

## RESEARCH ARTICLE

# A cross-sectional study of factors associated with nurses' postoperative pain management practices for older patients

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**Abstract**

**Aim:** The aim of the study was to identify factors associated with nurses' pain management practices in older patients undergoing surgery.

**Design:** A cross-sectional study.

**Methods:** The study sample was 85 Registered nurses working in inpatient surgical units in a tertiary care hospital, Thailand. Data were analysed using descriptive statistics, Pearson's and point biserial correlation coefficients, and stepwise multiple regression analysis.

**Results:** A positive correlation was found between practices and (a) pain management training and (b) perceptions related to collaboration with physicians. However, practices were negatively related to (a) the nurses' perception of their workload and (b) the number of years of nursing experience. The recent pain management training, the nurses' perceptions of both collaboration with physicians and their workload explained 24.40% of the variance in practices. Appropriate nursing workloads, regular pain management training and promoting collaboration among the healthcare team could all improve the quality of nurses' postoperative pain management.

**KEYWORDS**

Nurses' pain management, older patients, pain assessment, postoperative pain

## 1 | INTRODUCTION

Postoperative pain is a statistically significant problem for older patients undergoing surgery. Acute pain management for this vulnerable population is complex (Jones et al., 2016), and previous studies have found that older patients usually receive inadequate postoperative pain management (Buowari, 2021; Horgas, 2017). Untreated pain can result in several negative consequences, including stress, depression, social isolation, insomnia, acute confused states, malnutrition, and poor functional outcomes and quality of life, which could in turn lead to increased length of hospital stay and cost of care (Buowari, 2021; Horgas, 2017). Improving the postoperative pain

management provided by nurses should therefore improve patients' outcomes (Schroeder et al., 2016).

## 2 | BACKGROUND

Nurses' pain management practice is a vital issue that is linked to positive pain management outcomes. When nurses accurately assess pain and effectively deliver pain management interventions, it can facilitate patients' willingness to perform early rehabilitation after surgical intervention and increase patient satisfaction (Schroeder et al., 2016). However, one study reported that

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nurses only used superficial language to assess pain during care routines without the explicit intention of managing postoperative pain (Bach, Forman, & Seibaek, 2018). Other studies have found that only 36.3% of surgical nurses in Ghana administered opioid analgesics for postoperative pain on a regular schedule (Menlah et al., 2018) and only 36.6% of Ethiopian nurses indicated that they had competency in pain management (Neme, Namera, & Bekele, 2018). Another study assessed nurses' pain management practices using case-study vignette pain. It found that 74% of nurses assessed pain using the pain assessment tool, but only 58% of nurses administered 3 mg of intravenous morphine as needed every four hours for older patients who were in severe postoperative pain (pain score = 8) (Youngcharoen, Vincent, Park, Eisenstein, & Wilkie, 2016). Pain management is a core competency for nurses and reflects the standard of care (Herr et al., 2015). It is therefore important to improve nurses' pain management practices. This study explored factors associated with nurses' pain management practices in older patients undergoing surgery. The aim was to support development of a target intervention to improve nurses' skills in pain management and promote better quality care.

Nurses' pain management practices in older adults are associated with their knowledge and attitudes towards pain management (Al Omari, Alhabahbeh, Subih, & Aljabery, 2021). However, only one recent study has examined factors influencing nurses' postoperative pain management in older patients. It used the theory of planned behaviour (Ajzen, 1991) as a framework. The study found that attitudes and perceived norms directly affected nurses' intention to perform postoperative pain management. However, the nurses' intentions were not related to their practices in older patients (Youngcharoen et al., 2016). Other factors may also affect nurses' pain management behaviours, such as organizational, patient-based and sociopolitical issues. These could also be associated with pain care outcomes (Youngcharoen et al., 2016).

Irvine, Sidani, and Hall (1998) proposed the nursing role effectiveness model and provided concrete variables of structure, process and outcome linked to outcomes related to the nursing context. Structure consists of factors related to the nurses (e.g. experience, knowledge and skills), organization (e.g. staff mix, workload and assignment pattern) and patients (e.g. health status, severity and comorbidities). These three major types of factors affect the nursing process and how nurses perform their independent, interdependent and interprofessional roles. If nursing processes are competently performed, it can in turn lead to specific patient or health outcomes (Irvine et al., 1998). Improving our understanding of theories that explain outcomes could facilitate better understanding of all aspects related to the process of caring (Irvine et al., 1998).

Unhealthy work environments, including high nurse-to-patient ratios, nursing workloads and inadequate staffing, are associated with reports of poor-quality nursing care (Irvine et al., 1998). Work environment is a statistically significant factor associated with nurses' pain management practice. Previous studies have shown that nursing workload was associated with frequency of nurses' pain assessment (Zuazua-Rico, Mosteiro-Diaz, Maestro-Gonzalez,

& Fernandez-Garrido, 2020) and was also a statistically significant factor in the use of pain assessment tools (Christie, Oluseyi, & Olufunke, 2018). Other studies found that other nursing duties meant that nurses had insufficient time to assess (Youngcharoen, Vincent, & Park, 2017) or manage (Mędrzycka-Dąbrowska, Dąbrowski, Gutysz-Wojnicka, Basiński, & Kwiecień-Jaguś, 2017) pain among older patients undergoing surgical procedures. Staff shortages and time constraints have also been found to be statistically significant barriers to providing pain management for older adults with chronic pain in the community (Park, Park, & Park, 2016). Nurses' perceptions of their workload are therefore reflected in the standard of their management of pain.

The interprofessional collaboration between nurses and physicians is a statistically significant factor in improving patients' outcomes (Elsous, Radwan, & Mohsen, 2017). Effective communications between nurses and physicians have been positively associated with nurses' pain management practices (Asman, Slutsker, & Melnikov, 2019). For example, one study found that effective communication between nurses and physicians contributed to adequate pain management strategies for older patients in emergency units (Gorawara-Bhat, Wong, Dale, & Hogan, 2017). Several other studies have also found that effective pain management and nurses' pain management competency was the result of good collaboration with physicians (Asman et al., 2019; Neme et al., 2018). Better collaboration therefore promotes better management of pain by nurses.

Pain management training plays a statistically significant role in addressing gaps in nurses' pain management practices. Previous studies have indicated that nurses demonstrated inadequate practice in pain management because of a lack of training in pain assessment and opioid administration, especially in older patients (Youngcharoen et al., 2017). Up-to-date and accurate pain resources provided through online training could promote healthcare professionals' pain practices and skills by correcting negative attitudes to pain management and enhancing knowledge and confidence, which can ultimately improve patients' outcomes (Liossi, Failo, Schoth, Williams, & Howard, 2018). Effective pain management education or training therefore facilitates and contributes to better management of pain by nurses.

Years of nursing experience have also been shown to influence nurses' pain management practices. Benner's novice to expert model (Benner, 1984) sets out that a nurse's skill performance is related to experience. Nurses who have more experience tend to have a higher level of competency in providing nursing care. More years of nursing experience were associated with higher perceptions of pain management in nurses working with mechanically ventilated patients (Asman et al., 2019). However, other studies have generated different results. For example, one study found no differences in pain assessment among nurses with different levels of experience, but that nurses with over 10 years of experience were less probably to administer opioid analgesics to older patients undergoing surgery (Youngcharoen et al., 2017). Similarly, another study reported that year of nursing experience was not associated with nurses' pain management practice with older patients (Al Omari et al., 2021). The inconclusive nature of these findings means that it is important to

examine how nurses' year of nursing experience affects their management of pain.

Unlike other countries, Thailand has no specific residency training or explicit clinical nursing practice guideline for older patients' postoperative pain management. Lack of specific training and guideline could affect quality of nurses' pain management practice for older patients. A few studies have examined factors associated with nurses' postoperative pain management practice in older patients, but most have only included individual-level factors (Teerasangchan, 2006; Youngcharoen et al., 2016). This study used the nursing role effectiveness model as a framework to facilitate a better understanding of the linkage between individual-level factors and the organizational context related to nurses' pain management practices. Understanding these factors could help to promote more effective pain management interventions and improve pain management for older patients undergoing surgery. This, in turn, would lead to better patient satisfaction and higher standards of care. The purpose of this study was therefore to identify factors associated with nurses' postoperative pain management practices in older patients undergoing surgery. Our research question was how nurses' perceptions of their workload, perceptions about their collaboration with physicians, experience of pain management training and the number of years of nursing experience were associated with their pain management practice with older patients undergoing surgery.

## 3 | METHODS

### 3.1 | Design, sample and setting

This cross-sectional correlational study design was part of a larger study that examined factors associated with older patients' satisfaction with postoperative pain management, which was conducted between July and October 2018. Data were collected from inpatient wards for adult patients at a tertiary university hospital in Bangkok, Thailand. The hospital has 1,600 beds and provides direct care for older patients undergoing elective surgery for neurology, urology, orthopaedics and gastrointestinal, hepatobiliary and cardiological issues.

Convenience sampling was used to recruit the participants in this study, who were Registered nurses providing direct care for older patients undergoing surgery. The inclusion criteria were being a nurse who (a) had worked at least 20h a week for the past year and (b) provided direct care to older patients undergoing surgery. Nurse administrators were excluded. Sample size was estimated using power analysis with the G-power version 3.1.9 software. Multiple linear regression was used for analysis and, based on a previous study (Vincent, Wilkie, & Wang, 2011), a medium effect size of 0.16, power of 0.80 and an alpha of .05 with four predictors were set. This suggested that 80 participants were required. Nurses' participation was voluntary, so the study included 85 nurses to compensate for any who dropped out of the study.

## 3.2 | Measures

### 3.2.1 | Demographic questionnaire

The demographic questionnaire was developed by the researchers to obtain the nurses' age, gender, educational level, marital status, workplace, nursing experience and experience of pain management training in the past 6 months. The response options were checklists and short answers.

### 3.2.2 | The Environmental Complexity Scale (ECS)

The ECS was developed by O'Brien-Pallas, Irvine, Peereboom, and Murray (1997) to examine nurses' perceptions of (a) unanticipated and delayed events and the subsequent resequencing and coordination in which nurses are involved (indirect and non-nursing tasks, psychosocial, operations and discharges), (b) multiple and long procedures that are a function of increased patient acuity (multiple procedures and long procedures) and (c) the characteristics and composition of the caregiving team (short staffed, students, skills, relief staff and absence of administrative support) and their workload, especially priority of workload, and working in a team of healthcare professionals. The ECS consists of 22 items including three subscales: (a) Unanticipated and delayed events (11 items), (b) Multiple and/or long procedures (six items) and (c) Characteristics and composition of the caregiving teams (five items). Each item is rated on a five-point Likert-type scale with response options from 1 (low influence) to 5 (high influence). The possible scores ranged from 22 to 110. Higher scores indicate that the work is more complex to manage. The construct validity of the ECS was confirmed through factor analysis (O'Brien-Pallas et al., 1997). The ECS was translated from English to Thai using the committee translation approach combined with cognitive interviews (Youngcharoen & Vincent, 2016). Three bilingual translators individually and independently used forward translation to translate the ECS from English to Thai and met to agree a consensus for a final version of each item. Disagreements were discussed with an adjudicator during a reconciliation meeting to produce the final version. Cognitive interviews were conducted with 10 nurses to confirm its understandability. The content validity index for items (I-CVI) was 0.98, and the content validity index for scales (S-CVI) was 0.90. In this study, the Cronbach's alpha coefficient for the 85 nurses was 0.94.

### 3.2.3 | The Collaboration and Satisfaction about Care Decisions Instrument (CSACD)

The CSACD was developed by Baggs (1994) to measure the collaboration between nurses and physicians in providing care to patients. The CSACD includes nine items. The first six items measure the collaborative characteristics and are rated on a seven-point Likert-type scale with responses ranging from 1 (strongly disagree) to 7 (strongly

agree). The next two questions ask about satisfaction with the collaboration and are rated on a seven-point Likert-type scale with responses ranging from 1 (not satisfied) to 7 (very satisfied). The last question is about the overall collaboration and is rated on a seven-point Likert-type scale ranging from 1 (no collaboration) to 7 (strong collaboration). The possible scores range from 7 to 63. Higher scores represent higher physician and nurse collaboration. The construct validity was confirmed using exploratory factor analysis (Baggs, 1994). The correlation of the CSACD and the actual collaboration was 0.87, representing its convergent validity. The Cronbach's alpha coefficients for the collaborative characteristics, satisfaction with collaboration and overall collaboration were 0.97, 0.91 and 0.85. In this study, we used the version of the CSACD that had been translated from English to Thai using the committee translation approach combined with cognitive interviews (Youngcharoen & Vincent, 2016). The CSACD had an I-CVI of 0.97 and an S-CVI of 0.88. In this study, the Cronbach's alpha coefficient for the 85 nurses was 0.70.

### 3.2.4 | The Nurses' postoperative pain management practice questionnaire

We adapted this questionnaire from the original version, which was developed by Teerasangchan (2006) to examine nurses' postoperative pain management practice. We eliminated six unrelated items that conflicted with the hospital pain management work instruction policy, including "placebo is administered to older adults undergoing surgery if they request more medications." We added 11 items related to the pain management work instruction policy provided by the hospital and the clinical guidance for acute postoperative pain management from the Thai Association for Pain Study. These included items about pain assessment for newly admitted patients and documentation. For example, "performing assessment of pain and the need for pain management in older adults undergoing surgery as part of scheduled assessments and records" and "the pain intensity level is re-assessed within 30min of administering intravenous opioid analgesics." The instrument included 27 items measuring nurses' practices related to (a) pain assessment (11 items), (b) pharmacological pain management (six items), (c) non-pharmacological pain management (six items) and (d) pain management documentation and consultation (four items). These were all rated on a three-point Likert-type scale ranging from 1 (never do) to 3 (always do). The possible scores ranged from 27 to 81. Higher scores indicate better postoperative pain management behaviour by the nurses. Five experts in pain management examined the revised questionnaire to ensure the content validity. The I-CVI and S-CVI were 0.99 and 0.92. Cronbach's alpha coefficient for the 85 nurses in this study was 0.70.

### 3.3 | Procedures

Once we obtained IRB approval and permission to collect the data, the research team met with the potential nurse participants to inform

them about the study and ask them to participate. After the participants signed the consent form, they completed the demographic questionnaire, the ECS, the CSACD, and the nurses' postoperative pain management practice questionnaires. All the self-rated questionnaires were checked for data completion by the research team.

### 3.4 | Data analysis

Data were analysed using SPSS version 21 (IBM Corp.). Descriptive statistics (mean, standard deviation, frequency and percentage) were used to explore the nurses' demographic information and all study variables. Pearson's correlation coefficients were used to examine the associations among the study variables. Relationships between pain management training (dummy variable) and other study variables were examined using point biserial correlation coefficients. The assumptions, including normality, linearity, homoscedasticity, autocorrelation and multicollinearity, were tested using regression analysis. Stepwise multiple linear regression was used to determine the predictors of nurses' postoperative pain management practice.

### 3.5 | Ethics considerations

The study was approved by the Institutional Review Board (IRB) of the Faculty of Medicine Ramathibodi Hospital, Mahidol University (MURA2021/520). The participants were informed about the study's objectives and data collection processes and signed a consent form. Participants were also informed that they had the right to refuse to participate and could withdraw from the study at any time without negative consequences for themselves. The results are reported in the overall score.

## 4 | RESULTS

### 4.1 | Demographic information and study variables

The mean age of the nurse participants was 28.73 years ( $SD = 6.44$ ), and most of them (97.60%) were female (Table 1). Approximately 85% of the participants were single and 92% had a bachelor's degree in nursing. The mean years of nursing experience were 5.72 ( $SD = 3.84$ ) years. Most of the nurses worked on the intermediate surgical (26.89%) and general surgical (26.89%) wards and almost half of them (50.60%) had received pain management training in the past 6 months.

Table 2 shows that nurses' workloads were moderate (mean  $\pm$   $SD = 72.97 \pm 14.88$ ) when compared to the possible mid-range score. However, the nurses' perceptions of their collaboration with physicians and their management of pain were both rated as high, at 52.06 ( $SD = 4.20$ ) and 70.00 ( $SD = 3.26$ ). When taking the subscales into consideration, nurses reported high scores for pain assessment (mean  $\pm$   $SD = 29.27 \pm 2.07$ ), pharmacological pain

TABLE 1 Demographic of nurses' participants (N = 85)

| Characteristics                               | N (%)       | Mean (SD)    | Range |
|---|-------------|--------------|-------|
| Age   |             | 28.73 (6.44) | 22–56 |
| Gender  |             |              |       |
| Female  | 83 (97.60%) |              |       |
| Male  | 2 (2.40%)   |              |       |
| Education level                               |             |              |       |
| Bachelor degree                               | 78 (91.80%) |              |       |
| Master degree                                 | 7 (8.20%)   |              |       |
| Marital status                                |             |              |       |
| Single  | 72 (84.70%) |              |       |
| Married                                       | 12 (14.10%) |              |       |
| Widow   | 1 (1.20%)   |              |       |
| Workplace                                     |             |              |       |
| Surgical unit for private patients            | 8 (7.39%)   |              |       |
| Neurological and urological unit              | 12 (14.12%) |              |       |
| Orthopaedic unit                              | 22 (26.89%) |              |       |
| Surgical unit for general patients            | 22 (26.89%) |              |       |
| Intermediate unit                             | 21 (24.71%) |              |       |
| Years of nursing experience                   |             |              |       |
| <5 years                                      | 35 (41.18%) | 5.72 (3.84)  | 1–15  |
| 5–10 years                                    | 35 (41.18%) |              |       |
| >10 years                                     | 15 (17.64%) |              |       |
| Pain management training in the past 6 months |             |              |       |
| No  | 42 (49.40%) |              |       |
| Yes   | 43 (50.60%) |              |       |

management (mean  $\pm$  SD = 15.41  $\pm$  0.73) and documentation of postoperative pain management (mean  $\pm$  SD = 11.71  $\pm$  0.55) compared with the possible mid-range score. However, they only had moderate scores for non-pharmacological pain management practices (mean  $\pm$  SD = 13.62  $\pm$  2.06).

## 4.2 | Relationships among the study variables

Table 3 shows that there was a moderate positive correlation between the nurses' pain management practices and (a) pain management training ( $r = .349, p < .01$ ) and (b) nurses' collaboration with physicians ( $r = .323, p < .01$ ). There was a low negative correlation between the nurses' management of pain and (a) their perceptions of workload ( $r = -.244, p < .05$ ) and (b) their years of nursing experience ( $r = -.215, p < .05$ ).

## 4.3 | Predicting factors

The regression analysis (Table 4) found that pain management training, nurses' collaboration with physicians and nurses' perceptions of their workload explained 24.40% of the variance in nurses' postoperative pain management behaviour. Pain management training was the strongest significant predictor ( $\beta = .292, p = .004$ ). However, the number of years of nursing experience was not a predictor of nurses' pain management practice.

## 5 | DISCUSSION

The aim of this study was to understand factors associated with nurses' pain management practice in older patients undergoing surgery. We found that nurses' pain management training, and nurses' perceptions of both their workload, and their collaboration with physicians could explain 24.40% of the variance in nurses' pain

| Variables   | Actual score | Possible score | M     | SD    |
|---|--------------|----------------|-------|-------|
| Nurses' workload  | 43–100       | 22–110         | 72.97 | 14.88 |
| Unanticipated and delayed events                        | 21–53        | 5–55           | 36.29 | 8.60  |
| Multiple and/or long procedures                         | 12–30        | 5–30           | 20.41 | 4.22  |
| Characteristics and composition of the caregiving teams | 7–23         | 5–25           | 16.26 | 3.72  |
| Nurses' collaboration with physicians                   | 43–59        | 7–63           | 52.06 | 4.20  |
| Nurses' pain management practice                        | 63–76        | 27–81          | 70.00 | 3.26  |
| Pain assessment   | 24–33        | 11–33          | 29.27 | 2.07  |
| Pharmacological pain management                         | 13–17        | 6–18           | 15.41 | 0.73  |
| Non-pharmacological pain management                     | 10–18        | 6–18           | 13.62 | 2.06  |
| Documentation   | 10–12        | 4–12           | 11.71 | 0.55  |

TABLE 2 Means and standard deviations of nurses' workload, nurses' collaboration with physicians and nurses' pain management practice (N = 85)

TABLE 3 Correlations among study variables and nurses' pain management practice (N = 85)

| Variables   | 1        | 2       | 3       | 3.1     | 3.2     | 3.3    | 4       | 5    |
|---|----------|---------|---------|---------|---------|--------|---------|------|
| 1. Years of nursing experience                              | 1.00     |         |         |         |         |        |         |      |
| 2. Pain management training                                 | -0.325** | 1.00    |         |         |         |        |         |      |
| 3. Nurses' workload   | 0.162    | -0.017  | 1.00    |         |         |        |         |      |
| 3.1 Unanticipated and delayed events                        | 0.125    | 0.028   | 0.940** | 1.00    |         |        |         |      |
| 3.2 Multiple and/or long procedures                         | 0.139    | -0.054  | 0.871** | 0.698** | 1.00    |        |         |      |
| 3.3 Characteristics and composition of the caregiving teams | 0.200    | -0.071  | 0.836** | 0.655** | 0.731** | 1.00   |         |      |
| 4. Nurses' collaboration with physicians                    | 0.184    | 0.200   | -0.011  | -0.037  | -0.044  | 0.090  | 1.00    |      |
| 5. Nurses' pain management practice                         | -0.215*  | 0.349** | -0.244* | -0.230* | -0.228* | -0.185 | 0.323** | 1.00 |

Note: Point biserial correlation coefficient was used to examine the relationship between pain management training (0 = no training in 6 months, 1 = received training in 6 months) and other variables.

\* $p < .05$ ; \*\* $p < .01$ .

management in older patients undergoing surgery. However, nurses' experience of pain management training was the strongest predictor of their behaviour.

Overall, nurses had high scores for postoperative pain management in older patients. These results were consistent with a previous study in nurses' pain management in older adults (Al Omari et al., 2021). However, the nurses in our study had higher scores for pain management than nurses in either Ghana (Menlah et al., 2018) or Ethiopia (Neme et al., 2018). The difference in findings may be related to the instruments used, and the types of hospital included in the different studies. The sociopolitical contexts, including policies and guidelines in different organizations, could have influenced pain care (Latimer, Ritchie, & Johnston, 2010). In this study, the data were collected from nurses working in a hospital affiliated to a university. This is a high-technology hospital and has among the best resources in Thailand in teaching and conducting research. The university hospital is responsible for promoting high-quality pain care in line with guidelines on acute, geriatric and cancer pain (Zoëga et al., 2015). The study participants were therefore probably to be familiar with and routinely following hospital instructions on providing care for older patients undergoing surgery. These are designed to promote early rehabilitation, minimize postoperative complications and prevent suboptimal pain care.

This study model only explained 24.40% of the variance in nurses' postoperative pain management practice in older patients. The low per cent of variance explanation could be because there were other factors that influenced nurses' management of pain. However, the percentage was similar to that found in a previous study, where nurses' self-perceptions of the collaboration between nurses and physicians, knowledge of behaviours indicating pain and years of nursing experience explained 27% of the variance in nurses' perceptions of their pain management practice (Asman et al., 2019). The nursing role effectiveness model (Irvine et al., 1998) suggests that nurses' independent, dependent and interdependent roles are determined by nurse, organizational and patient characteristics, including patients' health status, severity and morbidity. In this study, we included nurses working in various units who were providing care for older patients undergoing several types of surgery. The older patients' age, postoperative conditions, comorbidities and pain severity were probably taken into account by nurses in their decisions, which in turn were reflected in their pain management. Future studies should therefore include patient characteristics in assessing the quality of pain management practice.

Nurses who had received pain management training in the previous 6 months reported higher levels of pain management. These results are not consistent with the results from a previous study in which pain management training was not a predictor of nurses' pain management practices in older adults (Al Omari et al., 2021). The contrasting findings could be because of the difference in the timing of the pain management training. In the previous study, 49.10% of participants reported that they had received in-service pain management training, but this might not have been in the previous year. Most participants (51%) in our study had received pain education

| Predictors                            | b      | SE (b) | $\beta$ | T      | p-value |
|---------------------------------------|--------|--------|---------|--------|---------|
| Pain management training              | 1.894  | 0.639  | 0.292   | 2.966  | .004    |
| Nurses' workload                      | -0.052 | 0.021  | -0.236  | -2.446 | .017    |
| Nurses' collaboration with physicians | 0.203  | 0.076  | 0.262   | 2.661  | .009    |

Note:  $R = .494$ ;  $R^2 = .244$ ; adjust  $R^2 = .216$ ;  $SEE = 2.885$ ; overall  $F_{(3,81)} = 8.732$ ,  $p = .000$ .

\* $p < .05$ ; \*\* $p < .01$ .

training in the past 6 months. Recent pain management training would encourage better pain management practices through improvement of knowledge and positive attitudes toward pain management. A previous study found that pain education in the past year was a statistically significant predictor of nurses' knowledge and attitudes about pain (Brant, Mohr, Coombs, Finn, & Wilmarth, 2017). The knowledge, attitude and practices model (Bloom, 1964) suggests that individuals with high knowledge and positive attitudes are more probably to perform particular behaviours or practices. Our participants received general pain management training, but it includes case scenarios related to postoperative pain in older patients and workshops on multi-modal pain management. These help to refresh nurses' knowledge and enhance their pain management skills, which could lead to better management of pain for their older patients. Positive reinforcement of pain management training in older adults undergoing surgery could also facilitate better pain management (Youngcharoen et al., 2017). Improving nurses' pain management for older patients, who are a vulnerable population, may require specific pain management training focused on the needs of older patients.

Unsurprisingly, nurses' perceptions of their collaboration with physicians could predict their postoperative pain management. This finding was consistent with the results of previous studies in which nurses' perceptions about collaboration with physicians was a statistically significant predictor of their pain management in mechanically ventilated patients (Asman et al., 2019). Neme et al. (2018) also found that nurses who had a good perception of the overall nurse-physician relationship were 2.40 times more probably to be competent in pain management for hospitalized patients, compared with nurses who had a poor perception of collaboration. High collaboration between nurses and physicians can enhance the level of teamwork in decision-making, better solve patients' problems and create the most suitable care plan for patients (Elsous et al., 2017). One key strategy in effective pain management identified by nurses was to consult physicians to ensure that they provided adequate pain relief for patients (Mędrzycka-Dąbrowska et al., 2017). Pain management in older adults is challenging, especially because of the potential side effects of pain medication, drug-to-drug interaction, risk versus benefit and contraindications related to older adults' comorbidities (Horgas, 2017). It is therefore important for hospital policy makers to strengthen nurse and physician collaboration by providing interdisciplinary pain management training to promote care coordination. High collaboration between nurses and physician will not only improve clinical practices for pain management but also help to develop the network's health learning system, resulting in

transformative effects for improving the health of older patients (Mackey, 2016).

Nurses' perception of workload, another organizational factor, was also a statistically significant predictor of nurses' postoperative management of pain. These results are consistent with the results in previous studies (Christie et al., 2018; Zuazua-Rico et al., 2020). A high workload and exhaustion could affect nurses' ability to obtain accurate pain information from older adults using pain assessment tools. It could also mean that they have insufficient time to provide pharmacological and non-pharmacological pain management or to re-evaluate the pain score after any intervention, and therefore to further manage the pain. Nurses' perceptions that their workload is high have been associated with decreases in nursing performance, intention to leave and burn out, and with negative patient outcomes (MacPhee, Dahinten, & Havaei, 2017; Phillips, 2020). It is therefore important for hospital policy developers and national nursing organizations to monitor the appropriateness of nurses' work assignments. This will maintain nurses' overall clinical performance.

Interestingly, more years of nursing experience were not associated with the nurses' pain management. This was consistent with the results of at least one previous study (Al Omari et al., 2021), but contradicted the findings of another study, in which the number of years of nursing experience was a predictor of nurses' perception of their pain management in mechanically ventilated patients (Asman et al., 2019). The majority of participants in this study (82.40%) and in that of Al Omari and colleagues (62.60%) had less than 10 years' nursing experience. The participants in our study were mostly competent nurses, but those in the study by Asman and colleagues were more expert (mean years of nursing experience 5.72 vs. 13.11 years). It is possible that competent nurses can analyse problems and make decisions in emergency situations. However, expert nurses may be better able to understand deeply and holistically, analyse and foresee patients' situations, and rapidly make appropriate decisions for their patients (Benner, 1984). Providing access to training and materials could facilitate improvement of nursing practices and skills, especially in using effective instruments in their practices (Ericsson, Krampe, & Tesh-Romer, 1993).

## 6 | LIMITATIONS

This study had some limitations. The data were collected from nurses working in a single tertiary care university hospital, using convenience sampling. The results might therefore not be generalizable to

TABLE 4 Factors predicting nurses' pain management practice (N = 85)

other populations. Future studies should involve different populations to address this limitation. The information about the nurses' pain management behaviour was collected using self-reported questionnaires and may therefore not reflect actual pain management practice because of the potential for self-reporting bias. Direct, real-time observations or virtual human scenarios should be used in future studies to examine nurses' actual pain management practices in a clinical setting. The study also did not consider the direct and indirect effects of patient characteristics on the nurses' practices. Future studies should take these factors into account, so that a clearer picture of this patient may be developed.

## 7 | CONCLUSION

Our study highlighted the importance of nurses' postoperative pain management practices for older patients and the factors associated with better practice. Our findings suggest that pain management practices for older patients undergoing surgery were better when nurses received proper and timely pain management training, and had better perceptions of their collaboration with physicians and their workloads. Interventions should highlight the importance of effective postoperative pain management training for older patients, promoting collaboration in pain management between nurses and physicians and decreasing workloads.

### 7.1 | Implications for clinical practice

All nurses should receive training in postoperative pain management specifically designed for older patients because this is a vulnerable group with specific needs and challenges related to pain management. Online pain management training could provide more time flexibility and enable nurses to rapidly review best practice in pain management. To effectively promote collaboration between physicians and nurses, organizations should systematically and regularly set up interdisciplinary meetings to discuss issues related to pain management. This would promote a higher quality of pain care for older patients. Lastly, hospital policy makers should monitor nurses' workloads to maintain them at a reasonable level.

### AUTHOR CONTRIBUTIONS

All authors adhere to the authorship statement as proposed by the International Committee of Medical Journal Editors and have read and approved the final version of this manuscript. PY and SA: Study design. PY: Data collection and data analysis. PY and SA: Manuscript writing and revision.

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### CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

### DATA AVAILABILITY STATEMENT

All data included in this study are available from the corresponding author upon reasonable request.

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