



# Surgical Nurses' Thoughts on the Postoperative Pain Management of Patients After Total Hip or Knee Replacement Surgery

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**Abstract:** *Context:* Healthcare professionals face a major challenge in treating postoperative pain in patients after hip or knee replacement surgery (THR OR TKR). The use of advanced pain modalities for pain screening, assessment, and management is not yet consistent with the clinical practice guidelines available. *Aim:* In this study, it was explored and described how surgical nurses perceive and manage postoperative pain in patients following hip or knee replacement as well as the strategies employed to manage it. *Methods:* A qualitative descriptive approach was applied and adopted a purposive non-probability sampling approach. Semi-structured interviews audio-recorded with 20 surgical nurses were conducted in Riyadh city, Kingdom of Saudi Arabia. Transcribed interviews were coded and analyzed by following Creswell's "data analysis spiral". Using Good's 1998 middle-range theory of acute pain management and the existing literature, the data were compared and verified. *Findings:* Four themes emerged from the data. These themes were (1) postoperative pain described by surgical nurses, such as subjective experiences, duration, location, and severity; (2) assessment after total hip replacement and knee replacement surgery, the subjective assessment may be used along with behavioral observations; (3) postoperative pain management after total hip and knee replacements, employing strategies such as 'pain relief intervention and 'nurses' role to enhance pain relief intervention; and (4) involve loved ones in pain management by educating the patient. Despite the uncovered pain relief interventions, surgical nurses perceive that patients experience moderate to severe pain, and the language barrier and pain management strategies are identified as barriers to pain management. *Conclusion:* While most surgical nurses noted that patients still suffer moderate to severe postoperative pain following total hip or knee replacement surgery, multimodal pain interventions were provided for the patients. Nursing professionals should be sure to comply with ongoing assessment and reassessment of pain relief interventions in order to achieve optimal pain control and effectiveness; THR and TKR patients and their families must receive pain education before and after surgery, and for the purpose of providing accurate patient and family education regarding pain management, expatriate nurses need access to Arabic speakers if necessary.

**Keywords:** Nurses' Perceptions of Pain, Total Hip Replacements, Total Knee Replacements

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## 1. Introduction

Despite clinical practice guidelines for pain screening, assessment, and management using advanced modalities, the problem identified was that post-operative pain (POP) management remains one of the greatest clinical challenges for healthcare providers in surgical care areas. This challenge is evident in patients undergone total hip replacement (THR) or total knee replacement (TKR) surgeries. In this teaching hospital, Riyadh city of the

Kingdom of Saudi Arabia, during the first 72 hours after THR or TKR surgery, patients who have had these procedures are routinely administered pharmacological interventions that begin in the operating room and extend to the post-anesthetic care unit and the orthopedic wards. Analgesia controlled by the patient analgesia (PCA), epidural analgesia, peripheral nerve blocks, intrathecal opioids, and local anesthetics falls into this category.

According to the pain control of each patient, the acute pain service (APS) team follows up with them for up to 72

hours. Primary team physicians and surgical ward nurses will manage the pain of discharged patients under the care of the APS team. As part of the discharge process, the APS team ensures that the patients have been provided with analgesia.

Managing acute pain conditions such as POP, cancer-related acute pain, and non-cancerous acute pain is the role of the acute pain team at this teaching hospital. All other specialties refer their patients for further pain management to the hospital's acute pain team, which operates 24 hours a day. Physicians from the anesthesia department as well as nurses specifically trained to manage pain make up the acute pain team.

Using POP management guidelines, pain can be eliminated or reduced to a mild level of discomfort for patients in this hospital. There is guidance regarding the screening of pain, the assessment of pain, the design of a treatment plan, pain interventions, pain reassessment, and outcomes related to pain. Patients who tolerate mobilization gradually begin receiving oral opioids and non-opioid analgesia, along with nonsteroidal anti-inflammatory drugs, which are gradually introduced. Patients who undergo joint replacement surgery, regardless of the availability of pain management resources experience uncontrolled pain with moderate to severe levels.

Total joint replacements (THR or TKR) are performed at this teaching hospital using advanced techniques, including minimally invasive techniques, computer-assisted procedures, and advanced rehabilitation protocols. POP was diagnosed in approximately 136 patients at the teaching hospital's acute pain service (APS) in 2012 in four orthopedic wards, of whom eleven underwent hip replacement surgery, including primary and revision surgeries. Pain relief strategies are implemented to help the patients cope with the post-operative pain in addition to physiotherapy for specific exercises for the hip or knee. Having identified this problem, the purpose of this study was to describe how surgical nurses perceive and manage postoperative pain in patients following hip and knee replacement surgery, as well as the strategies they employ.

Inadequate management or unrelieved pain can have serious consequences for the patient's well-being such as anxiety, impaired mobility, chest infection, deep vein thrombosis, pulmonary embolus, tachycardia, hypertension, increased vascular resistance, and delirium. The unrelieved pain or inadequate management of pain can result in delirium, anxiety, respiratory issues, deep vein thrombosis, pulmonary embolism, high blood pressure, tachycardia, and high blood pressure [1]. POP that is inadequately managed contributes to patient dissatisfaction and prolonged hospital stays. Patients with unmanaged POP are dissatisfied and stay in the hospital for longer periods of time [2].

Pain in patients who have undergone hip or knee replacement is mostly related to surgical intervention leading to tissue damage. Anatomical disruption leading to tissue damage is a major cause of pain in patients after hip or knee replacements [3]. Most of the studies demonstrated that the classification of pain is according to three types namely,

acute pain such as postoperative or trauma pain, chronic pain, and cancer-related pain. The majority of studies have revealed that pain is classified into three types: chronic pain, cancer-related pain, and acute pain [4-6]. The revised International Association of Study of Pain (IASP) definition of pain indicates that there are three classifications of pain according to its inferred pathophysiology: nociceptive pain, neuropathic pain, and nociplastic pain [7]. Pain that lasts for short periods of time and has an identifiable cause, such as trauma, injury, or surgery, is defined as acute pain [8]. Keeping these classifications in mind, the present research is focusing predominantly on acute POP, which lasts for a short time, and post-operative pain management, namely total joint replacement surgery causes tissue damage [9]. Patients expect acute pain to subside as the injury heals and lasts for a short period of time [10].

Various agents with different mechanisms of action will be administered as part of the POP protocol, with a variety of effects being exerted locally and systematically [11, 12]. Using agents with both anti-inflammatory and analgesic properties is beneficial [11, 12]. It is recommended to convert parenteral to oral as soon as possible so the effects are prolonged, use baseline analgesics to control pain uniformly, and minimize the adverse effects associated with parenteral narcotics [11, 12]. An advanced pain management pharmacological technique, as well as non-pharmacological interventions, are common methods for controlling pain in postoperative patients [13, 14]. In acute pain management, multimodal analgesia combines multiple approaches to maximize analgesia and minimize side effects [12, 14].

There are several factors that affect POP management, including the patient's expectations that they will experience pain after surgery, their age and culture, and previous experiences with pain, as well as a lack of information about available methods of pain relief after surgery [15]. Healthcare professionals' unawareness about patients experiencing pain and organizational factors such as lack of pain management protocols and inadequate training of staff could also hamper pain relief [16, 17].

There are fewer procedures carried out on the THR side of the equation in Saudi Arabia than on the TKR side [18]. This was also indicated in this teaching hospital's 2012 APS statistics of patients managed for POP after THR surgery. As part of enhanced recovery after surgery (ERAS), after being discharged from the hospital, patients can attend physiotherapy programs as outpatients [19-21]. To prevent complications following surgery and to continue the rehabilitation program, pain medications are prescribed for home use [22, 23]. Non-pharmacological and pharmacological pain control strategies are available for post-operative patients [24, 25].

Surgical complications associated with hip or knee replacements include infections, deep vein thrombosis, fat embolisms, and post-operative pain [26]. A subjective view of pain and pain management in patients who have undergone total hip or knee replacements can lead to inadequate pain control.

If acute pain is mismanaged and unrelieved, it can have profound effects on the outcome of the patient, and failure to treat it can have psychological and physical consequences, it can affect the lungs, cardiovascular, digestive, endocrine, and immune systems, resulting in increased metabolic rate, thus lengthening hospital stays [27, 28]. Acute pain that is poorly treated may also lead to psychological distress and anxiety, leading to a lack of sleep and a feeling of helplessness, as well as impaired postoperative rehabilitation which may have long-term psychological consequences [29, 30]. It is possible to develop a chronic pain condition because of persistent surgical pain (PSP) after surgery [31].

Patients' POP continues to be inadequately managed, and nurses' myths and misinformation still create barriers to proper pain management. It is important to note that most studies have only examined patient perceptions, nurses' knowledge, and comparisons between patients' pain experiences and nurses' pain documentation [32].

A Middle-Range Theory of Acute Pain Management by Good (1998) is the basis for this study [33, 34]. Using the model allows for good pain control to be achieved with minimal side effects associated with potent pain medications. Three propositions make up Good's middle range theory: (1) involving both pharmacological and non-pharmacological adjuvants along with strong analgesics, (2) assuring that patients receive attentive care that assesses pain and side effects regularly and identify inadequate pain relief, intervenes, reassesses, and intervenes to maximize pain control and (3) in order to achieve good outcomes for pain control, patients need to be involved in patient education, which consists of teaching pain management and mutual goal setting [33, 34].

Various studies were conducted on nurses' perspectives, perceptions, attitudes, opinions, and beliefs about pain management, including (1) the study by Rejeh and Vaismoradi that examined how nurses perceived obstacles to managing POP and their experiences [35], in addition to the study's conclusions, nurse-patient relationships are limited, nurses' authority is limited and interventions in pain management are disrupted; (2) researchers examined the knowledge and attitudes of 313 nursing students in Louisiana regarding pain management in the study by Plaisance and Logan, also patients are overly concerned about the likelihood of addiction, as well as misconceptions about analgesics are administered and prolonged [36], and it was observed that pharmacology items were less well-known than non-pharmacology items; (3) According to Coulling, nurses are more knowledgeable of pain management after surgery compared to doctors, and nurses are more familiar with analgesic systems and assessment [37]; and (4) A study conducted by Wang and Tsai in intensive care found nurses had poor knowledge of pain management, and what nurses perceived as barriers to pain management was negatively associated with their knowledge on pain [38]. Effective pain management requires an understanding of physiology, and matching interventions to patients' needs, according to these studies [36-38].

It has been identified that patients' self-reported pain

differs from nurses' subjective judgments of patient pain when managing pain and the belief that patients exaggerate their pain. It is unknown whether there is a study in nursing in Saudi Arabian hospitals investigating surgical nurses' thinking about pain management and POP in patients who have undergone THR or TKR surgery in four orthopedic wards in Riyadh, Saudi Arabia. The importance of this study will contribute to the awareness and understanding of other surgical nurses about how to provide optimal postoperative pain management for orthopedic patients undergoing THR or TKR.

Following this introduction, the paper will present the materials and methods, followed by a presentation of the results, a discussion of the results and how they relate to the literature, and finally a conclusion and future research direction.

## 2. Materials and Methods

### 2.1. Interview Guide

A semi-structured interview guide was developed and tested through a pilot study on its suitability with two respondents who would not form part of the main study before use for the interview guide consisted of two sections, namely introductory biographical data and central/grand tour questions, and specific open-ended questions used to gain detailed perceptions of surgical nurses.

### 2.2. Study Design, Sample, and Settings

A qualitative, exploratory descriptive design was used. Purposive non-probability sampling was adopted to select participants. A list of all 41 surgical nurses from four orthopedic wards who met the inclusion criteria was obtained from the nurse managers after permission was granted by the nursing authority. The number of participants was determined by data saturation. Data saturation was reached after 20 surgical nurses were interviewed. The study was conducted in four orthopedic wards at a teaching hospital, in Riyadh, Kingdom of Saudi Arabia.

### 2.3. Data Collection Process

Data were collected between 24 June 2014 to 22 July 2014A semi-structured interview guide with open-ended questions was used to obtain data relevant to the study. Each participant received information about the study. Pilot semi-structured interviews were conducted with two (2) respondents who would not form part of the main study. These interviews were conducted before commencing the main study to test the suitability of the interview schedule, techniques used in the interviews, and the data analysis process. The method was found suitable for the study. Semi-structured interviews were done in a quiet, relaxed atmosphere to avoid distractions. The information gathered was recorded in audio tape and written field notes for recording observed non-verbal behaviors and reflections. The respondents were also probed.

The rationale for tape recording during the interviews was to ensure the accuracy of transcription and to allow the researcher to concentrate on the interview as recommended and the participants were permitted to use an audio recorder during the interviews [39]. Field notes were made during the interviews about the things the researcher hears, sees experiences, and thinks during interviews. Permission was obtained from all the participants to take field notes.

#### 2.4. Data Analysis

Transcribed verbatim interviews which were tape-recorded were analyzed together with field notes adopting Creswell's "data analysis spiral" [40]. A conscious effort to "bracket" all prejudgments and previous experiences on postoperative pain and pain management of a patient who has undergone total hip or knee replacement surgery was maintained. The field notes were included to form part of the data analysis. From the data analysis, four key themes emerged with related categories and subcategories.

#### 2.5. Rigor and Trustworthiness

In the context of this study, Guba and Lincoln's (1994) augmented model of five criteria for ensuring rigor of qualitative methodology [41, 42] was applied throughout the research process, namely *credibility* by prolonged engagement with a minimum of 30 to 45 minutes of interviews; *dependability* through audit trail maintained consistency of the findings of the study supervision; *confirmability* through bracketing and keeping all information in a safe place; *transferability* by applying strategies such as thick descriptions, purposive sampling, and applying data saturation; while the *authenticity* by including participants' direct quotes in the findings of the research report.

#### 2.6. Ethical Considerations

The study formed part of a master's dissertation at the University of South Africa. Complete ethical approval with a clearance certificate was granted by the Higher Degrees Committee of the Department of Health Studies, the University of South Africa after their review (HSHDC/187/2013). Ethical approval (Protocol SP13/012) was also obtained from the King Abdullah International Medical Research Center (KAIMRC) and the Institutional Review Board (IRB) in Riyadh, Kingdom of Saudi Arabia. The study complied with ethical principles of beneficence, respect for persons, and justice, protecting the rights of participants and the institution as well as the scientific integrity of the research. All participants were purposively selected from four orthopedic wards voluntarily obtaining written informed consent.

### 3. Findings

The findings presented here include general characteristics of the participants and analyses of the data revealed four key themes.

#### 3.1. General Characteristics of the Participants

A total of 20 surgical nurses (N=20; f=100%) working in the orthopedic ward participated. The majority of them were female (n=19; f=95%) and only one male (n=1; f=5%) (Table 1). Participants' age ranged from 27 to 60 years. Nine nationalities including Saudi nationals (n=3; f=15%) and expatriate nurses (n=17; f=85%) were study participants. The education levels of the participants range from Diploma certificates (n=4; f=20%), Bachelor's degree (n=15, f=75%) to master's degrees (n=1; f=5%) (Table 1). As stated in their professional titles, registered nurses are responsible for specific functions in their units. Nurses in the unit are educated by Clinical Resource Nurses, coordinating patient care between all nurses providing direct care is the responsibility of clinical nurse coordinators, a nurse manager, and other members of the multidisciplinary team, nursing staff ones and two provide direct primary care to patients. During this study, participants had experiences working in orthopedic wards varying from one year to 28 years (Table 1).

Table 1. Participants' main characteristics.

Characteristics	n=	%=	
Gender	Male	1	5
	Female	19	95
	27-30 years	6	30
Age	31-40 years	11	55
	41-50 years	2	10
	50-60 years	1	5
	Czech	1	5
	Filipino-British	1	5
Nationality	Filipino	7	35
	Irish	1	5
	Malaysian	4	20
	Saudi	3	15
	Singaporean	1	5
	Slovak	1	5
	South African	1	5
Level of education	Master's degree	1	5
	Bachelor's degree	15	75
	Diploma certificate	4	20
	Clinical Resource Nurse	2	10
Professional Title	Clinical care coordinator	2	10
	Staff nurse 1	12	60
	Staff nurse 2	4	20
	1-5 years	13	65
Years of experience	6-10 years	6	30
	11-20 years	0	0
	20-28 years	1	5

#### 3.2. Perceptions of Surgical Nurses Regarding the Post-operative Pain Management of Patients After Total Hip or Knee Replacement Surgery

The four themes with emerging 'emic' categories and sub-categories with relevant narrations (Quotes =Q) from respondents (R) identified to describe their perceptions regarding POP management of patients after THR or TKR were: (1) surgical nurses' descriptions of POP (Table 2), (2) assessment of pain in patients after THR and TKR surgery (Table 3), (3) management of post-operative pain after THR

and TKR surgery (Table 4), and (4) role of patients and loved ones in pain management (Table 5).

**3.2.1. Postoperative Pain Described by Surgical Nurses**

The first theme the nurse respondents described their

understanding of POP in patients who had total hip or knee replacement surgery into four main categories, namely a subjective experience, duration of pain, location of the pain, and the 'severity of pain' (Table 2).

*Table 2. Surgical nurses' quotes of descriptions of post-operative pain.*

<b>THEME 1: Postoperative pain described by surgical nurses</b>		
<b>Sub-theme</b>	<b>Quote</b>	
'Subjective experience'	Q1	"Pain is subjective, you cannot tell me I don't have pain, even if I'm not grinning or crying, the patients are not reacting the same [way] to pain..." R17
	Q2	"Yes ...pain is what the patient says it is." R11
Duration of pain	Q3	"That's the feeling of the patient after operation..." R6
	Q4	"...it's acute pain within [the] first couple of days..." R9
	Q5	"What I understand, I think this pain is very severe though most severe pain post-operatively...and then usually immediately post-surgery..." R8
Location of the pain	Q6	"... at the leg side and for the hip, if for sure the hip side..." R5
	Q7	"...for the total knee replacement most of them at the knee part..." R5
Severity of pain	Q8	"... but I think the next day when the patient will be more comfortable with the medication, especially when we are controlling the amount of medication going through the patient's body.....it will decrease from zero to three or less than four." R6
	Q9	"Zero is no pain...one to three is mild pain..." R16
	Q10	"...most of the time[s] they are always like three to four..." R20
	Q11	"I do definitely see patients with severe pain..." R12

In this context, Table 2 demonstrated that the surgical nurse respondents described POP as a subjective experience (Table 2: Q1, Q2) and related it to the patient's report of pain (Table 2: Q2,) and the patient's expression of pain (Table 2: Q3) when experiencing pain.

Most of the surgical nurse respondents described post-operative pain after THR or TKR by the duration of pain (Table 2: Q4, Q5) by mentioning the period immediately after surgery (Table 2: Q5) and a few days after surgery (Table 2: Q4).

The surgical nurse respondents perceived post-operative pain according to the location of the pain by explaining that the patient pointed to the area on the body that is painful such as the hip or the knee (Table 2: Q6, Q7). The related locations of pain were further described as hip surgery site (Table 2: Q6) and the second emerged was 'knee surgery site'

(Table 2: Q7).

The surgical nurse respondents described POP in terms of the severity of pain as rated on a scale of zero to 10 and were related to three levels that emerged namely, almost pain-free to mildly painful (Table 2: Q8), pain that ranges from mild to moderate (Table 2: Q10), and moderate to severe pain (Table 2: Q11). This was the nurses' response to indicate the levels of pain experienced by the patients after THR or TKR rating the pain on a scale of zero to 10.

**3.2.2. Pain Assessment After Total Hip Replacement and Knee Replacement Surgery**

This second theme indicates the methods described to be used by the surgical nurse respondents to identify if a patient who had a THR or TKR surgery experience pain (Table 3).

*Table 3. Surgical nurses' quotes of pain assessment in a patient after total hip and knee replacement surgery.*

<b>THEME 2: Pain assessment after total hip replacement and knee replacement surgery</b>		
<b>Sub-theme</b>	<b>Quote</b>	
The subjective assessment of pain	Q 12	"...screen... whether [the] patient is having pain or not." R5
	Q 13	"...we have to ask them if they are in pain..." R4
Observations of behavioural pain responses	Q14	"...the nurse observe[s] the behaviour of the patient, maybe the finger[s] are splaying or he's restless or it he's kicking his legs..." R15
	Q 15	"Usually on their facial expression[s]..." R11
	Q16	"The patient will be crying.... he will moan, groan [and] shout..." R17
	Q17	"FLACC scale is for nonverbal patient assessment based [on] one, two, three, four, five... we can see from the facial expression, from the legs, activity, cry and controllability" R1
Observations of physiological responses to pain	Q18	"When you check the vital signs" R10
	Q 19	"Sometimes we'll just see from the vital signs if the BP increases[s]..." R7
	Q 20	"...the increase of the heart rate can be one sign of the pain." R19
	Q 21	"Sometimes she will be having this respiration, tachypnoea because of pain" R17

The surgical nurses reported that they assess pain by considering 'the subjective assessment of pain' done by asking the patients if they are experiencing pain and those who could verbalize their pain (Table 3: Q12, Q13), by

'using the observations of behavioral pain responses' (Table 3: Q14) and checking the physiological responses to pain (Table 3: Q15). The emerged subjective assessment of pain was explained that patients who can verbalize their pain

asked questions to describe the pain through patient self-report of pain (Table 3: Q2, Q13).

Assessment of pain was articulated by most of the surgical nurse respondents to be performed in patients who cannot verbalize their pain properly as associated with an emerged category of observations of behavioral responses to pain (Table 3: Q14) and explained with developed descriptions such as facial expressions (Table 3: Q15), vocalizations (Table 3: Q16), actions that could imply pain (Table 3: Q14), and use of FLACC (Face, Legs, Activity, Crying, Consolability) scale for non-verbal patients (Table 3: Q17).

The surgical nurse respondents also believed that POP assessment may be carried out using observations of

physiological responses to pain (Table 3: Q18) by maintaining that vital signs such as elevated blood pressure (Table 3: Q19), increased heart rate (Table 3: Q20), and increased respiratory rate (Table 3: Q21) are essential to indicate that the patients experience the pain.

### 3.2.3. Postoperative Pain Management After Total Hip and Knee Replacements

The third theme (Table 4) indicates the findings related to articulated pain relief strategies employed by the surgical nurse respondents in the management of POP and describes their role in providing effective pain control following total hip or knee replacements.

**Table 4.** Surgical nurses' quotes of post-operative pain management after total hip and knee replacements.

THEME 3: Postoperative pain management after total hip and knee replacements	
Sub-theme	Quote
Pain relief interventions	Q 22 "...give analgesia and then encourage also to do non-pharmacological interventions" R17
	Q 23 "...nonpharmacological you can have deep breathing exercises, incentive spirometry, you can reposition your patient, relaxation techniques and you need to have a social support from the family, you can teach the patient and the family as well..." R3
	Q 24 "...these patient[s] with epidural sometimes they order Acetaminophen as a regular IV" R16
	Q 25 "...Ketorolac and in between they give some metoclopramide or other adjuvants like Celecoxib or Brufen..." R4
	Q26 "I normally give narcotics like morphine, hydromorphone, tramadol, PO tylenol3, or Percocet..." R7
	Q 27 "...they will prescribe medication that controls [s] the pain post-operatively or they might receive until they have nerve block or epidural analgesia to control the pain, especially the first two or three days" R6
	Q28 "...post-operatively either they manage the pain through PCA or epidural..." R2
	Nurses' role to enhance pain relief interventions
Q 30 "The guideline is: pain should be below four" R17	
Q 31 "For oral we have[a] time frame [of] one hour to follow-up, for IV we have half an hour to follow up...and for non-pharmacology immediately..." R1	
Q 32 "...we should involve the physiotherapist, the occupational therapist, in case we need something..." R10	
Q 33 "...we can monitor if there [are] any side effects or whatever, so [that] we can have a nursing intervention as soon as possible..." R11	
Q 34 "For respiratory depression, we also prepare the naloxone..." R18	

The key pain relief interventions (Table 4: Q22) and the examples that emerged as stated by the surgical nurse respondents were the non-pharmacological interventions' (Table 4: Q23) and pharmacological interventions (Table 4: Q24, Q25, Q26, Q27).

Most of the respondents revealed the examples they used for non-pharmacological interventions to manage POP namely: relaxing music, muscle relaxation, massage techniques, heat and cold therapies, and a booklet with information (Table 4: Q23). Furthermore, for pharmacological interventions, the surgical nurse respondents reported that they used them with emerged examples such as non-opioid analgesics (Table 4: Q24), non-steroidal anti-inflammatory drugs (Table 4: Q25), opioid analgesia (Table 4: Q26), epidural analgesia, patient-controlled analgesia, and peripheral nerve blocks (Table 4: Q27, Q28).

Another strategy to relieve POP as reported by the surgical nurse respondents was the nurses' role to enhance pain relief interventions in promoting and providing optimal management of post-operative pain that demonstrate that they are advocates for a patient suffering pain after surgery (Table 4). The nursing actions that emerged from the reported role specified by most of the surgical nurse respondents were,

maintaining goals for pain relief (Table 4: Q29) according to their pain nursing intervention guidelines (Table 4: Q30), reassessment of pain (Table 4: Q31), collaboration amongst multidisciplinary teams (Table 4: Q32), monitoring adverse or side effects of analgesia (Table 4: Q33), management of adverse or side effects of analgesia (Table 4: Q34). These were strategies the surgical nurse respondents reported that they used to ensure effective management and reverse adverse reactions and side effects that occur frequently due to medications used to manage POP.

### 3.2.4. Involve Loved Ones in Pain Management by Educating the Patient

In this fourth theme (Table 5), the surgical nurse respondents expressed their main purpose to engage the patients who had total hip or knee replacement surgery and their loved ones by educating them about pain (Table 5: Q35, Q36) and involvement of family members (Table 5: Q43) to achieve effective pain control and patient satisfaction.

Educating about pain was stressed as substantiated to be achieved by most of the surgical nurse respondents by stating that they conduct education regarding (i) pain assessment tools used (Table 5: Q37); (ii) encouraging patients to notify health care providers of their pain, the appropriate pain relief

can be provided timely and appropriately (Table 5: Q38); (iii) patients' rights about pain management by educating the patients about their right to adequate pain control and pain relief belongs to them, and they must know that it is within their rights to do so (Table 5: Q39); (iv) by educating patients about available pain management options, including PCA, epidural analgesia, peripheral nerve blocks, and pharmacological and non-pharmacological strategies

(Table 5: Q40), highlighting education regarding the side-effects of analgesia (Table 5: Q42 (v) provision of pamphlets to reinforce education provided to the patient (Table 5: Q41). The involvement of family members emerged among the respondents as they felt that family members and significant others play a major role and need to be engaged in the management of POP for effective pain control (Table 5: Q43).

*Table 5. Surgical nurses' quote of involvement of loved ones in pain management by educating the patient.*

THEME 4: Involve loved ones in pain management by educating the patient		
Sub-theme	Quote	
Educating about pain	Q35	"Okay, at first we have to provide patient education, so if we cannot explain [it] in Arabic, we can ask the assistance of the unit assistant to explain it for us." R2
	Q36	"I educate them what they should do...regarding the pain management." R 5
	Q37	"...educate them about the pain tools we are using here in the hospital, which is numeric, zero to ten..."R1
	Q 38	"...we encourage patients to verbalize pain" R9
	Q 39	"Patients' rights that they deserve to have their pain managed while they are in the hospital." R13
	Q40	"...we usually re-educate them about the PCA when they come to the ward..." R11
	Q 41	"You need to give them also pamphlets so that they can understand why and how you manage the pain" R18
	Q 42	"He...should be instructed about possible side effects and he should have [a] call bell within reach to call the nurse, anytime he feels any discomfort..." R15
Involvement of family members	Q43	"We involve the family by educating them" R14

### 4. Discussion

It contributes to our understanding of how surgical nurses perceive postoperative pain management for total hip and knee replacement patients. A middle-range theory of acute pain management, formulated by Good in1998, was in agreement with the themes in the study [34].

It was evident from this study that the nurses in the four orthopedic wards demonstrated varying levels of experience and competencies.

About other literature, the findings in this study maintained some similarities related to the concepts of post-operative active pain and contributed with new ideas. This is indicated as some of the nurses described POP as a subjective phenomenon as maintained in several studies [43, 44]. In this study, the surgical nurses also confirmed and accepts that postoperative pain is a patient's report of pain after surgery and due to what the patient experience and say at that time as this is believed to be the golden standard of pain assessment and pain intensity [45, 46]. So, one of the nurses' descriptions of POP is confirmed as they reported that it is an individual patient's expression of pain [47, 48]. The study highlight that the nurses' pronouncement of the POP is established following the duration that it occurs immediately after surgery, or it may last for days following hip or knee replacement surgery [49]. The nurses' description of POP is confirmed by reporting the pain in terms of the location due to surgical incision and therefore is described as a kind of nociceptive pain that arises from tissue damage and is perceived as painful on the hips or knees when the noxious stimulus is applied to them [50]. This description of the location of pain in this study is confirmed by the nurses' description that the patient point to the area on the body that

is painful such as the hip or the knee [51]. The nurses' description of POPs was confirmed in terms of its severity highlighted as uncontrolled despite multimodal interventions as the pain levels during the first 72 hours after surgery, POP is severe, unpleasant, and uncomfortable, so it is important to manage it in a timely manner [52, 53]. The pain rating scales such as numeric and FLACC rated from 0 to 10 were referred to be available resources to be used to measure the pain of adult patients after surgery experiencing pain [54]. The four main pain levels alluded as confirmed by the surgical nurses' descriptions to be experienced by the patients who had THR or TKR surgery was that the level of pain can be either zero, mild, moderate, or severe [55, 56].

This study found that surgical nurses adopted the assessment methods to identify if the patients who had THR or TKR surgery experienced the pain was confirmed to be similar to other studies. Most of the surgical nurses expressed to confirm that they used the subjective assessment which refers to asking the patients if they experienced pain during pain screening procedures [57]. The nurses also confirmed that they observed the behavioral responses to pain of both patients who can self-report their pain and cannot verbally communicate by looking at their facial expressions, vocalizations, and body movements, and emerged in this study as actions that imply pain [58, 59]. The FLACC was confirmed to be used by most of the nurses to rate the pain of those adult patients who could not rate their pain verbally [46] Observations of physiological responses to pain were reported to be used by some of the nurses to provide information about pain [60]. The established reported observations of physiological responses by some of the surgical nurses were related to imply that the patients had increased blood pressure, tachycardia, and tachypnoea [61].

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replacements as one of the themes demonstrated the surgical nurses' knowledge and skills in using pain relief strategies. The excerpts from some of the nurses confirmed the pain relief strategies they used to manage the POP of patients who endured THR or TKR surgery was identified as nonpharmacological and pharmacological interventions [62]. The examples of nonpharmacological interventions reported by the nurses in this study are knee mobilizer for TKR patients, a variety of methods, including knee mobilizer for TKR patients, abduction pillows, deep breathing exercises, changing postures, diversional therapies, etc., [63]. The definite pharmacological interventions to be employed include general and advanced modalities that consist of non-opioid analgesia, epidural analgesia, non-steroidal anti-inflammatory drugs, opioid analgesia, PCA, and peripheral nerve blocks. A combination of general and advanced pharmacological interventions were employed [64].

Another theme indicated the nurses' emphasis on their important role that contributing to the promotion and provision of optimal POP management of the patient after total hip or knee replacements. The nurses' main role was to maintain pain relief goals that enhance patient satisfaction. It was the nurses' primary responsibility to improve patient satisfaction by maintaining pain relief goals [65]. The nurses indicated that to prioritize the goal to achieve optimal pain control by ensuring that pain reassessment was performed after pain interventions for (i) assessing the effectiveness of executed interventions, and (ii) observing the potential side effects of the interventions, and the outcome of pain severity [66]. This aim was about Good's proposition to maintain the balance between analgesia and side effects by implementing counteract interventions [34].

Lastly, the theme indicated the surgical nurses' activities to educate the patients and their loved ones to empower them in pain management for effective pain control [67]. The patient pain education content confirmed includes the use of pain assessment tools, patient educated to report pain, the rights of patients regarding pain management options, provision of leaflets for pain management, and mentioning the side effects of analgesia [68]. The family members of the patients were indicated to form part of the education for effective pain relief [69].

The implications of this study's findings in nursing indicated that multi-modal interventions that include combined pharmacological and nonpharmacological adjuvants as analgesics must be used as supported by Good's Middle range. The focussed nursing care must be provided as embraced by the participants' postoperative pain assessment of patients undergoing total hip or knee replacements. Nurses' role to enhance the intervention of pain is important to collaborate amongst multidisciplinary teams and by monitoring and managing adverse or side effects of analgesia. The implementation of nursing care interventions, reassessment of the effectiveness of the interventions, and reintervention were indicated to be essential as projected in this theory. Patient participation was indicated to be an

important role of patients and family members in managing the patient's pain management. Educating about pain and the involvement of family members relates to Good's middle-range theory. Goal setting for pain relief confirmed Good's proposition of patient participation as demonstrated in this study's findings as is essential for patients to manage their pain.

The limitation of this study includes 20 surgical nurses; moreover, the study has been conducted in one hospital in Riyadh and the study sample reflects only one area of Saudi Arabia in four orthopedic units. The research was determined by data saturation rich to explain what surgical nurses thought about post-operative pain management of patients after THR or TKR surgery but was not reflective of the entire population. Considering this, it is not possible to generalize these findings to all surgical nurses caring for patients undergoing total hip and knee replacement surgery. Patients who have had a total hip or knee replacement did not form part of the study to give their views on postoperative pain management.

## 5. Conclusion and Future Research

Nursing professionals should be sure to comply with ongoing assessment and reassessment of pain relief interventions to achieve optimal pain control and effectiveness; THR and TKR patients and their families must receive pain education before and after surgery, and for the purpose of providing accurate patient and family education regarding pain management, expatriate nurses need access to Arabic speakers if necessary. Future research should consider patients' perceptions of pain following surgery pain management since pain is subjective [70].

## Conflicts of Interest

The authors declare that they have no competing interests.

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