, such as institutional placement or home care services (Cosgrave et al., 2025).

From a nursing quality perspective, adverse events serve both as critical signals of suboptimal nursing care and as factors that further consume nursing resources and strain healthcare systems. Falls, pressure injuries, infections, malnutrition, bladder overdistension, delirium, and adverse drug reactions are all classic nursing-sensitive outcomes, closely linked to the quality of nursing assessment, ongoing surveillance, timely intervention, and care coordination (Alotaibi et al., 2025; Järbrink et al., 2025). High adverse event rates often indicate missed or delayed nursing care, insufficient implementation of preventive measures, and inadequate medication management. This pattern is particularly evident among cognitively impaired patients, in whom nursing- and organization-related adverse events account for a larger proportion, revealing gaps in individualized supervision, communication, and environmental adaptation (Schouten et al., 2025). Conversely, strengthened nursing interventions-such as comprehensive geriatric assessment, proactive pharmacovigilance, early mobilization, and seamless care transitions-have the potential to reduce adverse events, improve functional trajectories, lower readmission risk, and enhance patient satisfaction (Schattner, 2023).

3 Nursing-Sensitive Indicators Related to Adverse Events in Older Patients

3.1 Concept of nursing-sensitive indicators and principles for indicator selection

Nursing-sensitive indicators (NSIs) refer to changes in health status or care processes that can be directly influenced by nursing care, and they constitute a core foundation for monitoring nursing quality and performance. Within Donabedian's "structure-process-outcome" framework, NSIs typically span three dimensions: structural indicators (e.g., nurse staffing levels and skill mix), process indicators (e.g., risk assessment, ongoing monitoring, patient education, nursing communication, and care coordination), and outcome indicators (e.g., falls, pressure injuries, infections, satisfaction, and functional decline) (Baillie et al., 2025). Compared with broader quality indicators, the defining feature of NSIs is that there is an empirically supported association between nursing inputs and patient outcomes, and the indicator content explicitly targets professional nursing practice, thereby enabling a more precise estimation of nursing's independent contribution to patient outcomes. Accordingly, in the inpatient geriatric context, NSIs are not only used to describe the level of adverse event occurrence but, more importantly, to use quantitative evidence to elucidate the pathways through which nursing interventions contribute to risk control and functional preservation, providing actionable levers for quality improvement.

Selection of NSIs in geriatric care should follow principles of scientific rigor, relevance, and feasibility, while ensuring that indicators are truly "nursing-sensitive." International and national experiences in indicator development emphasize that NSIs should: (1) be clearly and modifiably influenced by nursing; (2) focus on high-incidence or high-risk problems; (3) sensitively discriminate differences in nursing quality; and (4) have reliable, standardized data sources and operational definitions that support continuous measurement and inter-institutional comparison (Tevik et al., 2023). Delphi studies further propose that indicator selection should incorporate clinical relevance, modifiability by nursing, alignment with professional standards, and potential value for benchmarking and quality improvement. For hospitalized older adults, indicator selection should also reflect a risk-oriented and population-specific approach: priority should be given to indicators that capture key geriatric