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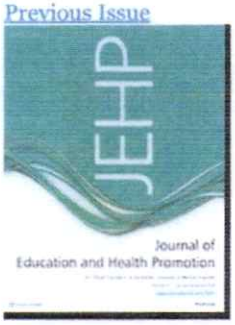
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Effects of nursing interventions on clinical outcomes in patients undergoing abdominal surgery: A systematic review and meta-analysis

Sanya Pongam, Thassaporn Chusak, Pannee Banchonhattakit, Manaporn Chatchumni[1]

Abstract:

BACKGROUND: Abdominal surgery patients remain at risk for postoperative complications despite medical advancements. Effective nursing interventions, such as pain management, early mobilization, and structured education, play a crucial role in improving recovery. However, inconsistencies in existing studies necessitate a comprehensive review. This study systematically evaluates the impact of nursing interventions to guide standardized postoperative care and enhance patient outcomes.

MATERIALS AND METHODS: The systematic review and meta-analysis followed the PRISMA guidelines. A literature search was conducted across five databases (PubMed, Scopus, CINAHL, Embase, and Web of Science) for studies published between January 2019 and December 2023. Study quality was assessed using the Joanna Briggs Institute critical appraisal tools. Meta-analysis was performed to synthesize the findings.

RESULTS: A total of 21 studies met the inclusion criteria and were included in the final meta-analysis. Nursing interventions significantly reduced postoperative pain at 8 hours, 1 day, 2 days, 3 days, and ≥4 days. Additionally, they effectively shortened the time to first bowel movement and first flatus while also improving postoperative self-care behaviors. Significant reductions in abdominal distension were observed at 1 day, 2 days, and 3 days.

CONCLUSIONS: Nursing interventions play a crucial role in improving postoperative outcomes for patients undergoing abdominal surgery. The findings support the implementation of evidence-based nursing strategies to minimize complications and optimize recovery, emphasizing the need for standardized nursing guidelines to improve patient care and healthcare efficiency.

Keywords:

Abdominal surgery, nursing care, postoperative complications, systematic review, treatment outcome

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Introduction

Abdominal surgery is a critical intervention for managing various gastrointestinal, gynecological, and urological conditions, including colorectal cancer, appendicitis, hernias, and gynecological malignancies.[1] These procedures range from minimally invasive laparoscopic techniques to extensive open surgeries, each requiring comprehensive perioperative care to optimize patient outcomes.[2] Despite advancements in surgical techniques, anesthesia, and perioperative care, patients remain vulnerable to postoperative complications.[3] Common issues include acute and persistent pain, abdominal distension (ileus), nausea, vomiting, and delayed gastrointestinal recovery.[4] These complications not only hinder patient comfort and recovery but also prolong hospital stays, increase healthcare

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costs, and elevate the risk of readmission.[5,6] Effective nursing interventions are essential for mitigating these complications, promoting early recovery, and improving overall patient outcomes.[7-9]

Postoperative nursing care involves a wide array of interventions designed to manage symptoms, prevent complications, and promote early rehabilitation.[10,11] Pain management strategies, including pharmacologic and non-pharmacologic approaches, are critical in enhancing patient comfort and facilitating early mobilization.[12-14] Encouraging early movement after surgery has been shown to reduce the risk of deep vein thrombosis, improve circulation, and accelerate gastrointestinal recovery.[15] Structured postoperative education, which includes guidance on wound care, dietary modifications, and activity restrictions, helps patients and caregivers adhere to postoperative care plans, ultimately reducing complications and promoting self-care.[16,17] Additionally, supportive nursing interventions, such as emotional support, patient education, and reinforcement of self-management strategies, contribute to improved patient satisfaction and adherence to recovery protocols.[18,19]

While numerous studies have explored the effectiveness of nursing interventions in improving postoperative outcomes, findings have been inconsistent, and evidence remains fragmented across different settings, patient populations, and types of abdominal surgeries.[20,21] Some studies suggest that early mobilization significantly reduces postoperative complications, while others indicate limited benefits depending on patient adherence and surgical complexity.[15,22,23] Similarly, while multimodal pain management strategies are recommended, variations in implementation and patient response lead to differing conclusions.[24] The lack of a comprehensive synthesis of evidence limits the ability to establish best practices and standardize nursing protocols for postoperative care. Therefore, this study conducted a systematic review and meta-analysis to evaluate the impact of nursing interventions on key clinical outcomes in patients undergoing abdominal surgery. The findings will inform healthcare professionals and policymakers in developing evidence-based nursing guidelines to enhance recovery, reducing complications, and improving patient quality of life. Importantly, this study systematically synthesizes the effectiveness of a wide range of nursing strategies across diverse surgical contexts, consolidating previously fragmented evidence and providing a robust foundation for the development of standardized nursing protocols. In contrast to earlier research with narrower scopes, this analysis offers a broader and more integrated understanding of effective nursing practices, facilitating their application across various healthcare settings.

Materials and Methods

Search methods

The study conducted a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[25] Relevant articles published between January 2019 and December 2023 were retrieved from five databases: PubMed, Scopus, CINAHL, Embase, and Web of Science. The search strategy utilized the PICO framework: participants (patients undergoing abdominal surgery), interventions (nursing interventions or Clinical Nursing Practice Guidelines [CNPG] for preventing postoperative complications), comparison (standard nursing care), and outcomes (pain, abdominal distension [ileus], nausea, vomiting, knowledge, and postoperative self-care behaviors). The primary search terms included a combination of "Abdominal Surgery" AND ("Nursing" OR "Prevent Complications" OR "Intervention" OR "Postoperative") AND ("Pain" OR "Ileus" OR "Nausea" OR "Vomit").

Eligibility criteria

Studies were selected based on clearly defined inclusion and exclusion criteria. The inclusion criteria were as follows: (1) studies evaluating nursing interventions aimed at preventing postoperative complications among patients undergoing open abdominal surgery; (2) participants aged 18 years or older; (3) measurement of clinical outcomes following surgery, such as pain, abdominal distension, nausea, vomiting, knowledge, and postoperative self-care behaviors; (4) presence of a control or comparison group; and (5) studies published in English or Thai with accessible full-text versions. The exclusion criteria were: (1) studies unrelated to nursing interventions; (2) studies involving laparoscopic surgery; (3) non-experimental studies (e.g. cross-sectional, cohort, or case-control designs); and (4) studies including participants under 18 years of age. The screening process was conducted independently by two reviewers, with disagreements resolved through team discussion.

Data extraction

Data extraction was conducted independently by two authors from each included study. Extracted information comprised study details (e.g., authors, title, publication year), research design, characteristics of the sample, nursing interventions to prevent postoperative complications, outcomes measured, statistical values utilized for meta-analysis (e.g., means, standard deviations), significant findings, and quality assessment scores. Any discrepancies were resolved through team discussion.

Risk of bias assessment

Two reviewers independently assessed each study by using the Joanna Briggs Institute critical appraisal tools

for randomized controlled trials (RCTs) (13 items) and quasi-experimental studies (9 items).[26,27] Items were scored as 1 ("Yes") or 0 ("No" or "Unclear"), with total scores categorizing study quality into three levels. For RCTs, scores of 0–4 indicated low quality, 5–9 moderate quality, and 10–13 high quality. For quasi-experimental studies, scores of 0–2 indicated low quality, 3–6 moderate quality, and 7–9 high quality.

Statistical analysis

Data were analyzed using R version 4.3.1 with the "metafor" package.[28] Standardized mean differences (SMD) and 95% confidence intervals (CIs) were calculated for continuous data. Heterogeneity was assessed using Cochrane's Q test and I^2 statistics,[29] with I^2 >25% indicating substantial heterogeneity, necessitating a random-effects model. Due to the limited number of studies, subgroup analyses by study type, nursing intervention, and quality assessment were not performed. Publication bias was evaluated using Egger's test, where a statistically significant result suggests potential bias.[30] If no bias is present, the distribution of studies around the pooled effect size is expected to be symmetrical.

Results

Literature search

The researcher conducted a systematic literature review, initially identifying 2,464 studies. After removing duplicates across databases, 1,356 remained. Titles and abstracts were screened using the PICO criteria, selecting only studies with full-text access, resulting in 133 articles. A full-text review excluded 112 studies for the following reasons: unrelated outcomes, non-nursing focus, non-experimental methods, laparoscopic procedures, duplicates, participants under 18, and insufficient statistical data. Ultimately, 21 studies met the inclusion criteria for meta-analysis. Figure 1 summarizes the review process.

Study characteristics

Table 1 summarizes the characteristics of the included studies. Among the 21 studies identified in this systematic review, most were conducted in Thailand (n = 10, 47.6%), followed by Turkey (n = 5, 23.8%). A majority utilized a quasi-experimental design (n = 12, 57.1%), while RCTs accounted for 42.9% (n = 9). Sample sizes ranged from 28 to 160 participants. Nursing interventions varied and included postoperative education programs, early postoperative mobilization, early ambulation stimulation, cold therapy, gum chewing, abdominal binder usage, structured pain management, and relaxation techniques. Control groups generally received standard postoperative care. The most frequently measured outcome was pain (17 studies). Other evaluated outcomes included hospital length of stay, duration of abdominal distension, time to first flatus, time to first

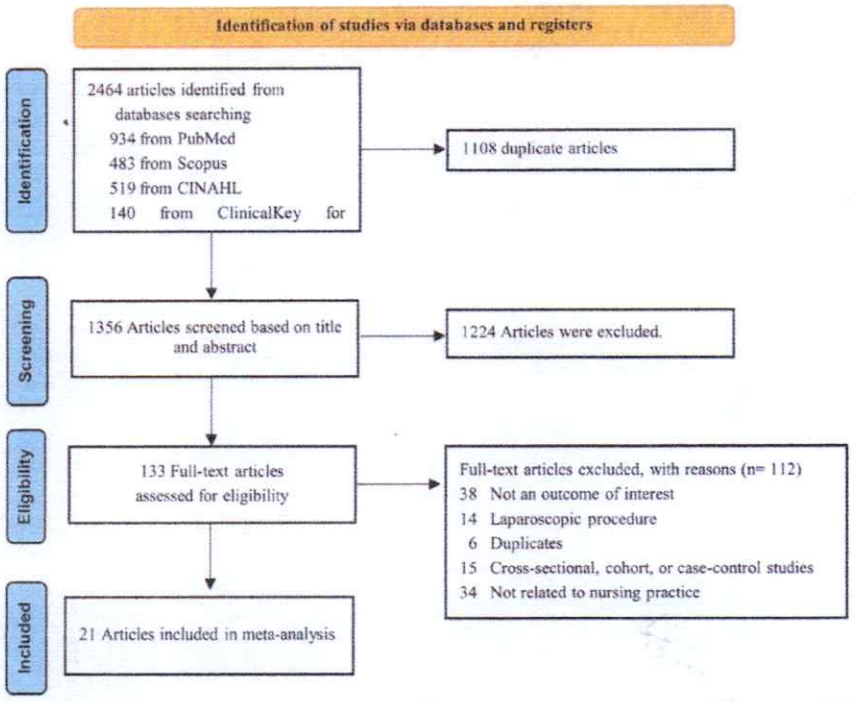


Figure 1: PRISMA flow diagram

Table 1: Study characteristics

Authors	Year	Country	Study Type	Sample Characteristics	Nursing Practice	Control Group	Measured Outcomes	Key Findings	Study Quality
Avci and Oskay[31]	2023	Turkey	RCT	E (*n*=54); Age 50.18±6.34, C (*n*=46); Age 51.80±7.23; Hysterectomy	Foot reflexology	Usual care	Pain	Pain significantly reduced in experimental group compared to control	Moderate
Seok *et al.*[32]	2021	South Korea	Quasi	E (*n*=40); Age 48.28±13.64, C (*n*=39); Age 49.00±14.56; Kidney surgery	Educational program to reduce nausea, vomiting, and dizziness	Instruction manual	Nausea, vomiting	Experimental group had significantly reduced nausea	High
Koyuncu and Iyigun[33]	2022	Turkey	Quasi	E (*n*=21); Age 62.81±11.57, C (*n*=21); Age 63.62±8.99; Pancreatic, gastrointestinal, colorectal cancer surgery	Early mobilization	Usual care	Hospital stay duration, abdominal distension hours	Experimental group showed significantly reduced hospital stays and abdominal distension duration	High
Gungor *et al.*[34]	2024	Turkey	RCT	E (*n*=55); Age 53.20±10.29, C (*n*=55); Age 50.90±14.52; General abdominal surgery	Cold water spray	Usual care	Pain	Experimental group showed significantly reduced pain	High
Hsu and Szu[35]	2022	Taiwan	RCT	E (*n*=30); Age 59.57±9.56, C (*n*=30); Age 58.07±9.47; Gastrointestinal surgery	Gum chewing	Usual care	Time to first flatus and bowel movement	Experimental group had significantly reduced time to first flatus	Moderate
Chantawong and Charoenkwan[36]	2021	Thailand	RCT	E (*n*=56); Mean age=55.50, C (*n*=53); Mean age=54.00; Abdominal surgery	Abdominal binder	Usual care	Pain	Experimental group showed significantly reduced pain	Moderate
Saeed *et al.*[37]	2019	Pakistan	RCT	E (*n*=70); Age 44.00±20.00, C (*n*=70); Age 45.00±26.00; Abdominal surgery	Abdominal binder	Usual care	Pain, hospital stay	Experimental group showed significantly reduced pain	Low
Campagna *et al.*[38]	2020	Italy	RCT	E (*n*=80), C (*n*=80); Mean age=66.3; Colorectal cancer surgery, chronic inflammatory bowel disease	Preoperative educational video	Usual care	Pain	No significant difference between groups	Low
Yaban *et al.*[39]	2023	Turkey	RCT	E (*n*=60); Age 45.00±6.87, C (*n*=60); Age 47.13±7.02; Abdominal surgery	Bed exercises	Usual care	Pain	Experimental group showed significantly reduced pain	Moderate
Guo *et al.*[40]	2023	China	Quasi	E (*n*=42); Age 42.88±14.34, C (*n*=42); Age 42.33±14.41; Gastrointestinal surgery	Intelligent information-based perioperative care	Usual care	Pain, hospital stay	Experimental group had reduced pain and hospital stay duration	High
Gao *et al.*[41]	2020	China	Quasi	E (*n*=42), C (*n*=42); Age 60.28±6.10; Gastric cancer surgery	Comprehensive postoperative health education	Usual care	Pain	Experimental group had significantly reduced pain	Moderate
Ozkan and Cavdar[42]	2021	Turkey	RCT	E (*n*=30), C (*n*=30); General, emergency, urological surgery	Cold therapy	Usual care	Pain	Experimental group had significantly reduced pain	High

Contd...

Table 1: Contd...

Authors	Year	Country	Study Type	Sample Characteristics	Nursing Practice	Control Group	Measured Outcomes	Key Findings	Study Quality
Wongart[43]	2023	Thailand	Quasi	E (*n*=26); Age 42.48±8.23, C (*n*=26); Age 44.69±8.37; Gynecological surgery	Music and gum chewing	Usual care	Pain, abdominal distension	Experimental group showed reduced Pain and abdominal distension	Moderate
Kaewpia *et al.*[44]	2023	Thailand	Quasi	E (*n*=26), C (*n*=26); Age 20–60; Abdominal surgery	Systematic pain management	Usual care	Pain, postoperative self-care behavior	Experimental group showed reduced pain and improved postoperative self-care behavior	Moderate
Boonploeng *et al.*[45]	2021	Thailand	RCT	E (*n*=30); Age 41.03±10.83, C (*n*=30); Age 41.97±10.99; Gynecological abdominal surgery	Abdominal binder	Usual care	Pain	Experimental group showed significantly reduced Pain	High
Wongruang *et al.*[46]	2020	Thailand	Quasi	E (*n*=14); Mean age=44.71, C (*n*=14); Mean age=42.50; Abdominal surgery	Gum chewing	Usual care	Time to first flatus and bowel movement	Experimental group had significantly reduced time to first flatus	Moderate
Worachotthaveewat *et al.*[47]	2023	Thailand	Quasi	E (*n*=30); Age 54.17±19.13, C (*n*=30); Age 50.70±16.75; Abdominal surgery	Early mobilization program	Usual care	Pain, knowledge	Experimental group showed reduced pain and improved knowledge	Moderate
Thonglor *et al.*[48]	2023	Thailand	Quasi	E (*n*=20), C (*n*=20); Gastrointestinal surgery	Cold compress with rice-berry pillow	Usual care	Pain	Experimental group had significantly reduced pain	Moderate
Khoyun *et al.*[49]	2019	Thailand	Quasi	E (*n*=30), C (*n*=30); Age 20–65; Abdominal surgery	Postoperative recovery program with walking aid	Usual care	Pain, abdominal distension, self-care	Experimental group had reduced pain, abdominal distension, and improved self-care	Moderate
Homvisasevongsa and Chuanrum[50]	2019	Thailand	Quasi	E (*n*=30); Age 45.03±4.45, C (*n*=30); Age 45.66±5.92; Abdominal hysterectomy	Breathing-based relaxation techniques	Usual care	Pain	Experimental group showed significantly reduced pain	Moderate
Gridana and Nunthaitaweekul[51]	2023	Thailand	Quasi	E (*n*=22); Age 55.32±8.99, C (*n*=22); Age 45.66±5.92; Liver surgery	Symptom management program with abdominal binder and cold compress	Usual care	Pain	Experimental group showed significantly reduced pain	Moderate

bowel movement, abdominal bloating, and postoperative self-care behaviors. Regarding methodological quality, most studies were rated as moderate quality (n = 13, 61.9%), followed by high-quality studies (n = 6, 28.6%).

Meta-analysis

From Table 2, nursing practices showed no statistically significant effect on postoperative pain at 1 hour (SMD = −0.60; 95% CI: −1.80, 0.60), 2 hours (SMD = −0.57; 95% CI: −1.59, 0.45), and 4 hours (SMD = −0.89; 95% CI: −2.17, 0.39). However, a significant reduction was observed at 8 hours (SMD = −0.36; 95% CI: −0.66, −0.05) [Figure 2]. Furthermore, significant reductions in pain were noted at 1 day (SMD = −0.88; 95% CI: −1.25, −0.51), 2 days (SMD = −0.85; 95% CI: −1.17, −0.53), 3 days (SMD = −0.80; 95% CI: −1.11, −0.48), and ≥ 4 days (SMD = −1.65; 95% CI: −2.72, −0.58), all at the 0.01 significance level [Figure 3]. These findings suggest that nursing interventions effectively reduced pain starting from 8 hours postoperatively, with sustained benefits over the following days.

Additionally, significant reductions were observed in the time to first bowel movement (SMD = −0.68; 95% CI: −1.12, −0.23) and time to first flatus (SMD = −0.84; 95% CI:

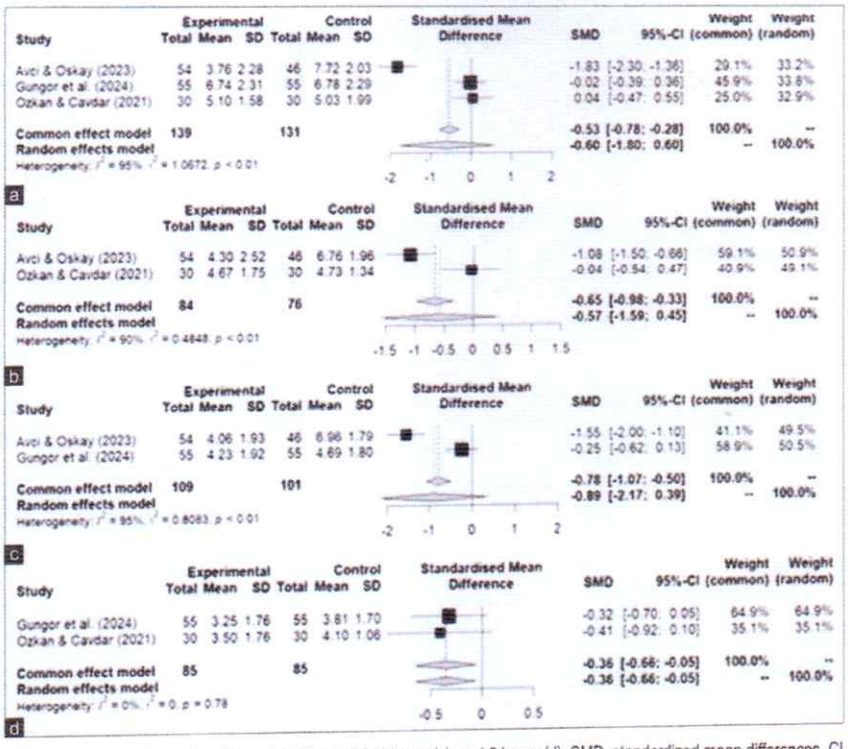


Figure 2: Pooled estimates of postoperative pain at 1 hour (a), 2 hours (b), 4 hours (c), and 8 hours (d). SMD, standardized mean differences, CI, confidence interval

Table 2: Pooled effect of nursing practice on outcomes among patients undergoing abdominal surgery

Outcomes	k	*n*	SMD (95% CI)	z	*P*	Heterogeneity			
						Q	df	*P*	*I*
Pain									
• 1 hour	3	270	−0.60 (−1.80, 0.60)	−0.98	0.327	41.38	2	0.000	95.2
• 2 hours	2	160	−0.57 (−1.59, 0.45)	−1.09	0.274	9.59	1	0.002	89.6
• 4 hours	2	210	−0.89 (−2.17, 0.39)	−1.37	0.171	19.11	1	0.000	94.8
• 8 hours	2	170	−0.36 (−0.66, −0.52)	−2.30	0.022	0.08	1	0.783	0.0
• 1 day	9	807	−0.88 (−1.25, −0.51)	−4.67	0.000	57.13	8	0.000	86.0
• 2 days	8	667	−0.85 (−1.17, −0.53)	−5.26	0.000	31.53	7	0.000	77.8
• 3 days	7	472	−0.80 (−1.11, −0.48)	−4.89	0.000	19.06	6	0.004	68.5
• 4 days or more	6	598	−1.65 (−2.72, −0.58)	−3.03	0.003	88.19	5	0.000	94.3
First bowel movement	2	88	−0.68 (−1.11, −0.25)	−3.09	0.002	1.05	1	0.306	4.6
First flatus	3	130	−0.84 (−1.20, −0.48)	−4.55	0.000	0.54	2	0.765	0.0
Abdominal distension									
• 1 day	2	112	−0.44 (−0.82, −0.07)	−2.31	0.021	0.08	1	0.783	0.0
• 2 days	2	112	−1.10 (−1.63, −0.58)	−4.14	0.000	1.70	1	0.192	41.3
• 3 days	2	112	−1.30 (−2.38, −0.22)	−2.36	0.019	6.81	1	0.009	85.3
Postoperative self-care	5	268	5.25 (3.77, 6.73)	6.94	0.000	31.54	4	0.000	87.3
Length of hospital stay	1	84	−3.09 (−3.72, −2.45)	−9.48	0.000	-	-	-	-
Nausea	1	79	−0.58 (−1.03, −0.13)	−2.51	0.012	-	-	-	-

−1.20, −0.48), both at the 0.01 significance level, indicating that nursing interventions effectively accelerated recovery. Nursing practices also significantly enhanced postoperative self-care behaviors at 1 day (SMD = 5.25; 95% CI: 3.77, 6.73), highlighting their positive impact on postoperative self-management [Figure 4]. Furthermore, significant reductions in postoperative abdominal distension were observed at 1 day (SMD = −0.44; 95% CI: −0.82, −0.07), 2 days (SMD = −1.10; 95% CI: −1.63, −0.58), and 3 days (SMD = −1.30; 95% CI: −2.38, −0.22), demonstrating the effectiveness of nursing interventions in alleviating abdominal distension from

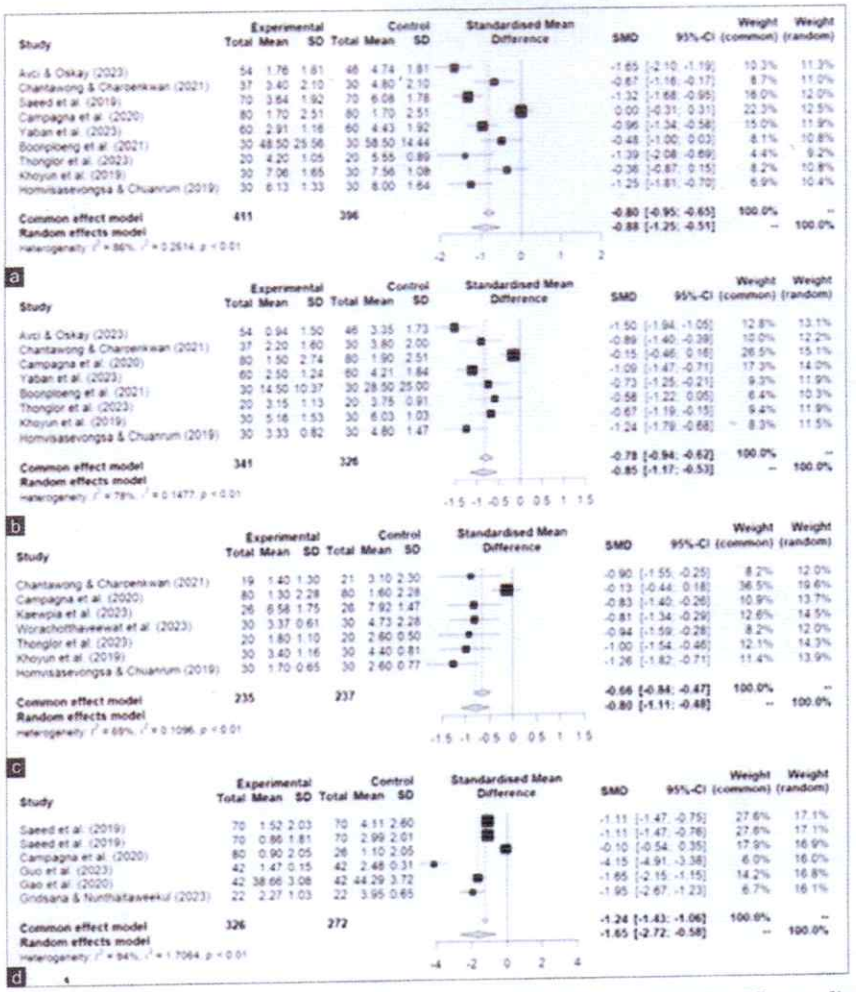


Figure 3: Pooled estimates of postoperative pain at 1 day (a), 2 days (b), 3 days (c), and ≥4 days (d). SMD, standardized mean differences, CI, confidence interval

day 1 onward [Figure 5]. Additionally, individual studies reported significant reductions in hospital length of stay and postoperative nausea.

Publication bias was assessed using Egger's regression test. Results indicated no significant publication bias for postoperative pain at 1 hour ($t = 0.38$, $df = 1$, $P = 0.77$), 1 day ($t = 1.13$, $df = 7$, $P = 0.30$), 2 days ($t = 1.22$, $df = 6$, $P = 0.27$), and ≥ 4 days ($t = 1.92$, $df = 4$, $P = 0.13$). However, evidence of significant publication bias was observed for postoperative pain at 3 days ($t = 4.76$, $df = 5$, $P < 0.01$), first flatus ($t = 17.83$, $df = 1$, $P < 0.05$), and postoperative self-care behaviors ($t = 18.01$, $df = 3$, $P < 0.01$). Publication bias assessments could not be performed for postoperative pain at 2, 4, and 8 hours; first bowel movement; and abdominal distension at 1, 2, and 3 days due to an insufficient number of studies for evaluating small-study effects.

Discussion

This systematic review and meta-analysis highlights the significant impact of nursing interventions on key clinical outcomes in patients undergoing abdominal surgery. Nursing interventions effectively reduced postoperative pain from 8 hours onward, with sustained benefits at 1, 2, 3, and ≥4 days, demonstrating the effectiveness of structured pain management. They also accelerated gastrointestinal recovery by shortening the time to first bowel movement and first flatus, helping mitigate postoperative ileus. Improved self-care behaviors further emphasize the role of patient education and nursing support in enhancing adherence to postoperative care. Additionally, reductions in abdominal distension suggest that nursing-led interventions improve gastrointestinal function and overall patient well-being. Individual studies also reported benefits such as shorter hospital stays and reduced postoperative nausea.

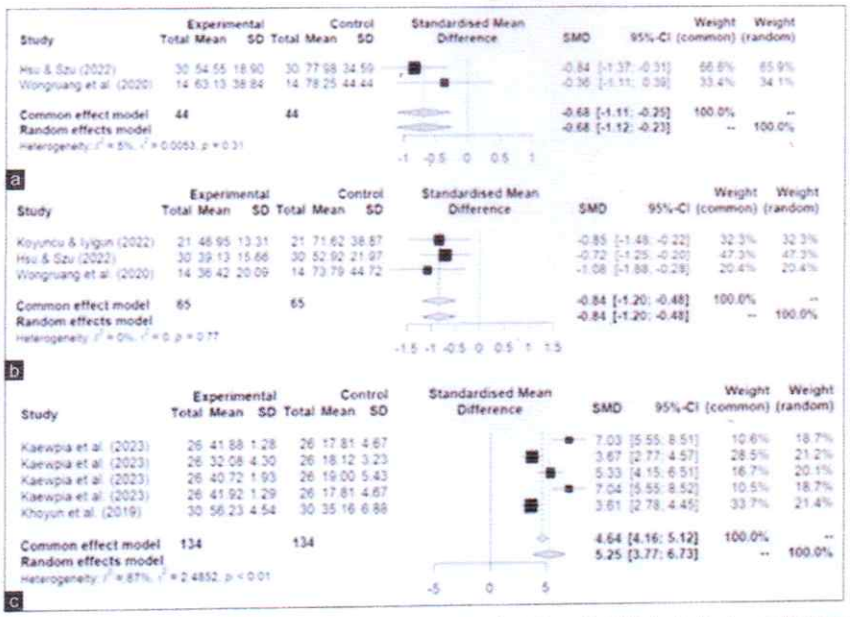


Figure 4: Pooled estimates of time to first bowel movement (a), time to first flatus (b), and postoperative self-care (c). SMD, standardized mean differences, CI, confidence interval

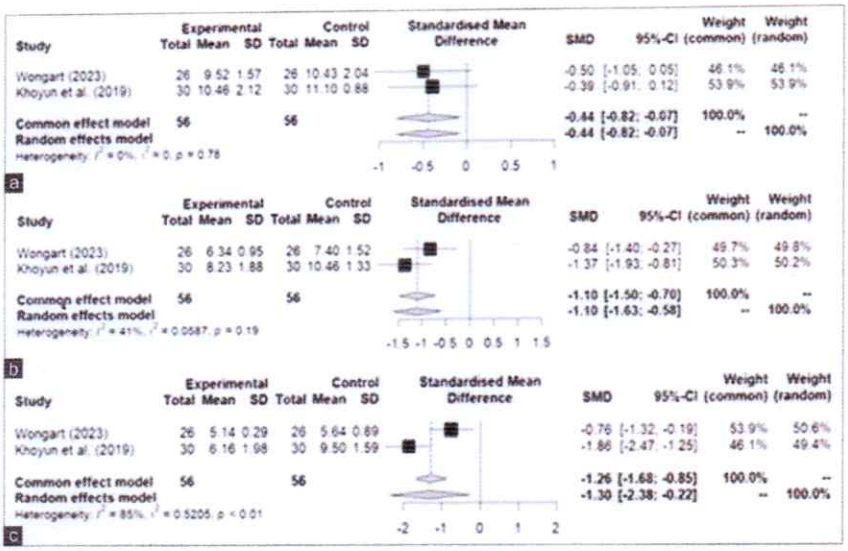


Figure 5: Pooled estimates of abdominal distension at 1 day (a), 2 days (b), and 3 days (c). SMD, standardized mean differences, CI, confidence interval

Nursing interventions significantly reduced postoperative pain from 8 hours onward, with sustained benefits at 1, 2, 3, and ≥4 days. These findings align with studies supporting multimodal nursing-led pain management, which integrates pharmacologic and non-pharmacologic strategies to enhance recovery.[52,53] While previous research has primarily demonstrated pain reduction within the first 24 hours postoperatively,[54] this study provides evidence of prolonged effectiveness. Effective pain control is critical, as inadequate management can prolong hospital stays, impair mobility, and reduce quality of life.[55] Non-pharmacologic techniques such as guided relaxation, breathing exercises, and cognitive behavioral therapy complement pharmacologic treatments, reducing opioid dependence while improving comfort and mobility.[56] This review suggests that nursing-led interventions not only enhance pain control but also facilitate early mobilization, thereby reducing complications, shortening hospital stays, and improving

functional recovery, consistent with the findings of Lee *et al.*[57] and Zhang *et al.*[58] To optimize outcomes, it is recommended that evidence-based multimodal pain management protocols—including individualized pain assessments and non-pharmacologic strategies—be systematically integrated into standard nursing practice, supported by specialized training for nursing staff.

Nursing interventions also significantly accelerated gastrointestinal recovery, demonstrated by shorter times to first bowel movement and first flatus, and reduced abdominal distension from the first postoperative day onward, thereby mitigating postoperative ileus. Postoperative ileus, a transient impairment of bowel motility, remains a frequent and costly complication following abdominal surgeries.[59] The beneficial effect of early mobilization, dietary modifications, and patient education, as supported by consistent findings in prior studies,[60,61] underscores the importance of proactive nursing strategies. Early ambulation has been emphasized in studies such as Willner *et al.*[62] and Debas *et al.*,[63] showing direct benefits on bowel function recovery. Patients who ambulate earlier experience reduced ileus duration and faster return of gastrointestinal activity, leading to better outcomes and lower healthcare costs. Hence, incorporating structured early mobilization protocols and dietary counseling into nursing care pathways is essential, alongside institutional policies that support nursing initiatives to encourage patient mobility.

In addition, nursing interventions significantly improved postoperative self-care behaviors, highlighting the pivotal role of structured patient education and supportive nursing interventions in enhancing adherence to recovery protocols. Self-care competence is crucial for postoperative success, as it empowers patients to recognize complications early, adhere to prescribed therapies, and promote faster recovery.[64,65] Research suggests that patients who receive comprehensive education before discharge are more likely to follow medication regimens, recognize early signs of complications, and engage in necessary self-care behaviors such as wound cleaning, hydration, and gradual mobilization.[66-68] Our findings align with evidence suggesting that structured, continuous education—supported by easy-to-understand materials and reinforced by trained nursing staff—can substantially improve patient outcomes. Institutions should implement standardized discharge education programs and invest in training nurses on effective patient communication strategies to promote long-term self-care success.

Collectively, these findings highlight the centrality of nursing interventions in enhancing postoperative recovery and reducing complications. Evidence-based practices such as structured multimodal pain management, early mobilization, and comprehensive discharge education should be systematically incorporated into nursing care protocols. Nurses serve as critical agents in implementing these interventions, motivating patient engagement, and ensuring adherence to recovery pathways. Providing educational materials in multiple formats—including print, digital media, and mobile applications—and offering personalized instruction can further enhance patient understanding and compliance.

From a health policy perspective, the evidence reinforces the need for greater investment in nursing-led postoperative care models. Healthcare policymakers should prioritize resources to ensure appropriate staffing levels, provide continuing professional education on evidence-based postoperative care, and support policy frameworks that institutionalize best practices in nursing care. Addressing nursing workforce shortages, maintaining optimal nurse-to-patient ratios, and ensuring structured competency assessments are essential steps toward improving surgical outcomes. Hospitals should implement institutional policies requiring systematic training in multimodal pain management, early ambulation promotion, and patient education. Furthermore, national and international healthcare organizations should disseminate standardized nursing protocols derived from systematic reviews and meta-analyses to ensure consistency and maximize the effectiveness of nursing interventions across diverse clinical settings.

This study has several strengths. It is among the few systematic reviews and meta-analyses that comprehensively synthesize evidence on the effectiveness of nursing interventions in improving postoperative outcomes after abdominal surgery. The analysis adhered strictly to PRISMA guidelines and included critical appraisal of study quality, ensuring a transparent, methodologically robust, and replicable process.

Despite these strengths, several limitations should be acknowledged. First, methodological heterogeneity existed among the included studies, with variations in design, intervention protocols, and outcome measurements. Despite efforts to standardize data synthesis, differences in intervention intensity, duration, and patient adherence may have influenced effect estimates. Future research should adopt standardized methodologies with uniform protocols and outcome measures to improve comparability. Second, most studies were conducted in specific regions, such as Thailand and Turkey, limiting the generalizability of findings. Broader studies across diverse geographic and clinical settings are needed to enhance external validity. Third, the limited number of studies reporting

specific outcomes restricted subgroup analyses based on study type, nursing intervention, and patient demographics. Larger, multicenter RCTs are needed to explore intervention effects across different patient groups. Finally, publication bias could not be assessed for certain outcomes due to the small sample of studies, potentially affecting conclusions. Future research should address this by promoting the publication of both positive and negative findings and expanding the range of postoperative outcomes in prospective trials.

Conclusion

This systematic review and meta-analysis underscore the critical role of nursing interventions in enhancing clinical outcomes among patients undergoing abdominal surgery. Interventions that mitigate pain, expedite gastrointestinal recovery, and promote self-care are fundamental to optimizing postoperative care and align with broader health policy objectives aimed at improving quality, safety, and cost-efficiency within healthcare systems. The findings highlight the necessity of implementing standardized, evidence-based nursing protocols and integrating them into both national and institutional policy frameworks. Strengthening nursing practices through targeted policy initiatives has the potential to improve patient outcomes, reduce hospital length of stay, and enhance healthcare resource utilization. Future research should prioritize the development of scalable, policy-aligned nursing interventions to further elevate surgical recovery standards and ensure equitable, high-quality postoperative care across diverse clinical settings.

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Conflicts of interest

There are no conflicts of interest.

References

1. Hijazi Y, Gondal U, Aziz O. A systematic review of prehabilitation programs in abdominal cancer surgery. Int J Surg 2017;39:156–62.
2. Gustafsson UO, Scott MJ, Hubner M, Nygren J, Demartines N, Francis N, *et al*. Guidelines for perioperative care in elective colorectal surgery: Enhanced recovery after surgery (ERAS®) society recommendations: 2018. World J Surg 2019;43:659–95.
3. van Kooten RT, Bahadoer RR, Peeters KCMJ, Hoeksema JHL, Steyerberg EW, Hartgrink HH, *et al*. Preoperative risk factors for major postoperative complications after complex gastrointestinal cancer surgery: A systematic review. Eur J Surg Oncol 2021;47:3049–58.
4. Mazzotta E, Villalobos-Hernandez EC, Fiorda-Diaz J, Harzman A, Christofi FL. Postoperative ileus and postoperative gastrointestinal tract dysfunction: Pathogenic mechanisms and novel treatment strategies beyond colorectal enhanced recovery after surgery protocols. Front Pharmacol 2020;11:583422.
5. Iskander O. An outline of the management and prevention of postoperative ileus: A review. Medicine 2024;103:e38177.
6. Skořepa P, Ford KL, Alsuwaylihi A, O'Connor D, Prado CM, Gomez D, *et al*. The impact of prehabilitation on outcomes in frail and high-risk patients undergoing major abdominal surgery: A systematic review and meta-analysis. Clin Nutr 2024;43:629–48.
7. Ju W, Ren L, Chen J, Du Y. Efficacy of relaxation therapy as an effective nursing intervention for post-operative pain relief in patients undergoing abdominal surgery: A systematic review and meta-analysis. Exp Ther Med 2019;18:2909–16.
8. Mendes DIA, Ferrito CRAC, Gonçalves MIR. Nursing interventions in the enhanced recovery after surgery®: Scoping review. Rev Bras Enferm 2018;71:2824–32.
9. Rao L, Liu X, Yu L, Xiao H. Effect of nursing intervention to guide early postoperative activities on rapid rehabilitation of patients undergoing abdominal surgery: A protocol for systematic review and meta-analysis. Medicine 2021;100:e24776.
10. Jakobsen DH, Høgdall C, Seibæk L. Postoperative mobilization as an indicator for the quality of surgical nursing care. Br J Nurs 2021;30:S4–15.
11. Sun Y. Analysis of effect on infection factors and nursing care of postoperative incision in gynecological cancer patients. Biomed Res Int 2021;2021:2996216.
12. Huang J, Li P, Wang H, Lv C, Han J, Lu X. Exploring elderly patients' experiences and concerns about early mobilization implemented in postoperative care following lumbar spinal surgery: A qualitative study. BMC Nurs 2023;22:355.
13. Nachiyunde B, Lam L. The efficacy of different modes of analgesia in postoperative pain management and early mobilization in postoperative cardiac surgical patients: A systematic review. Ann Card Anaesth 2018;21:363–70.
14. Pashaei S, Akyüz N. Effective role of aromatherapy in reducing big little problem-postoperative nausea and vomiting: A systematic review. J Educ Health Promot 2024;13:298.
15. Tazreean R, Nelson G, Twomey R. Early mobilization in enhanced recovery after surgery pathways: Current evidence and recent advancements. J Comp Eff Res 2022;11:121–9.
16. Atinyagrika Adugbire B, Aziato L. Surgical patients' perspectives on nurses' education on post-operative care and follow up in Northern Ghana. BMC Nurs 2018;17:29.
17. Mannarino CN, Michelson K, Jackson L, Paquette E, McBride ME. Post-operative discharge education for parent caregivers of children with congenital heart disease: A needs assessment. Cardiol Young 2020;30:1788–96.
18. Brodersen F, Wagner J, Uzunoglu FG, Petersen-Ewert C. Impact of preoperative patient education on postoperative recovery in abdominal surgery: A systematic review. World J Surg 2023;47:937–47.
19. Cook DJ, Moradkhani A, Douglas KS, Prinsen SK, Fischer EN, Schroeder DR. Patient education self-management during surgical recovery: Combining mobile (iPad) and a content management system. Telemed J E Health 2014;20:312–7.
20. Reaza-Alarcón A, Rodríguez-Martín B. Effectiveness of nursing educational interventions in managing post-surgical pain. Systematic review. Invest Educ Enferm 2019;37:e10.
21. Shah AA, Alnajib AMA, Baldaniya L, Hassan H, Kaur P, Sharma R, *et al*. Investigating the effectiveness of enhanced recovery after surgery (ERAS) protocols in improving postoperative outcomes

and reducing hospital readmission rates in patients undergoing abdominal surgery. J Pharm Bioallied Sci 2024;16:S3534–7.
22. Iniesta MD, Lasala J, Mena G, Rodriguez-Restrepo A, Salvo G, Pitcher B, *et al*. Impact of compliance with an enhanced recovery after surgery pathway on patient outcomes in open gynecologic surgery. Int J Gynecol Cancer 2019;29:1417–24.
23. Ni YX, Li Z, Zhou LL, Gong S. Factors influencing early mobilisation for patients undergoing pancreatic surgery from multiple perspectives: A qualitative descriptive study. BMJ Open 2023;13:e077419.
24. Shauly O, Marxen T, Menon A, Swan C, Smearman E, Gould DJ. Multimodal pain control in abdominoplasty: A systematic review and algorithm of optimal pain management. Aesthet Surg J 2024;44:S22–30.
25. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, *et al*. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ 2021;372:n71.
26. Barker TH, Habibi N, Aromataris E, Stone JC, Leonardi-Bee J, Sears K, *et al*. The revised JBI critical appraisal tool for the assessment of risk of bias for quasi-experimental studies. JBI Evid Synth 2024;22:378–88.
27. Barker TH, Stone JC, Sears K, Klugar M, Tufanaru C, Leonardi-Bee J, *et al*. The revised JBI critical appraisal tool for the assessment of risk of bias for randomized controlled trials. JBI Evid Synth 2023;21:494–506.
28. Viechtbauer W. Conducting meta-analyses in R with the metafor package. J Stat Soft 2010;36:1–48.
29. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ 2003;327:557–60.
30. Egger M, Smith GD, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ 1997;315:629–34.
31. Avci N, Oskay U. Effect of reflexology on decreasing postoperative pain and anxiety after total abdominal hysterectomy. Holist Nurs Pract 2023;37:78–89.
32. Seok Y, Suh EE, Yu S, Park J, Park H, Lee E. Effectiveness of integrated education to reduce postoperative nausea, vomiting, and dizziness after abdominal surgery under general anesthesia. Int J Environ Res Public Health 2021;18:6124.
33. Koyuncu F, Iyigun E. The effect of mobilization protocol on mobilization start time and patient care outcomes in patients undergoing abdominal surgery. J Clin Nurs 2022;31:1298–308.
34. Gungor S, Tosun B, Candir G, Ozen N. Effects of cold spray on thirst, frequency of oral care, and pain of general surgery intensive care unit patients. Sci Rep 2024;14:9997.
35. Hsu Y, Szu S. Effects of gum chewing on recovery from postoperative ileus: A randomized clinical trail. J Nurs Res 2022;30:e233.
36. Chantawong N, Charoenkwan K. Effect of elastic abdominal binder on pain and functional recovery following gynecologic cancer surgery: A randomized controlled trial. Medicina 2021;57:481.
37. Saeed S, Rage KA, Memon AS, Kazi S, Samo KA, Shahid S, *et al*. Use of abdominal binders after a major abdominal surgery: A randomized controlled trial. Cureus 2019;11:e5832.
38. Campagna S, Clari M, Delfino C, Rolfo M, Rizzo A, Berchialla P, *et al*. Impact of a preoperative video-based educational intervention on postoperative outcomes in elective major abdominal surgery: A randomized controlled trial. J Gastrointest Surg 2020;24:2295–7.
39. Yaban ZS, Bulbuloglu S, Kapikiran G, Gunes H, Sahin SK, Saritas S. The effect of bed exercises following major abdominal surgery on early ambulation, mobilization, pain and anxiety: A randomized-controlled trial. Int Wound J 2023;21:e14406.
40. Guo X, Li X, Tang H, Tang L, Tao F, Zhuge H. Impact of intelligent information-based perioperative care on postoperative rehabilitation, complications, and quality of life of patients undergoing gastrointestinal surgery. Medicine 2023;102:e35977.
41. Gao Q, Li H, Zou Y, Hou B, Liu L. Effectiveness of a comprehensive post-operative health education program in improving quality of life after gastric cancer surgery. Ann Palliat Med 2020;9:921–6.
42. Ozkan B, Cavdar I. The effect of cold therapy applied to the incision area after abdominal surgery on postoperative pain and analgesic use. Pain Manag Nurs 2021;22:775–82.
43. Wongart S. The effects of symptom management program of gynecological patients after abdominal surgery on postoperative pain and abdominal distention in Suwannaphum hospital, Roi-Et province. J Res Health Innov Dev 2023;4:112–25. (Thai).
44. Kaewpia T, Pakanta I, Khamboon T. The effects of planned pain management program on pain and self-practice after abdominal surgery in abdominal injuries patients. J Nurs Health Sci Res 2023;15:68–81. (Thai)
45. Boonploeng K, Pratipanawatr S, Tangsiriwatthana T. Abdominal binder for improving postoperative physical function after benign gynecologic surgery: A randomized controlled trial. Thai J Obstet Gynaecol 2021;29:10–6.
46. Wongruang W, Vuttanon N, Udomkhamsuk W. Effect of gum chewing on bowel function recovery in post abdominal surgery patients. Nurs J 2020;47:157–67. (Thai)
47. Worachotthaveewat N, Chamnian P, Thongthaweephokhin S, Kerdprasong N. The effects of the program early postoperative ambulation in patients after abdominal surgery, Phichit hospital. Region 4-5 Med J 2023;42:583–92. (Thai)
48. Thonglor C, Thato R, Supametaporn P. Effects of cold compress using rice-berry pillow on pain after open abdominal surgery in patients with gastrointestinal disease. J Nurs Sci Chulalongkorn Univ 2023;35:61–74. (Thai)
49. Khoyun S, Poothawee W, Srisoy A. Effect of post-operative recovery program with the use of easy walk equipment to prevent complications in abdominal surgery patients. Srinagarind Med J 2019;34:386–92. (Thai)
50. Homvisasevongsa Y, Chuanrum J. Comparison of postoperative pain between patients received and not trained relaxing techniques that use breathing training in patients with abdominal hysterectomy. Med J Srisaket Surin Buriram Hosp 2019;34:161–79. (Thai)
51. Gridana T, Nunthaitaweekul P. The effect of symptom management program combined with abdominal binder with cold compression on pain in patients with open hepatectomy. Thai J Nurs 2023;72:21–31. (Thai)
52. Montgomery R, McNamara SA. Multimodal pain management for enhanced recovery: Reinforcing the shift from traditional pathways through nurse-led interventions. AORN J 2016;104:S9–16.
53. Niyonkuru E, Iqbal MA, Zhang X, Ma P. Complementary approaches to postoperative pain management: A review of non-pharmacological interventions. Pain Ther 2025;14:121–44.
54. Small C, Laycock H. Acute postoperative pain management. Br J Surg 2020;107:e70–80.
55. Gan TJ. Poorly controlled postoperative pain: Prevalence, consequences, and prevention. J Pain Res 2017;10:2287–98.
56. Patil JD, Sefen JAN, Fredericks S. Exploring non-pharmacological methods for pre-operative pain management. Front Surg 2022;9:801742.
57. Lee J, Kim Y, Lee HJ. Nurse-involved early mobilization in the intensive care unit: A systematic review and meta-analysis. Nurs Crit Care 2025;30:e13278.
58. Zhang D, Ding H, Shen C, Liu Y, Jia N. Evaluating the role of nursing interventions in enhanced recovery after surgery for minimally invasive spine surgery: A retrospective analysis. Front Surg 2025;12:1519135.
59. Chapman SJ, Pericleous A, Downey C, Jayne DG. Postoperative ileus following major colorectal surgery. Br J Surg 2018;105:797–810.
60. Cui Y, Zhang C, Zhang H, Zhang X, Tang Y, Wu Z, *et al*. Effect evaluation of different preventive measures for ileus after

abdominal operation: A systematic review and network meta-analysis. Heliyon 2024;10:e25412.
61. Emile SH, Horesh N, Garoufalia Z, Gefen R, Ray-Offor E, Wexner SD. Strategies to reduce ileus after colorectal surgery: A qualitative umbrella review of the collective evidence. Surgery 2024;175:280–8.
62. Willner A, Teske C, Hackert T, Welsch T. Effects of early postoperative mobilization following gastrointestinal surgery: Systematic review and meta-analysis. BJS Open 2023;7:zrad102.
63. Debas SA, Chekol WB, Zeleke ME, Mersha AT. Delayed ambulation in adult patients after major abdominal surgery in Northwest Ethiopia: A multicenter prospective follow up study. Sci Rep 2025;15:13382.
64. Yan H, Su Y, Wang L. Impact of Ahmadi continuing nursing model on self-care ability, stoma complications and quality of life of colostomy patients. BMC Gastroenterol 2024;24:421.
65. Ranaut R, Pareek B, Samual S. Effect of nurse-led psychosocial intervention on body image distress and treatment compliance among patients undergoing treatment of cancer: A randomized controlled trial. J Educ Health Promot 2024;13:248.
66. Blöndal K, Sveinsdóttir H, Ingadottir B. Patients' expectations and experiences of provided surgery-related patient education: A descriptive longitudinal study. Nurs Open 2022;9:2495–505.
67. Walton LL, Duff E, Arora RC, McMillan DE. Surgery patients' perspectives of their role in postoperative pain: A scoping review. Int J Nurs Stud Adv 2023;5:100124.
68. Shoja M, Arsalani N, Fallahi-Khoshknab M, Mohammadi-Shahboulaghi F. The barriers and facilitators to nursing care for patients with permanent colostomy in outpatient centers: A qualitative study. J Educ Health Promot 2024;13:72.