# A Systematic Compilation of the Satisfaction Levels of Patients with Nursing Interventions Regarding Post-Operative Pain Management

## Ameliyat Sonrası Ağrı Yönetimine İlişkin Hemşirelik Uygulamalarına Karşı Duyulan Hasta Memnuniyetinin Sistematik Derlemesi

**Semra BÜLBÜLOĞLU[1], Fatma ETİ ASLAN[2], Gürkan KAPIKIRAN[3], Serdar SARITAŞ[4], Emine KAPLAN SERİN[5], Hüseyin GÜNEŞ[6]**

## ABSTRACT

**Purpose:** In this systematic compilation study, it was aimed to investigate the satisfaction levels of patients with nursing interventions regarding post-operative pain management.

**Methods:** Published studies on the subject between 1999-2019 were searched over the databases of Science Direct, Turkish Medline, PubMed, Ovid, ProQuest, Google Scholar and Ulakbim Turkish Database, and 9 studies which met the inclusion criteria were chosen within the scope of the compilation. The methodological quality of the papers included in the compilation was examined through the Turkish version of Joanna Briggs Institute MAStARi Critical Appraisal Tool.

**Findings:** The sample groups of the studies included in the compilation study consisted of patients in the post-operative period. In the studies, it was determined that the level of pain experienced in the post-operative period and satisfaction levels of the patients were high. It was also identified that in all studies, pharmacological methods were commonly used in the post-operative pain management, and that non-pharmacological practices were not used sufficiently by nurses in pain management.

**Conclusion:** As a result of this systematic compilation, it was concluded that patient satisfaction with nursing interventions in terms of post-operative pain management has been high for the last 20 years, and scientific evidence was obtained which shows that non-pharmacological nursing interventions suggested in pain management have been insufficient.

**Keywords:** Nursing approaches/interventions, patient satisfaction, post-operative pain.

## ÖZET

**Amaç:** Bu sistematik derlemede; ameliyat sonrası ağrıya ilişkin hemşirelik girişimlerinden hastaların memnuniyet düzeylerini incelemek amaçlandı.

**Yöntemler:** 1999-2019 yılları arasında, cerrahi ağrıya ilişkin yapılan hemşirelik uygulamalarından hastaların memnuniyet düzeylerini konu alan çalışmaların yayınlandığı    Science Direct, Türk Medline, PubMed, Ovid, ProQuest, Google Akademik and Ulakbim Türk Veri tabanlarından, dahil etme kriterlerine uygun toplam 9 çalışma ile bu sistematik derleme gerçekleştirildi.

[1] Gaziosmanpaşa University, Erbaa Health Sciences Faculty, Nursing Department, Tokat, Turkey, semrabulbuloglu@hotmail.com Orcid No: 0000-0002-7252-9478

[2] Bahçeşehir University, Health Sciences Faculty, Nursing Department, Istanbul, Turkey, fatmaetiaslan@gmail.com Orcid No: 0000-0003-0965-1443

[3] Bingöl University, Health Sciences Faculty, Nursing Department, Bingöl, Turkey, gurkankpkrn@gmail.com Orcid No: 0000-0002-3242-1059

[4] İnönü University, Nursing Faculty, Malatya, Turkey, serdar.saritas@inonu.edu.tr Orcid No: 0000-0003-4076-9001

[5] Gaziantep University, Health Sciences Faculty, Gaziantep, Turkey, emine_3354@hotmail.com 0000-0002-7327-9167

[6] Malatya Education and Research Hospital, Orthopedics and Traumatology Clinic, Malatya, Turkey, gunes_huseyinn@hotmail.com Orcid No: 0000-0001-5313-0819

Metodolojik kalite değerlendirmesi Joanna Briggs Institute'ye ait MAStARi Değerlendirme Aracı Türkçe versiyonu ile yapıldı. Verilerin değerlendirmesinde, çalışmaya özel bir veri formu kullanılmıştır.

**Bulgular:** Sistematik derleme kapsamına alınmış çalışmaların örneklem grubunu ameliyat sonrası dönemdeki hastalar oluşturmaktadır. Çalışmalarda post-operative dönemde hissedilen ağrının ve hastaların memnuniyet düzeylerinin yüksek olduğu saptandı. Tüm çalışmalarda ameliyat sonrası ağrı yönetiminde sıklıkla farmakolojik yöntemlerin kullanıldığı ve hemşireler tarafından özellikle ilaç dışı uygulamaların ağrı yönetiminde yeterince kullanılmadığı belirlendi.

**Sonuç:** Bu sistematik derlemede, son 20 yıldır ameliyat sonrası ağrı yönetimi için yapılan hemşirelik uygulamalarından hasta memnuniyetinin yüksek düzeyde olduğu ve ağrı yönetiminde önerilen non-farmakolojik hemşirelik uygulamalarının yetersiz olduğunu gösteren bilimsel kanıtlara ulaşılmıştır.

**Anahtar kelimeler:** Cerrahi ağrı, hasta memnuniyeti, hemşirelik uygulamaları/yaklaşımları

## Introduction

Pain in the post-operative period is a potential and foreseeable experience. However, contrary evidence suggests that in more than half of the patients who underwent an operation, interventions regarding pain management are insufficient [1-4]. In the literature review, it has been determined that more than 90% of the operated patients expressed that they experienced pain at medium, severe and intolerable levels in the post-operative period [5-9].

If post-operative pain is not taken under control, it affects the system and causes complication. In the literature, psychological, physiological, social and emotional impacts occurring as a result of ineffective pain management have been reported. In this context, ineffective pain management results in delay in scars, myocardial ischemia, deep vein thrombosis, insufficient respiration related atelectasis, pulmonary functional disorders, pneumonia, cognitive disorders, increased anxiety, glucose imbalance as a result of stress and sympathetic activity, chronic pain, increased morbidity and mortality, delay in patient discharge and decreased life quality [10-12].

In this systematic compilation, the answer to the question "What is the patients' level of satisfaction with nursing interventions regarding post-operative pain management?" was sought.

## Materials and Methods

It was followed steps of Preferred Reporting Items for Systematic reviews and Meta-analyses: the PRISMA statement in this systematic review [13].

**Screening Process:** Literature screening was performed through the terms "non-pharmacological methods, nursing interventions, patient satisfaction, pharmacological methods, post-operative pain, pain management." Research papers on the subject published between January 1999 and September 2019 were included in the compilation study. As a result of the screening process, a total of 233 studies were accessed, including 24 studies on the database of Science Direct, 20 studies on the database of Turkish Medline, 21 studies on PubMed database, 13 studies on Ovid database, 23 studies on ProQuest database, 18 studies on the database of Ulakbim Turkish Medicine Index, and 114 studies on Google Scholar database.

Among the inclusion criteria for the compilation were 1) being published in a national/international refereed journal, 2) being published between 1999-2019, 3) being conducted in Turkey, 4) covering patients in the post-operative period, 5) having a sample including patients who are over 18 years old, conscious, able to communicate and with good mental health. In line with the inclusion criteria, 9 studies were included within the scope of the compilation study.

**Figure 1. Study selection**
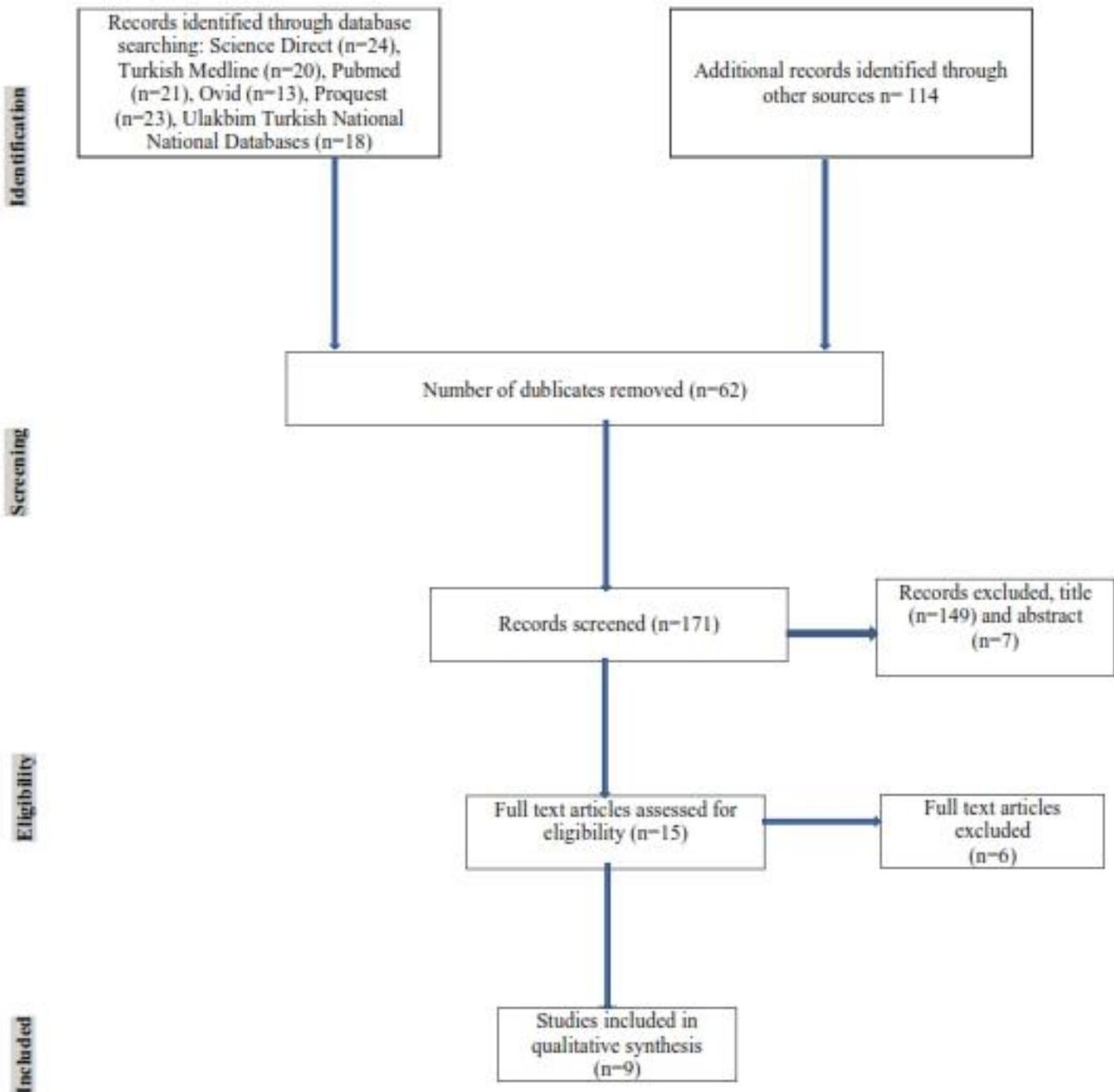
**Findings**

**The results of the screening**

As a result of the screening process, 9 studies, which met the inclusion criteria, were included within the scope of the systematic compilation (Figure 1).

**Evaluation of the methodological quality:** As the methodological quality evaluation tool in the study, Diagnostic/Case Series (Cross-sectional, Relational Screening, Comparative) Mastari Critical Appraisal Tool, proposed by Joanna Briggs Institute and adapted to Turkish by Nahcivan and Seçginli, was employed [14]. As a result of the assessment made by the two researchers, the highest score was 8, while the lowest score came out to be 6. For interrater reliability and compatibility analysis, Kappa coefficient was calculated using SPSS 25 software. The Kappa coefficient in the study was found to be 0.78, which indicated a high interrater compatibility. The average scores given by the researchers for each study were shown in Table1.

**Sample characteristics**

Of the 9 studies included in the compilation, 7 had descriptive (Akyol, Karayurt and Salmond, 2009; Ayhan and Kurşun, 2017; Dirimeşe, Yavuz and Altınbaş, 2014; Eti Aslan, Aygin and Sarıyıldız, 2007; Karabulut et al., 2015; Sayın, Öner Cengiz and Ayoğlu, 2016; Yılmaz and Gürler, 2011), and 2 had randomized controlled (Acar and Aygin, 2019; Yılmaz et al., 2019) study designs, and all were published between 1999-2019. The sample groups consisted of individuals who were over 18 years old and in the post-operative period.

The study conducted by Acar and Aygin was designed as a randomized controlled study, and 30 post-operative patients were included in each of the experimental and control group. The average age of the participants was 49.7±16.9, 53% were male, 73% were married, and 73% had undergone open surgical operation.

In the randomized controlled study conducted by Yılmaz et al., a total of 52 participants, 26 in the experimental group and 26 in the control group, were investigated. It was determined that the average age of the participants in the experimental group was 44.96±14.48, 66% were female, and 68% were retired. The participants were the in-patients in the post-operative period in the general surgery clinic of the hospital where the research was conducted. In order to alleviate the post-operative pain, the experimental group was treated with Transcutaneous Electrical Nerve Stimulation (TENS), while the control group patients were given routine pain-relieving pharmacological treatment of the clinic.

**Table 1. Characteristics of the Studies Included within the Scope of the Systematic Compilation**

| Study | Sample Characteristics | Measurement Tools Used | Results Obtained |
|---|---|---|---|
| **Acar and Aygin (2019)** | Randomized Controlled type A total of 60 patients (n=60) who had elective surgeries due to various reasons in experimental and control groups | Socio-demographic question form Visual Analog Scale (VAS) Other forms where post-operative symptoms are evaluated | Satisfaction level with nursing interventions for pain, according to VAS it was determined to be 8 in the experimental group and 6 in the control group (min 1, max 10). |
| **Yilmaz et al. (2019)** | Randomized controlled type A total of 52 patients (n=52) who were in the post-operative period after having inguinal herniorrhaphy surgery in experimental and control groups | Socio-demographic question form Newcastle Satisfaction with Nursing Scale Visual Analog Scale (VAS) | The rate of patient satisfaction with pain-related nursing interventions was found to be 87.89% in the experimental group and 79.47% in the control group. |
| **Ayhan and Kurşun (2017)** | Descriptive type. n=103 patients in the post-operative period in surgery clinics of a state hospital | Pain-relieving interventions and related satisfaction levels were examined through a question form developed by the researchers on the basis of the literature. Visual Analog Scale (VAS) | 59% of the patients reported pain while getting out of bed while 50% felt pain while coughing. Patients were applied both pharmacological and non-pharmacological interventions. Satisfaction rate with nursing interventions for pain was determined to be 90%. |

| | | | |
|---|---|---|---|
| **Sayın et al. (2016)** | Descriptive type, N=402 patients who had surgeries in general surgery, urology, cardiovascular surgery, orthopedy, otorhinolaryngology clinics. | Socio-demographic question form Newcastle Satisfaction with Nursing Scale | The rate of experiencing pain at a disturbing level was 44%, Satisfaction level with nursing interventions for pain mean score was 40.51±15.07 points (min 19, max 95) |
| **Karabulut et al. (2015)** | Descriptive type, N=52 patients who had open heart surgery | Personal information form Patient satisfaction form General Comfort Scale Pain assessment form | Pain scores post-operative: 7.07±2.6, during first mobilization: 6.71±2.7, 24 hours before discharge: 6.32±2.4, during discharge: 4.57±2.3, Patient satisfaction level with nursing interventions for pain: 80.8% very satisfied. |
| **Dirimeşe et al. (2014)** | Descriptive type A total of n=199 patients who had chest and abdominal surgery, 103 patients in 2008 and 96 patients in 2013. | Pain Management quality observation questionnaire Pain assessment form | Pain scores: Post-operative 2nd day average pain level was found to be 6 for 2008, and 5.9 for 2013. Patient satisfaction level with nursing interventions for pain was determined as 8.6 for 2008, and 6.9 for 2013. |
| **Yilmaz and Gürler (2011)** | Descriptive type, n=360 patients who had CVS, GIS, urinary system, abdominal and discectomy surgeries | Personal information form, Form for identifying nursing interventions for post-operative pain | Patients experience the most pain on the 3rd and 4th post-operative days while coughing, followed by while moving, sleeping, and breathing as well as during dressing and getting out of bed. Patients' satisfaction level with nursing interventions for pain was found to be 100%. |
| **Akyol et al. (2009)** | Descriptive type, n=120 patients who had total knee replacement | Personal information form Pain assessment form Patient satisfaction form | Patients' pain mean score on the 3rd post-operative day was determined as 7.20± 1.95. Patients' satisfaction level related to pain was found as 8.88±1.33. |
| **Eti Aslan et al. (2007)** | Descriptive type, n=418 patients in the emergency unit who had trauma | Personal information form Brief injury assessment form Visual comparison scale McGill Melzack Pain question form | 33.7 of the patients reported that they experienced unbearable pain by the time of the interview, 51.7% said it was very severe, 14.6% expressed that it was severe. 63.4 were not satisfied with nursing interventions for pain, mean score was 4.35±2.78, and satisfaction level was medium. |

In the descriptive study conducted by Ayhan and Kurşun, 103 patients in the post-operative period in the surgery clinics of a state hospital were included in the research. 69% of the participants were female, 82% were married, 49% had primary school education, 45% were in-patients in general surgery clinic.

Sayın et al. conducted a descriptive study on 402 surgery patients. 25% of the patients were between 28-37 years of age, 51% were male, 46% had primary school education,

82% were married, 65% had a job, and 52% had an average income.

The sample group of the descriptive study conducted by Karabulut et al. consisted of 32 male and 20 female patients. The average age of the patients was 58.4, 92% were married, 48% were literate, 73% had a chronic disease, 62% had coronary artery bypass graft surgery, 31% had aortic and mitral valve replacement surgery, and 8% aneurysm surgery.

The descriptive study carried out by Dirimeşe et al. had a sample group of 199 individuals. Regarding the participants

from 2008, 41% had chest surgery, 59% underwent abdominal surgery, the average age was 57.34±12.35, 56.3% were male, 46.6% had primary education; as for the participants from 2013 (n=96), 42% had chest surgery, 57% received abdominal surgery, the average age was 51.9±15.76, 51% were male, and 44% had primary school education.

360 patients in surgery clinics in the post-operative period constituted the sample group of the study conducted by Yılmaz and Gürler. 61% of the sample group were female, 83% were over the age of 40, 88% had low level of education, and 60% had no past surgery experience.

In the descriptive study conducted by Akyol et al., 120 in-patients in the orthopedics clinic who had undergone total knee replacement surgery were included. The average age of the patient was 67, 86% were female, 98% were married, and 73% had high school education.

A total of 418 in-patients in the emergency trauma units of two separate hospitals made up the sample group of the descriptive study conducted by Eti Aslan et al. The average age of the patients was determined to be 40, 70% were male, 71% had primary school education and 45% were self-employed.

**Data collection tools**

**Patient satisfaction measurement tools used in the studies included within the scope of the systematic compilation**

In the study conducted by Acar and Aygün, Visual Analog Scale (VAS) was used in order to assess patient satisfaction. Accordingly, 1 point referred to "not satisfied at all", while the score of 10 referred to "very satisfied".

In Ayhan and Kuran's study, a questionnaire form developed by the researcher referring to the literature was used, and patients' satisfaction levels regarding nursing interventions in relieving surgical pain were investigated, the results of which were presented numerically and in percentages.

In the studies conducted by Sayın et al. and Yılmaz et al., Newcastle Satisfaction with Nursing Scale was employed in order to evaluate patients' perception of general care services. Care services related to pain were included in the questions of the scale as a subdimension. Patient satisfaction level was scored out of 100.

In the study by Karabulut et al., patients' satisfaction with nursing interventions were scored as "5-very satisfied, 4-satisfied, 3-partly satisfied, 2-unsatisfied, 1-not satisfied at all".

In the study carried out by Dirimeşe et al., Patient Satisfaction Level, which was included in the "Environment" subdimension of Pain Management Quality Observation Questionnaire, was scored on a numerical scale ranging from 1 to 10.

In Yılmaz and Gürler's study, patients were asked to express their satisfaction with the interventions made regarding the post-operative pain they experienced as either "Yes" or "No".

In the study conducted by Akyol et al., patients were requested to score their satisfaction level from 0 to 10.

In their study, Eti Aslan et al. used Visual Analog Scale (VAS), in which patients scored their satisfaction level out of 10 as "0-3.9 – not satisfied at all, 4-5.9 – moderately satisfied, and 6-10 – very satisfied".

In the studies included in the research, researchers employed a variety of forms and scales such as Personal Information Form, Patient Satisfaction Form, General Comfort Form, Pain Management Quality Observation Form, Pain Assessment Form, The form for Determining Nursing Approaches regarding Post-operative Pain, BPI Short Form, Abridged Wounding Assessment and Visual Analog Scale (VAS), McGill-Mulzac Pain Question From and Newcastle Satisfaction with Nursing Scale.

**Nursing interventions regarding post-operative pain management**

Of the 9 studies included in the compilation, 7 had descriptive and 2 had randomized controlled study designs, and all were published between 1999-2019. The sample groups consisted of individuals who were over 18 years old and in the post-operative period.

In the study conducted by Acar and Aygün, the experimental and control groups were given routine treatment and care in the clinic, which are intravenous metoclopramide drug application for nausea and throwing up and application of intravenous ondansetron in case of continued nausea. Besides, 20 mg of tenoxicam non-steroidal anti-inflammatory medicine application three times a day is a routine post-operative pain management application. When tenoxicam proved insufficient, it was determined that 1 g/kg Paracetamol or 1.5 mcg/kg Fentanyl infusion was administered. In the experimental group, in addition to routine application, a video which was suggested by the Turkish Psychologists Association and believed to have a comforting effect on surgery patients was shown to the patients through a CD player or mobile phone, and comforting music was played both before and after the surgery.

In the study conducted by Yılmaz et al., clinical routine pain-relieving application was provided to the experimental and control groups, and the patients with a VAS score of 4 and above were administered intramuscular diclofenac sodium analgesic. In the experimental group, analgesic was administered by the researcher as well as Transcutaneous Electrical Nerve Stimulation (TENS).

In Ayhan and Kurşun' study, as pain-relieving intervention by the nurses in the post-operative period, 89% of the patients were administered analgesics, 35%

received resting, 13% did exercises, 17% changed positions in bed, and 3.9% were made to see pain-relieving dreams.

In the study performed by Sayın et al., no standard surgical pain management applications preferred by clinics were mentioned.

In their study, Karabulut et al. reported that the patients who underwent open heart surgery measured their own pain level every eight hours in the post-operative period and informed the nurses, and that patients who experienced pain were administered non-opioid analgesics, non-pharmacological interventions were applied, and low dosages of opioids were administered. As a result of the study, the pain levels were measured through a tool of pain level ranging from 0 to 10, and it was determined that the patients experienced the severest pain (7.0±2.6) on the first post-operative day, that they experienced intense pain (6.7±2.7) during the first mobilization, that the pain level followed a high course (6.3±2.4) in the 24 hours prior to discharge, and that the pain lessened to a certain degree (4.5±2.3) on the day of discharge in comparison to the previous days.

In their study, Dirimeşe et al. reported that in the General Surgery and Cardiovascular Surgery clinics of The Medicine Faculty of Ege University, based on a multimodal approach in post-operative pain treatment, doctors initially applied paracetamol followed by non-steroid drugs (NSAID) and weak opioids within the scope of routine pain-relieving protocol. In the relevant study, it was observed that the severest pain average of the patients was 5.9, while the lowest pain level average was 2.3, and it was 2.6 during the interview.

In the study conducted by Yılmaz and Gürler, a routine drug treatment regarding the post-operative pain management was reported. It is noteworthy that in a non-routine way and rarely, some non-pharmacological pain-relieving applications such as adjusting the position of the patient, arm and leg exercises, and informing the patients about post-operative pain were performed. According to the results of the study, patients felt pain the most in the post-operative period while they were coughing (96%), and they experienced the least pain while they were walking (46%). In the same study, it was determined that nurses did not use any forms to measure the severity of the patients' pain, 98% of the nurses did not inform the patients about the ways to reduce/eliminate pain, 84% did not help the patients about taking appropriate positions in order to relieve pain, 98% did not apply warm/clod compression to reduce pain, 99% did not give massage, 95% did not get the patients to do arm, leg and walking exercises, 98% did not let the patients listen to music to relieve pain, but 99% checked whether the pain was relieved or not after administering analgesics.

In the study conducted by Akyol et al., it was determined that analgesics were administered to the patients who had total knee replacement in order to relieve their pain in the post-operative period. According to the results of the study, on a scale of 0-10, the mean pain score was 3.70±1.30, the mean score for the severest pain was 7.20±1.95, the lowest

pain mean score was 2.38±1.29, and the mean score of pain during the interview was 2.13±2.15. The majority of the patients (77%) expressed that they had pain in the incision area. In the post-operative period, more than half of the patients (58%) reported that they waited for the analgesics to take effect for less than 10 minutes, while 8% reported 11-20 minutes, 4% 21-30 minutes, 4% 31-60 minutes, and 3% more than 60 minutes, and 23% of the patients did not ask for pain-relieving drugs. In the same study, the pain level average of females was found to be higher than that of males (3.84±1.25>2.82±1.23). In the study, the graduates of higher education and university reported feeling less pain compared to primary school and high school graduates. It was determined in the study that the pain experienced by the patients caused their activities (general activities, walking, exercise, sleep) to be constrained and led to negative emotional feelings (mood, relations with others, enjoying things).

In the study conducted by Eti Aslan et al., it is seen that in two research and training hospitals in Istanbul, in order to relieve post-traumatic pain, the patients were intramuscularly (IM) administered non-steroid anti-inflammatory drugs and opioid drugs when necessary. 95% of the patients received blunt trauma, and 75% were wounded on the extremities. In the post-trauma period, the patients were administered intramuscular NSAID, and those who still felt pain (14%) were administered opioid drugs. 15% of the patients described their pain as "severe", 52% said it was very severe, and 34% reported it as "unbearable." 49% of the females described the pain they experienced during the interview as "severe", and 30% said it was "disturbing." 97% of the patients who had blunt trauma defined the pain the felt during the interview as "disturbing."

### The levels of satisfaction with nursing approaches

In the study conducted by Acar and Aygin, it was found that on a scale of 100 points, pain score was 65, 60, 40 in the control group and 50, 40, 27.5 in the experimental group at 24th, 48th, 72nd hours, respectively. The satisfaction level with nursing interventions was found to be 8 in the experimental group and 6 in the control group on the VAS scale (where the lowest score to be obtained is 1, and the highest score is 10).

In the study by Yılmaz et al., the satisfaction rate of the patients was 87.89% in the experimental group, while it was found to be 79.47% in the control group.

In Ayhan and Kurşun's study, 59% of the patients reported that they felt pain while they were getting out of the bed, and 50% said they experienced pain while coughing. The satisfaction level with nursing interventions was determined as 90%.

In the study carried out by Sayın et al., 44% of the patients expressed that they felt severe surgical pain. It was determined that the level of satisfaction with nursing interventions was 40.51±15.07 points (where the lowest score to be obtained is 19, and the highest score is 95).

In the study conducted by Karabulut et al., 82% of the patients expressed that they were very satisfied with nursing interventions in terms of pain.

In their study, Dirimeşe et al. examined the patients' expectation of post-operative pain, and more than half of the patients (57%) reported that they did not feel much pain. It is seen that the mean score of the patients regarding their satisfaction with the treatment they received on a scale of 0-10 was 8.6 for the year of 2008 and 6.9 for 2013.

In the study conducted by Yılmaz and Gürler, all patients expressed their satisfaction with nursing interventions in relation to analgesic administration.

In their study, Akyol et al. measured the patients' satisfaction with pain measurement on the third day after the surgery and determined that the mean satisfaction score on a scale of 0-10 was 8.88±1.33 (min-max:5-10).

In the study by Eti Aslan et al., it was found that patients were moderately satisfied with pain-relieving interventions and that 64% of the patients were not satisfied with the pain-relieving applications and approach.

## Discussion

This systematic compilation was conducted with the aim of evaluating the patients' level of satisfaction with nursing interventions regarding post-operative pain management. The studies included in the compilation were evaluated to have methodological qualities ranging from 6 to 8. Thus, it is possible to argue that the methodological quality scores of the studies were not high.

Post-operative pain levels are affected by nursing approaches. Pain management, which is applied in order to improve life quality of the patients, to speed up the recovery process, to get the to do their daily life activities, to shorten the length of disease and hospital stay and to eliminate the problems stemming from pain, includes evaluation and identification of the pain, taking the complications under control, patient and family training, registering the processes, relieving the pain and assessing the results [15,16]. In the studies included in the compilation, the primary nursing approach in relieving the pain was administering analgesic medication, and it was reported that as a result of this application the pain was relieved.

According to the studies examined, it was determined that the Patients' satisfaction level was affected by other applications as well as nursing approaches in pain management. The satisfaction levels with other applications regarding care were examined only in the studies conducted by Eti Aslan et al., Yılmaz et al., and Sayın et al., while daily life activities affected by pain were included in all studies. Thus, it can be inferred that pain management is an important parameter in affecting patient satisfaction level. When looked from this perspective, the reliability of the studies in terms of measuring patient satisfaction level was weakened since the confounding variables were mostly not taken under control in the studies. When the literature is reviewed, it is

seen that 58% of doctors and nurses did not know about pain control [17], that nurses did not make an effective assessment of post-operative pain [18], that 81% of nurses diagnosed pain without using pain scale [19], and that 75.4% of the patients felt themselves better and safe when pain scale was used in the assessment of pain [20]. Consequently, it is seen that doctors and nurses are insufficient in terms of pain assessment and pain management applications, and related knowledge and experiences [6,15,21]. However, one of the perquisites of providing optimal health care and ensuring a high life quality for patients is applying effective pain management [22]. The results of this systematic compilation are consistent with the findings of other studies in the literature.

An effective post-operative pain management increases patient satisfaction [23]. In a study conducted, it was determined that the high expectation of the patients as regards pain management is related to knowledge and awareness level [24,25].

The purpose of pain management in all the processes before, during and after the surgery is to prevent the undesired effects of pain and pain treatment, to accelerate the recovery period and to increase patient satisfaction [26]. In the post-operative period, as a part of multimodal therapy approach to pain management, such methods as administering intravenous or oral acetaminophen before and after the surgery, using non-steroid anti-inflammatory drugs (NSAID), gabapentinoids, and among the non-pharmacological pain- relieving applications, cold and hot compression, playing music and medication are frequently used [27].

In this systematic compilation, it was determined that nurses generally administered only analgesic drugs for pain management in the post-operative period, and that non-pharmacological methods were not routinely employed. Although non-pharmacological pain-relieving methods such as deep breathing exercises, supporting the wound during coughing and mobilization, providing the patient with a proper position are among nursing duties, it was determined that these studies were not frequently performed by nurses. In this respect, the findings of the compilation are similar to a study conducted in which it was reported non-pharmacological pain relieving/eliminating methods are not frequently used by nurses for pain management in the post-operative period, but that they frequently administered analgesics or sedative drugs through intramuscular or intravenous ways [26].

As a result of the compilation, it was found that nurses did not generally use any forms measuring the severity of pain. Determining the presence of pain in patients, treating the pain as a result of assessing it and evaluating its effects on the patient as well as ensuring an effective pain management within a care plan are all considered indicators of a quality care. Effective pain management supports patients' safety and requires the participation of the patient and family members. It also involves providing an appropriate and individual-specific accessible health care

service by considering the individuals' cultural and developmental levels [17,28,29].

Strengthening the knowledge and interventions of nurses in terms of pain management will be an important step towards increasing care quality [30].

In another systematic compilation conducted in Turkey, it was determined that non-pharmacological methods were applied less in comparison to the previous 5 years, and that research on the subject was mostly descriptive [2]. Since there is ample evidence showing the presence of severe pain experienced by patients in the post-operative period and it is being tracked by nurses for a long time, it is important that nursing interventions proposed for pain management be performed frequently.

Patient satisfaction with pain management is affected by various factors such as relieving the pain in a short time, patients' past pain experiences, their expectations in the pre-operative period and negative effects of analgesic drugs.

## Limitations

Among the limitations of this systematic compilation, the varying number of samples, few numbers of studies in which experimental and control groups are included, and the distance between the clinics where the studies are conducted can be counted.

## Conclusion

It is important to strengthen the knowledge and skills of all clinicians and to increase their awareness of post-operative effective pain management in terms of applying pharmacological and non-pharmacological methods. As nurses are engaged more with the patients in comparison to other health professionals, they should be informed about comprehensive strategies used in pain management and they should reflect this knowledge on their interventions.

## Competing Interests

The authors declare that they have no competing interests.

No Fund.

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