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Nurses' Performance Regarding Post-Operative Pain Management for Orthopedic Patients

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Abstract

Background: Effective pain management promotes faster healing and prevents complications, making it a cornerstone of post-surgical nursing care. **Aim of the study**: This study aimed to assess nurses' performance regarding post-operative pain management for orthopedic patients. **Research design**: A descriptive exploratory research design was used to achieve the aim of this study. **Sample**: A convenient sample of all available nurses (40 nurses) caring for patients at the orthopedic department in El Kasr El Ainy hospital. **Setting**: The study was carried out in the orthopedic department in El Kasr El Ainy hospital in Giza. **Tools**: 3 tools. **1st tool**: A Structured interview questionnaire for nurses, consisting of two parts: Part (1): Nurses' demographic characteristics. Part (2): Nurses' knowledge regarding pain management for post-operative orthopedic patients. **2nd Too**l Nurses 'reported practice regarding post-operative pain management for orthopedic patients. **3rd tool**: Nurses' attitude regarding pain management for post-operative orthopedic patients. **Result**: 87.5% of the studied nurses had unsatisfactory knowledge regarding post-operative pain care for orthopedic patients. 55% of the studied nurses had incompetent practice regarding post-operative pain management for orthopedic patients. 52.5% of the studied nurses had a negative attitude regarding post-operative pain management for orthopedic patients. **Conclusion**: It can be concluded that there is a highly positive statistical significance relation between total knowledge, total practice, and total attitude, while there is no statistical significance between total knowledge of the studied nurses and total attitude. **Recommendation:** Develop and implement comprehensive educational programs focusing on postoperative pain management, including pharmacological and non-pharmacological interventions.

Keywords: *Post-Operative, Pain Management, Orthopedic Patients, performance*

1-Introduction:

The International Association for the Study of Pain describes pain as "An unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage" (***Raja et al., 2020***). Postoperative pain, which affects approximately 80% of surgical patients, starts with surgical trauma, slowly resolves as the tissue heals, and finally ceases. Problems resulting from ineffective postoperative pain management may lengthen the postoperative recovery period, increasing morbidity, mortality rates, and treatment costs. Nurses must be well-versed in analgesia methods to provide quality postoperative pain management. They must also assess the method's suitability for each patient and provide appropriate care (***Akpolat et al., 2021***).

Pain is a subjective response, not consistently measurable or observable, to both physical and psychological stressors, which all people experience at some point during their lives. Although pain is usually experienced as uncomfortable and unwelcome, it also serves a protective role and may warn of potential health-threatening conditions. For this reason, pain needs to be assessed and considered an essential vital sign. Each pain event is a distinct personal experience. It is influenced by physiological, cognitive, psychological, sociocultural, and spiritual factors. Pain is the symptom most associated with describing oneself as ill and the most common reason for seeking healthcare (***El Sayed et al., 2021).***

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Postoperative pain in orthopedic patients is a common and often significant concern following surgery, particularly after procedures involving bones, joints, or soft tissues. This pain can vary in intensity, ranging from mild discomfort to severe, debilitating pain, and is typically a result of tissue trauma, inflammation, and the healing process. Effective management of postoperative pain is crucial to prevent complications such as delayed healing, deep vein thrombosis, or respiratory issues, while also ensuring the patient's comfort and promoting early mobilization. A multidisciplinary approach, including medications such as analgesics (opioids, non-opioids), nerve blocks, and physical therapy, is often employed to address pain and facilitate recovery. Proper pain management also plays a vital role in improving the patient's overall experience and outcomes (***Akpolat et al., 2021***).

Despite advancements in understanding postoperative pain and the establishment of evidence-based guidelines, pain management remains suboptimal across different hospital systems, surgical types, and countries. Inadequate pain control in the postoperative period can lead to chronic pain, reduced quality of life, and increased healthcare costs. Recognizing these challenges, accrediting bodies like the Joint Commission have implemented standards emphasizing quality care practices, including those delivered by nurses, to improve pain management outcomes. This focus on integrating evidence-based clinical practices is critical for enhancing patient recovery and overall satisfaction ***(Moraes et al., 2024).***

Nurses play a crucial role in effectively managing postoperative pain in orthopedic patients, where interprofessional collaboration with physicians significantly enhances patient outcomes. Effective communication between nurses and physicians positively correlates with improved pain management practices. For example, adequate communication facilitates appropriate pain strategies for patients in various healthcare settings. Strong collaborative relationships between nurses and physicians also enhance nurses' pain management competencies. These findings highlight the importance of teamwork and communication within healthcare settings to ensure optimal pain management practices for orthopedic patients, improving recovery outcomes and patient satisfaction ***(Youngcharoen & Aree-Ue, 2023).***

Significance of the study

Pain is a key factor affecting orthopedic patients' postoperative recovery. Due to patients' different tolerances to pain, there are significant differences in the degree of coordination of treatment and rehabilitation training. Therefore, appropriate nursing intervention measurements are important to control postoperative pain in fracture patients, bolster their treatment compliance, and improve the clinical treatment effect ***(Yu et al., 2021).***

Despite advances in technology and medications, unrelieved postoperative pain continues to be problematic for surgical patients. Statistics indicate that about 43 million patients in the United States experience acute postoperative pain, with pain intensities of moderate to severe, which is reported by 80% of these patients. About 50% of postoperative orthopedic patients report unrelieved pain (Centers for Disease Control and Prevention Guidelines) ***(CDC, 2022).***

Ineffective nursing care can have a profound impact on patient outcomes, compromising both the quality and safety of 2healthcare delivery. Factors such as inadequate training, understaffing, communication breakdowns, and lack of access to essential resources contribute to poor care. Nurses who are overworked or lack proper education may make critical errors, such as incorrect medication administration, delayed assessments, or failing to recognize warning signs in a patient's condition. Additionally, poor communication among healthcare team members can lead to misunderstandings, misdiagnoses, and delayed interventions. Addressing these issues requires improvements in training, working conditions, and fostering a collaborative approach to ensure that nurses can provide the highest level of care (**Khalil et al.,2022).**

In Egypt, the patients experienced moderate to severe pain on the first postoperative day; about 70 % and 50 % of patients continued to experience pain at rest or with movement on the second postoperative day **(*Noaman et al., 2023*).** So, the study aims to assess nursing knowledge and practice, which may aid in improving successful pain management methods and the nursing role in the care of postoperative orthopedic surgery **(Ozdoba et al,2024).**

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Assessing nurses' knowledge will establish the base for future training and suitable courses. Using effective methods and assessing practices will help hospitals identify gaps and fill them. This study will help to assess nurses' performance regarding post-operative pain management for orthopedic patients.

Aim of the study: -

This study aimed to assess nurses' performance regarding post-operative pain management for orthopedic patients through the following objectives:

1. Assess the level of nurses' knowledge regarding postoperative pain management for orthopedic patients.
2. Assess the level of nurses' practice regarding postoperative pain management for orthopedic patients
3. Assess the level of nurses' attitude regarding postoperative pain management for orthopedic patients

Research questions:

The objectives of the study were achieved through answering the following questions: -

1. What is the level of nurses' knowledge regarding postoperative pain management for orthopedic patients?
2. What is the level of nurses' practice regarding postoperative pain management for orthopedic patients?
3. What is the level of nurses' attitude regarding postoperative pain management for orthopedic patients?

2-Subjects and methods:

Research design: A descriptive exploratory research design was used to achieve its aim. Descriptive design involves directly exploring, analyzing, and describing a particular phenomenon.

Setting: This study was conducted at the orthopedic department's ward affiliated with El Kasr Al-Ainy, Cairo University Hospital. The hospital's orthopedic wing is designed for patient comfort and efficiency, featuring specialized departments on the ground floor (Department 7 and Department 9) for specific orthopedic care. The second floor houses Ward 18 and Ward 20, each with 50 beds, supported by 10 to 20 nurses per ward to provide continuous patient care.

Sampling: A convenient sample of available nurses (40) working in the selected setting during the study period agreed to participate.

Tools for data collection:

Tool I: A Structured Interview Questionnaire for nurses: It was developed by the investigator after reviewing related literature **(Khali et al., 2023)**. This tool was developed in English and translated into Arabic to suit all levels of participants. It consisted of the following:

Part (1): Nurses' demographic characteristics: This part includes items related to nurses' demographic data, such as (gender, age, qualification, years of experience, years of experience, and marital status in pain and its management, with additional questions about the location and usefulness of the training).

Part (2): Nurses' knowledge regarding pain management for post-operative orthopedic patients: It comprised of questions related to nurses' general knowledge about post-operative pain management of orthopedic patients, including definition, signs and symptoms, pain types, pain assessment, non-pharmacological management, pharmacological management of pain, and the changes of pain on language. It consists of 3 sections:

(A) General Knowledge about Pain and its Management comprises 15 multiple-choice questions. This section assessed the nurses' understanding of pain and its management. Questions cover a broad range of topics, including defining pain, recognizing its signs and symptoms, and identifying different types of pain, such as acute, chronic, neuropathic, and nociceptive. Additionally, nurses are questioned on the most reliable indicators of pain, including patient self-report and physical signs. The section also evaluates knowledge of non-pharmacological interventions

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like massage therapy and TENS, their benefits, such as improved patient satisfaction and wound healing, and the common side effects of opioid and NSAID use.

(B) Nurses' Knowledge Regarding the Effect of Pain on the Body consisted of three true/false questions. This part evaluates the nurses' knowledge about the physiological and biochemical changes caused by pain. It covers how pain affects biochemical parameters such as blood glucose, CO2 levels, adrenaline, cortisone, and O2 levels. Additionally, it addresses the physiological impacts of pain, including changes in heart rate, respiratory rate, blood pressure, and other bodily functions. The section also explores the behavioral changes associated with pain, such as mood alterations, activity levels, and observable physical expressions like restlessness and wrinkling of the forehead.

(C) Nurses' Knowledge: related to Pharmacological and Non-Pharmacological Management of Postoperative Pain, this section assesses the nurses' knowledge related to various pain management techniques. It consists of 10 true/false questions. Questions focus on the use of opioids, including appropriate situations for their use and considerations for patients with substance abuse histories. The section also covers the role of pre-operative anesthesia in pain management and the implications of increasing analgesic use, which might indicate psychological dependence. Additionally, nurses are evaluated on their knowledge of non-pharmacological methods such as breathing exercises, distraction, cold and heat compresses, and assessing pain before and after administering drugs. The section concludes with questions about monitoring and managing the side effects of narcotics.

Scoring system for nurses' knowledge regarding Postoperative pain management questionnaire: The scores were distributed by giving 'one' for the correct answer and 'zero' for the incorrect answer. The total score of nurses' knowledge about post-operative pain management of orthopedic patients was 41 grades, and it was considered that:

- **Satisfactory level if the total score is** ≥ 80% of total grades (> 32 grades) **(Khali et al., 2023).**
- **There is an unsatisfactory level if the total score** is <80% of the total grades (≤ 32 grades).

Tool II: Nurses 'reported practice regarding post-operative pain management for orthopedic patients. This tool was adapted from **Grinstein-Cohen et al. (2019)** to assess nurses' practical skills regarding postoperative pain management of patients after orthopedic surgery. This tool was adapted to the English language and translated into Arabic. It consisted of 9 items determining whether nurses perform specific pain management practices. Nurses are asked whether each practice is "Done" or "Not done." The practices assessed cover several critical aspects of postoperative pain management.

Scoring system: Regarding the total scores for the nurses' practices about post-operative pain management for orthopedic patients, nurses' practices were compared with a model key answer, where (one) scores were given for steps done, and (zero) for not done. The total grades were nine scores. Nurses' practice has been classified as follows. The total score was calculated by summing up and converting into a percentage.

- **Competent** practice level for nurses scoring≥75 % (≥ seven grades).
- **Incompetent** practice level for nurses with scores of <75% (< 7 grades) **(Khali et al., 2023).**

Tool III: Nurses' attitudes regarding pain management for post-operative orthopedic patients. This tool was adapted from **(Al-Sayaghi et al., 2022)** to assess the nurses' attitudes about post-operative pain management of orthopedic patients. It comprises 11 questions with three Likert scales: agree, do not know, and disagree. The eleventh item investigates whether a lack of pain expression means a lack of pain. Understanding that patients may experience pain differently is crucial for effective pain management. The eleventh item evaluates whether nurses believe a patient's right to expect total postoperative pain relief due to treatment. Recognizing and respecting patients' rights to pain relief is fundamental to patient-centered care.
Scoring system: The total range score for the items ranges from 11 to 33 degrees, with scores arranged as one agrees, two do not know, and three disagree.

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- **Adequate** attitude at >75% of the total score (>24 grade) **(Al-Sayaghi et al., 2022).**
- **Inadequate** attitude at ≤ 75% of the total score (≤ 24 grade).

Validity:

The study tools were tested for validity (face and content validity). Face validity aimed to determine whether the tools measured what they were supposed to measure. Content validity was conducted to determine whether the tools' content covered the study's aim. A jury of 5 experts measured it: three assistant professors and two lecturers of medical-surgical nursing at the faculty of nursing, Helwan University. The experts reviewed the tool for clarity, relevance, accuracy, comprehensiveness, simplicity, and applicability, and necessary modifications were made.

Reliability:

Cronbach's Alpha was used to determine the internal reliability of the adapted tools. The reliability of the tools was tested to determine the extent to which the questionnaire items are related to each other. Cronbach's alpha reliability coefficient typically ranges between 0 and 1, with higher values (more than 0.7) denoting acceptable reliability. The tools showed good reliability in nurses' questionnaires regarding post-operative pain management for orthopedic patients. It was a valid and reliable questionnaire with psychometric properties. Regarding nurses' post-operative pain management practices for orthopedic patients, Cronbach's Alpha was 0.718. Total Reliability for the questionnaire to assess nurses' knowledge and the checklist to assess nurses' practices regarding postoperative pain management for orthopedic patients: Cronbach's Alpha correlation coefficient was 0.564, but it is considered high as the number of items is less than 10. The total reliability of attitude regarding postoperative pain management for orthopedic patients was Cronbach's Alpha, which was 0.703 **(Khali et al., 2023; Al-Sayaghi et al., 2022).**

3- Operational Item:

Preparatory phase: It included reviewing past, current, national, and international related literature and theoretical knowledge of various aspects of the study using books, articles, the internet, periodicals, and magazines to develop tools for data collection.

Pilot study: The pilot study was done on 10% of the sample (4 nurses) to examine the clarity of questions and the time needed to complete the study tools. Subjects in the pilot study were included in the study sample, as no modifications were made.

Field Work:

- Data was collected within 3 months from the beginning of July 2024 to the end of September 2024.
- The researcher visited the department ward once a week in the afternoon. Each day, the researcher interviewed four nurses, there was weeks that has been skipped due to personal duties.
- Data was collected by interviewing nurses to fill out data collection tools, and an online questionnaire was presented to the participants.
- At the beginning of the interview, the aim of the study was explained to the nurses.
- The researcher obtained the nurses' oral consent to participate in the study.
- The study tools were completed and filled in by the nurses: the structured interview questionnaire for collecting data regarding demographic characteristics of nurses took about 5-7 minutes; the nurses' knowledge questionnaire took about 25-30 minutes; and the nurses' attitude questionnaire took about 10-15 minutes.
- The nurse's reported practices done by investigator through monitoring the nurse was working with patient postoperatively to assess nurses' practical skills regarding postoperative pain management of patients after orthopedic surgery.
- Data collected and intended in an Excel sheet and sent to an expert statistician to analyze the data using SPSS.

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Ethical considerations:

Before the study was conducted, approval was obtained from the scientific research ethical committee in the faculty of nursing at Helwan University under the number (36) for date (3-10-2023), as well as approval from the nursing director of Cairo University Hospitals and charge nurses in the respective unit. They were assured that anonymity and confidentiality of their information would be guaranteed, and they were informed about their role before joining the study. The ethical considerations included explaining the purpose and nature of the study, stating the possibility of withdrawing at any time, and maintaining the confidentiality of the information so that any other party would not access it without the participants' permission. Ethics, values, culture, and beliefs were respected.

4- Results:

Table 1: frequency distribution of the studied nurses according to their demographic characteristics (n = 40).

Socio-demographic characteristics		N	%
Gender	Female	19	47.5
	Male	21	52.5
Age	20 less than 30 years	8	20.0
	30 or less than 40 years	31	77.5
	40-50 years	1	2.5
Qualification	Secondary Nursing school	7	17.5
	Technical institute of nursing	18	45.0
	Bachelor's degree	9	22.5
	Master's degree	6	15.0
Years of experience	<5 years	7	17.5
	5-10 years	21	52.5
	More than 10 years	12	30.0
Marital status	Single	7	17.5
	Married	32	80.0
	Divorced	0	0.0
	Widow	1	2.5

Table 1 shows that more than half (52.5%) of the studied nurses are male, and less than half (47.5%) of them are female. The majority (77.5%) of the studied nurses are between 30 and less than 40 years old. However, the minority (2.5%) of studied nurses were 40 and under 50, and about half (45%) had a Technical Institute of Nursing. The minority (22.5%) of them had a bachelor's degree, while the minority (17.5%) of them had less than 5 years of experience. Moreover, more than half (52.5%) of nurses have experience of 5 to 10 years, the majority (80.0%) of studied nurses are married.

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Table 2: Frequency distribution of the studied nurses' knowledge of General Information Regarding Post-Operative Pain Management for Orthopedic Patients (n = 40).

Items	Incorrect		Correct	
	N	%	N	%
The definition of pain.	20	50.0%	20	50.0%
Signs and symptoms of pain.	26	**65.0%**	14	35.0%
The type of pain.	17	42.5%	23	**57.5%**
The most reliable indicator of pain in a patient.	21	52.5%	19	47.5%
A non-pharmacological intervention for pain management.	21	52.5%	19	47.5%
A non-pharmacological intervention for postoperative pain management in orthopedic patients.	20	50.0%	20	50.0%
A potential benefit of non-pharmacological interventions for pain management.	17	42.5%	23	**57.5%**
A common side effect of opioid use.	25	**62.5%**	15	37.5%
A potential side effect of nonsteroidal anti-inflammatory drugs (NSAIDs).	21	52.5%	19	47.5%
An appropriate dosing strategy for opioid medications.	19	47.5%	21	52.5%
The most appropriate pain assessment tool to use for a patient who is unable to communicate verbally.	18	45.0%	22	55.0%
Assessing pain: According to the Numerical Rating Scale (NRS)	20	50.0%	20	50.0%
Assessing pain: According to the Visual Analog Scale (VAS)	25	**62.5%**	15	37.5%
An important aspect of patient education is pain management.	20	50.0%	20	50.0%
A potential consequence of inadequate pain management after orthopedic surgery.	23	**57.5%**	17	42.5%

Table (2) Shows that about two-thirds of the studied nurses (65%) had incorrect answers regarding knowledge about Signs and symptoms of pain, and more than half (57.5%) of the studied nurses know about the type of pain, about two third (57.5%) of them know the potential benefit of non-pharmacological interventions for pain management. About two-thirds (62.5%) of them had incorrect answers regarding both the common side effects of opioid use and assessing pain according to the Visual Analog Scale (VAS). More than half had incorrect answers regarding A potential consequence of inadequate pain management after orthopedic surgery.

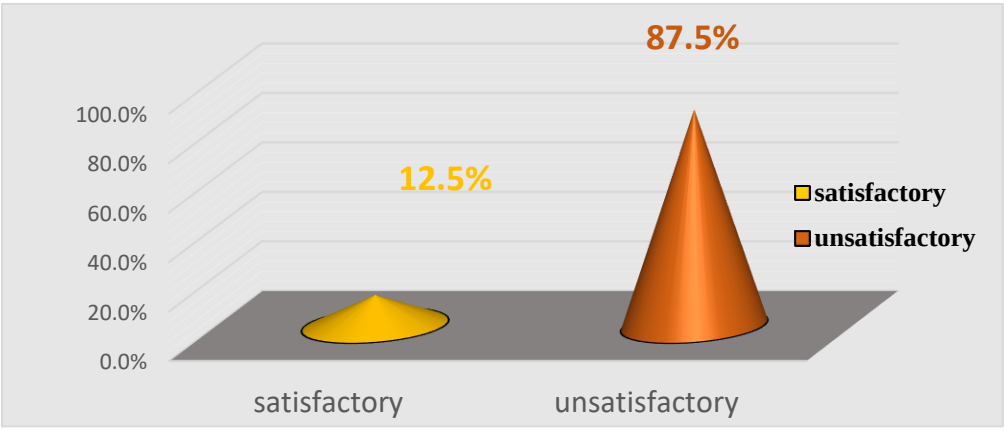

Figure (1): Total knowledge level of studied nurses regarding post-operative pain management for orthopedic patients (n = 40).

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Fig 1 shows that the majority of the studied nurses (87.5%) had unsatisfactory knowledge of postoperative pain management for orthopedic patients, but a minority (12.5%) had satisfactory knowledge.

Table (3): Frequency and distribution of the studied nurses' practices Regarding Post-Operative Pain Management for Orthopedic Patients.

Step	Done		Not done	
	N	%	N	%
Assessing the patient's pain level at regular intervals	36	59.0	3	41.0
Using a validated pain assessment tool to assess postoperative pain	31	**79.5**	8	20.5
Providing non-pharmacological interventions to manage postoperative pain	29	74.4	10	25.6
Administering pain medication according to the prescribed dosing regimen?	23	**92.3**	16	7.7
Monitoring the patient's response to pain medication and adjusting the dose as needed.	26	66.7	13	33.3
Using patient distraction relaxation postoperatively to reduce pain postoperatively	22	15.0	18	**85.0**
Using patient breathing exercise techniques postoperatively to reduce pain postoperatively	26	66.7	13	33.3
Using patient massage techniques postoperatively to reduce pain postoperatively	24	38.5	15	61.5
Using patient cold and heat compression techniques postoperatively to reduce pain postoperatively	29	74.4	10	25.6
Using patient positioning techniques postoperatively to reduce pain postoperatively	3	7.7	36	92.3
Documenting pain assessment findings and reassessment findings in the patient's medical record?	29	**76.3**	9	23.7
Documenting the postoperative management interventions provided, including medication administration and non-pharmacological interventions?	29	74.4	10	25.6
Documenting patient education about pain management interventions and potential side effects?	24	61.5	15	38.5

Table (3) Show that most of the studied nurses (92.3%), (79.5%) and (76.3%) assess the patient's pain level at regular intervals, using a validated pain assessment tool to assess postoperative pain, Documenting pain assessment findings and reassessment findings in the patient's medical record respectively. At the same time, about half (45.0%) do not use patient distraction or relaxation postoperatively to reduce pain

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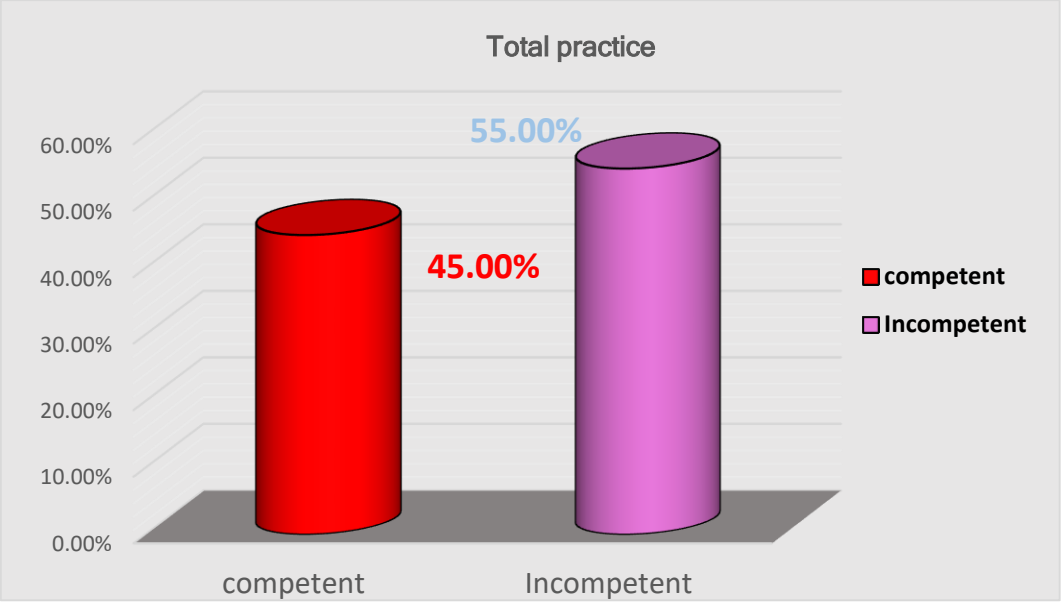

Figure (2): Total practice level of studied nurses regarding post-operative pain management for orthopedic patients (n = 40).

Fig (2) shows that more than half of the studied nurses (55%) practiced incompetently. In comparison, about half (45%) practiced competently regarding post-operative pain management for orthopedic patients.

Table (4): Frequency and distribution of the studied Nurses' attitudes toward postoperative pain assessment for orthopedic patients (n = 40).

Items	Agree		Do not know		Disagree	
	N	%	N	%	N	%
cultural background affecting the nursing care of a patient's report of pain	24	**61.5**	7	17.9	8	20.5
Patients should experience discomfort before receiving the next dose of pain medications	16	**41.0**	7	17.9	16	41.0
Visual assessment of the patient reporting pain influences the response and treatment of POP	9	22.5	19	47.5	12	30.0
Using a placebo is important in determining if the patient is in real pain	19	48.7	7	17.9	13	33.3
The patient who frequently requests pain medication influences response time to analgesic administration	21	**55.3**	8	21.1	9	23.7
Using pain assessment tools usually makes nursing more complicated and consumes time for other ward activities	13	33.3	16	41.0	10	25.6
Patients should be encouraged to endure as much pain as possible before using an opioid	20	**51.3**	11	28.2	8	20.5
Observable changes in vital signs must be relied on to verify patients' complaints of severe pain	23	**59.0**	7	17.9	9	23.1
Nurses are the best judges of the patient's pain intensity because they spend 24 hours with the patients	21	55.3	2	5.3	15	39.5
The type of surgery done affects your response to pain management	18	46.2	7	17.9	14	35.9
A lack of pain expression does not mean a lack of pain	40	**100**	0	0.0	0	0.0
It is a patient's right to expect total postoperative pain relief because of the treatment	15	**38.5**	12	30.8	12	30.8

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Table 6 illustrates that about two-thirds (61.5%) of the studied nurses agreed that cultural background affects nursing care related to pain reports. In comparison, more than one-third (41.0%) acknowledged that patients often experience discomfort before receiving their next dose of pain medication. Interestingly, more than half (55.3%) believed that frequent requests for pain medication impact response time. Additionally, about half (51.3%) agreed that patients should endure pain before receiving opioids. Notably, all nurses (100%) agreed that a lack of pain expression does not equate to a lack of pain, yet only 38.5% felt it was a patient's right to expect total postoperative pain relief.

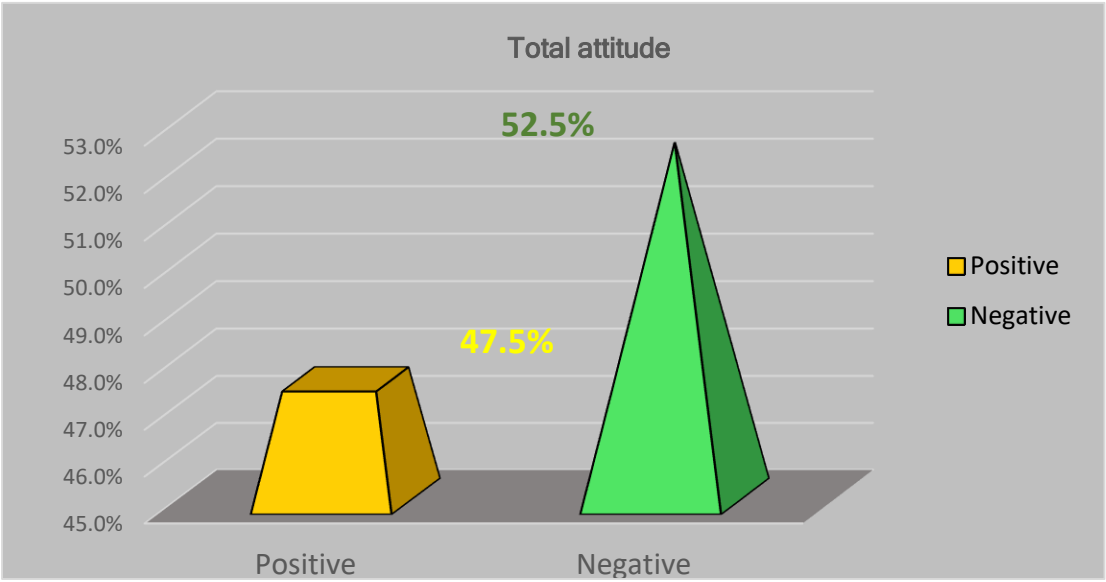

Figure (3): Total attitude level of studied nurses regarding post-operative pain management for orthopedic patients (n = 40).

Fig 3 shows that more than half of the studied nurses (52.5%) had a negative attitude toward it, while about half (47.5%) had a positive attitude.

Table 5: Relation between the total level of knowledge, total practices, and total attitude of the studied nurses (n = 40)

Items	Total knowledge		Total practice		Total attitude	
	R	*p*	*r*	*p*	*r*	*P*
The total level of knowledge	1		.448	**.004****	.218	**.176**
Total practice	.448	**.004****	1		.415	**.008****
Total attitude	.218	**.176**	.415	**.008****	1	

* Significant at **P < 0.5** ** highly significant at **P < 0.01**

Table (5) revealed that there is a highly positive statistical significance between total Knowledge of the studied nurses and total practice (P < .004), and there is a high statistical significance between total practice and total attitude (P < .008). There is no statistical significance between the total knowledge of the studied nurses and their total attitude.

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5- Discussion

Post-operative pain management is important in orthopedic care, because if the pain is unmanaged this can prolong the recovery, limit mobility, and reduce patient satisfaction. Nurses play a key role in assessing and managing pain, but their assessments often differ from patients' self-reported pain, which is typically more accurate. Studies suggest that inadequate education and inconsistencies in assessment practices hinder optimal pain management. Ongoing education, training in pain assessment tools (e.g., VAS, NRS), and evidence-based, individualized pain management plans can improve nurses' performance and patient outcomes by reducing assessment disparities and enhancing intervention effectiveness **(Lauretta et al., 2022; Mastel, 2020).**

Part I: The demographic characteristics of the studied nurses

By assessing the demographic characteristics of the studied nurses, the current study reveals that more than half of the studied nurses were males, and less than half were females. This result disagrees with **Samir et al., (2021),** Who carried out a study called *"Assessment of Nurses' Knowledge and Practice Regarding Care for Patients with Spinal Cord Injury in the Critical Care Unit. Egyptian Journal of Health Care."* and reported that the majority of +nurses were female rather than male, this may be due to the difference in the gender distribution of nurses from country to another. **From a research perspective**, this difference in gender distribution may be influenced by nursing specialties that appeal more to men, such as critical care, emergency, or surgical nursing, which involve hard work.

By evaluating the age of the studied nurses**,** the present study revealed that the majority of the studied nurses' ages are between 30 and less than 40. This result agrees with **Sepahvand et al. (2017),** who conducted a study about *"The relationship between some demographic characteristics and organizational commitment of nurses working in the Social Security Hospital of Khorramabad."* Moreover, it revealed that about half of the studied nurses were between 31 and 40. The same results were supported by **Khalil et al. (2022),** who reported that most of the sample was between the ages of 20 and 40.

Concerning the qualifications of the studied nurses, the study results reveal that about half have technical institute of nursing certificates. This result is similar to **Mohammed et al. (2024).** In their study titled *"The Effect of Training Program on Nurses' Competency Level regarding Care of Children Undergoing Orthopedic Surgery. Journal of Nursing Science Benha University."*. This study showed that more than two-thirds of nurses had technical institutes of nursing certificates. Highlighting a common educational background among nurses in similar healthcare settings. This similarity may reflect the prevalence of technical nursing education programs that provide nurses with important skills needed in orthopedic and critical care environments. Additionally, it suggests that nurses with technical certificates are a key workforce in specialized care areas, underlining the importance of tailored training programs to enhance their competency.

In addition to the marital status of the studied nurses, the present study revealed that the majority were married. This result is similar to **Samir et al. (2021**) in their study titled *"Assessment of Nurses' Knowledge and Practice Regarding Care for Patients with Spinal Cord Injury in the Critical Care Unit."*. Their study showed that more than two-thirds of the nurses in the critical care setting were also married, and they noted that marriage may be a common demographic characteristic among nurses in these environments. This similarity could be attributed to nurses' age and life stage, working in critical and specialized care settings, where many professionals may have established family lives. Understanding these demographics can help address work-life balance needs and provide support systems tailored to the employee's marital and family responsibilities.

The study findings reveal that more than half of the nurses have 5 to 10 **years of experience.** This result agrees with **El Sayed et al. (2021).** Their study about *"nurses 'knowledge and practice regarding post-operative pain management for orthopedic patients"* reported that most studied nurses have experience from 5 to 10 years. This may be because nurses are in a phase where they have built strong clinical skills, feel more stable in their roles, and may seek further professional growth and promotions, also seeking higher salaries. This experience range often aligns with high job satisfaction and adaptability, making these nurses valuable in specialized care

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areas while positioning them for advanced roles or certifications. **From a researcher's perspective,** the high prevalence of marriage among nurses in Egypt can be attributed to deeply rooted cultural norms that emphasize marriage as an essential life milestone. Additionally, the ability to achieve a satisfactory work-life balance, facilitated by organizational support, allows nurses to meet both professional and personal expectations, reinforcing the trend of early and widespread marriage within this demographic.

Part II: The level of nurses' knowledge

In the same context, the knowledge of general information regarding post-operative pain management for orthopedic patients was studied among nurses, and the study results showed that about two-thirds of the studied nurses knew about the signs and symptoms of pain. This result disagrees with **Al-Sayaghi et al. (2022).** In their study about *"Nurses' knowledge and attitudes regarding pain assessment and management in Saudi Arabia,"* the findings also indicate that most studied nurses had a poor level of knowledge and attitude about the signs and symptoms of pain. The other study is similar to that of **Ahmadi et al. (2023).** Their study *"The study of nurses' knowledge and attitudes regarding pain management and control in emergency departments"* indicated that most nurses concerning pain management and control had insufficient knowledge.

Considering the knowledge of General Information Regarding Post-Operative Pain Management for Orthopedic Patients of the studied nurses, the study results showed that more than half of the studied nurses knew about the type of pain, and more than half had correct answers about the type of pain. This result agrees with **Jaleta and Wake (2021).** Their study about *"Knowledge and associated factors towards post-operative pain management among nurses working at referral hospitals, Ethiopia"* indicates that more than half of the studied nurses know about the type of pain and answered correctly about the type of pain.

Regarding the total knowledge level of studied nurses regarding post-operative pain management for orthopedic patients, the result reveals that most studied nurses had satisfactory knowledge regarding post-operative pain management for orthopedic patients. However, the minority had unsatisfactory knowledge regarding it. This disagrees with **Al-Amer et al. (2024).** The title is *"Effect of nursing educational program on nurses' knowledge and practice regarding patients with anterior cruciate ligament surgery at Assiut University Hospital."* This study revealed that more than two-thirds were unsatisfied with the knowledge.

Part III: Nurses' reported practices

Concerning postoperative pain management for orthopedic patients, the results of the studied nurses' practices reveal that most patients' pain levels are assessed at regular intervals. However, a minority of them do not. This is in agreement with **Kgakge et al. (2024).** The title is *"Investigating the Risk of Patient Manual Handling Using the Movement and Assistance of Hospital Patients Method among Hospital Nurses in Botswana."* It revealed that most nurses assess patients' pain levels and document their interventions.

By assessing the total practice level of studied nurses regarding post-operative pain management for orthopedic patients, the results show that more than half of the studied nurses had incompetent practice. This disagrees with **Amena et al. (2024).** The study, *"Postoperative pain management practice and associated factors among nurses working at public hospitals, in Oromia region, Ethiopia, 2021: an institution-based cross-sectional study,"* found that more than half of the nurses demonstrated competent practices regarding postoperative pain management. **From the researcher's point of view,** these results may be due to excessive workloads, insufficient institutional support for evidence-based protocols, and ingrained cultural attitudes that undervalue pain management or prioritize efficiency over individualized care. Additionally, practical training deficiencies—such as underutilization of pain scales, hesitancy in opioid administration, or limited non-pharmacological skill application—likely hinder effective implementation of knowledge. Addressing this issue requires holistic interventions, including hands-on simulation training, mentorship programs, optimized staffing models, and institutional policies that empower nurses to prioritize patient-centered pain management. Without systemic and educational reforms, preventable patient suffering and suboptimal recovery outcomes risk becoming entrenched in orthopedic post-operative care.

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Part IV: Nurses' attitudes toward pain management

Concerning the total attitude level of the studied nurses regarding post-operative pain management for orthopedic patients, more than half of the studied nurses had a negative attitude. This result disagrees with **Chen et al. (2024).** Their study, "Nurses' knowledge of and attitude toward postoperative patient-controlled analgesia (PCA) and the associated factors," found that most participants had a positive attitude toward pain assessment. **From the researcher's perspective,** the findings suggest that a significant portion of the nursing staff may not fully recognize or prioritize the importance of effective pain management, potentially impacting the quality of care provided to orthopedic patients post-surgery. Further investigation and targeted interventions may be necessary to address this issue and improve the overall approach to pain management in this clinical setting.

This perspective is supported by the cross-sectional study conducted by **Samara et al. (2024)** titled *"Nurses' Knowledge and Attitudes about Adult Post-Operative Pain Assessment and Management: Cross Sectional Study in Qatar,"* published in Nursing Reports. The study assessed the knowledge and attitudes of nurses in Qatar regarding post-operative pain assessment and management. The findings revealed a significant deficit in nurses' knowledge and attitudes about pain, with a mean score of 19.6 out of 41, indicating a need for improved education and training in pain management.

Part V: The relationships and correlations between demographic variables, knowledge levels, practices, and attitudes

Regarding the relationship between the total level of knowledge, total practices, and total attitude of the studied nurses, the present study revealed that there is a highly positive statistical significance between the total Knowledge of the studied nurses and total practice, and a high statistical significance between total practice and total attitude. There is no statistical significance between the total knowledge of the studied nurses and their total attitude. This is in agreement with **Kgakge et al. (2024).** The title is *"Investigating the Risk of Patient Manual Handling Using the Movement and Assistance of Hospital Patients Method among Hospital Nurses in Botswana."* It was revealed that there is a significant relationship between total practice, total knowledge, and total attitude level.

6- Conclusion:

This study concluded that most of the studied nurses had satisfactory knowledge regarding post-operative pain management for orthopedic patients. However, a minority have unsatisfactory knowledge of this, and more than half of the studied nurses had incompetent practice. In contrast, about half of the studied nurses had competent practice in this area. More than half of the studied nurses had a negative attitude, while about half of the studied nurses had a positive attitude regarding it. Additionally, there is a highly positive statistical significance between the total knowledge of the studied nurses and total practice, and there is a high statistical significance between total practice and total attitude. There is no statistical significance between the total knowledge of the studied nurses and their total attitude.

7- Recommendations

For Practice

1. Develop and implement comprehensive educational programs on postoperative pain management, including pharmacological and non-pharmacological interventions.
2. Emphasize the accurate use of standardized pain assessment tools, such as the Visual Analog Scale (VAS) and Numeric Rating Scale (NRS), to improve consistency in pain evaluation.
3. Establish mandatory training sessions on postoperative pain management tailored to the hospital's specific protocols and patient population.
4. Advocate for adequate institutional resources for advanced pain management tools, medications, and nursing staff development.

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For Education

1. Include educational content on the physiological effects of pain and the consequences of inadequate pain management on recovery outcomes.
2. Facilitate nurses' participation in continuous professional development programs, conferences, and workshops on pain management.

For Further Research

1. Encourage research to identify and address barriers to effective pain management in orthopedic care settings.
2. Further investigation into the role of nursing regarding non-medication techniques to relieve pain.

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