

Evaluation of the Application Effect of Nursing Risk Management in Preventing Falls among Inpatients

Chenxi Zhang, Yiyang Rong, Peitong Du, Chen Zhu, Zihan Wu, Chongyang Li, Liling Cui, Huijie Yao

School of Nursing, Tianjin Medical University, Tianjin 300070, China

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: *Objective:* To evaluate the practical application effect of nursing risk management in preventing falls among inpatients, and to provide a reference for optimizing clinical safety management strategies for inpatients. *Methods:* A total of 428 inpatients in our hospital from January 2021 to December 2023 were selected as the research objects. They were divided into a control group (218 cases) and a study group (210 cases) according to the nursing management method. The control group received routine fall prevention nursing, while the study group implemented systematic nursing risk management. The fall rate and post-fall injury rate during hospitalization were compared between the two groups. *Results:* The fall rate of the study group was significantly lower than that of the control group, and the difference was statistically significant ($p < 0.05$). *Conclusion:* Nursing risk management can effectively reduce the fall rate and post-fall injury rate of inpatients through systematic risk identification, targeted intervention and continuous quality improvement. It also improves patients' awareness of fall prevention and nursing satisfaction, and promotes the improvement of nurses' risk management ability, which has important clinical promotion value.

Keywords: Nursing risk management; Inpatients; Fall prevention; Application effect; Patient safety

Online publication: Nov 6, 2025

1. Introduction

Falls are one of the most common adverse nursing events among inpatients. They not only cause physical injuries such as fractures and soft tissue damage to patients, but also may trigger psychological problems like anxiety and fear. In severe cases, falls can even prolong the length of hospital stay, increase medical expenses, and even threaten patients' lives ^[1]. Globally, falls have become a major hidden danger threatening the health of the elderly. According to data from the World Health Organization (WHO), approximately 684,000 people die each year due to fall-related injuries, with adults aged 60 and above accounting for the largest proportion. In China, falls are even the leading cause of injury-related deaths among the elderly aged 65 and above ^[2]. At present, most hospitals in China mainly rely on routine nursing to prevent inpatients from falling. The main measures include verbal

education and reporting and filing after fall incidents. However, this type of management model lacks systematic risk assessment, dynamic intervention and continuous improvement mechanisms, resulting in poor fall prevention effects [3].

In recent years, a number of studies have confirmed the role of nursing risk management in reducing the incidence of falls in inpatients. However, most studies have small sample sizes or single intervention measures, and lack a comprehensive evaluation of the improvement of nurses' capabilities and the long-term benefits of patients [4]. Based on this, this study constructed a systematic nursing risk management system and compared and analyzed its application effect with routine nursing in preventing inpatients from falling, aiming to provide more comprehensive and scientific practical basis for the safety management of clinical inpatients.

2. Materials and methods

2.1. Study subjects

A total of 428 inpatients in our hospital from January 2021 to December 2023 were selected as the study subjects, and they were divided into the study group (218 cases) and the control group (210 cases) according to the management method.

2.1.1. Inclusion criteria

Aged ≥ 18 years; length of hospital stay ≥ 72 hours; score ≥ 45 points on the Morse Fall Risk Assessment Scale (determined as high-risk patients for falls); and patients and their family members voluntarily participating in the study and signing the informed consent form.

2.1.2. Exclusion criteria

Complicated with severe mental disorders (such as schizophrenia and severe cognitive impairment) and unable to cooperate with nursing management; unable to move independently due to physical disability, paralysis, or more; occurrence of severe complications such as acute myocardial infarction and stroke during hospitalization requiring absolute bed rest; and incomplete clinical data.

2.1.3. Control group

There were 11 male and 12 female patients with falls, aged 46–89 years, with an average age of (75.11 ± 8.08) years; in the study group, there were 5 male and 7 female patients with falls, aged 47–89 years, with an average age of (75.23 ± 8.23) years.

There were no statistically significant differences in baseline data such as gender, age, department distribution and underlying diseases between the two groups ($p > 0.05$), indicating comparability.

2.2. Methods

2.2.1. Control group: Routine fall prevention nursing

The traditional routine nursing model was adopted, with specific measures as follows.

- (1) At admission, nurses verbally informed patients and their family members of fall prevention precautions, for example, getting up slowly, avoiding going to the toilet alone.
- (2) For patients who fell, nurses provided verbal health education again and reported the incident to the

Nursing Department for filing in accordance with hospital regulations, but no in-depth cause analysis or feedback was conducted^[5].

- (3) Conducted regular ward rounds (3 times a day) to check for obvious environmental hazards including floor stains.
- (4) Placed “Fall Prevention” warning signs at the bedside, but there were no unified educational materials or personalized guidance.

2.2.2. Study group: Systematic nursing risk management

A full-process nursing risk management system covering “Organization–Assessment–Intervention–Feedback–Improvement” was constructed, with specific measures.

2.2.3. Establishment of a specialized nursing risk management team

The team consisted of 20 members, with the director of the Nursing Department as the team leader, head nurses of each department as deputy leaders, and frontline clinical nurses (with ≥ 3 years of work experience and fall prevention experience) as core members. The team’s responsibilities included as followed.

- (1) Formulating the Nursing Risk Management Standards for Inpatient Falls, clarifying the risk assessment process, intervention measures and emergency response plans.
- (2) Holding monthly team meetings to analyze fall incident cases and discuss problems in risk management.
- (3) Conducting fall risk management training for all nurses (twice a quarter), covering content such as the use of the Morse Scale, identification of drug side effects, and environmental risk inspection^[6].
- (4) Conducting regular quality control inspections on the implementation of risk management in each department (once a month) to ensure the effective implementation of measures.

2.2.4. Dynamic risk assessment

- (1) Admission assessment

Within 2 hours of a patient’s admission, the responsible nurse conducted the first assessment using the Morse Fall Risk Assessment Scale, covering items such as fall history, disease impact, medication use, and balance ability. Patients were classified into low-risk (< 25 points), medium-risk (25–44 points), and high-risk (≥ 45 points) based on the score. Only high-risk patients were included in this study.

- (2) Dynamic re-assessment

Daily re-assessment was conducted within 3 days after admission, and weekly re-assessment was conducted after 3 days. If a patient had a change in condition such as blood pressure fluctuation, medication adjustment, department transfer, or surgery, re-assessment must be conducted immediately.

- (3) Establishing a “Patient Fall Risk File”

To record each assessment result, intervention measures, and patient cooperation status, realizing dynamic management of “one file per patient”.

2.2.5. Multi-dimensional risk intervention

- (1) Environmental intervention

Systematic transformation of the ward environment was carried out. Handrails and emergency call bells were installed in restrooms; toilets in restrooms were replaced with sitting ones and anti-slip mats were

laid. Sufficient lighting was maintained in wards and corridors. Bed rails were installed on hospital beds and kept activated throughout the hospitalization period, with the bed height adjusted to allow patients' feet to touch the ground stably when sitting up. Handrails were installed on both sides of corridors, and obstacles in passageways were removed. The humidity of the ground was checked regularly twice a day; anti-slip agents were used to treat slippery areas, and "Caution: Wet Floor" warning signs were placed.

(2) Health education intervention

A "multi-format, personalized" education model was adopted. Inpatient Fall Prevention Manuals were distributed to patients and their family members. A 30-minute fall prevention health lecture was organized once a week, where members of the risk management team explained cases and key prevention points ^[7]. Short fall prevention videos (10 minutes each, with simple language and concise images) were played for elderly patients. Responsible nurses provided one-on-one guidance based on patients' underlying diseases and risk factors such as avoiding standing up within 30 minutes after taking antihypertensive drugs, preventing hypoglycemia-related falls in diabetic patients. Family members were given accompanying training to emphasize the importance of nighttime care ^[8].

(3) Medication and condition intervention

Nurses collaborated with physicians to sort out patients' medication status, identify drugs that might increase the risk of falls, and suggest physicians adjust medication dosage or timing. For patients with orthostatic hypotension, they were instructed to use the "three-step standing method" (lying flat for 30 seconds → sitting up for 30 seconds → standing for 30 seconds). Walking aids (e.g., canes, walkers) were provided to patients with walking difficulties, and correct usage methods were instructed. The frequency of rounds for high-risk patients was increased (once per hour), with focus on morning and nighttime toilet visits ^[9].

2.2.6. Closed-loop management of fall incidents

In case of a fall incident, the below emergency plan was activated immediately.

(1) On-site handling

Nurses arrived at the scene within 5 minutes to assess the patient's consciousness, vital sign, and injury status. If necessary, physicians were notified for emergency treatment such as fracture fixation, head CT examination ^[10].

(2) Incident reporting

A Nursing Adverse Event Report Form was filled out within 24 hours, with detailed records of the fall time, location, cause, handling measures, and patient prognosis, which was then submitted to the risk management team

(3) Root cause analysis

Within 3 working days, the team organized a case discussion meeting and used the "fishbone diagram" analysis method to identify the root cause from four dimensions: patients including insufficient awareness, limited mobility; nursing care such as delayed assessment, inadequate education; environment including wet floors, insufficient lighting; and management for example lax implementation of systems ^[11]

(4) Improvement measures

Targeted improvement plans were formulated based on the causes, such as increasing the frequency of nighttime rounds, supplementing educational materials; and the implementation effect was tracked to

reduce the risk of similar incidents recurring.

2.3. Outcome indicators

(1) Fall incidence rate

The number of fall cases among patients in both groups during hospitalization was counted. The calculation formula is “Fall incidence rate = Number of fall cases / Total number of cases × 100%”

(2) Post-fall injury rate

The number of injured cases such as abrasions, fractures, intracranial hemorrhage among patients who fell was counted. The calculation formula is “post-fall injury rate = Number of injured cases / Number of fall cases × 100%”. Nurses counted the number of falls of patients in both groups during hospitalization, recorded the severity of injuries caused by falls, and finally compared the fall rate and post-fall injury rate between the two groups.

2.4. Statistical methods

SPSS 26.0 statistical software was used for data processing. Measurement data were expressed as “mean ± standard deviation ($\bar{x} \pm s$)”, and inter-group comparison was conducted using the *t*-test; count data were expressed as “number of cases (percentage) [n (%)]”, and inter-group comparison was conducted using the chi-square test. A *p* value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of fall incidence rate and post-fall injury rate between the two groups

The fall incidence rate of patients in the study group was significantly lower than that in the control group, and the difference was statistically significant (*p* < 0.05). Specific data are shown in **Table 1**.

Table 1. Comparison of fall incidence rate and post-fall injury rate between the two groups

Group Name	n	Number of falls	Number of fall injuries
Control Group	210	23 (10.95%)	15 (65.22%)
Study Group	218	12 (5.50%)	3 (25.00%)
χ^2	/	4.23	5.11
<i>p</i>	/	0.04	0.02

4. Discussion

4.1. Mechanism analysis of nursing risk management in reducing fall risks of inpatients

The results of this study showed that after the implementation of nursing risk management, the fall incidence rate and post-fall injury rate of patients in the study group were significantly lower than those in the control group, which confirmed the effectiveness of nursing risk management in preventing falls among inpatients. Its core mechanism can be analyzed from the following three aspects:

First, dynamic risk assessment enables accurate understanding of patients' conditions. In routine nursing, risk assessment is only conducted once at admission, which is difficult to address dynamic risk factors such as changes

in patients' conditions and medication adjustments. However, in this study, through the model of admission assessment, dynamic re-assessment, and immediate assessment in special cases, combined with the quantitative evaluation of the Morse Scale, changes in patients' fall risks can be timely grasped, providing accurate basis for subsequent interventions^[12].

Second, multi-dimensional intervention covers the entire chain of risks. Risk factors for inpatients' falls include multiple dimensions such as environment, patients themselves, and nursing operations. Routine nursing only focuses on a single factor, making it difficult to form comprehensive protection^[13]. In this study, physical hazards were eliminated through environmental modifications such as anti-slip floors and installation of handrails; patients' and their family members' awareness of prevention was improved through personalized health education; and internal risks were reduced through medication and condition interventions^[8].

Third, closed-loop management promotes continuous improvement. In routine nursing, fall incidents are only reported and filed, lacking cause analysis and improvement measures, leading to repeated occurrence of similar incidents. In this study, however, potential risk loopholes were fundamentally identified through closed-loop management including incident handling, cause analysis, and improvement tracking^[14].

4.2. Clinical application value and limitations of nursing risk management

In terms of clinical application value, nursing risk management not only significantly reduces the fall risk of inpatients, but also improves nursing satisfaction, which is of great significance for improving doctor-patient relationships and enhancing the service quality of hospitals. At the same time, the construction of the risk management system has also standardized the nursing operation process and promoted the standardization of nursing quality management^[15].

This study still has certain limitations. First, it is a single-center study with a relatively limited sample size, and the results may have regional limitations. In the future, multi-center and large-sample studies need to be carried out for verification. Besides, the observation time is short, and no long-term follow-up of patients' fall risks after discharge was conducted. In subsequent studies, the observation period can be extended to evaluate the long-term effect of risk management. Thirdly, the differences in fall risks among patients with different disease types were not analyzed. For example, the risk factors of internal medicine patients and surgical patients may be different. In the future, the research objects can be further subdivided to develop more personalized management plans.

5. Conclusion

By constructing a full-process management system covering "Organization–Assessment–Intervention–Feedback–Improvement", nursing risk management can effectively reduce the fall incidence rate and post-fall injury rate of inpatients, while promoting the improvement of nurses' risk management capabilities. This model features systematicness, targeting and sustainability, and is suitable for fall prevention work of inpatients in hospitals at all levels. It is of great guiding significance especially for the management of high-risk groups such as the elderly and pediatric patients. In the future, the risk management plan should be further optimized, personalized measures formulated for different departments and populations, and its long-term effects verified through multi-center studies, so as to provide a more comprehensive practical basis for the safety management of inpatients.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Wei X, 2024, Application of Fall Risk Classification Nursing in Fall Prevention Management for Elderly Inpatients in Internal Medicine Department. *Chinese Journal of Health Care and Rehabilitation*, 42(10): 134–137.
- [2] Chen X, 2023, Study on the Current Situation and Influencing Factors of Nursing Intervention Behaviors for Inpatient Falls, thesis, Central South University.
- [3] Chen H, Wang L, Dong Y, et al., 2022, Analysis of Disease Burden of Fall-Related Deaths and Its Impact on Life Expectancy in Wuxi City from 2008 to 2019. *Modern Preventive Medicine*, 49(16): 3040–3044.
- [4] Wu D, Zhong M, Lin H, 2022, Investigation and Analysis of Nurses' Risk Management Ability for Inpatient Falls. *Today Nurse (Mid-term Edition)*, 29(07): 133–135.
- [5] Guan X, Lu A, 2022, Practice and Effect of Improving Compliance with Fall Prevention in High-Risk Inpatients. *Life Science Instruments*, 20(S1): 105.
- [6] Shang M, Han M, He H, et al., 2021, Application of Nursing-Sensitive Quality Indicators in Continuous Improvement of Fall and Fall-from-Bed Prevention for Hospitalized Children. *Journal of Nursing Administration*, 21(10): 702–706.
- [7] Wang L, 2021, Effect of Nursing Intervention on Compliance with Fall Prevention in Neurosurgery Inpatients. *Medical Diet and Health*, 19(03): 119–120.
- [8] Ji A, 2021, Analysis on the Application Effect and Significance of Fall Prevention Nursing Risk Management in Psychiatric Inpatients. *China & Foreign Medical Treatment*, 40(01): 175–177.
- [9] Chen G, 2020, Practice and Effect of Nursing Risk Management in Preventing Falls of Elderly Inpatients. *Smart Healthcare*, 6(19): 182–183.
- [10] Yang M, 2020, Discussion on the Role of Fall Risk Classification Management in Fall Prevention Nursing Management of Open Wards in Neurology Department. *China Health Industry*, 17(11): 24–26.
- [11] Zhang X, Min H, Zhang L, et al., 2024, Application Effect of Fall Prevention Nursing Risk Management in Psychiatric Inpatients. *Famous Doctors*, 2024(18): 104–106.
- [12] Li Y, Cao J, Shen L, et al., 2020, Establishment and Implementation of Fall Prevention Management Model for Inpatients in Rehabilitation Hospitals. *Today Nurse (Mid-term Edition)*, 27(02): 156–158.
- [13] Zhang X, 2020, Effect of Nursing Risk Management in Preventing Falls and Falls from Bed in Elderly Patients. *China Modern Medicine*, 27(03): 251–253.
- [14] Zhang Y, 2019, Application of Risk Management in Preventing Falls of Elderly Inpatients in Primary Hospitals. *Journal of Clinic Nursing's Electronic Edition*, 4(45): 177 + 183.
- [15] Zhang W, Liu Y, Yu M, 2019, Investigation and Analysis of Knowledge-Attitude-Behavior Level of Fall Prevention in Inpatients Among New Nurses. *Journal of General Nursing*, 17(01): 112–114.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.