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Original Article

Effectiveness of nursing signs in reducing risk events in the management of elderly patients with fracture

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Abstract: Objective: To investigate the application value of nursing signs in the risk management of elderly fracture patients. Methods: A total of 88 elderly fracture patients admitted to West China Hospital between April 2021 and August 2022, along with 12 nursing staff members, were selected as study participants. The clinical data of these patients were retrospectively analyzed, and the patients were divided into two groups based on the nursing management strategy employed. The control group received routine nursing risk management, whereas the observation group received nursing interventions incorporating nursing signs. The two groups were compared in terms of risk management effectiveness, including the occurrence of adverse events, patient compliance with treatment, quality of life, and anxiety levels. Results: Following nursing intervention, the observation group showed significantly lower scores on the Self-Rating Anxiety Scale (SAS) and Hamilton Anxiety Scale (HAMA) compared to the control group ($P<0.05$). The incidence of risk events was lower while the compliance rate was higher in the observation group than those in the control group (all $P<0.05$). Additionally, the observation group had higher post-intervention scores in all dimensions of the EuroQol Five Dimensions Questionnaire (EQ-5D) than the control group ($P<0.05$). Nursing staff in the observation group also achieved higher scores in theoretical knowledge and practical risk management skills compared to those in the control group ($P<0.05$). Conclusion: The application of nursing signs in the risk management of elderly fracture patients positively impacts patients' emotional well-being and quality of life, significantly reducing the occurrence of related risk events.

Keywords: Nursing signs, senile fractures, nursing risk management, quality of life

Introduction

Clinical studies have shown that most elderly people experience varying degrees of abnormal bone metabolism, making them prone to osteoporosis with increased bone fragility [1-3]. Moreover, age-related degenerative changes in various bodily functions, including motor function decline, can impair balance, leading to a higher risk of falls and other accidents in daily life, which significantly raises the likelihood of fractures. Elderly patients with fractures account for a relatively high proportion of orthopedic cases, and with an aging population, the incidence of fractures has been steadily increasing in recent years. During hospitalization, patients are at risk for a variety of nursing-related incidents, such as falls and pressure sores. These events not only impede the healing process but also elevate the potential for legal disputes in the medical field [4]. A key challenge in orthopedic care is reducing the occurrence of such risks among elderly fracture patients to promote functional recovery, improve therapeutic outcomes, and enhance prognosis [5].

Nursing risk management involves the comprehensive analysis of relevant data on elderly patients with fractures by clinical staff, identifying risk factors based on their professional experience and the causes of common incidents in the department. This analysis is used to formulate and implement targeted nursing management plans that account for specific risk factors, with the aim of improving nursing practices, outcomes, and safety while reducing the incidence of risk events [6, 7]. By focusing on the characteristics unique to elderly fracture patients, nursing risk management seeks to identify potential safety risks and select appro-

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priate management strategies to prevent related incidents [8].

Nursing signs, a critical component in the implementation of nursing risk management, help ensure patient safety through systematic nursing care [9]. Compared with the conventional nursing risk management mode, integrating nursing signs into the care model enhances safety by using distinct graphics, bright colors, and clear language to highlight critical actions to be taken or avoided. These visual cues serve as reminders for nursing staff, reinforcing their responsibility and attentiveness during patient care. They also help inform patients and their families about necessary precautions during hospitalization, reducing the likelihood of accidental injuries in the absence of verbal warnings [10]. Besides, before making nursing signs, nursing staff need to conduct a comprehensive analysis of the potential risks for elderly pa-tients with fracture during hospitalization. Additionally, staff training should be enhanced to ensure that nurses fully understand the significance of the signs, thereby improving their awareness of prevention and risk management. This approach not only bolsters patient confidence and safety but also enables nurses to more effectively identify risks and minimize errors when providing essential care for elderly patients with fractures [11].

In recent years, rising living standards and advancements in the medical environment have significantly increased patients' expectations for clinical nursing services. Efficient nurse risk management, which identifies and mitigates potential hazards by accounting for all risk factors, can better safeguard patients' health. It is essential for further improving the risk awareness of clinical nursing staff and the quality of nursing risk management. Integrating nursing signs-through the use of distinct colors, images, and phrases that serve as reminders and warnings-can further enhance the prevention of risk events and contribute to more effective nursing risk management [12, 13]. In this study, we investigated the application value of nursing signs in the management of elderly fracture patients, aiming to provide reference for future nursing work in such populations.

Data and methods

Data

Eighty-eight senior patients with fractures admitted to West China Hospital between April 2020 and August 2022 were chosen as the study subjects, and their clinical data were reviewed retrospectively. This study was ratified by the Ethics Committee of West China Hospital.

Inclusion criteria: Patients admitted within 12 hours of fracture occurrence; Patients with normal coagulation function; Patients with normal cognitive and mental state; Patients with fracture confirmed by imaging examination.

Exclusion criteria: Patients unable to communicate normally; Patients with local or systemic infectious diseases; Patients with severe organic diseases or malignant tumors; Patients who were critically ill or died during the treatment.

Methods

Control group: Patients in the control group received routine nursing risk management, mainly including the following contents:

(1) A risk management group was established, primarily consisting of a head nurse and major subordinate nurses. They reviewed incidents where nurses encountered challenges at work, identified the underlying causes of these incidents, and examined records to understand the issues. Based on the data, past experiences, and other relevant factors, the nursing team developed a tailored nursing plans for each patient.

(2) The department of orthopedics implemented a flexible shift system, alternating between first-line and second-line nurses. The nursing process was optimized according to the identified issues in the risk management practices. Additionally, nursing staff participated in regular training sessions to ensure they fully understood prevention measures for common risk events in the care of elderly fracture patients, enhancing their awareness of risk management and improving nursing quality. The staff also underwent communication skills training to better master and apply nurse-patient communication techniques effectively.

Observation group: Patients in the observation group received nursing interventions incorporating nursing signs, in addition to the standard care described earlier. The main interventions included:

(1) The head nurse organized training meetings for the nursing staff, focusing on the risk factors associated with elderly fracture patients during hospitalization. Individualized assessments of patient conditions were conducted, and group discussions were held to identify the relevant factors that may adversely affect the life safety of patients. A corresponding management plan was developed based on this analysis. Nursing staff were also trained to understand the significance of nursing signs, learning how to interpret the different colors and patterns.

(2) Various nursing signs were created, with colors and symbols assigned specific meanings. These signs were placed in strategic locations, and their significance was explained using simple graphics and text to ensure clarity for medical staff and patients. For instance, a red "medication contraindication" sign with the slogan "no glucose" was placed on the bed of a diabetic patient, while a red "allergy" sign marked "penicillin allergy" was placed for patients with allergies. Patients with poor cardiopulmonary function had a red "slow" sign on their IV stand, and a sign reading "no automatic speed regulation" was placed near the infusion device. Family members were instructed to monitor the patient's infusion and report any issues to the nursing staff, who were solely responsible for adjusting the infusion rate.

(3) Wristbands were distributed to the patients, with detailed information marked according to their conditions using different colors for easy identification. For patients at risk of falls or bed-related accidents, spacious beds were provided close to the wall or windows, with bed bars added for safety. Signs like "prevention of falls", "keep away from hot water bottles", "prevention of pressure sores", and "prevention of catheter slippage" were posted near the wards to increase awareness and caution among patients and their families, helping to reduce the risk of incidents like falls, burns, and pressure sores. Signs were posted to maintain the dryness of the ward floor, reminding patients and their families to "watch for slipping". Nursing staff adjusted their care activities based on these signs. For example, for patients with "prevention of pressure sores" signs, the nursing staff regularly helped them turn over, closely monitored for erythema and pressure ulcers at bony prominences, and massaged the area with vitamin E to improve blood circulation. For patients with the sign of "prevention of hypostatic pneumonia", nurses guided them in deep breathing exercises and expectoration, and provided active or passive rehabilitation to reduce the risk of deep venous thrombosis and promote joint recovery. Drugs were color-coded: red for oral, blue for topical, and yellow for intravenous. A colorful disinfection card was used with equipment to indicate whether it had been sanitized.

(4) The nurse station was designated as a sign area, featuring warnings related to fall prevention and other safety measures. Eye-catching graphics and text were placed in specific areas to continuously remind the nursing staff to maintain a vigilant and rigorous approach, ultimately enhancing the quality of nursing risk management.

Observation indexes

The Self-rating Anxiety Scale (SAS) and the Hamilton Anxiety Scale (HAMA) were used to assess anxiety levels in both groups before and after the implementation of nursing work. Lower scores indicate lower anxiety levels, with critical values of 50 and 14 points, respectively, for the two scales.

(1) The quality-of-life of the two groups were evaluated using the EuroQol Five Dimensions Questionnaire (EQ-5D) before and after the nursing intervention. This questionnaire covers aspects such as mobility, self-care, daily activities, pain/discomfort, anxiety/depression, and other aspects. Scores ranged from 0 to 100, with higher scores indicating better quality of life.

(2) Risk events that occurred during hospitalization, such as pressure sores, falls, falling out of bed, deep venous thrombosis of the lower limbs, were documented for both groups.

(3) Nurses evaluated patient compliance in both groups. Complete compliance: patients actively participated in clinical nursing activities; partial compliance: patients showed some resistance to certain clinical procedures but were generally cooperative; non-compliance: patients resisted relevant clinical procedures. The compliance rate was the sum of complete compliance rate and partial compliance rate.

Table 1. Comparison of baseline data between the two groups of patients

Group	N	Male (n)	Female (n)	Age (years)	Hip fracture (n)	Patella fracture (n)	Tibiofibular fracture (n)
Control group	44	30	14	68.93 ± 1.72	21	15	8
Observation group	44	28	16	68.79 ± 1.68	18	16	10
X^2/t		0.202		0.386	0.414	0.050	0.279
P		0.653		0.700	0.520	0.823	0.597

Table 2. Comparison of baseline data between the two groups of nursing personnel

Group	N	Age (years)	Nursing age (years)	Junior College (n)	Undergraduate (n)	Nurse (n)	Nurse practitioner (n)	Supervisor nurse (n)
Control group	6	28.09 ± 1.16	6.15 ± 0.42	2	4	3	2	1
Observation group	6	28.25 ± 1.23	6.22 ± 0.38	1	5	4	1	1
X^2/t		-0.232	-0.303	0.444		0.343	0.444	0.001
P		0.821	0.768	0.505		0.558	0.505	1.000

Table 3. Comparison of SAS and HAMA scores between the two groups before and after the intervention

Group	SAS score		HAMA score	
	Before nursing	After nursing	Before nursing	After nursing
Control group	38.75 ± 2.26	30.49 ± 1.84*	13.32 ± 1.47	10.69 ± 0.55*
Observation group	38.81 ± 2.32	26.05 ± 1.02*,#	13.29 ± 1.52	8.05 ± 0.41*,#
t	-0.123	13.999	0.094	25.527
P	0.903	<0.001	0.925	<0.001

Note: *, compared with before nursing, P<0.05; #, compared with the control group, P<0.05. SAS, Self-Rating Anxiety Scale; HAMA, Hamilton Anxiety Scale.

(4) The nursing risk management ability of the nursing team was assessed through both theoretical and practical exams, focusing on risk management for elderly fracture patients.

Statistical treatment

SPSS 20.0 was used for data analysis. Count data were represented in the form of percentage, and the difference between groups was determined using chi square test. The measurement data were expressed in the form of ($\overline{x}$±s), and the difference between the two groups were analyzed using t-test. A significant difference was determined at P<0.05.

Results

Comparison of anxiety between the two groups

A total of 88 patients were included in this study and further divided into an observation group (n=44) and a control group (n=44) according to the nursing protocols. In addition, a total of 12 nursing staff, with 6 in the control group and 6 in the observation group, were involved in the nursing works. No significant differences were observed in the data between both the two patient cohorts or the two nursing staff cohorts (P>0.05) (**Tables 1**, **2**).

Table 3 shows that before nursing intervention, there was no significant difference in SAS scores or HAMA scores between the observation group and the control group (P>0.05). However, following the nursing intervention, the SAS scores and HAMA scores of the observation group were significantly lower than those of the control group (all P<0.05).

Comparison of quality-of-life scores between the two groups

Table 4 shows that before nursing, there was no significant difference in quality-of-life scores between the two groups (P>0.05). However, after the intervention, the quality-of-life scores in the observation group were considerably higher than those in the control group (P<0.05).

Comparison of risk event incidence between the two groups

As shown in **Table 5**, the incidence of risk events was considerably lower in the observa-

Table 4. Comparison of the quality-of-life scores between the two groups of patients

Group	Mobility score		Self-care ability score		Daily activities score	
	Before nursing	After nursing	Before nursing	After nursing	Before nursing	After nursing
Control group	51.68 ± 1.15	66.91 ± 3.82*	60.12 ± 1.43	63.19 ± 2.01*	55.52 ± 1.12	63.25 ± 2.04*
Observation group	51.72 ± 1.23	74.89 ± 4.05*,#	60.43 ± 1.32	73.34 ± 3.18*,#	55.34 ± 1.08	73.19 ± 3.12*,#
T	-0.158	-9.508	-1.057	-17.897	0.767	-17.688
P	0.875	<0.001	0.294	<0.001	0.445	<0.001

Group		Control group	Observation group	t	P
Mobility score	Before nursing	51.68 ± 1.15	51.72 ± 1.23	-0.158	0.875
	After nursing	66.91 ± 3.82*	74.89 ± 4.05*,#	-9.508	<0.001
Self-care ability score	Before nursing	60.12 ± 1.43	60.43 ± 1.32	-1.057	0.294
	After nursing	63.19 ± 2.01*	73.34 ± 3.18*,#	-17.897	<0.001
Daily activities score	Before nursing	55.52 ± 1.12	55.34 ± 1.08	0.767	0.445
	After nursing	63.25 ± 2.04*	73.19 ± 3.12*,#	-17.688	<0.001
Pain discomfort score	Before nursing	54.31 ± 2.43	54.19 ± 2.38	0.234	0.816
	After nursing	62.25 ± 3.08*	71.12 ± 3.54*,#	-12.539	<0.001
Anxiety depression score	Before nursing	61.19 ± 2.26	61.24 ± 2.33	-0.102	0.919
	After nursing	70.39 ± 3.48*	81.52 ± 4.06*,#	-13.807	<0.001

Note: *, compared with before nursing, P<0.05; #, compared with the control group, P<0.05.

Table 5. Comparison of the incidence of risk events between the two groups of patients (n, %)

Group	N	Pressure sores	Fall	Falling out of bed	Deep venous thrombosis of lower extremity	The incidence of risk events
Control group	44	1	1	1	2	11.36
Observation group	44	0	0	0	0	0.00
X^2						5.301
P						0.021

Table 6. Comparison of treatment compliance between the two groups of patients (n, %)

Group	N	Complete compliance	Partial compliance	Non-compliance	Compliance rate
Control group	44	16	20	8	81.82
Observation group	44	19	23	2	95.45
X^2					4.062
P					0.044

tion group compared to in the control group (11.36% vs 0%, P=0.021).

Comparison of compliance level between the two groups

Table 6 shows that the observation group demonstrated significantly higher compliance compared to the control group (95.45% vs 81.82%; P<0.05).

Comparison of nursing risk management skills between the two groups

The evaluation nursing staff's risk management theory and practical skills in the observation group was significantly higher than in the control group (P<0.05), as demonstrated by the data in **Table 7**.

Discussion

The elderly population has become the most affected by fractures [14, 15]. Surgery is a common measure for the treatment of elderly fractures; however, the postoperative rehabilitation period, which often requires extended bed rest, presents a high risk of complications such as pressure ulcers, falls, and other adverse events [16, 17]. Thus, clinical practice primarily focuses on providing high-quality care and improving rehabilitation outcomes for elderly fracture

Table 7. Comparison of risk management skill scores between the two groups of nursing staff

Group	Risk management theory score	Risk management practical operation score
Control group	80.36 ± 3.97	78.06 ± 2.09
Observation group	89.52 ± 4.15	87.65 ± 3.16
t	-10.580	-16.790
P	<0.001	<0.001

patients after surgical treatment, as well as reducing the risk of adverse consequences during the postoperative period.

This study revealed that the observation group had considerably lower SAS and HAMA scores compared to the control group, indicating reduced anxiety levels. Additionally, the observation group showed significantly higher scores in all aspects of quality of life. Previous studies have also highlighted the numerous benefits of using nursing signs, particularly in alerting nurses to potential risks when caring for elderly fracture patients. Nursing signs encourage staff to prioritize the prevention of such risks during care planning and implementation, leading to improved emergency response and overall nursing quality [18, 19]. By adhering to the guidelines provided by the nursing signs, staff were able to ensure both the quality and safety of care, while minimizing risk events associated with improper nursing practices. This not only enhanced patient trust but also improved rehabilitation outcomes, reduced psychological stress, alleviated negative emotions, and supported the patient's overall physical recovery [20]. Therefore, incorporating nursing signs into risk management for elderly fracture patients proves to be an effective strategy for reducing anxiety, improving rehabilitation outcomes, and enhancing overall quality of life.

According to the findings of this study, participants in the observation group reported a significantly lower incidence of risk events and demonstrated higher compliance levels compared to the control group. The use of nursing signals to communicate with senior patients who have sustained fractures has been shown to prevent complications during treatment and improve patient cooperation with essential medical procedures. This is because nurses using nursing signs are able to implement more organized and effective risk management for their patients. Consistent with previous research, nursing signs were used for monitoring infusion speed, preventing pressure scores, falls, and other hospital-related risks feeling. The use of eye-catching colors and clear, concise wording tailored to the needs of elderly fracture patients served as an effective reminder for nursing staff to adhere to necessary precautions, ensuring timely and high-quality care [21]. Furthermore, nursing signs had a good normative effect on the behavior of nursing staff, patients and family members, enhancing overall safety and care standards [22].

The evaluation ratings for nurses in the observation group improved significantly compared to the control group, indicating that the incorporation of nursing signs into the care of elderly fracture patients enhances nurses' competence in managing such cases. This approach allows the nursing team to better anticipate and prepare for potential nursing risk events during the hospitalization of elderly patients with fractures [23]. Furthermore, the focus on staff training and assessment during the implementation of this nursing model ensures that nursing personnel are well-versed in relevant intervention measures and actively engage in learning. Displaying nursing signs at patients' bedsides and nurses' stations can serve as reminders, helping nurses avoid repeated mistakes [24].

There are still some limitations in this study. 1) Although 88 elderly fracture patients were included, the sample size is relatively small and needs to be expanded in future studies. 2) This study excluded patients who were unable to communicate normally, so it remains unclear whether nursing interventions would be as effective for these patients. 3) Due to the flexible shift system implemented in orthopedics, frontline and second-line nurses alternate shifts, which may lead to variations in record-keeping and nursing care. This should also be considered in future research.

Conclusion

In conclusion, the utilization of nursing signs in the nursing risk management of elderly patients

with fractures has been shown to reduce the incidence of risk events. The clinical outcomes are highly favorable, indicating that this approach holds great potential for broader implementation and utilization in the future.

Disclosure of conflict of interest

None.

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