

## Original Article

# Effectiveness of a Nursing-Based Fast Track Surgery Protocol on Postoperative Pain Reduction: A Quasi-Experimental Study



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### ARTICLE INFO

#### Article History

Submit : August 11, 2025  
Accepted : October 30, 2025  
Published : November 7, 2025

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#### Citation:

Ariani, S. P. ., Yuhansyah, Y., Ernawati, E., & Jariyah, A. . (2025). Effectiveness of a Nursing-Based Fast Track Surgery Protocol on Postoperative Pain Reduction: A Quasi-Experimental Study. Journal of Applied Nursing and Health, 7(3), 451–459. <https://doi.org/10.55018/janh.v7i3.390>

### ABSTRACT

**Background:** Ineffective management of postoperative pain can delay recovery, increase the risk of complications, and extend the length of hospital stay. Fast Track Surgery (FTS) is a multidisciplinary approach that speeds up recovery and reduces postoperative pain effectively. However, studies on the effectiveness of nursing-based FTS interventions in regional hospitals are still limited. This study examines the effectiveness of an innovative nursing-based FTS approach in reducing pain intensity among postoperative patients.

**Methods:** This quasi-experimental study used purposive sampling and involved 30 participants, divided into intervention and control groups. The study was conducted at TK III Dr. R. Soeharsono Hospital in Banjarmasin, South Kalimantan. Inclusion criteria were patients aged 18 to 65 years, postoperative, able to communicate well, and willing to participate. Pain intensity was measured using the Visual Analog Scale (VAS) before and two hours after the Fast Track Surgery intervention. The nursing-based FTS intervention included preoperative education, early mobilization, and multimodal analgesia management. The study was reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to ensure clarity and completeness.

**Results:** Most participants were between 19 and 44 years old, 60% were male, and the majority had completed high school. Before the intervention, patients mainly reported moderate to severe pain; after the FTS intervention, most reported mild pain. Pain intensity was significantly different between the intervention and control groups ( $p < 0.001$ ).

**Conclusion:** The nursing-based Fast Track Surgery approach effectively reduces postoperative pain intensity. It is recommended that nurse-led FTS protocols be implemented in regional hospitals to improve pain management and accelerate patient recovery.

**Keywords:** Fast Track Surgery; Postoperative Pain; Pain Management; Nursing.

### Implications for Practice:

- Substantially contributes to the diminution of postoperative pain intensity through the application of a structured non-pharmacological intervention, thereby expediting the patient's recovery process.
- Enhances the efficacy of nursing care by actively empowering nurses in patient education, clinical condition monitoring, and the facilitation of early postoperative mobilization.
- Promotes the reduction of opioid analgesic consumption via the implementation of multimodal analgesia, thus mitigating the risk of adverse effects and potential drug dependency.

## Introduction

Postoperative pain remains a major challenge in the recovery process following surgery. Pain affects patient comfort and significantly impacts quality of life, prolongs hospital stays, and increases the risk of complications. According to the International Association for the Study of Pain (IASP), about 80% of patients experience pain after surgery, with 20–40% reporting moderate to severe pain ([IASP, 2023](#)).

In Indonesia, the Ministry of Health has identified postoperative pain as a leading cause of delayed early mobilization and increased opioid use in patient care, affecting recovery efficiency and patient safety ([Ministry of Health, 2022](#)). A study at Dr. Sardjito Hospital in Yogyakarta found that 62% of postoperative patients experienced moderate to severe pain within the first 24 hours after surgery ([Yuliana & Pratama, 2023](#)). In South Kalimantan, the Provincial Health Office reported that 58% of postoperative patients faced delays in mobilization due to poorly managed pain ([South Kalimantan Provincial Health Office, 2024](#)). These findings highlight that ineffective pain management can lead to further complications, longer hospital stays, and higher healthcare costs ([Kehlet, 2021](#)).

Fast Track Surgery (FTS), also called Enhanced Recovery After Surgery (ERAS), is a multidisciplinary approach shown to speed up recovery and reduce postoperative pain. This method covers interventions before, during, and after surgery, emphasizing teamwork among healthcare professionals to support faster and safer recovery ([Ljungqvist, Scott, & Fearon, 2022](#)). Key components of FTS include multimodal analgesia, early mobilization, and preoperative patient education to prepare patients both physically and mentally for surgery ([Desborough, 2020](#)). Recent meta-analyses indicate that FTS can significantly reduce

pain scores and shorten hospital stays by up to two days when compared to conventional care ([Lv, Shao, & Zhou, 2022](#)).

Nurses play a crucial role in the success of FTS by assessing and monitoring pain, providing patient education, and coordinating with the multidisciplinary team ([Nasution & Harahap, 2023](#)). Despite strong international evidence supporting FTS, research focusing specifically on nursing-based FTS interventions in Indonesia, especially in regional hospitals, remains scarce. This gap points to the need for empirical studies in this area.

This study is grounded in pain management theory and perioperative recovery theory. Pain management theory stresses the importance of systematic and ongoing pain control before and after surgery. Meanwhile, perioperative recovery theory emphasizes integrated interventions—such as education, mobilization, and analgesia—with nurses acting as key facilitators to speed up recovery. Combining these theories provides the basis for developing nursing-based FTS innovations to significantly reduce postoperative pain. This study aims to evaluate the effectiveness of a nursing-based Fast Track Surgery approach in lowering pain intensity among postoperative patients.

## Methods

### Study Design

This study used a quasi-experimental design with an intervention group and a control group. Pain levels were measured in both groups before surgery (pre-test) and after the intervention (post-test). This design was chosen to assess how effective the nursing-based Fast Track Surgery (FTS) innovation is in reducing postoperative pain

## Participants

The research was conducted at TK III Dr. R. Soeharsono Hospital in Banjarmasin, South Kalimantan, Indonesia, between July and August 2025, involving 30 participants selected through purposive sampling. The sample size was determined based on the available time rather than a power analysis, which represents one of the study's limitations. The inclusion criteria included postoperative patients aged 18–65 years who were able to communicate clearly and willing to participate in the study, while the exclusion criteria comprised pregnant women, patients with chronic illnesses, and those who declined to participate.

## Instruments

The instrument used to assess pain intensity was the Visual Analog Scale (VAS), a 10 cm horizontal line scored from 0 to 10, where 0 represents “no pain” and 10 represents “worst possible pain.” The reliability and validity of the VAS have been well established in numerous studies as a standard tool for pain assessment, demonstrating a strong correlation with other pain measurement instruments ([Hawker et al., 2021](#)). The VAS is an open, valid, and reliable instrument widely used in clinical research and medical practice. Since it is non-commercial and requires no special license, its use does not require written permission from the developer. In this study, pain intensity was categorized as follows: scores of 1–3 indicated mild pain, 4–6 indicated moderate pain, and 7–10 indicated severe pain.

## Intervention

The intervention group in this study received a nursing-based Fast Track Surgery (FTS) innovation consisting of several structured components designed to enhance recovery after surgery. The first component was preoperative education, conducted one day before surgery, which included information about the surgical

procedure, breathing techniques, the importance of early mobilization, and pain management. This session was provided by trained surgical nurses following the Patient Education Standard Operating Procedure (SOP) at TK III Dr. R. Soeharsono Hospital in Banjarmasin.

The second component was multimodal analgesia, in which patients received a combination of non-opioid analgesics and low-dose opioids according to hospital standards. Analgesia administration began as soon as patients regained consciousness after surgery and continued following the scheduled postoperative pain management SOP. This approach aimed to optimize pain control, reduce opioid dependence, and facilitate faster mobilization.

The third component was early mobilization, which began two hours after surgery. It included progressive activities such as limb movement exercises in bed, sitting at the bedside, and gradually progressing to standing or walking with nurse assistance. This procedure followed the Early Mobilization SOP for postoperative patients. In contrast, the control group received standard postoperative care without structured FTS components, consisting only of single analgesia on demand and mobilization according to patient tolerance.

## Data Collection

Data was collected in the surgical inpatient ward at TK III Dr. R. Soeharsono Hospital, Banjarmasin. Trained ward nurses appointed as research assistants gathered the data. Before the study commenced, these research assistants received detailed briefings and synchronized their understanding with the principal investigator to ensure uniformity and consistency in executing the research procedures.

The data collection process consisted of three stages. The pre-test phase was

conducted before surgery to measure patients' baseline pain levels using the Visual Analog Scale (VAS). Postoperative patients received multimodal analgesia, education, and early mobilization during the intervention phase according to the study protocol. Finally, in the post-test phase, two hours after the intervention, patients' pain levels were remeasured using the same VAS instrument to evaluate pain reduction outcomes.

All procedures were carried out in accordance with the established inclusion and exclusion criteria to maintain data validity and ensure ethical and methodological consistency throughout the study.

### Data Analysis

Data were analysed using the Wilcoxon Signed Rank Test to compare differences in pain intensity between pre-test and post-test in the intervention group. Analysis was performed with SPSS version 21.

A significance level was set at  $p$ -value  $\leq 0.05$ . If  $p \leq 0.05$ , it indicated a statistically significant difference between pre-test and post-test pain scores, meaning the Fast Track Surgery intervention had a real effect in reducing pain. Conversely,  $p > 0.05$  indicated no statistically significant difference, suggesting the intervention did not significantly reduce pain.

### Ethical Considerations

This study received ethical approval from the Muhammadiyah University of Banjarmasin Research Ethics Committee, with approval number 477/UMB/KE/VII/2025. All participants were informed about the study's purpose, procedures, benefits, and potential risks, and their personal data confidentiality was guaranteed. After understanding this information, participants provided voluntary informed consent before participating in the study.

## Results

**Table 1** provides a detailed description of the respondents' characteristics alongside the effects of the intervention, which consisted of multimodal analgesic administration, early mobilization, and modified patient education on postoperative pain reduction. The majority of participants were male (60%) and had a moderate educational background, with 50% having completed senior high school (SMA). This demographic profile suggests possible limitations in health literacy that might influence pain perception; however, the favourable outcomes indicate that clear and straightforward educational efforts are effective even within populations of basic education level.

The mean age of the respondents ranged from 19 to 44 years, corresponding to the productive age group. This aligns with extant literature demonstrating that age influences pain perception and recovery processes, as age-associated declines in neurological and immune function, coupled with musculoskeletal physiological changes affecting mobilization, contribute to delayed postoperative recovery.

**Table 1.** Demographic characteristics of respondents

| No | Respondent Characteristics | Group                 |                  |
|----|----------------------------|-----------------------|------------------|
|    |                            | Intervention<br>N (%) | Control<br>N (%) |
| 1  | Age                        |                       |                  |
|    | 19–44 years                | 13 (43.3%)            | 11 (36.7%)       |
|    | 45–60 years                | 12 (40.0%)            | 13 (43.3%)       |
|    | > 60 years                 | 5 (16.7%)             | 6 (20.0%)        |
| 2  | Gender                     |                       |                  |
|    | Male                       | 18 (60.0%)            | 19 (63.3%)       |
|    | Female                     | 12 (40.0%)            | 11 (36.7%)       |
| 3  | Occupation                 |                       |                  |
|    | Entrepreneur               | 7 (23.3%)             | 6 (20.0%)        |
|    | Housewife                  | 7 (23.3%)             | 8 (26.7%)        |
|    | Civil Servant / Military   | 8 (26.7%)             | 10 (33.3%)       |
|    | Laborer                    | 4 (13.3%)             | 2 (6.7%)         |
|    | Private Sector Employee    | 3 (10.0%)             | 3 (10.0%)        |

| No       | Respondent Characteristics | Group              |               |
|----------|----------------------------|--------------------|---------------|
|          |                            | Intervention N (%) | Control N (%) |
|          | Unemployed                 | 1 (3.3%)           | 1 (3.3%)      |
| <b>4</b> | <b>Education</b>           |                    |               |
|          | No Formal Education        | 1 (3.3%)           | 0 (0%)        |
|          | Elementary School          | 2 (6.7%)           | 3 (10.0%)     |
|          | Junior High School         | 6 (20.0%)          | 7 (23.3%)     |
|          | Senior High School         | 15 (50.0%)         | 13 (43.3%)    |
|          | Diploma III                | 3 (10.0%)          | 4 (13.3%)     |
|          | Bachelor's Degree (S1)     | 3 (10.0%)          | 3 (10.0%)     |

**Table 2** provides a detailed pain scale category classifications before and after the intervention revealed a substantial reduction in pain intensity: prior to intervention, 56.7% of patients reported moderate pain and 43% severe pain, whereas post-intervention, 60% reported mild pain and 33.3% moderate pain. These

findings indicate a statistically significant decrease in mean pain scores and a clinically important redistribution towards lower pain categories, demonstrating meaningful improvement in postoperative pain management.

It is important to consider potential confounding variables such as other lifestyle factors, including physical activity and psychological stress, which were not controlled or measured within this quasi-experimental design. In summary, the data presented in Table 2 corroborate the effectiveness of the Fast Track Surgery (FTS) intervention comprising multimodal analgesia, early mobilization, and patient education in significantly reducing postoperative pain intensity. Nonetheless, further large-scale and longitudinal randomized controlled trials are warranted to confirm these findings and to control for potential confounders.

**Table 2.** Characteristics of pain in the intervention and control groups before and after fast track surgery

| No | Variable (Pain Scale) | Category | Intervention Group n (%) | Control Group n (%) | Statistical Test | p-value |
|----|-----------------------|----------|--------------------------|---------------------|------------------|---------|
| 1  | Before Intervention   | Mild     | 0 (0%)                   | 0 (0%)              | Wilcoxon Test    | 0.005   |
|    |                       | Moderate | 17 (56.7%)               | 18 (60%)            |                  |         |
|    |                       | Severe   | 13 (43.3%)               | 12 (40%)            |                  |         |
|    |                       | Total    | 30 (100%)                | 30 (100%)           |                  |         |
| 2  | After Intervention    | Mild     | 18 (60%)                 | 0 (0%)              |                  |         |
|    |                       | Moderate | 10 (33.3%)               | 16 (53.3%)          |                  |         |
|    |                       | Severe   | 2 (6.7%)                 | 14 (46.7%)          |                  |         |
|    |                       | Total    | 30 (100%)                | 30 (100%)           |                  |         |

## Discussion

The study found that most of the respondents were male, both in the intervention group (60%) and the control group (63.3%). This aligns with previous studies suggesting that men tend to experience more postoperative pain than women, influenced by biological, hormonal, and psychosocial factors. For example, oestrogen and progesterone in women

affect pain thresholds and inflammatory responses, while testosterone dominance in men is linked to lower pain thresholds (Fillingim et al., 2021). Differences in brain structures related to pain perception, such as the amygdala and prefrontal cortex, have also been noted between genders (Bartley & Fillingim., 2021).

Regarding age, most respondents were between 19 and 44 years old, followed by



those over 60. Age significantly affects pain response and healing. Older adults often face physiological changes like peripheral nervous system degeneration, reduced pain receptor sensitivity, and weakened immune function, which can slow postoperative recovery and increase complication risks ([Schug & Bruce, 2021](#)). Meanwhile, younger patients generally have better physiological adaptability, leading to faster recovery ([Wylde et al., 2021](#)).

Most respondents reported moderate to severe pain before the Fast Track Surgery (FTS) intervention. After the FTS protocol was applied, there was a significant reduction, with most reporting mild pain. The Wilcoxon test showed a p-value of 0.000 ( $p < 0.05$ ), confirming that the FTS intervention significantly reduced pain. This is consistent with earlier research showing that FTS reduces pain intensity, speeds up physiological recovery, and shortens hospital stays ([Ljungqvist et al., 2020](#)).

The success of FTS in this study can be attributed to three key factors: multimodal analgesia, which combines pharmacological and non-pharmacological pain control methods and has been shown to be more effective than single-agent analgesics ([Kehlet & Joshi, 2021](#)); early mobilization, which involves initiating movement within six hours after surgery to improve blood flow, enhance digestive function, and reduce the risk of blood clots ([Thorell et al., 2020](#)); and preoperative education, which helps prepare patients mentally, reduce anxiety, and manage expectations regarding postoperative pain ([Lee et al., 2022](#)).

Thus, FTS is a holistic approach that considers the patient's physical, psychological, and social needs. This approach fits well within nursing practice, where nurses play a crucial role in early mobilization, patient education, pain monitoring using VAS, and involving families to support recovery ([Abustam &](#)

[Ullah, 2025](#); [Delianto & Kumar, 2025](#); [Pratiwi et al., 2025](#); [Saragih et al., 2025](#)). When applied properly, nurses significantly enhance postoperative care quality and help patients regain independence sooner.

However, the study has limitations. The sample size was relatively small, limiting the ability to generalize the findings. Potential confounding variables such as nutritional status, anxiety level, surgery type, and social support were not deeply explored but may affect pain perception. Additionally, the study was conducted in a single hospital, so results might vary in different settings with diverse patient demographics and resources.

Overall, these findings confirm that Fast Track Surgery (FTS) improves clinical outcomes by reducing postoperative pain and advances modern nursing practice. Implementing FTS protocols in Type C and D hospitals can be an effective, sustainable, and patient-centered nursing intervention model, with nurses leading the program's success.

### Implications and limitations

This study highlights that Fast Track Surgery (FTS), which integrates multimodal analgesia, early mobilization, and preoperative education, plays a crucial role in modern nursing practice. The protocol enhances patient comfort, facilitates faster recovery, and reduces postoperative complication risks. Moreover, FTS is practical to implement because it does not require advanced technology, making it feasible even in smaller hospitals with limited resources. These findings reinforce the importance of evidence-based nursing interventions to improve care quality and ensure patient safety. However, the study has several limitations. The relatively small sample size reduces the statistical power and limits the generalizability of the results. Conducting the study in a single hospital means that institutional characteristics may

have influenced the outcomes. Additionally, psychosocial factors such as anxiety, family support, and pain perception were not examined, despite their potential impact on patient responses to the intervention. The short follow-up period, limited to the inpatient stay, also prevents conclusions about the long-term effects of FTS on patients' quality of life. Therefore, while the results offer valuable insights for nursing practice, they should be interpreted with caution. Future research with larger sample sizes, multicenter participation, and extended follow-up periods is recommended to validate the findings and explore additional factors influencing the effectiveness of FTS implementation.

## Relevance to for Practice

The findings of this study underscore the effectiveness of the Fast Track Surgery (FTS) protocol, which integrates multimodal analgesia, early mobilization, and preoperative education in significantly reducing postoperative pain and expediting patient recovery. This protocol's minimal reliance on advanced technology renders it adaptable and applicable across a broad range of healthcare settings, including type C and D hospitals with resource constraints. Within nursing practice, FTS offers a structured intervention framework that emphasizes interdisciplinary collaboration, nurse competency development, and active engagement of both patients and their families. Accordingly, it is recommended that the FTS protocol be institutionalized as a standard of care for postoperative pain management to enhance patient comfort, mitigate complication risks, and reduce length of hospital stays.

## Conclusion

Fast Track Surgery (FTS) has been demonstrated to effectively alleviate postoperative pain. This comprehensive

approach improves patient comfort and facilitates recovery by combining pharmacologic pain control, early mobilization, and patient education. Furthermore, its practical applicability across diverse clinical settings supports its broader adoption in healthcare institutions.

## Funding

This research was funded by a grant from the Ministry of Education, Science, and Technology (Grant Number: [0321/C3/DT.05.00/2025]). The funding body had no involvement in the study design, data collection, data analysis, interpretation of findings, or manuscript preparation.

## CrediT Authorship Contributions Statement

**Sri Purwanti Ariani:** Conceptualization, research proposal development, data collection oversight, and manuscript preparation.

**Ernawati:** Data collection

**Yuhansyah:** Statistical analysis, hypothesis testing, and data interpretation.

**Ainun Jariyah:** preparing a manuscript for an article

## Conflicts Of Interest

The authors declare no financial or personal conflicts of interest that could have influenced the outcomes or presentation of this study.

## Acknowledgments

The authors wish to express their sincere gratitude to all individuals and institutions involved in facilitating this research. Special thanks to the Head of the Research and Community Service Institute at Politeknik Kesdam VI Banjarmasin for providing essential support and resources throughout the study. Appreciation is also due to the research team, field technical

staff, and all collaborators contributing to data collection and implementation. This publication represents part of the findings supported by the Ministry of Education, Science, and Technology grant (Grant Number: [0321/C3/DT.05.00/2025]).

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