Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Best Evidence Summary of the Best Evidence for Postoperative Pain Management in Elderly Patients with Hip Fragility Fractures

Wu Jiao
Inner Mongolia Medical University
Zang Yuantong
Second Affiliated Hospital of Inner Mongolia Medical University
Li li
408375918@qq.com

Second Affiliated Hospital of Inner Mongolia Medical University
Li Delong
Inner Mongolia Medical University
Zhuang ShuYuan
Inner Mongolia Medical University
Dong SiHong
Inner Mongolia Medical University
She Na
Inner Mongolia Medical University
Sun Nalin
Inner Mongolia Medical University
Pan Linlin
Second Affiliated Hospital of Inner Mongolia Medical University
Dang Yu
Second Affiliated Hospital of Inner Mongolia Medical University

Systematic Review

Keywords: Hip fracture, Older adults, Pain, Evidence summary, Evidence-based nursing

Posted Date: July 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9504229/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Objective: To synthesize the best available evidence on postoperative pain management for aaaaelderly patients with hip fragility fractures and provide evidence-based references for clinical medical professionals.

Methods: Following the Joanna Briggs Institute (JBI) evidence synthesis method and under the guidance of the "6S" evidence model, a systematic search was conducted in Chinese and English databases such as BMJ Best Practice, UpToDate, JBI, Cochrane Library, PubMed, CNKI, and professional institution websites. The search period was from the establishment of the databases to December 1, 2025. Two researchers independently screened and evaluated the literature and extracted and integrated the evidence based on the JBI evidence grading and recommendation system.

Results: A total of 15 papers were included, including 4 guidelines, 4 systematic reviews, 2 expert consensuses, 1 recommended practice, and 4 narrative reviews. Ultimately, 25 best pieces of evidence were extracted from four dimensions: pain assessment, pharmacological intervention, non-pharmacological intervention, and health education.

Conclusion: This study summarizes the best evidence for postoperative pain management in elderly patients with hip fragility fractures, covering assessment tools and timing, multimodal analgesia, non-pharmacological adjunctive therapies, and health education, providing a scientific basis for the implementation of systematic and individualized pain management in clinical practice.

Introduction

Hip fragility fracture refers to any fracture of the proximal femur from the femoral head to 5 cm below the lesser trochanter[1]It is one of the major health problems worldwide, especially in the elderly population[2]. According to the United Nations definition, the target population is adults aged 65 years and older[3]. Fragility fracture is a fracture that occurs under minimal trauma (e.g., a fall from standing height or routine activities) or without obvious trauma due to osteoporosis or other bone metabolic abnormalities[4], It is common in older adults, especially those with reduced bone strength due to decreased bone mineral density and bone quality[5]. Inadequate treatment can easily lead to secondary fractures, seriously affecting patients' health and quality of life[6]. Among the elderly, the incidence of hip fragility fractures is rising, and it is estimated that by 2050, the number of hip fracture cases in people aged 65 years and older in China will reach 1.3 million[7]. Hip fragility fracture is a major cause of morbidity, mortality, disability, pain, and hospitalization in the elderly. If postoperative pain is not effectively controlled, its impact extends far beyond mere discomfort, affecting patients' physical and mental function, family care, and socioeconomic burden. Elderly patients with hip fragility fractures often experience severe pain and functional impairment[8, 9], Effective pain management can not only improve patients' quality of life but also promote postoperative recovery and reduce complications[10-12]. Older adults represent a vulnerable group with unique postoperative pain management needs; therefore, pain management in this population is very challenging and particularly importan[13]. However, existing evidence remains fragmented, and there is a lack of comprehensive research on perioperative pain management. Nursing practice in China still has deficiencies in developing systematic and individualized pain management protocols for elderly patients with hip fragility fractures. This study aims to provide evidence-based references for clinical medical professionals through systematic evidence retrieval, critical appraisal, data extraction, and evidence grading.

Methods

This evidence summary followed the framework described in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis[14]. The reporting process included formulating the research question, conducting a systematic literature

search, screening and appraising studies, summarizing and grading evidence, and developing practice recommendations[15]. The methodology and results were reported in accordance with the PRISMA 2020 statement and the JBI Manual for Evidence Synthesis[14, 16]. The study was approved by the Fudan University Center for Evidence-based Nursing (registration number: ER20251278) and registered with PROSPERO (registration number: 0009-0008-8135-5984).

Question formulation

The evidence-based question was developed using the PIPOST model[17]. In this study, the first P (population) was: patients aged ≥65 years with hip fragility fractures; I (intervention) included pain assessment, non-pharmacological interventions, pharmacological interventions, health education, etc.; the second P (professional) was orthopedic medical professionals; O (outcome) included pain level, quality of life, etc.; S (setting) was the orthopedic ward; T (type of evidence) included clinical decisions, best practices, guidelines, expert consensuses, evidence summaries, and systematic reviews.

Search strategy

Evidence retrieval followed the top-down "6S" evidence model[18]. Databases searched included: BMJ Best Practice, UpToDate, Joanna Briggs Institute Evidence-Based Healthcare Database, Cochrane Library, PubMed, SinoMed, Web of Science, Embase, Medline, DynaMed, CINAHL, ClinicalKey for Nursing, OVID, JAMA, Wanfang Data, VIP Chinese Science and Technology Periodical Database, and CNKI. In addition, guidelines from organizations such as the International Collaboration of Orthopaedic Nursing (ICON), the American Academy of Orthopaedic Surgeons (AAOS), and the Association of Anaesthetists (AA) were also searched. Reference lists were hand-searched.

English databases were searched using a combination of MeSH terms and free words. Boolean operators AND and OR were used to construct search strings. Key terms included "aged/elderly", "hip fracture/proximal femoral fracture/femoral neck fracture/femoral head fracture/intertrochanteric fracture/subtrochanteric fracture", and "pain". The search period was from database inception to December 1, 2025. Languages were limited to English or Chinese. Figure 1 shows an example of the search strategy.

Inclusion and exclusion criteria

Inclusion criteria: (1) subjects were patients aged ≥65 years with hip fragility fractures; (2) literature focusing on postoperative pain management for elderly patients with hip fragility fractures, including pain assessment and intervention strategies; (3) types of literature including best decisions, guidelines, expert consensuses, evidence summaries, and systematic reviews; (4) the latest updated or revised clinical guidelines; (5) language English or Chinese.

Exclusion criteria: (1) study protocols, drafts, or no full-text abstract; (2) literature that could not be obtained through various channels; (3) literature that failed quality assessment; (4) direct translations of guidelines.

Literature screening and data extraction

All retrieved records were imported into Endnote software for management, and duplicates were removed. Two researchers trained in evidence-based medicine independently screened the titles and abstracts according to the inclusion and exclusion criteria. Any disagreements were resolved by discussion or by consulting a third author. Subsequently, the same reviewers independently extracted data using a standardized data extraction form, including first author, year, source, type of evidence, and article topic.

Quality appraisal of evidence

Appropriate quality appraisal tools were selected according to the type of evidence.

Guidelines: The AGREE II instrument was used to assess the quality of included guidelines[19], covering 6 domains with 23 items: scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. Each item was scored from 1 (strongly disagree) to 7 (strongly agree). The standardized domain score was calculated as (obtained score – minimum possible score) / (maximum possible score – minimum possible score) × 100%. If ≥6 domains had scores ≥60%, the guideline was rated as A (recommend); if ≥3 domains had scores ≥30% but some domains scored <60%, it was rated as B (recommend after revision); if ≥3 domains had scores <30%, it was rated as C (excluded)[20-22].

Systematic reviews: The AMSTAR-2 tool was used for quality assessment. Based on the presence of critical deficiencies, the overall quality was classified as “high quality”, “moderate quality”, or “low quality”.

Expert consensus, recommended practice, and narrative reviews: The JBI critical appraisal tool for “text and expert opinion” was used[23], covering 6 items: source of opinion, expert influence, centrality of patient interests, logical analysis, reference to literature, and consistency with previous literature. Each item was rated as “yes”, “no”, “unclear”, or “not applicable”.

Quality appraisal was performed independently by two reviewers trained in evidence-based nursing. Disagreements were resolved by consultation with a third reviewer with experience in evidence-based research. In the case of conflicting evidence, inclusion decisions were based on the source of evidence, high-quality studies, and the most recent authoritative publications[14].

Evidence extraction and synthesis

Two researchers with more than 10 years of experience in geriatric and orthopedic nursing extracted and synthesized evidence according to the following principles: (1) when content was consistent across sources, the most professional and concise evidence was selected; (2) when content from multiple sources was similar or complementary, it was integrated into a single evidence item; (3) in the case of conflicting content, the most recent publication from a higher-quality or authoritative evidence-based journal was prioritized. The extracted evidence was graded according to the JBI Evidence Grading and Recommendation System (2014 edition), with levels ranging from Level 1 to Level 5 (Level 1 being the highest)[24]. Based on feasibility, appropriateness, meaningfulness, and effectiveness (FAME), an expert panel discussion was conducted to determine the strength of recommendation: strong (Grade A) or weak (Grade B)[24].

Results

Literature search results and general characteristics of included studies

A total of 6775 articles were identified through database searches. After removing duplicates using Endnote, 4140 articles remained. After rigorous screening, 15 articles were finally included[25-39],4 guidelines[26, 31, 35, 36], 4 systematic reviews[30, 32, 34, 39], 2 expert consensuses[33, 37], 1 recommended practice[38] and 4 narrative reviews[25, 27-29]. Among the excluded articles, 13 did not meet the inclusion/exclusion criteria, and 3 had no extractable information. The literature screening process is shown in Figure 2. The basic characteristics (source, evidence type, topic) of the included literature are presented in Table1.

Table 1 Basic characteristics of included literature

Included Literature	Literature resource	Type of Literature	Literature Topics	Years
National Health Commission of the PRC	uptodate	Guideline	Diagnosis, treatment and management of geriatric hip fracture	2023
Schofield P	PubMed	Guideline	Pain assessment in older people	2018
Mcdonough CM	PubMed	Guideline	Physical therapy management of older adults with hip fracture	2021
NICE	NICE	Guideline	Hip fracture management	2023
Guay J Kopp S	Cochrane Library	Systematic review	Peripheral nerve blocks for hip fractures	2020
Pommier W, et al	PubMed	Systematic review	NSAIDs for perioperative pain control in hip fracture surgery	2024
Li P, et al	PubMed	Systematic review	Auricular acupressure for postoperative pain in hip fracture	2023
Davison P, et al	PubMed	Systematic review	Electrical stimulation to improve outcomes after hip fracture	2022
Beijing Nursing Association, et al	Wanfang	Expert consensus	Perioperative nursing care of geriatric hip fracture	2023
National ERAS Expert Group	Wanfang	Expert consensus	Perioperative pain management for enhanced recovery in orthopedics	2022
DynaMed	DynaMed	Recommended practice	Perioperative management of patients with hip fracture	2024
Meehan AJ, et al	ICON website	Narrative review	Best practice nursing care standards for older adults with fragility hip fracture	2019
Mears SC, Kates SL	OVID	Narrative review	A guide to improving the care of patients with fragility fractures (2nd ed)	2015
Elsevier H, Cannada LK	PubMed	Narrative review	Management of pain associated with fractures	2020
Dizdarevic A, et al	PubMed	Narrative review	Analgesia and pain modalities in hip fracture	2019

Quality appraisal results

Quality appraisal of guidelines

Four guidelines were assessed using the AGREE II tool [26, 31, 35, 36]. Results: three guidelines achieved ≥60% standardized scores in all six domains and were rated as Grade A [26, 31, 35] One guideline had a lower score in the editorial independence domain (41.7%) [36], but still had ≥3 domains with scores ≥60%, and was rated as Grade B. The standardized domain scores and recommendation grades are shown in Table 2.

Table 2: AGREE II quality appraisal results for guidelines

Included guideline	content validity						Grade
	Scope and purpose	Stakeholder involvement	Rigor of development	Clarity of presentation	Applicability	Editorial independence	
Schofield P	100%	61.1%	77.1%	88.9%	66.7%	100%	A
National Health Commission	100%	72.2%	64.6%	94.4%	83.3%	41.7%	B
Mcdonough CM	100%	88.9%	97.9%	100%	91.7%	83.3%	A
NICE	100%	83.3%	92.7%	100%	87.5%	100%	A

Quality appraisal of systematic reviews

Four systematic reviews were assessed using the AMSTAR-2 tool. Results: one was of high quality [30] one was of moderate quality [39] and two were of low quality [32, 34]. Low quality mainly resulted from lack of pre-registered protocol, failure to provide a list of excluded studies, and insufficient assessment of publication bias. Detailed results are shown in Table 3.

Table 3: AMSTAR-2 quality appraisal results for systematic reviews

Item	Pommier W et al	Li P et al	Davison P et al	Guay J, Kopp S
1. Did the research question include PICO (population, intervention, comparison, outcome)?	Yes	Yes	Yes	Yes
2. Was the report of the review clearly based on a pre-established research plan? If there were deviations, were they explained?	Yes	Yes	No	Yes
3. Did the authors explain the types of study designs included?	Yes	Yes	Yes	Yes
4. Was the search strategy comprehensive?	Partially	Yes	Partially	Yes
5. Was study selection performed by two independent reviewers?	Yes	Yes	Yes	Yes
6. Was data extraction performed by two independent reviewers?	Yes	Yes	Yes	Yes
7. Did the authors provide a list of excluded studies and justify the exclusions?	No	No	Yes	Yes
8. Did the authors describe the included studies in adequate detail?	Yes	Yes	Yes	Yes
9. Did the authors use an appropriate tool to assess risk of bias in the included studies?	Yes	Yes	Yes	Yes
10. Did the authors report the sources of funding for the included studies?	No	No	No	Yes
11. If meta-analysis was performed, were the statistical methods appropriate?	Meta-analysis not performed	Yes	Meta-analysis not performed	Yes
12. If meta-analysis was performed, did the authors assess the impact of risk of bias on the pooled results?	Meta-analysis not performed	No	Meta-analysis not performed	Yes
13. Did the authors explain the impact of risk of bias of individual studies on the results in the discussion/conclusion?	Yes	Yes	Yes	Yes
14. Did the authors explain consistency of the included studies in the discussion (even if meta-analysis was not performed)?	Yes	Partially	Yes	Yes
15. If quantitative synthesis was performed, did the authors adequately assess publication bias?	Meta-analysis not performed	No	Meta-analysis not performed	Yes
16. Did the authors report any potential conflicts of interest?	Yes	Yes	Yes	Yes

Quality appraisal of expert consensuses, recommended practice, and narrative reviews

Two expert consensuses[33, 37], one recommended practice[38], and four narrative reviews were assessed using the JBI critical appraisal tool for text and expert opinion[25, 27-29]. Results: all items were rated “yes” for all included articles, indicating high quality. Details are shown in Table 4.

Table 4: JBI quality appraisal results for expert consensuses, recommended practice, and narrative reviews

Included Literature	□	□	□	□	□	□
Elsevier H, Cannada LK	Yes	Yes	Yes	Yes	Yes	not applicable
Dizdarevic et al	Yes	Yes	Yes	Yes	Yes	not applicable
Meehan AJ et al	Yes	Yes	Yes	Yes	Yes	Yes
DynaMed	Yes	Yes	Yes	Yes	Yes	Yes
Mear SC, Kates SL	Yes	Yes	Yes	Yes	Yes	not applicable
Beijing Nursing Association et al	Yes	Yes	Yes	Yes	Yes	Yes
National ERAS Expert Group	Yes	Yes	Yes	Yes	Yes	Yes

□: Has the source of the viewpoint been clearly marked? (For example: Is it an opinion or a consensus meeting?) □: Does the viewpoint come from an influential expert in the field? (For example: Does the author have the endorsement of an authoritative institution?).□: Was the proposed viewpoint centered on the interests of the relevant population group? (For example: Did it consider the safety and preferences of the patients?). □: Is the conclusion of the statement based on a logical analysis/argumentation process? □: Did you refer to any existing literature to support your argument? (That is, apart from experience, did you cite any references?). □: Does the proposed viewpoint have any inconsistencies with the previous literature? (If so, is there a reasonable explanation for it?).

Evidence synthesis and generation

From the included literature, 25 best evidence items were extracted and synthesized into four dimensions: pain assessment, pharmacological interventions, non-pharmacological interventions, and health education. Evidence levels were graded according to the JBI Evidence Pre-grading System (2014 version): Level 1 (from systematic reviews/meta-analyses, RCTs, authoritative guidelines), Level 2 (from controlled non-randomized studies, cohort studies, expert consensuses), Level 3 (from uncontrolled observational studies, authoritative expert experience). Recommendation strength was classified as Grade A (strong recommendation) or Grade B (moderate recommendation). The evidence content, levels, and recommendation grades are shown in Table 5.

Table 5: Summary of best evidence

Dimension	Evidence statement	Evidence statement	Recommendation grade
Pain assessment	Assessment tools: 1. It is recommended to use the Numerical Rating Scale (NRS), Verbal Rating Scale (VRS), Visual Analogue Scale (VAS), Faces Pain Scale - Revised (FPS-R), or the Iowa Pain Thermometer (IPT) for pain assessment.	Level 1	A
	2.Patient self-reporting is the most accurate basis for determining the presence and intensity of pain.	Level 1	A
	3.Once the assessment tools have been determined, a simple tool should be used for continuous assessment to dynamically monitor the analgesic effect.	Level 1	A
	Evaluation Time: 4. Pain Assessment: The first assessment should be completed within 30 minutes after the visit. The re-assessment should be conducted 30 minutes after medication administration. Subsequent assessments should be conducted every hour until admission to the ward; Regular assessments during hospitalization.	Level 1	A
	5.Set the assessment frequency based on the pain intensity: VAS scores of 0-3 points are assessed 3 times daily; scores of 4-6 points are assessed 4 times daily; for scores of 7-19 points, assessment is conducted at any time or continuously.	Level 2	B
	6.Dynamic adjustment of the treatment plan during analgesia: Maintain the original plan when the VAS score is ≤ 3; Add drugs with different mechanisms to implement multimodal analgesia when the VAS score is ≥ 4; Combine opioid drugs for individualized treatment when the VAS score is ≥ 6.	Level 2	B
	7.For elderly people who may deny experiencing pain, alternative terms such as"aching", "difficulty", "discomfort" can be used, or indirect questioning such as "where can't you move" or "what affects your activities" can be employed to identify the pain.	Level 3	B
	8.The degree of pain, the assessment methods, and the unrelieved behavioral manifestations (such as vocalization, posture, and gestures) should be systematically recorded in the nursing records. The pain assessment and its records should be incorporated into the routine nursing observations.	Level 1	A
Pharmacological interventions	9.Recommend multimodal analgesia: Acetaminophen combined with NSAIDs or COX-2 inhibitors; NSAIDs should be used with caution for those with high gastric and intestinal risks; Be cautious when using NSAIDs for those with a history of kidney, heart, or digestive tract diseases.	Level 1	A
	10.Regional block combined with systemic analgesia can improve postoperative mobility, reduce postoperative cognitive dysfunction, and optimize the discharge status.	Level 1	A
	11.Peripheral nerve block can alleviate motor pain within 30 minutes after the implantation of the block, improve the patient's sitting comfort, and thereby reduce pain.	Level 1	A

	12.Oral opioids are preferred over intravenous administration and are suitable for those who can take food orally. Concentrated oral opioids administered sublingually can shorten the onset time.	Level 2	B
	13.The combined use of painkillers with two or more complementary mechanisms is more effective in relieving pain, reducing side effects, and promoting recovery compared to the use of a single high-dose drug.	Level 1	A
	14.Acetaminophen, NSAIDs, NMDA inhibitors, α-2 agonists, and local anesthetics are effective in elderly patients. The single dose and risk assessment need to be individualized.	Level 2	B
	15.On the basis of conventional pain relief, the use of sedative-hypnotic drugs or anti-anxiety drugs at appropriate times according to sleep and psychological conditions can indirectly enhance the pain relief effect.	Level 2	B
Non-pharmacological interventions	16.Ear acupuncture therapy can alleviate postoperative pain, reduce the dosage of painkillers, improve hip joint function, and decrease the incidence of adverse events.	Level 1	A
	17.Early application of non-invasive electrical stimulation (TENS) can alleviate pain, reduce medication intake, and improve mobility and joint range of motion.	Level 1	A
	18.Apply ice to the hip for 15 minutes each time as a local physical pain relief measure[28].	Level 3	B
	19.Using a warm blanket and gentle massage can alleviate anxiety, provide a sense of security and happiness.	Level 3	B
Health education	20.Cognitive Behavioral Therapy (CBT) and psychological interventions (such as breathing exercises, music therapy, mindfulness meditation, guided imagery, etc.) are helpful for postoperative pain management.	Level 1	A
	21.Regularly adjust your posture and use pillows to support it, to prevent local areas from being continuously compressed.	Level 3	B
	22.Psychological interventions (such as music, ambient lighting, comfortable items, religious reading, etc.) can serve as supplementary measures for postoperative pain management.	Level 3	B
	23.Conduct training on pain management knowledge and attitudes for medical staff, ensuring they understand the factors influencing pain assessment, the timing of assessment, and the continuity of the process, and enhancing their monitoring capabilities.	Level 1	A
	24.Involve patients and their families in the training of pain management skills and enhance their self-care knowledge and abilities through education and guidance.	Level 1	A
	25.After the surgery, educational sessions were conducted for the patients and their families, covering	Level 2	B

	the definition of pain, its hazards, understanding of assessment tools, feedback mechanisms, and helping to adjust their psychological expectations and alleviate anxiety.

Discussion

Individualized pain assessment is the basis of scientific management

Pain is a highly subjective experience involving multidimensional sensory, cognitive, and emotional components[18]. Pain assessment in older patients is complex and may be influenced by cognitive ability and sociocultural factors. This evidence summary shows (evidence 1-3) that patient self-report remains the most accurate and reliable method for assessing pain presence and intensity. Recommended tools include NRS, VRS, VAS, FPS-R, and IPT[26, 28, 31, 37]. However, Chinese elderly patients often tend to tolerate mild pain without reporting it, only expressing it when pain reaches moderate or severe levels. This contrasts with Western cultures where active pain reporting is encouraged. Therefore, medical professionals should use more culturally adapted terms (e.g., “soreness”, “difficulty”, “discomfort”) (evidence 7), or ask indirect questions such as “Where can’t you move?” or “What affects your activity?” to help identify pain presence and location[26]. Additionally, sensory deficits (vision, hearing) in older patients should be addressed by ensuring hearing aids, glasses, etc., are in place, providing adequate lighting, and allowing sufficient response time. Evidence 4-6 specify assessment timing and frequency, emphasizing continuous assessment from emergency visit to hospitalization, with dynamic adjustment based on pain intensity[33, 35-37]. Evidence 8 requires incorporating pain assessment and documentation into routine nursing observations to achieve standardized management[26, 37].

Multimodal pharmacological intervention is the core analgesic strategy

Effective pain management requires integration of pharmacological and non-pharmacological interventions. Both pain and opioid use can increase delirium risk in elderly patients with hip fragility fractures[40], thus, balancing adequate analgesia and avoiding opioids remains a major clinical challenge. This evidence summary supports multimodal, individualized analgesic protocols (evidence 9, 13)[28, 38, 39]. According to the WHO analgesic ladder, oral acetaminophen is recommended as first-line, and current guidelines suggest dosing every 6 hours in patients without contraindications[41]. Multimodal analgesia combining acetaminophen with NSAIDs or COX-2 inhibitors can optimize pain control, reduce single-drug doses, and minimize adverse effects[39]. For patients with high gastrointestinal risk, non-selective NSAIDs should be used with caution, and COX-2 inhibitors preferred; those with renal, cardiac, or digestive disease history should avoid them (evidence 9)[39]. Regional blocks and peripheral nerve blocks significantly reduce movement-related pain (evidence 10, 11)[25, 27, 29, 30], improve patient comfort, and work within 30 minutes post-operatively. Oral opioids are preferred over intravenous administration, and sublingual administration shortens onset time (evidence 12)[38]. Evidence 14 emphasizes that drug doses and risk assessment must be individualized for older patients[39], Evidence 15 suggests that adding sedative-hypnotics or anxiolytics based on sleep and psychological status can indirectly enhance analgesia[33]. These evidence items provide a clear pathway for drug selection and adjustment.

Non-pharmacological interventions are important adjuncts

Non-pharmacological interventions play an irreplaceable adjunctive role in postoperative pain management for elderly patients with hip fragility fractures. Evidence 16-22 cover various non-pharmacological therapies. Auricular acupressure (evidence 16) and transcutaneous electrical nerve stimulation (evidence 17) both received Level 1/Grade

A recommendations[34, 38], supported by meta-analyses and systematic reviews showing reduced pain, less analgesic use, and improved function[31, 32]. Ice packs (evidence 18) are a simple physical analgesic measure (15 minutes per session) that is easy to perform and low risk[28]. Warm blankets and gentle massage (evidence 19) reduce anxiety and provide comfort[42]. Cognitive behavioral therapy and psychological interventions (evidence 20), such as breathing exercises, music therapy, mindfulness meditation, and guided imagery, are effective[28, 38]. Basic nursing measures such as regular posture changes and pillow support (evidence 21) and spiritual interventions (evidence 22), although lower-level evidence[28, 38], are clinically well-accepted as supplements to routine care. Importantly, the effect of non-pharmacological interventions should be individually assessed based on the patient's age, pain characteristics, and overall health status. Furthermore, rural areas in China may lack advanced analgesic techniques and professional teams; basic analgesics and non-pharmacological methods such as ice packs and positional adjustments are particularly important in these settings. Therefore, adapting pain management strategies to local resource availability is crucial. Moreover, telemedicine and targeted training programs are strongly recommended to enhance pain management capacity among rural healthcare providers.

Health education is a catalyst for improving pain management outcomes

Collaboration with patients and families is essential for effective pain management. Evidence 23 emphasizes the need for systematic training of medical staff in pain management knowledge and attitudes[26], ensuring understanding of assessment factors, timing, and continuity to improve monitoring ability. Evidence 24 and 25 focus on the patient and family level[28], recommending preoperative and postoperative health education to involve patients and families in pain management. Content should include the definition of pain, its harms, awareness of assessment tools, feedback mechanisms, adjusting psychological expectations, and relieving anxiety[33]. Nurses play a central role in pain management and should adopt a consistent, systematic approach to pain assessment and intervention. At the same time, nurses need to closely monitor analgesia-related complications and provide comprehensive medication safety education. Strengthening nurse training and increasing patient/family awareness are key strategies to improve pain management outcomes and enhance nursing quality.

Limitations

This study retrieved relevant guidelines, expert consensus statements, and systematic reviews, but lacks original research. Future studies could include other high-quality original research to enrich knowledge on postoperative pain management in elderly patients with hip fragility fractures. In addition, this study includes many English articles, which may have regional and demographic differences. Furthermore, the evidence comes from a multi-center summary, which may be influenced by different center background conditions. When applying the evidence, it is necessary to consider the patient's cultural background, lifestyle habits, economic status, and local medical standards to selectively develop feasible management protocols. Finally, because this study used qualitative synthesis, only descriptive analysis was performed, and methodological heterogeneity and potential publication bias among the included studies and guidelines were not tested. In the future, quantitative research methods may be considered for analysis and synthesis.

Conclusion

This study summarizes 25 best evidence items on postoperative pain management for elderly patients with hip fragility fractures, covering four dimensions: pain assessment, pharmacological interventions, non-pharmacological interventions, and health education. This evidence provides an evidence-based basis for clinical nursing staff to develop systematic and individualized postoperative pain management protocols. Since most of the evidence comes

from international literature, when translating it into clinical practice, the feasibility and appropriateness of each recommendation should be carefully evaluated considering local medical resources, patient cultural background, and economic status, to ensure the scientific validity and effectiveness of pain management strategies.

Registration

http:ebn.nursing.fudan.edu.cn, registration number: ER20251278；https://www.crd.york.ac.uk/PROSPERO, registration number:：0009-0008-8135-5984.

Declarations

Ethics approval and consent to participate: Not applicable. This evidence summary is based on previously published literature and did not involve direct human subjects or primary data collection. Therefore, no approval from an ethics committee or institutional review board (IRB) was required.

Consent to participate: Not applicable.

Human Ethics and Consent to Participate declarations: Not applicable.

Consent for publication: Not applicable. No individual person's data are presented.

Availability of data and materials: All data supporting the findings of this study are derived from previously published articles and publicly available databases. The sources of the included studies are specified in the manuscript (Table 1 and the reference list). No primary data were collected, and no new datasets were generated or analyzed during this evidence summary. The extracted evidence data are presented in Table 5. Further inquiries can be directed to the author.

Competing interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding: No funding was received for this study.

Authors' contributions: WJ, YZ, and LL conceptualized and designed the study. DL, SZ, DS, and NS performed the literature search and data extraction. LP and YD analyzed and interpreted the data. WJ drafted the initial manuscript, and YZ, LL, and SN critically revised it for important intellectual content. All authors reviewed and approved the final version of the manuscript.

Acknowledgements: Not applicable.

References

1. Rudy M D, Grant P J. The patient with hip fracture [J]. Med Clin North Am, 2024, 108(6): 1155-1169.
2. Zhang C, Feng J, Wang S, et al. Incidence of and trends in hip fracture among adults in urban china: A nationwide retrospective cohort study [J]. PLoS Med, 2020, 17(8): e1003180.
3. Keating N. A research framework for the united nations decade of healthy ageing (2021-2030) [J]. Eur J Ageing, 2022, 19(3): 775-787.
4. Xu Y M, Wu G, Diao R Y, et al. Risk factors and prediction model for postoperative complications and activities of daily living in elderly patients with fragility hip fracture. Zhongguo Gu Shang, 2025: 1-11.

5. Chinese Society of Osteoporosis and Bone Mineral Research, Zhang Z L. Guidelines for the diagnosis and treatment of primary osteoporosis (2022). Chinese General Practice, 2023, 26(14): 1671-1691
6. Liu H, Yang Y L, Cai L, et al. Establishment of standardized postoperative anti-osteoporosis drug treatment management model for fragility fractures. China Pharmacy, 2025, 36(15): 1926-1930.
7. Gong X F, Li X P, Zhang L X, et al. Current status and distribution of hip fractures among older adults in china [J]. Osteoporos Int, 2021, 32(9): 1785-1793.
8. Jung K H, Park J H, Song J Y, et al. State-anxiety in geriatric patients undergoing surgical treatment for femoral neck or intertrochanteric fractures [J]. Geriatr Orthop Surg Rehabil, 2021, 12: 21514593211063320.
9. Levi Y, Punchik B, Zikrin E, et al. Intensive inpatient vs. Home-based rehabilitation after hip fracture in the elderly population [J]. Front Med (Lausanne), 2020, 7: 592693.
10. Zullo A R, Zhang T, Beaudoin F L, et al. Pain treatments after hip fracture among older nursing home residents [J]. J Am Med Dir Assoc, 2018, 19(2): 174-176.
11. Jing G W, Xie Q, Tong J, et al. Early intervention of perioperative delirium in older patients (>60 years) with hip fracture: A randomized controlled study [J]. Orthop Surg, 2022, 14(5): 885-891.
12. Snapp C, Byrd B, Porter M. Reduction of postoperative delirium and opioid use in hip fracture patients through utilization of emergency department physician administered regional nerve blocks [J]. Geriatr Orthop Surg Rehabil, 2024, 15: 21514593241228073.
13. Ackermann L, Schwenk E S, Lev Y, et al. Update on medical management of acute hip fracture [J]. Cleve Clin J Med, 2021, 88(4): 237-247.
14. Aromataris E, Lockwood C, Porritt K, et al. Jbi manual for evidence synthhesis [J/OL] 2024, https://synthesismanual.jbi.global. 10.46658/JBIMES-24-01
15. Munn Z, Lockwood C, Moola S. The development and use of evidence summaries for point of care information systems: A streamlined rapid review approach [J]. Worldviews Evid Based Nurs, 2015, 12(3): 131-138.
16. Page M J, McKenzie J E, Bossuyt P M, et al. The prisma 2020 statement: An updated guideline for reporting systematic reviews [J]. J Clin Epidemiol, 2021, 134: 178-189.
17. Zhu Z, Hu Y, Xing W J, et al. Components of different types of evidence-based questions. Nurse Education Today, 2017, 32: 1991-1994.
18. McMaster University. Resources for evidence-based practice: The 6s pyramid [J]. 2019.
19. Brouwers M C, Kerkvliet K, Spithoff K. The agree reporting checklist: A tool to improve reporting of clinical practice guidelines [J]. Bmj, 2016, 352: i1152.
20. He W M, Luo Y T, Shui X, et al. Critical appraisal of international guidelines on chronic heart failure: Can china agree? [J]. Int J Cardiol, 2016, 203: 111-114.
21. Lamloum D, Arghittu A, Ferrara P, et al. A systematic review of clinical practice guidelines for caries prevention following the agree ii checklist [J]. Healthcare (Basel), 2023, 11(13).
22. Zhang S, Zhou H, Zhuang X, et al. Critical appraisal of guidelines for coronary artery disease on dual antiplatelet therapy: More consensus than controversies [J]. Clin Cardiol, 2019, 42(12): 1170-1180.
23. Joanna Briggs Institute. Critical appraisal tools [J/OL] https://jbi.global/critical-appraisal-tools.
24. JBI Levels of Evidence and Grades of Recommendation Working Party. Supporting document for the jbi levels of evidence and grades of recommendation [J/OL] 2014, https://jbi.global.
25. Mears S C, Kates S L. A guide to improving the care of patients with fragility fractures, edition 2 [J]. Geriatr Orthop Surg Rehabil, 2015, 6(2): 58-120.

26. Schofield P. The assessment of pain in older people: Uk national guidelines [J]. Age Ageing, 2018, 47(suppl_1): i1-i22.
27. Dizdarevic A, Farah F, Ding J, et al. A comprehensive review of analgesia and pain modalities in hip fracture pathogenesis [J]. Curr Pain Headache Rep, 2019, 23(10): 72.
28. Meehan A J, Maher A B, Brent L, et al. The international collaboration of orthopaedic nursing (icon): Best practice nursing care standards for older adults with fragility hip fracture [J]. Int J Orthop Trauma Nurs, 2019, 32: 3-26.
29. Elsevier H, Cannada L K. Management of pain associated with fractures [J]. Curr Osteoporos Rep, 2020, 18(3): 130-137.
30. Guay J, Kopp S. Peripheral nerve blocks for hip fractures in adults [J]. Cochrane Database Syst Rev, 2020, 11(11): Cd001159.
31. McDonough C M, Harris-Hayes M, Kristensen M T, et al. Physical therapy management of older adults with hip fracture [J]. J Orthop Sports Phys Ther, 2021, 51(2): Cpg1-cpg81.
32. Davison P, Wilkinson R, Miller J, et al. A systematic review of using electrical stimulation to improve clinical outcomes after hip fractures [J]. Physiother Theory Pract, 2022, 38(12): 1857-1875.
33. Orthopedic Expert Group of the National Health Commission Enhanced Recovery After Surgery Expert Committee, Orthopedic Enhanced Recovery Professional Committee of Chinese Research Hospital Association, Orthopedic Enhanced Recovery Professional Committee of China Rehabilitation Technology Transformation and Promotion Association. Expert consensus on perioperative pain management for enhanced recovery in orthopedics. Chinese Journal of Bone and Joint Surgery, 2022: 739-745.
34. Li P, Chen H, Fu X, et al. Clinical effects and safety of auricular acupressure as an adjunct therapy on postoperative pain among patients with hip fracture: A meta-analysis [J]. Pain Res Manag, 2023, 2023: 5077772.
35. National Institute for Health and Care Excellence (NICE). Hip fracture management. [J]. National Institute for Health and Care Excellence (NICE), 2023.
36. Department of Medical Administration, National Health Commission of the People's Republic of China. Guideline for diagnosis, treatment and management of geriatric hip fracture (2022 edition). Chinese Journal of Orthopaedic Trauma, 2023.
37. Orthopedic Professional Committee of Beijing Nursing Association, Nursing Group of Chinese Orthopaedic Association, Nursing Group of Chinese Trauma Society. [Chinese expert consensus on perioperative nursing care of geriatric hip fracture 2023. Chinese Journal of Orthopaedic Trauma, 2023.
38. DynaMed. Perioperative management of patients with hip fracture [J/OL] 2024, DynaMed. Perioperative Management of Patients With Hip Fracture. EBSCO Information Services. Accessed 2026□4□10□. https://www.dynamed.com/management/perioperative-management-of-patients-with-hip-fracture.
39. Pommier W, Minoc E M, Morice P M, et al. Nsaids for pain control during the peri-operative period of hip fracture surgery: A systematic review [J]. Drugs Aging, 2024, 41(2): 125-139.
40. Callear J, Shah K. Analgesia in hip fractures. Do fascia-iliac blocks make any difference? [J]. BMJ Qual Improv Rep, 2016, 5(1).
41. Vargas-Schaffer G. Is the who analgesic ladder still valid? Twenty-four years of experience [J]. Canadian Family Physician, 2010, 56(6): 514-517.
42. Kolodychuk N, Krebs J C, Stenberg R, et al. Fascia iliaca blocks performed in the emergency department decrease opioid consumption and length of stay in patients with hip fracture [J]. J Orthop Trauma, 2022, 36(3): 142-146.

Figures

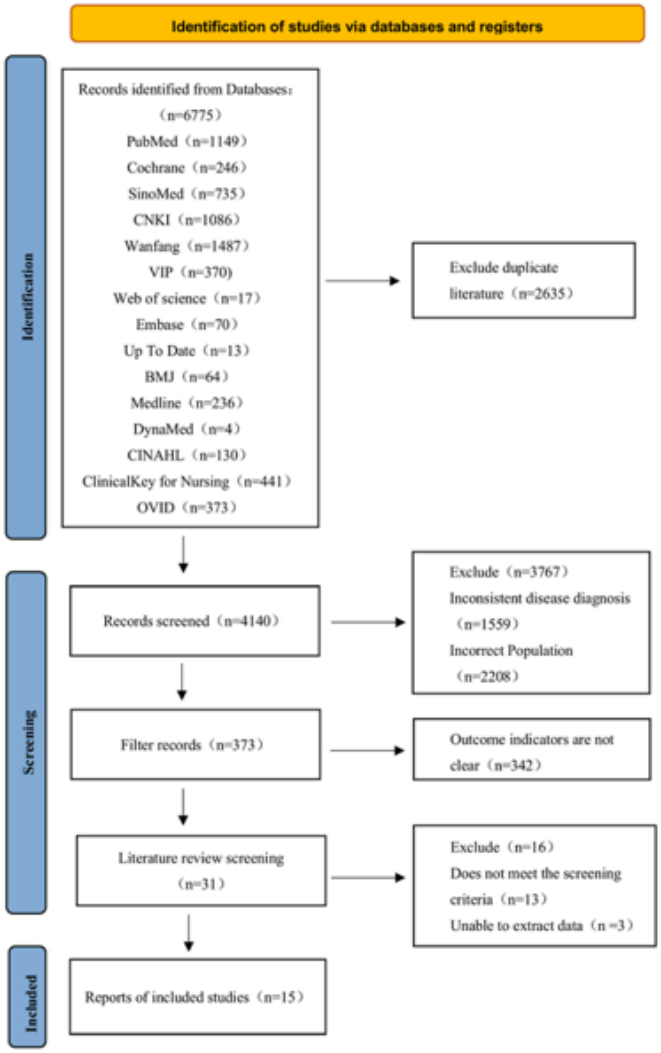


Figure 1

PubMed search flow diagram – omitted here for brevity

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- PubMedSearchExpression.pdf
- PRISMAChecklistRevised.docx