

Application Research of Collaborative Decision-Making Nursing Intervention Based on Information Asymmetry Theory in Postoperative Limb Functional Rehabilitation of Patients with Lower Limb Fractures

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Abstract: Lower limb fractures are a prevalent clinical orthopedic condition, primarily caused by factors such as trauma and osteoporosis. Surgical treatment serves as the main intervention method; however, the postoperative rehabilitation of limb function is characterized by a lengthy and challenging process. Patients often experience suboptimal rehabilitation outcomes due to a lack of rehabilitation knowledge and insufficient compliance. The information asymmetry theory elucidates the information imbalance between doctors and patients resulting from disparities in professional knowledge. Collaborative decision-making nursing intervention effectively alleviates information asymmetry by establishing a mechanism for information sharing between doctors and patients, thereby fully mobilizing patients' initiative in rehabilitation. This paper synthesizes relevant domestic and international research in recent years to summarize the application methods and implementation effects of collaborative decision-making nursing intervention based on information asymmetry theory in the postoperative limb functional rehabilitation of patients with lower limb fractures. It aims to provide theoretical references and practical evidence for optimizing clinical rehabilitation nursing models and enhancing rehabilitation quality following lower limb fracture surgery.

Keywords: Information asymmetry theory; Collaborative decision-making; Lower limb fractures; Postoperative rehabilitation; Limb function

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1. Introduction

Lower limb fractures account for over 30% of all fractures in the body, with their incidence showing an upward trend due to population aging and the development of the transportation and construction industries^[1]. Surgery can effectively reduce fractured bone ends, but long-term functional training is required postoperatively to restore

limb function and reduce the incidence of complications ^[2]. However, approximately 40% of patients experience issues such as non-standardized rehabilitation training and poor compliance after surgery, leading to delayed recovery of limb function and increased medical burdens on families and society ^[3]. One of the core reasons for this is the information asymmetry between doctors and patients; in traditional nursing care, patients are at an informational disadvantage and find it difficult to actively participate in rehabilitation ^[4]. The information asymmetry theory, proposed by Akerlof in 1970 and later extended to the medical field, refers to the disadvantage suffered by the less informed party due to differences in information between the two parties in a transaction. Collaborative decision-making nursing intervention emphasizes information sharing and joint decision-making between doctors and patients; combining this theory can compensate for patients' informational disadvantages and improve rehabilitation outcomes ^[5]. This paper provides a comprehensive review of its application to offer clinical references.

2. Application of collaborative decision-making nursing intervention based on information asymmetry theory in postoperative limb function rehabilitation of patients with lower limb fractures

2.1. Establishing a professional nursing team

Form a professional nursing team consisting of orthopedic surgeons, rehabilitation therapists, and responsible nurses, clarifying the responsibilities of each member to collaboratively carry out collaborative decision-making nursing interventions ^[6]. Orthopedic surgeons are responsible for assessing the patient's fracture healing status, formulating a basic rehabilitation plan, and answering patients' questions regarding fracture diagnosis and treatment. Rehabilitation therapists guide patients in conducting scientific rehabilitation exercises, adjust exercise intensity and methods, and evaluate limb function recovery. Responsible nurses are tasked with conveying rehabilitation information, communicating daily with patients and their families, observing the patient's rehabilitation progress and psychological state, providing psychological interventions and health guidance, and coordinating the work of team members. Team members hold regular communication meetings to exchange information on the patient's rehabilitation progress and optimize rehabilitation plans.

2.2. Establishing a multi-channel information dissemination mechanism

To alleviate information asymmetry between healthcare providers and patients, establish a multi-channel information dissemination mechanism to ensure that patients can promptly obtain accurate and effective rehabilitation information ^[7].

(1) Oral communication

After the patient regains consciousness post-surgery, the responsible nurse promptly explains the fracture healing status, postoperative precautions, and the initial rehabilitation plan to the patient and their family using simple language, avoiding medical jargon, and patiently answering the patient's questions.

(2) Written communication

Develop personalized rehabilitation guidance manuals covering fracture-related knowledge, rehabilitation exercise steps, exercise precautions, complication prevention methods, and rehabilitation evaluation criteria, and distribute them to patients and their families for easy reference at any time.

(3) Visual guidance

Utilize images, videos, and models to demonstrate specific rehabilitation exercises and the fracture healing process to patients, helping them intuitively understand relevant information. Establish a rehabilitation exercise video library, allowing patients to watch training videos on their mobile phones or tablets to standardize exercise movements.

(4) Online communication

Establish a WeChat group for healthcare provider-patient communication, where healthcare providers regularly post rehabilitation knowledge, exercise reminders, and answers to common questions. Patients and their families can consult questions and provide feedback on rehabilitation progress at any time, with healthcare providers responding promptly to ensure real-time information transmission.

2.3. Conducting two-way communication to alleviate information interpretation differences

Establish an effective two-way communication mechanism between healthcare providers and patients to alleviate information interpretation differences and ensure effective information transmission and understanding.

(1) Regular communication

The responsible nurse communicates daily with patients and their families to understand the patient's rehabilitation experience, difficulties encountered during exercises, psychological state, and information needs, promptly answering the patient's questions. Weekly healthcare provider-patient communication meetings are organized, where orthopedic surgeons and rehabilitation therapists explain the rehabilitation progress and evaluation results in detail to patients and their families, answer common questions, and collect patient feedback and suggestions^[8].

(2) Optimizing communication skills

Healthcare providers use communication techniques such as listening, empathy, and guidance to patiently listen to patients' concerns and worries, empathize with their pain, and encourage patients to actively express their feelings and questions. Avoid using medical jargon and interpret rehabilitation evaluation indicators and exercise plans in simple language, repeating explanations if necessary to ensure patient understanding.

(3) Encouraging patient participation

Encourage patients and their families to actively consult healthcare providers, provide feedback on abnormal situations during rehabilitation, and participate in the formulation and adjustment of rehabilitation plans, enabling patients to fully understand their rehabilitation status and improve their information interpretation abilities.

2.4. Jointly formulating and implementing personalized rehabilitation plans

Collaborate with patients and their families to develop personalized postoperative limb function rehabilitation plans based on individual patient conditions, clarifying rehabilitation goals, exercise content, intensity, and schedule to ensure the feasibility and applicability of the rehabilitation plan^[9].

(1) Rehabilitation evaluation

Within 24 hours post-surgery, the nursing team conducts a comprehensive evaluation of the patient, including fracture site, type, healing status, joint range of motion, muscle strength, physical condition, psychological state, rehabilitation needs, and educational level, to provide a basis for formulating the rehabilitation plan^[10].

(2) Plan formulation

Healthcare providers explain the advantages, disadvantages, risks, and prognosis of different rehabilitation plans to patients and their families in detail, and jointly formulate a rehabilitation plan based on the patient's evaluation results and preferences. For example, for young patients with rapid fracture healing, a rehabilitation plan with moderate intensity and rapid progress is formulated, focusing on restoring joint range of motion and muscle strength. For elderly patients with poor physical condition and slow fracture healing, a rehabilitation plan with gentle intensity and slow progress is formulated, emphasizing complication prevention and gradual limb function recovery.

(3) Plan implementation

Healthcare providers guide patients to exercise according to the rehabilitation plan, with rehabilitation therapists demonstrating exercise movements on-site and correcting non-standard movements. The responsible nurse observes the patient's exercise progress daily and adjusts exercise intensity and progress promptly. Patients and their families strictly follow the rehabilitation plan for exercises, actively providing feedback on feelings and abnormal situations during exercises, which healthcare providers address promptly.

(4) Dynamic adjustment

Conduct a rehabilitation evaluation of the patient weekly and a comprehensive evaluation monthly, adjusting the rehabilitation plan jointly with the patient based on the patient's fracture healing status, limb function recovery, psychological state, and preferences to ensure that the rehabilitation plan always meets the patient's individual needs.

2.5. Strengthening psychological interventions and social support

Postoperative patients with lower limb fractures are prone to negative emotions such as anxiety, fear, inferiority, and depression due to limb dysfunction, a long rehabilitation cycle, and concerns about prognosis, which can affect their rehabilitation enthusiasm and compliance and exacerbate information asymmetry^[11]. Therefore, healthcare providers need to strengthen psychological interventions for patients based on the concept of collaborative decision-making and encourage family members to provide social support.

(1) Psychological evaluation

Regularly evaluate the patient's psychological state using tools such as the Self-Rating Anxiety Scale (SAS) and the Self-Rating Depression Scale (SDS) to identify the causes of negative emotions.

(2) Psychological counseling

Address the patient's negative emotions through one-on-one communication with healthcare providers, listening to the patient's worries, and using cognitive-behavioral therapy and relaxation training to help the patient adjust their cognition and alleviate negative emotions. Introduce successful rehabilitation cases to enhance the patient's rehabilitation confidence.

(3) Family support

Encourage family members to spend more time with and care for the patient, providing emotional and financial support. Guide family members to participate in the patient's rehabilitation exercise process, supervise the patient's standard exercises, and help the patient establish rehabilitation confidence and improve rehabilitation compliance.

2.6. Establishing a rehabilitation effect evaluation system

Establish a scientific rehabilitation effect evaluation system to regularly evaluate the patient's limb function rehabilitation progress, promptly identify problems and adjust rehabilitation plans, while enabling patients to clearly understand their rehabilitation progress and enhance their rehabilitation enthusiasm ^[12]. Evaluation indicators include limb function indicators and patient subjective feeling indicators: Limb function indicators include joint range of motion, muscle strength, walking function, and fracture healing time, evaluated using tools such as a goniometer and muscle strength grading method. Patient subjective feeling indicators include rehabilitation compliance, rehabilitation satisfaction, and psychological state, evaluated using tools such as the Rehabilitation Compliance Scale, Nursing Satisfaction Scale, SAS, and SDS. Regularly provide feedback on evaluation results to patients and their families, jointly analyze the strengths and weaknesses of the rehabilitation process with the patient, and adjust rehabilitation strategies to ensure rehabilitation effectiveness.

3. Application effects

3.1. Improving patient rehabilitation compliance

The collaborative decision-making nursing intervention based on the information asymmetry theory compensates for patients' information disadvantages through a multi-channel information dissemination mechanism, enabling them to fully understand the importance, methods, and precautions of rehabilitation exercises, thereby enhancing their awareness of rehabilitation nursing ^[13]. Meanwhile, equal communication between healthcare providers and patients, along with the formulation of personalized rehabilitation plans, makes patients feel respected and valued, fully mobilize their initiative and enthusiasm for rehabilitation, effectively improving their rehabilitation compliance ^[14].

3.2. Reducing the risk of complications

The collaborative decision-making nursing intervention effectively prevents complications such as joint stiffness, muscle atrophy, deep vein thrombosis, and pressure ulcers by comprehensively conveying information on complication prevention and guiding patients to perform rehabilitation exercises, limb massages, turning over and patting the back, etc., in a standardized manner ^[15]. Additionally, healthcare providers regularly observe the patient's rehabilitation progress, promptly identify early signs of complications, and take joint intervention measures with the patient, reducing the severity of complications ^[16].

3.3. Improving postoperative limb function in patients

The collaborative decision-making nursing intervention based on the information asymmetry theory effectively promotes the recovery of postoperative limb function in patients by jointly formulating personalized rehabilitation plans, standardizing rehabilitation exercise behaviors, and dynamically adjusting exercise intensity and progress ^[17]. Through standardized rehabilitation exercises, patients experience significant improvements in joint range of motion, muscle strength, and walking ability, along with a noticeable reduction in fracture healing time ^[9].

3.4. Alleviating negative emotions and improving quality of life in patients

The collaborative decision-making nursing intervention alleviates negative emotions such as anxiety, fear,

and depression in patients through enhanced psychological interventions, thereby boosting their rehabilitation confidence ^[18]. Meanwhile, improvements in limb function and a reduction in the incidence of complications enhance patients' self-care abilities, subsequently improving their quality of life ^[19].

4. Conclusion

The collaborative decision-making nursing intervention based on the information asymmetry theory effectively alleviates information asymmetry between healthcare providers and patients during the postoperative rehabilitation of patients with lower limb fractures by establishing a comprehensive information dissemination mechanism, strengthening two-way communication between healthcare providers and patients, and jointly formulating personalized rehabilitation plans. This intervention enhances patient rehabilitation compliance and improves limb function recovery outcomes, while also mitigating healthcare provider-patient conflicts, demonstrating significant clinical application value. As healthcare and nursing models continue to evolve and advance, collaborative decision-making nursing intervention will gradually become the mainstream approach for postoperative rehabilitation care in patients with lower limb fractures. In the future, further research is needed to explore more scientific and comprehensive application models of information asymmetry theory and collaborative decision-making nursing intervention. Additionally, leveraging advanced technologies such as artificial intelligence and big data can optimize information dissemination mechanisms, construct intelligent healthcare provider-patient communication platforms, and achieve precise and personalized delivery of rehabilitation information.

Disclosure statement

The author declares no conflict of interest.

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