



REVISTA DE LA FACULTAD DE CIENCIAS DE LA SALUD

Vol. 27(1):52-61, April - July 2024
i-ISSN 0123-7047 e-ISSN 2382-4603



Reflective article

Reflections on the Evaluation of the Clinical Practice Guideline Regarding Pain Management and Patient Satisfaction with Total Hip Arthroplasty

Reflexiones sobre la Evaluación de la Guía de Práctica Clínica en sobre el Manejo del Dolor y la Satisfacción del Paciente con Artroplastia Total de Cadera

Reflexões sobre a Avaliação do Guia de Prática Clínica sobre Manejo da Dor e Satisfação do Paciente com Artroplastia Total de Quadril

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ARTICLE INFORMATION:

Article received: February 27, 2023

Article accepted: July 31, 2024

DOI: <https://doi.org/10.29375/01237047.4653>



How to reference. Huo SJ, Zhao C, An LL, Liu F, Jiang ZD, Yuan ZX, et al. Reflections on the Evaluation of the Clinical Practice Guideline Regarding Pain Management and Patient Satisfaction with Total Hip Arthroplasty. MedUNAB [Internet]. 2024;27(1):52-61. doi: <https://doi.org/10.29375/01237047.4653>

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Conceptualization, Methodology, Software, Formal analysis, Writing - Original Draft, Writing - Review & Editing, Visualization, Funding acquisition.

CZ. Investigation.

Resources, Data Curation. **LLA.**

Validation,

Investigation. **FL.**

Investigation. **ZJ.**

Investigation. **YZ.**

Resources, Data

Curation. **DX.**

Conceptualization,

Supervision, Project administration,

Funding

acquisition. **XY.**

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ABSTRACT

Introduction. This paper is based on the third Edition of the RNAO “Pain Assessment and Management” guideline applied to total hip arthroplasty (THA) patients and the evaluation of clinical practice guidelines on pain management and patient satisfaction. **Objective.** To apply the Third Edition Guideline for the Pain Assessment and Management from RNAO to patients after total hip arthroplasty and evaluate its effectiveness. **Division of topics covered.** Evaluate the knowledge, assessment of pain by nursing, and satisfaction in the care of patients with total hip arthroplasty before and after the implementation of the guide, according to the Knowledge to Action Framework. According to 20 recommendations from the Guideline, 6 quality review indicators were formulated: 1. Establish and implement standard assessment processes and forms; 2. Conduct nurse training and patient education; 3. Compare nurses’ pain knowledge and attitude levels before and after evidence-based practice; 4. Compare nurses’ implementation of various indicators of patient pain assessment and management; 5. Compare pain control satisfaction of total hip arthroplasty patients before and after Best Practice Guideline implementation; and 6. Ensure nurses use the same proven tool to assess pain in patients. **Results.** After implementing the Guideline, the rate of nurses’ knowledge of pain assessment and management has increased from 42.6% to 48%. Nurses’ pain screening and evaluation, strategies to encourage patients and if the families participated in pain management were recorded after an assessment, and they were statistically significant (all $P < 0.05$). There were statistically significant differences in patients’ perceptions of pain management, active reporting of pain, and patient satisfaction with pain control (all $P < 0.05$). **Conclusion:** The application of the evidence can improve nurses’ knowledge and attitude toward pain assessment and management, standardize their operating system and process, and improve patients’ satisfaction with pain control.

Keywords:

Arthroplasty, Replacement, Hip; Pain; Evidence-Based Practice; Practice Guideline

RESUMEN

Introducción. Este artículo se basa en la tercera edición de la guía de “Evaluación y Manejo del Dolor” de la RNAO, aplicada a pacientes con artroplastia total de cadera (ATC) y en la evaluación de guías de práctica clínica sobre el manejo del dolor y la satisfacción del paciente. **Objetivo:** Aplicar la tercera edición de la Guía de Evaluación y Manejo del Dolor de la RNAO a pacientes después de la artroplastia total de cadera y evaluar su efectividad. **División de temas tratados.** Evaluar el conocimiento, la valoración del dolor por parte del personal de enfermería y la satisfacción de los pacientes con artroplastia total de cadera antes y después de la implementación de la guía, siguiendo el Marco de Conocimiento para la Acción. Con base en las 20 recomendaciones de la Guía, se formularon 6 indicadores de calidad para su revisión: 1. Establecer e implementar procesos y formularios estandarizados de evaluación; 2. Realizar

capacitación de personal de enfermería y educación a los pacientes; 3. Comparar los niveles de conocimiento y actitudes del personal de enfermería sobre el dolor antes y después de la práctica basada en evidencia; 4. Comparar la implementación de varios indicadores de evaluación y manejo del dolor en los pacientes por parte del personal de enfermería; 5. Comparar la satisfacción de los pacientes con artroplastia total de cadera respecto al control del dolor, antes y después de la implementación de la Guía de Buenas Prácticas; 6. Asegurar que el personal de enfermería emplee la misma herramienta acreditada para evaluar el dolor en los pacientes. **Resultados.** Tras la implementación de la Guía, la tasa de conocimiento del personal de enfermería sobre la evaluación y manejo del dolor aumentó del 42.6% al 48%. La evaluación del dolor por parte del personal de enfermería, las estrategias para motivar a los pacientes, y si las familias participaban en el manejo del dolor, fueron evaluadas y se registraron con diferencias estadísticamente significativas (todos $P < 0.05$). También, se presentaron diferencias estadísticamente significativas en las percepciones de los pacientes sobre el manejo del dolor, el reporte activo del dolor y la satisfacción de los pacientes con el control del dolor (todos $P < 0.05$). **Conclusión.** La aplicación de la evidencia puede mejorar el conocimiento y la actitud del personal de enfermería hacia la evaluación y manejo del dolor, estandarizar sus sistemas y procesos operativos, y mejorar la satisfacción de los pacientes sobre el control del dolor.

Palabras clave:

Artroplastia de Reemplazo de Cadera; Artroplastia; Artroplastia de Reemplazo; Cadera; Dolor; Práctica Clínica Basada en la Evidencia; Guía de Práctica Clínica

RESUMO

Introdução. Este artigo baseia-se na terceira edição do guia “Avaliação e Manejo da Dor” da RNAO, aplicada a pacientes com artroplastia total de quadril (ATQ) e na avaliação de guias de prática clínica sobre manejo da dor e satisfação do paciente. **Objetivo:** Aplicar a terceira edição do Guia de Avaliação e Manejo da Dor da RNAO em pacientes após artroplastia total de quadril e avaliar sua

eficácia. **Divisão dos tópicos abordados.** Avaliar o conhecimento, a avaliação da dor pela equipe de enfermagem e a satisfação dos pacientes com artroplastia total do quadril antes e após a implementação do guia, seguindo a Estrutura de Conhecimento para Ação. Com base nas 20 recomendações do Guia, foram formulados 6 indicadores de qualidade para revisão: 1. Estabelecer e implementar processos e formulários de avaliação padronizados; 2. Realizar treinamento da equipe de enfermagem e educação dos pacientes; 3. Comparar os níveis de conhecimento e atitudes da equipe de enfermagem sobre a dor antes e depois da prática baseada em evidências; 4. Comparar a implementação de diversos indicadores de avaliação e manejo da dor em pacientes pela equipe de enfermagem; 5. Comparar a satisfação dos pacientes com artroplastia total do quadril quanto ao controle da dor, antes e após a implementação do Guia de Boas Práticas; 6. Garantir que a equipe de enfermagem utilize a mesma ferramenta credenciada para avaliar a dor nos pacientes. **Resultados.** Após a implementação do Guia, o índice de conhecimento da equipe de enfermagem sobre avaliação e manejo da dor aumentou de 42.6% para 48%. A avaliação da dor pela equipe de enfermagem, as estratégias para motivar os pacientes e o envolvimento das famílias no manejo da dor foram avaliadas e registradas com diferenças estatisticamente significativas (todos $P < 0.05$). Além disso, houve diferenças estatisticamente significativas nas percepções dos pacientes sobre o controle da dor, no relato ativo da dor e na satisfação dos pacientes com o controle da dor (todos $P < 0.05$). **Conclusão.** A aplicação de evidências pode melhorar o conhecimento e a atitude da equipe de enfermagem em relação à avaliação e manejo da dor, padronizar seus sistemas e processos operacionais e melhorar a satisfação do paciente em relação ao controle da dor.

Palavras-chave:

Artroplastia de Quadril; Artroplastia; Artroplastia de Substituição; Quadril; Dor; Prática Clínica Baseada em Evidências; Guia de Prática Clínica

Introduction

Knowledge to Action Framework (KTA) was proposed by Professor Graham's team in Canada in 2006, aiming to promote the application of research results in clinical practice by policy-makers, managers, practitioners, researchers, patients, and the public and promote knowledge transformation and practice reform. Improve the quality of clinical care and patient health. KTA includes two parts: knowledge generation and knowledge application. Total hip arthroplasty (THA) is the implantation of an artificially manufactured hip prosthesis to replace the damaged hip joint, which can stabilize the hip joint, restore hip joint function, and reduce the pain caused by the damaged hip joint (1,2). A study has shown (3) that the incidence of chronic pain after THA is 7%~23%. Pain in patients after THA seriously affects early functional recovery, affects patients' early ambulation, and increases the risk of deep vein thrombosis (4).

The Institute of Medicine (IOM) pointed out that the clinical practice guide (CPG) is based on evidence from systematic reviews and balances the pros and cons of different interventions, forming recommendations that can provide patients with the best health care services opinions (5,6). As the most authoritative evidence, CPG is one of the most essential tools to guide clinical practice, and it is also the criterion used by clinical staff for treatments and nursing (7,8). In this study, according to the KTA (9), as the basis of the Assessment and Management of Pain BPG, an evidence-based practice plan for pain assessment and management of patients after THA was developed and implemented. The influence on nurses' knowledge and attitude, and behavior of pain assessment and management as well as patients' satisfaction with pain control were evaluated. The methods and results were reported as

follows. This study aims to apply the Third Edition Guideline for the Pain Assessment and Management from RNAO to patients after total hip arthroplasty and evaluate its effectiveness.

Division of topics covered

The clinical question

According to the PICOS principle (10), P is a specific research object/clinical problem (patient/population, P), that is, a patient or a population; I/E is an intervention/exposure factor (intervention/exposure, I); C is control measure or another intervention that can be used for comparison (comparison/control, C), that is a comparative factor; O is the outcome index (outcome, O), that is the effect of the intervention; S is the research design (study/design, S). The research question of this study is: For THA patient (P), implement an evidence-based plan to evaluate and manage postoperative pain based on the Assessment and Management of Pain BPG (I), compared to pre-evidence-based plan (C), if it can improve nurses' knowledge and attitude of pain management, nurses' practice of pain management, and patients' satisfaction with pain control (O). This study is an experimental study (S).

Established an evidence-based practice team

Our hospital's nursing and orthopedic departments identified pain control in patients after THA as an urgent problem and established an evidence-based practice team. This team has 22 champions, including four nurses with master's and doctoral degrees and 18 undergraduate nursing students.

Evidence retrieval and selection

A systematic search of professional associations, evidence-based guidelines, websites, and databases was carried out to collect articles from inception to December 2019 that are relevant to pain management for patients after THA. Databases include Cochrane Library, PubMed, the Chinese Biological Literature and Medical Database (CBM), the Chinese Period Journal full-text database (CNKI), and the Wan Fang database. Mesh terms or keywords were used and combined with free words. The search terms in Chinese were “hip replacement,” “hip prosthesis implantation,” “hip arthroplasty,” “surgery,” “pain,” “assessment,” “evaluation,” “guideline,” and “best practice” the search term. The search terms in English are “hip replacement arthroplasty,” “hip prosthesis implantation,” “total hip replacement,” “total hip arthroplasty,” “operative surgical procedures,” “operative surgical,” “surgery,” “pain,” “assessment,” “evaluate,” “clinical practice guideline,” “best practice.” Inclusion criteria of the Guideline included: (1) Recommendations related to hip replacement pain assessment; (2) Latest version of revised or updated guidelines; (3) Publications in Chinese or English; (4) The paper type is evidence-based Guideline with complete information. Exclusion criteria included: (1) Repeatedly published guidelines; (2) Interpretation of the guidelines; (3) Criteria or manuals. A total of 8 guidelines were included, including 7 in English and 1 in China. The AGREE II evaluation tool was used to evaluate the quality of these guidelines. As a result, the quality of 5 guidelines was in grade A and was recommended without any changes; the quality of 3 guidelines was in grade B and recommended after modification (11). Finally, the Assessment and Management of Pain Best Practice Guideline (3rd Edition) by the Registered Nurses Association of Ontario (RNAO) was selected for clinical practice by the BPG team (12). The Guideline was graded as A and has 20 recommendations, covering six aspects of pain management: Assessment, planning, implementation, evaluation, education, and organization and policy.

Built an Evidence-Based Practice Project

In this study, RNAO Assessment and Management of Pain BPG (3rd Edition) was selected for clinical practice (12), guided by the KTA (9) and the Implementation of Best Practice Guidelines Toolkit (2nd Edition) (13). Through a scientific adaptation of the Guideline (14), we planned to implement several evidence-based pain assessment and management interventions for patients after THA.

Evidence-based change in organizations and processes

• *Established a standardized operation process*

Based on the recommendations of Assessment and Management of Pain BPG (3rd Edition) (12) and the

implementation principles of the toolkit, we adopted the guidelines’ recommendations to develop a pain assessment and management flow chart and a pain assessment record form for patients after THA. This will improve the comprehensiveness of patient pain assessment and the effectiveness and satisfaction of patient pain management.

• *Nurses training and education*

Nurse’s training included both hospital-level and departmental-level training. The hospital level includes providing advanced training to other hospitals (such as Dongzhimen Hospital of the Beijing University of Traditional Chinese Medicine); and the annual training course on the application of evidence-based nursing in Gansu Province held by the Lanzhou University Second Hospital. Through these training sessions, we constantly recruited new champions, invited domestic and foreign experts to conduct follow-up training courses, and made the content rich and comprehensive. Every two weeks, departmental training provided nurses with knowledge and skills on evidence-based practice, including strategies to implement best practice guidelines, literature retrieval, scientific research paper writing, and gap analysis. These training sessions were mainly to improve nurses’ awareness of evidence-based practice, change the concept of nurses’ clinical practice, and actively participate in integrating the best practice guidelines in their practice. Each interactive training was an hour long. After the session, nurses were encouraged to ask questions and provide feedback. The nurses were provided with an electronic version of the materials, so they could consult with each other and study at any time. The champions were responsible for evaluating the process of pain assessment and management practice, discovering problems promptly, and giving feedback. The head nurse would organize discussion sessions to resolve any issues correctly.

Nurse education was mainly done by compiling and distributing the *Orthopedic Pain Education Manual-Nurses Edition*. The main content of this manual included the definition, classification, harm, assessment, management, education, and other aspects of pain. The manual was printed and distributed as a pocketbook. The evidence-based practice team gave each nurse a copy so they could read it at any time.

• *Patient Education*

The nurses gave patients an interactive discussion on pain management-related knowledge during admission and preoperative training. Professionally trained nurses gathered patients and their families in classrooms to explain pain management, about half an hour each time, and interacted with patients to encourage them to ask questions and enhance the effectiveness of knowledge education. The nurses also provided the patients an Orthopedic Pain

Education Handbook - Patient Edition. The main content of the handbook included the concept of pain and its harm to the body, commonly used drug treatments and adverse reactions, non-drug treatments, assessment and active reporting. Nurses placed this manual on the patient's bedside. When patients were admitted to the hospital, nurses would tell them where the education manual was in their room and its main contents. They taught the patients how to use the visual analog scale (VAS), the Facespainscale (FPS), and other tools to determine their pain. The same assessment tool was required for the same patient to complete before and after the interventions.

Data collection and effect evaluation

• General information

33 patients who were hospitalized in the Department of Orthopedics of the Lanzhou University Second Hospital in Gansu Province from March to May 2021 were selected

as the pre-evidence-based practice group (baseline review group), and patients who were hospitalized in the Department of Orthopedics in our hospital from June to August 2021 were selected. 34 patients agreed as the post-evidence-based practice group. Inclusion criteria included Patients undergoing THA; patients who signed an informed consent, between 18 years old to 80 years old, alert and responsive, able to correctly understand and cooperate to fill out the questionnaire. Exclusion criteria included Patients with serious cardiovascular and cerebrovascular diseases and patients with serious conditions that may change at any time. There was no statistically significant difference in the general data of the patients before and after the implementation of evidence-based practice ($P>0.05$), and they were comparable. The results were shown in Table 1. The nurses engaged in the study were all orthopedic nurses, and none of these nurses received relevant training on guideline implementation before the study.

Table 1. Comparison of general data of patients before and after BPG implementation

Characteristic	Before practice (N=33)	After practice (N=34)	chi-square value	P-value
Sex				
Male	16	17	0.015	0.901
Female	17	17		
Age (years)				
18~60	21	25	0.762	0.383
>60	12	9		
BMI				
<18.5	4	7	1.456	0.483
18.5~23.9	19	15		
>23.9	10	12		
Comorbidity				
Yes	18	14	1.200	0.273
No	15	20		
Anesthesia				
General Anesthesia	25	31	2.901	0.089
Local Anesthesia	8	3		

Source: prepared by authors

Topics for Reflection

• Nurses' pain knowledge and attitude

The Chinese version of the Pain Knowledge and Attitude Survey questionnaire (KASRP, 2008) was used for evaluation (15). KASRP was divided into three types of questions: Yes/no questions, multiple choice questions, and case analysis questions, including pain assessment, treatment, medication principles, etc., and it consisted of 41 items. Standard answers were used for scoring. The author of the original questionnaire believed that an 80% correct answer rate was a qualified rate. If the score was lower than this ratio, it indicated that the nurses lacked pain management knowledge and attitude and needed to be improved. We calculated the proportion of correct answers, i.e., correct answer ratio = (number of correct answers/total number of questions) x 100%. The total Cronbach α coefficient was 0.743. The retest reliability was 0.660. Before the implementation, a total of 81 questionnaires were distributed, and 80 questionnaires were collected, with an effective rate of 98.77%. After the implementation, a total of 81 questionnaires were distributed, and 78 were effectively recovered, with an effective recovery rate of 96.30%.

• The implementation of various indicators of nurses' pain assessment and management

Based on the pain assessment and management flow chart and the record form for patients after THA established by the Guideline, 6 quality review indicators were formulated. The main content includes pain screening, evaluation content, evaluation tools, reassessment, analgesic measures, and health education. The questionnaires were filled in by consulting the medical records, nursing records, and on-site investigations.

• Patient Satisfaction

A patient pain control satisfaction questionnaire was developed and used, which mainly consisted of essential patient information, operation name, frequency of pain control during hospitalization, behavioral pain scale, whether

pain management concepts changed, and whether pain was actively reported. After the patients had consented to the study, specially trained nurses conducted a questionnaire survey on the day they were discharged from the hospital. They filled them out anonymously, and the nurses collected the questionnaires on the spot.

• Statistical method

Statistical analysis of data was carried out using SPSS 26.0 statistical software. The measurement data conforming to the normal distribution were expressed as mean $\pm$ standard deviation. The t test was used to compare the groups. The measurement data of the skewed distribution were expressed as the median (quartile) [M (P25, P75)]. Comparisons were made using the nonparametric Mann-Whitney U test. Enumeration data were expressed by frequency and composition ratio, and the chi-square test was used for comparison between groups. $P < 0.05$ was considered statistically significant.

Results

• Comparison of pain management knowledge and attitudes of nurses before and after the BPG implementation.

The results showed that the average response rate of nurses' pain management knowledge and attitude increased from 42.6% to 48% after BPG implementation. The comparison of the five items of the knowledge and attitude of nurses in pain management with their answers before and after implementation is shown in Table 2. There were fewer correct answers in all these items before the implementation. The number of nurses who correctly answered the questionnaire after the BPG implementation was relatively small. There was no statistical significance in the comparison of 4 items except the one that patients may still be able to fall asleep even if they have severe pain ($P = 0.003$) after the implementation ($P > 0.05$).

Table 2. Comparison of 5 items of nurses' knowledge and attitude of pain management before and after the BPG implementation of (N/%)

Item	Before Implementation (N=80)	After Implementation (N=78)	chi-square value	P-value
Give a dose of morphine	12 (15)	20 (26)	2.769	0.096
Patients may be able to sleep even if they are in severe pain	10 (12)	25 (32)	8.754	0.003
The cause of the pain is unknown and drugs should not be administered during the pain assessment phase	8 (10)	15 (19)	2.706	0.100
Describe Andrew's pain score	7 (8.75)	12 (15)	1.643	0.200
Give Andrew a dose of morphine	5 (6.25)	10 (13)	1.984	0.159

Source: prepared by authors

• **Comparison of nurses' implementation of patient pain assessment and management before and after evidence-based practice**

Table 3 shows the comparison of nurses' implementation of various indicators of patient pain assessment and management before and after BPG implementation.

In Table 3, patients' pain assessment and management and its frequencies were recorded before and after the implementation. They were all statistically significant (all $P < 0.05$). However, there was no statistical significance in the completeness of evaluation content, selection of evaluation tools, and re-evaluation (all $P > 0.05$).

Table 3. Nurses' implementation of various indicators of patient pain assessment and management before and after BPG implementation (N/%)

Item	Before Implementation (N=33)	After Implementation (N=34)	chi-square value	P-value
Patients' pain was evaluated at admission and before, during and after surgery	12 (36.3)	22 (64.7)	5.382	0.020
The first pain intensity assessment was performed within 3 to 6 hours after the operation. No pain or mild pain was recorded every 12 hours, moderate pain every 6 hours, and severe pain and severe pain every 1 hour	8 (24.2)	17 (50)	4.750	0.029
When assessing the patient's pain, ask detailed questions about pain intensity, nature, location, disease history, medication, pain aggravating/alleviating factors, and acceptable level of pain	14 (42.4)	15 (44.1)	0.020	0.889
The same proven tool was used to assess pain in patients	29 (87.9)	30 (88.2)	0.002	0.964
Patients' pain was reassessed after 30 minutes of intervention after drug and non-drug intervention	11 (33.3)	12 (35.3)	0.029	0.866
Encourage patients and family members to participate in pain management through health education	15 (45.4)	25 (73.5)	5.486	0.019

Source: prepared by authors

• **Comparison of patients' satisfaction with pain control before and after BPG implementation**

The comparison of pain control satisfaction of surgical patients before and after BPG implementation was shown

in Table 4. After the BPG implementation, patients' perceptions of pain management, active reporting of pain, and patient satisfaction with pain control were different from those before the implementation (all $P < 0.05$).

Table 4. Comparison of surgical patient satisfaction before and after BPG implementation

Item	Before Implementation (N=33)	After Implementation (N=34)	chi-square value	P-value
Change of concept				
Painkillers have severe adverse reactions and can cause dependence	8 (24.2)	17 (50)	4.750	0.029
Painless means no pain at all	15 (45.4)	25 (73.5)	5.486	0.019
Actively report pain	5 (15.2)	16 (47.1)	7.923	0.005
Satisfaction with pain control	14 (42.4)	25 (73.5)	6.661	0.010

Source: prepared by authors

Reflection

With the rapid development of evidence-based medicine, evidence-based nursing has evolved in recent years. As one of the most authoritative sources of evidence, the Best Practice Guidelines can be effectively used to integrate evidence into practice. Studies have shown that nurses in China's tertiary general hospitals have initially met the essential criteria of evidence-based practice. Among them, nurses have an attitude of actively implementing evidence-based nursing but need to gain knowledge and skills (16). Based on the *Assessment and Management of Pain BPG*, this study developed an *Orthopedic Pain Education Manual-Patient Edition*, actively training nurses to integrate the evidence into practice and strengthen their health teaching skills. Results showed that after BPG implementation, the rate of nurses' pain management knowledge and awareness was improved, though they did not reach the qualified rate of 80%. After the BPG implementation, nurses who had received training improved their knowledge and attitude towards pain management. This result indicated that guideline implementation has improved the knowledge and attitude of nurses towards pain assessment and management. The study also found that four of the five items with a lower percentage of correct answers were related to the amount of opioid use. There was also no statistical difference among these four items because the wording of these items was simple and easy for nurses to understand. This leads to the difference in the effect before and after training. The difference in the correct rate of these four items was not statistically significant. As a result, the evidence-based practice team recommended strengthening the nurses' knowledge of managing pain medication in future training.

• Integrating evidence into practice can standardize nurses' pain management for patients after THA

The pain of patients after THA is evident, which seriously affects their recovery from the surgery. Timely and accurate pain assessment of patients can provide a scientific basis for doctors and nurses to manage their pain. At present, the postoperative pain assessment of orthopedic patients in our hospital mainly depends on patients' self-reports, experience of medical staff, and a one-time pain assessment tool such as VAS, FPS, and McGill Pain Assessment Scale. Patients' postoperative pain has not been effectively controlled due to a lack of a comprehensive and timely patient assessment and management plan. In this study, the evidence-based practice team conducted a gap analysis between the recommendations of *RNAO Assessment and Management of Pain BPG* (3rd Edition) (12) and the clinical nursing practice of our hospital. The results showed that there was a need to standardize the pain assessment and management of joint replacement patients. This study was based on the

RNAO Assessment and Management of Pain BPG (3rd Edition) for clinical practice (12), the *Implementation of Best Practice Guideline Toolkit* (13), the flow chart of patient pain assessment and management, and the pain assessment record form for patients after THA, which could facilitate nurses to assess and manage patients' pain in a comprehensive, dynamic and timely manner. A rigorous pain assessment and management process and tools were established through the interpretation and localization of the guidelines. Nurses could master relevant knowledge through systematic training and provide health education for postoperative pain in patients after THA.

Evidence-based nursing provides a reliable and scientific basis for decision-making in clinical nursing practice by seeking the best and available evidence (17). Through the BPG implementation, this hospital standardized the process and tools of pain assessment and management for patients after THA, increased their nurses' knowledge of pain assessment, and changed their attitudes toward pain management. Based on the recommendations of the Guideline, this study formulated six quality review indicators. The results showed that after the implementation of the Guideline, the rate of nurses' in screening and evaluating patients' pain, and in encouraging patients and their families to participate in their pain management has increased compared with before. This may be related to the fact that nurses are fully aware of the importance of person- and family-centered care in pain assessment and management. However, the completeness of the assessment content was similar to that before the practice, which could be related to the workload of nurses and the length required for this operation. The same assessment tool had to be selected for the pain assessment of the same patient. No difference in assessment tools before and after the study might be related to using the identical McGill Pain Assessment Scale for THA patients in our department. Reassessment is crucial to evaluate patients' analgesic effects and adverse reactions. Currently, nursing practice in the hospital mainly relies on patients' direct reporting. There was no difference in the study on reassessing pain before and after the BPG implementation. It is recommended that future training on pain reassessment be strengthened to improve the effect of nurses on pain management further.

• Evidence-based practice can improve patient satisfaction with pain control

The results of this study showed that after implementing the Guideline, the concept of pain management in patients changed. The number of patients directly reporting their pain; and patients' satisfaction with pain control during hospitalization had increased, which was consistent with the results of previous studies (18). The content

of the *Orthopedics Pain Education Manual - Patient Edition* focused on standardized pain management in the perioperative period of orthopedics, including the concept of pain and its harm, commonly used drug treatments and adverse reactions, and non-drug treatments, assessment, and proactive reporting. The design of the patient version of the education manual was straightforward, simple to use, and easy to understand, with pictures and texts, which increased the interest of patients in reading. At the same time, pain education had been added to the admission and preoperative education. Patients could better understand the effects of analgesic drugs, adverse reactions, and pain-free management. Nurses also understood scientific analgesic management measures and alleviated patients' worries.

Consequently, patients wouldn't refuse medication due to its side effects and painless management of the surgery. They could report the pain level to the nurse in a timely manner. The nurse could also provide individualized pain management measures for the patient. The patient's pain could be controlled in a timely and effective manner. Patients' satisfaction with pain control had been improved. Therefore, integrating evidence on pain assessment and management into practice has changed the concept of pain management for patients. They would actively report their pain level and effectively control their pain. As a result, patients' satisfaction improved with proper pain control interventions.

• Limitations

The BPG implementation did not adopt a multidisciplinary team approach, which could lead to unilateral management of patients' pain. Future studies will include multidisciplinary team members such as doctors, anesthesiologists, and rehabilitation therapists to further evaluate the effect of the BPG implementation. Since this study's sample size was small, the results would need to be further confirmed by a large sample and multi-center clinical studies.

Conclusion

In summary, applying the Assessment and Management of Pain BPG for patients after THA could improve nurses' knowledge and skills of pain assessment and management, standardize the pain assessment and management operation system and process, and improve patients' satisfaction with pain control. This study shows that evidence-based practice can promote the progress of nursing work by applying guideline recommendations.

Conflict of Interest

The authors declare that they have no conflicts of interest.

Funding

No external funding was provided to the authors for this study.

Ethical responsibilities

This study was approved by the Ethics Committee of the Lanzhou University Second Hospital (batch number:2023A-488)

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