American Journal of Nursing Science
2026, Vol. 15, No. 4, pp. 108–114
https://doi.org/10.11648/j.ajns.20261504.14

SciencePG
Science Publishing Group

Research Article

Evidence-based Practice of Pain Management in Postoperative Patients with Gastric Cancer

Wang Xicheng, Xiao Fang*

Gastric Surgery Department, Sun Yat-sen University Cancer Center, Guangzhou, China

Abstract

Objective: To construct an evidence based practice protocol for pain management in patients following gastric cancer surgery and evaluate its clinical application effects. Methods: Evidence-based nursing methods were employed to systematically retrieve, evaluate, and summarize evidence regarding post-gastric surgery pain management. Patient outcomes were compared before (June-September 2025, n = 70) and after (October-December 2025, n = 70) protocol implementation, alongside an evaluation of implementation processes among 28 on-duty nurses. Results: A total of 17 articles were included, yielding 10 pieces of best evidence across four themes: organizational and system management, pain screening and assessment, pain intervention, and health education and training. Post-implementation, patients' pain scores at 48–72 h postoperatively decreased from (3.61 ±1.82) to (2.09 ± 2.16) points. Concurrently, patients' scores for pain control knowledge and analgesia self-management behaviors increased from (22.62 ±4.42) to (29.69 ±3.36) points and from (27.37 ±6.53) to (38.71 ±4.49) points, respectively. Furthermore, nurses' knowledge and attitude scores regarding pain management increased from (19.43 ± 5.06) to (29.82 ± 6.74) points. Conclusion: Implementing an evidence-based pain management protocol effectively enhances nurses' professional competence, optimizes ward pain management workflows, empowers patient self-management, and ameliorates postoperative pain outcomes.

Keywords

Gastric Cancer, Pain, Evidence-based Nursing, Pain Management

1. Introduction

Gastric cancer (GC) ranks as the fifth most common malignancy worldwide, and radical surgery remains the primary therapeutic modality [1]. Characterized by significant surgical trauma, gastric cancer surgery is associated with an incidence of postoperative incisional pain and visceral referred pain exceeding 75% [2]. Severe postoperative pain not only induces sympathetic nervous system excitation and leads to cardiovascular complications but also restricts patients' early mobilization and effective coughing, thereby increasing the risks of deep vein thrombosis and pulmonary infection and significantly impeding the process of postoperative enhanced recovery [3]. Although relevant guidelines and consensus statements have emphasized the importance of multimodal analgesia, clinical practice still faces challenges such as inconsistent timing of pain assessment, insufficient multidisciplinary collaboration, inadequate pain-related knowledge among nurses, and deeply ingrained patient beliefs regarding pain tolerance; consequently, a substantial gap persists between evidence and its clinical implementation [4]. This study formulates targeted

*Correspondence: Xiao Fang (xiaofang@sysucc.org.cn)

Received: 28 July 2026; **Accepted:** 5 August 2026; **Published:** 22 August 2026

evidence-based practice strategies addressing the aforementioned clinical barriers, with the aim of standardizing clinical practice and facilitating the improvement of nursing quality.

2. Materials and Methods

2.1. Evidence Acquisition

An evidence-based practice group for gastric tumor surgery was established in January 2025. The group consisted of six members, all of whom have long been engaged in clinical and research work related to gastric tumor surgery. The responsibilities of the group members were clearly defined: one Associate Chief Physician with rich clinical experience served as the project consultant, responsible for project design, academic guidance, and organizational coordination; one Head Nurse (Associate Chief Nurse) was responsible for full-process supervision, nursing quality control, and clinical implementation; two nurses with a Master's degree in nursing background were responsible for systematic evidence retrieval, literature quality evaluation, and evidence synthesis and induction; and two clinical charge nurses were responsible for the investigation, collection, and organization of basic data.

2.1.1. Problem Identification

The evidence-based problem was determined according to the PIPOST model. The target population (P): patients undergoing gastric cancer surgery; intervention (I): postoperative pain nursing and multimodal analgesia measures; professionals (P): medical staff; outcome (O): execution rate of pain management audit indicators, knowledge of pain management among nurses and patients, and postoperative pain scores of patients; setting (S): gastric surgery wards in hospitals; type of evidence (T): clinical decisions, guidelines, expert consensus, systematic reviews, randomized controlled trials, quasi-experimental studies, etc.

2.1.2. Literature Retrieval and Quality Evaluation

Following the "5S" pyramid model of evidence-based resources, a top-down hierarchical search was conducted in the National Institute for Health and Care Excellence (NICE) guidelines website, the National Guideline Clearinghouse (NGC), the American Pain Society (APS), Cochrane Library, PubMed, Web of Science, CINAHL, CNKI, Wanfang Data, and VIP Chinese Journals. Additionally, backward citation searching was performed on the references of the included literature. The search period ranged from the inception of the databases to February 31, 2025. Chinese search terms included "gastric cancer/gastric tumor/abdominal surgery", "pain/analgesia/multimodal analgesia/pain management/postoperative pain", and "guideline/expert consensus/evidence summary/systematic review/randomized controlled trial". English search terms included "gastric cancer/stomach neoplasms/abdominal surgery", "pain/analgesia/multimodal analgesia/pain management/postoperative pain", and "guideline/consensus/systematic review/randomized controlled trial". Inclusion criteria: (1) the subjects were patients undergoing gastric cancer surgery, aged ≥18 years; (2) the study content involved measures such as pain assessment and intervention; (3) the study types were clinical decisions, guidelines, expert consensus, systematic reviews, randomized controlled trials, or quasi-experimental studies; (4) the language was Chinese or English. Exclusion criteria: (1) incomplete information or inability to obtain the full text; (2) failure to pass quality evaluation; (3) homologous updates or literature with highly repetitive content. The literature screening and quality evaluation process was conducted independently and in parallel by two group members trained in evidence-based methodology, who performed methodological quality evaluations on the included literature. After screening and evaluation, the two parties cross-checked the results; in case of disagreement, a decision was reached through discussion and negotiation or submission to the group for discussion. Ultimately, 17 articles were included in this study.

2.1.3. Evidence Synthesis and Development of Audit Indicators

Two nurses with backgrounds in evidence-based nursing and Master's degrees independently completed the literature organization, evidence extraction, and synthesis. Corresponding evaluation tools were adopted for methodological quality evaluation based on different types of literature. On the basis of completing the methodological evaluation, combined with the JBI evidence grading and FAME structure, the recommendation level of the evidence was comprehensively judged from four dimensions: feasibility, appropriateness, clinical significance, and effectiveness. After sorting and synthesis, 10 pieces of best evidence were finally formed, summarized into four major categories: organization and system management, pain screening and assessment, pain intervention, and health education and training. Specific evidence and audit methods are shown in Table 1.

Table 1. *Evidence and Review Methods.*

Category	Best Evidence Content	Review Method
Organization and System Management	1. Standardize analgesia management. Incorporate postoperative analgesia into pain management, and establish an acute pain management team consisting of general surgeons and nurses; consult anesthesiologists when necessary to implement multidisciplinary intervention.	Document review

Category	Best Evidence Content	Review Method
Pain Screening and Assessment	2. Select a validated tool to assess pain intensity and consistently use the same assessment tool. 3. Obtain the patient's self-report of pain as much as possible; the patient's self-report is the only reliable indicator of the presence and intensity of pain. 4. Adjust the postoperative pain assessment time according to the patient's condition. 5. Record the patient's pain characteristics, including the results of pain screening, assessment, and reassessment after intervention implementation.	On-site observation, Document review
Pain Intervention	6. Medical staff use a combination of pharmacological and non-pharmacological interventions to treat postoperative pain in adults. 7. After implementing pain management interventions, evaluate the patient's response to the interventions. 8. Implement psychological interventions (such as cognitive behavioral therapy, relaxation techniques, etc.) for patients during the perioperative period to reduce their pain.	On-site observation, Document review, Patient interview
Health Education and Training	9. Medical and nursing staff should provide patient-centered, individualized health education, and evaluate the effectiveness of the health education after implementation. 10. Carry out continuing education for nurses on pain-related knowledge.	On-site observation, Document review, Questionnaire assessment, On-site observation

2.2. Application of Best Evidence

Convenience sampling was employed to conduct a pre-application audit of practice status in the Department of Gastric Surgery at a tertiary grade A cancer hospital in Guangzhou. Patient inclusion criteria were: (1) age ≥ 18 years; (2) scheduled for radical gastrectomy (open or laparoscopic); (3) clear consciousness with basic communication skills; (4) voluntary participation and signed informed consent. Exclusion criteria were: (1) pre-existing chronic pain lasting ≥ 3 months with a Numeric Rating Scale (NRS) score ≥ 4, or regular long-term use of analgesics due to chronic pain; (2) presence of cognitive dysfunction or severe mental illness. The first and second rounds of status audits were conducted from June to September 2025 (pre-application) and October to December 2025 (post-application), respectively. Based on the inclusion and exclusion criteria, 70 patients visiting before and after evidence application, respectively, and all 28 registered nurses working in the Department of Gastric Surgery during the study period were selected as audit subjects. This study was approved by the Hospital Medical Ethics Committee (Ethics No: B2025-172-01).

2.2.1. Status Audit

This study employed on-site surveys for data collection. Two uniformly trained researchers independently conducted clinical observations and medical record reviews, filling out checklists item by item. Simultaneously, a questionnaire survey method was used to collect relevant data from patients and nurses. Prior to the survey, the researchers used standardized instructions to explain the purpose, significance, and filling requirements of the study to the subjects, promised anonymous filling and data confidentiality, and obtained informed consent from the subjects. Questionnaires were distributed, filled out, and collected on-site. After collection, the researchers immediately checked the completeness of the questionnaires and requested the subjects to supplement any missing items promptly. A total of 145 questionnaires were distributed, and 140 valid questionnaires were recovered, resulting in an effective response rate of 96.5%.

2.2.2. Evidence Introduction

Based on the baseline audit results and clinical interviews, the current major problems in the ward were identified. The project team accordingly defined improvement goals and prioritized four weak links: assessment processes, analgesic pathways, personnel training, and patient education. The project team compared evidence requirements with existing ward processes item by item and prioritized the implementation of measures such as electronic medical record optimization, clinical pathway formulation, nurse training, and patient education material development. Addressing the barriers identified during the comparative evaluation phase, the project team optimized the electronic medical record system by embedding a pain assessment module and pop-up reminder functions; collaborated with the Department of Anesthesiology to establish a pain management team, formulated the "Clinical Pathway for Multimodal Analgesia after Gastrointestinal Surgery," and defined stepped dosing regimens; organized nurses to conduct special training on "Pain-free Surgical Pathways" and scenario simulation assessments; and developed the "Handbook for Pain-free Recovery after Gastric Cancer Surgery," educational videos, and standardized educational materials. Furthermore, primary nurses used teach-back methods during the preoperative period to guide patients in mastering Patient-Controlled Analgesia (PCA) operation, NRS scoring, and common non-pharmacological analgesic techniques.

2.3. Observation Indicators

1) Postoperative pain scores: Assessed using the Numeric Rating Scale (NRS) within 24 hours post-operation, 24 to 48 hours post-operation, and 48 to 72 hours post-operation, respectively [5]. The scale consists of numbers from 0 to 10, where 0 represents no pain and 10 represents the most severe pain imaginable; patients circled the number representing their pain intensity on a straight line based on their own perception.
2) Pain Control Cognition Questionnaire: Assessed using the Pain Control Cognition Scale [6]. The questionnaire contains 8 items and uses a 5-level Likert scoring method. Items 1 to 7 are negatively stated; the scoring method is: strongly disagree = 5 points, disagree = 4 points, no opinion = 3 points, agree = 2 points, strongly agree = 1 points. Item 8 is positively stated, with the opposite scoring principle. The total score ranges from 8 to 40, with higher scores indicating more accurate patient cognition of pain control. In this study, the Cronbach's α coefficient of this scale was 0.889.
3) Postoperative Analgesic Self-management Behavior Questionnaire: The Postoperative Analgesic Self-management Behavior Scale developed by domestic scholars was adopted [7]. The questionnaire covers 3 dimensions: disease knowledge management behavior, self-care behavior, and treatment compliance, containing a total of 11 single-choice items. Scoring method: "can always do" scores 4 points, "can mostly do" scores 3 points, "can occasionally do" scores 2 points, "cannot do at all" scores 1 point. The total score ranges from 11 to 44, with higher scores indicating higher levels of postoperative analgesic self-management among patients. In this study, the Cronbach's α coefficient of this scale was 0.849.
4) Nurses' Pain Management Knowledge and Attitude Questionnaire: The Chinese version of the "Knowledge and Attitudes Survey Regarding Pain" (NKASRP) compiled by Ferrell and McCaffery in 1987 [8]. The questionnaire contains 41 items divided into three parts: ① True/False questions (22 items): testing basic pain theory and drug addiction knowledge; ② Single-choice questions (15 items): testing the pharmacological effects and dose calculations of analgesic drugs; ③ Case analysis questions (4 items): testing pain assessment and decision-making ability in clinical contexts. A binary scoring method was used; a correct answer scores 1 point, and an incorrect or unknown answer scores 0 points. The total score ranges from 0 to 41, with higher scores indicating higher professional competence in nurses' pain management. In this study, the Cronbach's α coefficient of this questionnaire was 0.855.

2.4. Statistical Methods

Statistical analysis was performed using SPSS 26.0 software. Measurement data were expressed as mean ± standard deviation, and comparisons between groups were performed using the t-test; count data were described using frequencies and constituent ratios, and comparisons between groups were performed using the $\chi 2$ test or Fisher's exact probability method. $P<0.05$ was considered statistically significant.

3. Results

3.1. Comparison of General Information of Study Subjects

A total of 28 nurses were included, comprising 27 females and 1 male, with a mean age of (34.15±4.28) years; the length of service was (12.5±3.2) years. Comparison of general information of 70 patients in each group showed no statistically significant differences ($P>0.05$), as shown in Table 2.

Table 2. *General Data of Patients in the Two Groups.*

Item (n)		Before Evidence Application	After Evidence Application	χ^2/t	P
Age (years)		60.6±11.56	58.55±12.71	0.994	0.322
Gender [n (percentage,%)]	Male	46 (65.7)	39 (55.7)	1.467	0.226
	Female	24 (34.3)	31 (44.3)		
Educational Level [n (percentage,%)]	Junior high school and below	22 (31.4)	20 (27.1)	0.368	0.832
	High school/technical secondary school	16 (22.9)	19 (27.1)		
	College and above	32 (45.7)	31 (44.3)		
Marital Status [n (percentage,%)]	Unmarried	56 (80.0)	46 (65.7)	3.843	0.146
	Married	7 (10.0)	10 (14.3)		
	Widowed	7 (10.0)	14 (20.0)		

Item (n)		Before Evidence Application	After Evidence Application	χ^2/t	P
Monthly Per Capita Household Income [n (percentage,%)]	<1000	20 (28.6)	15 (21.4)	1.315	0.726
	1001~2999	21 (30.0)	20 (28.6)		
	3000~4999	17 (24.3)	20 (28.6)		
	≥5000	12 (17.1)	15 (21.4)		

3.2. Patient Level

There were statistically significant differences between the two groups of patients in postoperative pain scores at 48-72 hours, knowledge of pain control, and self-management behaviors for postoperative analgesia before and after the application of evidence, as shown in Table 3.

Table 3. *Scores of Pain, Knowledge and Self-management Behaviors of Patients in the Two Groups Before and After Evidence Application.*

Item	Before Evidence Application	After Evidence Application	t	P
Pain score within 24 hours after surgery	1.25±0.62	1.34±0.76	0.810	0.421
Pain score 24-48 hours after surgery	2.98±2.41	2.59±2.21	-1.050	0.312
Pain score 48-72 hours after surgery	3.61±1.82	2.09±2.16	-4.77	<0.001
Pain control knowledge level	22.62±4.42	29.69±3.36	11.25	<0.001
Postoperative analgesia self-management behavior level	27.37±6.53	38.71±4.49	12.62	<0.001

3.3. Nurse Level

Before and after the application of evidence, the scores of nurses' pain management knowledge and attitudes increased from 19.43±5.06 to 29.82±6.74, and the difference was statistically significant (t=10.901, p<0.001).

4. Discussion

Before the application of evidence, the patient pain control knowledge score was (22.62±4.42), which was at a moderate level; patients possessed erroneous cognitions such as analgesics affecting wound healing and being prone to causing addiction. The immense psychological pressure and physiological trauma faced by postoperative patients with gastric cancer, combined with traditional oral education, yielded minimal results. This study adhered to best evidence, advanced preoperative pain education, utilized illustrated manuals and intuitive short videos combined with teach-back method [9], and helped patients become familiar with the use of PCA and NRS scoring before surgery. After the application of evidence, patients' pain control knowledge scores improved. It can thus be seen that evidence-based practice is conducive to helping patients change the traditional concept of enduring pain, prompting them to actively participate in pain management, improving the compliance of patients and their families in pressing the analgesic pump and early ambulation, and enhancing pain self-management ability [10].

The results showed that there was no statistically significant difference in pain scores between the two groups of patients within 24 h and 24-48 h after surgery (P>0.05), and both remained at a low level (<3 points). This may be related to the routine use of potent multimodal analgesia schemes such as intravenous patient-controlled analgesia in the early postoperative period, where the basic analgesic effect was relatively definite; therefore, the pain-reducing effect of evidence-based intervention did not show statistical significance at this stage. However, at 48-72 h after surgery, the pain score of patients after the application of evidence decreased from (3.61±1.82) to (2.09±2.16), and the difference was statistically significant (P<0.001). Postoperative 48 h is usually a critical time point for the removal of the PCA analgesic pump; meanwhile, patients begin to increase ambulation and functional exercises at this stage, making them prone to pain caused by mechanical traction of the wound [11]. This study suggests that nurses apply evidence-based knowledge to implement the concept of

preemptive analgesia, providing sufficient pain assessment and intervention before removing the analgesic pump or guiding patients to get out of bed; meanwhile, after evidence-based practice, patients' pain knowledge and self-management behaviors improved significantly, enabling them to actively apply non-pharmacological analgesic techniques such as deep breathing and position transfer after the analgesic method changed, and report pain timely and accurately to obtain oral analgesics, thereby effectively avoiding severe pain fluctuations. The results of this study suggest to clinical medical staff that perioperative pain management should not be limited to the early postoperative period only, but should focus on the period before and after the removal of the analgesic pump, and advance evidence-based patient pain self-management education to achieve high-quality pain control that is whole-process and stable [12].

The results of this study showed that after the application of evidence, the scores of nurses' pain management knowledge and attitudes increased from (19.43±5.06) to (29.82±6.74), suggesting that evidence-based practice helps to improve the pain management ability of clinical nurses [13]. Under the traditional nursing model, nurses' pain knowledge mostly originated from fragmented accumulation of clinical experience, and cognitive errors such as believing that patients' complaints were exaggerated often existed. This study introduced best evidence and provided nurses with systematic and standardized evidence-based training, breaking their inherent erroneous pain cognitions; meanwhile, pain assessment was incorporated into the routine vital sign monitoring system, supplemented by clear clinical pain management pathways, transforming nurses from passively executing pain orders to actively assessing, intervening, and dynamically following up. This not only enriched nurses' knowledge of pharmacological and non-pharmacological analgesia but also prompted them to establish a more active and scientific attitude towards pain management in clinical practice.

Limitations

This study was a single-center pre-post comparison study with a limited sample size, especially at the nurse level where only 28 on-duty nurses from a single ward were included; secondly, this study was practiced in a single ward, and the follow-up time was limited to the hospitalization period, so the effect of evidence translation still needs to be further verified in more centers. In the future, multi-center and large-sample studies can be conducted, and evidence should be continuously updated based on unified methodological evaluation standards, extending follow-up time to focus on medication management after discharge and the incidence of chronic pain in gastric cancer patients, so as to more comprehensively evaluate the long-term clinical benefits of the evidence-based protocol.

5. Conclusion

The evidence-based practice protocol for pain nursing in postoperative gastric cancer patients constructed in this study effectively improved the cognition of pain by both nurses and patients, standardized the clinical pathway for multimodal analgesia and dynamic assessment in the department, and enhanced patients' analgesic self-management ability.

Abbreviations

CINAHL	Cumulative Index to Nursing and Allied Health Literature
CNKI	China National Knowledge Infrastructure
FAME	Feasibility, Appropriateness, Meaningfulness, and Effectiveness
NRS	Numeric Rating Scale
PCA	Patient-Controlled Analgesia
SPSS	Statistical Package for the Social Sciences
VIP	VIP Chinese Science and Technique Journals Database

Author Contributions

Wang Xicheng: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft

Xiao Fang: Project administration, Resources, Supervision, Validation, Writing – review & editing

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Bray F, Laversanne M, Sung H, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries [J]. CA: A Cancer Journal for Clinicians, 2024, 74(3): 229-263. https://doi.org/10.3322/caac.21834

[2] Professional Committee of Tumor Anesthesia and Analgesia, China Anti-Cancer Association. Expert consensus on perioperative pain management for cancer patients in China (2020 version) [J]. Chinese Journal of Clinical Oncology, 2020, 47(14): 703-710. https://doi.org/10.3969/j.issn.1000-8179.2020.14.002

[3] Chinese Society of Surgery, Chinese Society of Anesthesiology. Guidelines for clinical practice of accelerated rehabilitation surgery in China (2021 version) [J]. Chinese Journal of Surgery, 2021, 59(7): 481-498. https://doi.org/10.3760/cma.j.cn112139-20210518-00224

[4] Tong Y G, Guo Q Z, Wang C T, et al. Construction of quality evaluation standards for postoperative pain management [J]. Chinese Journal of Nursing, 2020, 55(01): 45-50. https://doi.org/10.3761/j.issn.0254-1769.2020.01.009

[5] Hawker G A, Mian S, Kendzerska T, et al. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), and Short Form McGill Pain Questionnaire (SF-MPQ) [J]. Arthritis Care & Research, 2011, 63(S11): S240-S252. https://doi.org/10.1002/acr.20543

[6] Ward S E, Goldberg N, Miller-McCauley V, et al. Patient-related barriers to management of cancer pain [J]. Pain, 1993, 52(3): 319-324. https://doi.org/10.1016/0304-3959(93)90165-L

[7] Zhao J, Tong Y, Chai Y, et al. Development and reliability and validity testing of the Postoperative Analgesia Patient Self-management Behavior Scale [J]. Journal of Nursing Science, 2015, 30(20): 11-14. https://doi.org/10.3870/hlxzz.2015.20.004

[8] Ferrell B R, McCaffery M. Knowledge and attitudes survey regarding pain [DB/OL]. http://www.cityofhope.org/education/prc, 1987

[9] Wang L, Xie B Q, Chen Y H. Effect of NBASS-APS pain management model intervention on postoperative pain intensity and self-health behaviors in patients with gastric cancer [J]. Journal of Aerospace Medicine, 2024, 35(8): 986-989. https://doi.org/10.12473/j.issn.2095-1434.2024.08.008

[10] Bico I, Afonso A, Sousa L, et al. Empowering cancer patients with self-care and pain management skills: a quasi-experimental study [J]. Pain Management Nursing, 2024, 25(4): 369-376. https://doi.org/10.1016/j.pmn.2024.01.006

[11] Gilron I, Lao N, Carley M, et al. Movement-evoked pain versus pain at rest in postsurgical clinical trials and in meta-analyses: an updated systematic review [J]. Anesthesiology, 2024, 140(3): 442-449. https://doi.org/10.1097/ALN.0000000000004812

[12] Gan T J, Jin Z, Ayad S, et al. Fifth consensus guidelines for the management of postoperative nausea and vomiting: executive summary [J]. Anesthesia & Analgesia, 2025, 131(2): 411-448. https://doi.org/10.1213/ANE.0000000000004833

[13] Ülgen H, Güdücü Tüfekci F. The effect of pain management education on nurses' pain knowledge and attitudes [J]. Pain Management Nursing, 2024, 25(3): e186-e191. https://doi.org/10.1016/j.pmn.2023.12.007