Evaluation of Pain Management in Post-Spinal Decompression and Posterior Stabilization Patients: Case Study

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Abstract

Postoperative pain needs to be a concern for nurses because pain causes discomfort, one of the basic human needs. Untreated postoperative pain can affect quality of life and the recovery process. With a management approach, the nursing process can be integrated with the management process. Control and evaluation as part of the management process is important because at this stage the nursing manager can determine the quality of care provided. This case study aims to describe the use of the Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) in evaluating pain management. Patient was admitted with post-spinal decompression and posterior stabilization e.c tuberculosis spondylitis. Pain management includes observing pain, deep breathing relaxation techniques and praying/dzikir, providing education about the causes, triggers, and strategies to relieve pain, as well as providing collaborative measures of ketorolac analgesics. Evaluation of pain management with this questionnaire was carried by researcher out in the first 24 hours postoperative. After receiving pain management, an overview of the severity and reduction of patient pain, the impact of pain on activity, sleep, and negative emotions, the side effects of using ketorolac, the usefulness of information about pain management, the patient's ability to participate in pain treatment decisions, and use of non-pharmacological strategies. The APS-POQ-R can be used to evaluate of six aspects of patient pain management.

Keywords: Pain; pain management; postoperative; surveys and questionnaires.

Introduction

Spinal decompression and posterior stabilization are modality therapies that are performed to treat pain and compression problems due to spinal deformities, as well as to improve spinal instability (Tantri, 2022). This action can cause tissue discontinuity due to the incision, so that nociceptors are activated to release chemicals which are passed to the dorsal horn and continued to the brain as pain perception. Postoperative pain is identified with acute pain. Acute pain is defined as a sensory or emotional experience experienced by a patient associated with actual or functional tissue damage, with sudden or slow onset and of mild to severe intensity lasting less than three months (Tim Pokja SDKI PPNI, 2017). Untreated postoperative pain can cause unpleasant sensations, negative emotional experiences, autonomic hyper reactivity, decreased mobility, and decreased metabolism. Inadequate pain management also allows for sensitization of the peripheral and central nervous systems. Untreated acute pain can become chronic pain, which is pain that lasts for more than three months. This can affect the quality of life and the recovery process (Chou et al., 2016; Katz, 2002; Lengkong et al., 2022). The percentage of postoperative chronic pain is 10-15%, depending on the type of surgery performed, and around 2-10% of patients experience moderate to severe pain sensations (Ingadóttir & Zoëga, 2017).

Pain management is one of the main indicators of the quality of health services in hospitals (Nursalam, 2014). Nurses as health workers who most often come in contact with patients are the spearhead of health services in hospitals. Nurses see humans as bio-psycho-social-spiritual beings and their basic needs must be met. Pain is a problem that nurses pay attention to because pain causes a feeling of discomfort, so that the patient's basic needs are not met (Kozier, Glenora, Audrey, & Shirlee, 2010).

Potter and Perry (2012, in Sari, 2019) states that pain management is given in the form of systematic pain management so that one can understand the pain felt and the therapy given is in accordance with the patient's condition. Pain management is often carried out in a multidisciplinary approach involving physicians, pharmacists, clinical psychologists, physiotherapists, occupational therapists, recreational therapists, and nurses (Hardy, 1997; Main & Spanswick, 2000). Nurses carry out pain management through the nursing process, which is an approach to solving problems in a systematic and consistent way (Nursalam, 2014). Nurses can use a nursing management approach by involving integrated and coordinated nursing resources and implementing management processes to develop nursing care goals and nursing services (Huber, 2014 in Bekar & Baykal, 2020). The management process in question is planning, organizing, managing staff, directing, and controlling or evaluating (Pardede, Fitriani, & Hadi, 2020).

In the control process, control of the quality of care is one of the things to pay attention to. Nursing managers need to monitor patient care and analyze the results obtained from the plans set, and this control or control process takes place on an ongoing basis (Bekar & Baykal, 2020). Control of the quality of care is an activity that includes evaluation, monitoring and regulation of services to patients, which are carried out with the hope that the quality of care provided can be improved (Marquis & Huston, 2017). Quality pain management needs to be evaluated by looking at various aspects.

The Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) is an instrument for measuring the quality of pain management that has been used in various countries (Tantri, Satoto, Rahendra, Sukmono, & Kusumaningati, 2018). As care managers, nurses who care for patients after spinal decompression and posterior stabilization who experience postoperative pain and receive pain management interventions, need to evaluate the quality of pain management. This case report aims to describe the use of the APS-POQ-R instrument in evaluating the quality of pain management in inpatient rooms.

Case Presentation

This case report contains case management on October 22 and 24 2022, with prior informed consent regarding data collection

and the patient's illness experience. The patient underwent surgery on October 21, 2022. On October 22, 2022, the patient was diagnosed with post-spinal decompression and stabilization of the posterior e.c. TB spondylitis (POD 1) who appeared weak, had one line infusion with ketorolac 30 mg/12 hours in Ringer Lactate 500 mL, a dower catheter is attached, and a drainage tube is attached to the patient's back with an output of ±20 cc of blood. The patient complains of pain and flatulence. Pain comes and goes with a scale of 3 (range 0-10 with Numeric Rating Scale). Pain is felt around the operating area, pain increases when the back is moved. The patient is taking further doses of anti-tuberculosis drugs, namely rifampicin and isoniazid. Based on the results of the medical history anamnesis, the patient said that since two months ago he had experienced back pain, a lump appeared and the patient felt that his back was getting hunched. The patient had no history of being hospitalized, and no history of allergies. The patient said that so far he had no difficulty speaking or weakness in the limbs.

Results of vital signs assessment: blood pressure 118/88 mmHg, respiratory rate 20 times per minute, pulse 119 times per minute, temperature 36.5°C, and 91% oxygen saturation. Antopometric assessment results: body weight 36 kg, height 156 cm, and Body Mass Index (BMI) 14.8 which is included in the thin category. Laboratory review results on October 21, 2022: hemoglobin 6.4 gr/dL (normal value = 12.3 – 15.3 gr/dL), hematocrit 22.4% (normal value = 33.6 – 45%).

Based on the results of the assessment described above, then data analysis on nursing problems was carried out. Based on subjective data, patients complain of intermittent pain on a scale of 3 (range 0-10 using the Numeric Rating Scale). Pain is felt around the operating area, pain increases when the back is moved. The objective data that supports this diagnosis is that the patient appears to avoid movement (alert attitude), facial expressions appear grimacing, and the pulse rate increases to 119 times per minute. Based on the etiology of the problem, the pain felt by the patient is pain due to a surgical procedure that causes a break in tissue continuity. This will stimulate the release of pain mediators to the thalamus and cerebral cortex, then a painful sensation arises in the operating area. Based on this analysis, a nursing diagnosis of acute postoperative pain can be enforced related to posterior decompression and stabilization measures characterized by complaints of pain, alertness, grimacing facial expressions, and increased pulse.

Nursing care for pain problems is structured with the aim of reducing the patient's pain level. Pain management is one of the main interventions to overcome this problem. Pain management is defined as the act of identifying and managing sensory or emotional experiences associated with tissue or functional damage with sudden or slow onset and mild to severe and constant intensity. The implementation of nursing actions includes: 1) Observation of pain; 2) Explain the causes and strategies to reduce pain felt by the patient; 3) Train and encourage families to help patients perform deep breathing techniques and pray/dhikr to reduce pain; 4) Administration of ketorolac 30 mg/12 hours in 500 cc of RL via intravenously according to the doctor's advice.

Intervention

In this research, the researchers describe the utilization of APS-POQ-R as an assessment tool for pain management in a patient post-spinal decompression and posterior stabilization in the Kemuning 3 ward of Hasan Sadikin Hospital, West Java. Fill in the APS-POQ-R which measures six aspects of the quality of pain management which include: 1) level of severity and pain relief; 2) the impact of pain on activities, sleep, and negative emotions; 3) side effects of pain medication; 4) the usefulness of information about pain management; 5) ability to participate in pain treatment decisions; 6) the use of non-pharmacological strategies. The questionnaire consists of 12 question items. The way to fill out the questionnaire is by reading it by the author.

The first question is about the lowest pain felt by the patient in the first 24 hours after surgery. The second question is about the heaviest pain felt by the patient. The third question is about the percentage of severe pain felt by patients in the first 24 hours. The

fourth question is about describing the impact of pain on the patient's activities in bed (sitting, turning around, repositioning), out of bed (walking, sitting in a chair, standing at the sink), initiating sleep, and maintaining sleep.

The fifth question is about the effect of pain on mood and emotions, including feelings of anxiety, depression, fear and helplessness. The sixth question is about the side effects of using pharmacological therapy, including nausea, itching, drowsiness, and dizziness. The seventh question is about the percentage of pain relief after receiving pain management, both pharmacological and non-pharmacological therapy. The eighth question is about the patient's involvement in deciding pain treatment for himself. The ninth question is about the patient's satisfaction with the results of pain management that he received while he was hospitalized. The tenth question concerns receiving information from patients about pain management, and whether this information is helpful or not. The eleventh question is about the use of non-pharmacological therapies in pain management, including cold packs, deep breathing techniques, distraction, warm compresses, guided imagination, massage, meditation, listening to music, praying, relaxation, walking, etc. The last question is about how often doctors or nurses encourage patients to take non-pharmacological therapy.

Results

The results of filling out the APS-POQ-R in the first 24 hours after surgery: the lightest pain felt by the patient is 3 (0 – 10 with NRS), the heaviest pain is 8 (0 – 10 with NRS), severe pain often occurs 80% within the first 24 hours. Pain that is felt to be very disruptive to activities in bed with a score of 10 (0-10 with NRS), makes it difficult for patients to start sleeping with a score of 9 (0-10 with NRS), and makes it difficult for patients to maintain sleep with a score of 9 (0-10 with NRS). Pain felt by the patient causes the patient to feel afraid (score 5 in the range 0-10 with NRS) and helpless (score 9 in the range 0-10 with NRS).

Regarding the side effects of the drug therapy the patient received, namely ketorolac, the patient stated that he did not experience any side effects of the treatment, including nausea, itching, drowsiness, and dizziness. In the first 24 hours after surgery, medical therapy given to patients can relieve 30% of the pain they feel. The patient believes that he has been involved in deciding the treatment of his pain. The patient stated that he was not informed about his pain management options. Patients use non-pharmacological methods in their pain management, including deep breathing techniques and prayer/dhikr. Patients gave a score of 8 (range 0 – 10 with NRS) for satisfaction with in-room pain management.

Discussion

This study found that the Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) can be used to describe the evaluation of pain management in patients with post-spinal decompression and stabilization of the posterior due to TB spondylitis (POD 1). Evaluation in a simple way can be interpreted as an activity to measure and compare the achievement of expected performance (plan) with real performance (real) (Prijambodo, 2014). Nursing evaluation is a systematic and planned comparison between the observed end results and the goals or outcome criteria set out in the plan (Carpenito, 2009). In the management process approach, the control or evaluation stage is the final stage of the management process. At this stage, future treatment decisions are determined by comparing data from observations and evaluations of care against previously prepared care plans (Bekar & Baykal, 2020).

Evaluation of pain management is not enough with the results of reducing the pain scale (Mayasari, 2016). Quality pain management includes ongoing assessments such as screening for pain and reassessment of pain after treatment. Other things that are included in the evaluation of pain management are interdisciplinary collaborative care planning, taking into account patient input, selecting the right treatment, cost-effective, according to the patient's culture, safe, and easy access to care. Quality pain management includes ongoing assessments

such as screening for pain and reassessment of pain after treatment. Other things included in the evaluation of pain management are interdisciplinary collaborative care planning, taking into account patient input, selecting the right treatment, cost-effective, according to the patient's culture, safe, and easy access to care (Gordon et al., 2010).

The Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) instrument is a questionnaire used to evaluate pain management. Initially, in 1991 the American Pain Society published the APS-POQ published as a quality assurance standard for the management of acute pain and pain in cancer patients. This questionnaire is used to help health workers explore the patient's pain experience and treatment outcomes. The first revision was carried out in 1995 with updates based on published reports and clinical experience on the original questionnaire. A second revision was made in 2005 by expanding on the 1995 guidelines due to the need to change the level of care systems and how the quality of pain can be measured. Furthermore, Gordon et al. (2010) conducted a psychometric test of the APS-POQ-R questionnaire in 2005. The results obtained were that this questionnaire had internal consistency, construct validity, and clinical feasibility. The Indonesian version of the APS-POQ-R questionnaire was tested in 2018. The results of this questionnaire were declared valid and reliable for measuring the quality of postoperative pain management (Tantri et al., 2018).

The APS-POQ-R instrument measures six aspects of the quality of pain management which include: 1) level of severity and pain relief; 2) the impact of pain on activities, sleep, and negative emotions; 3) side effects of pain medication; 4) the usefulness of information about pain management; 5) ability to participate in pain treatment decisions; 6) the use of non-pharmacological strategies.

The first aspect is the severity and pain relief. Pain severity was measured using a numerical scale (0 = no pain, 10 = very painful) in the last 24 hours. The Numeric Rating Scale (NRS) is a pain assessment tool consisting of a range from 0 to 10, with 0 representing "no pain" and 10 representing the other extreme condition, namely "very painful". The scoring category with NRS is a score of 1-3 as mild pain, a score of 4-6 as moderate pain, and a score of 7-10 as severe pain. There are 2 types of questions related to the severity of pain, namely the heaviest pain and the least pain. Both questions are important because they can help assess the full range of pain experienced by the patient during periods of rest and general activity in acute pain. In this case study, the heaviest pain felt by the patient was in the category of severe pain, and the lightest pain was in the mild pain category.

Measurement of pain relief was added to this questionnaire to assess the patient's perception of the pain control provided during treatment. This aspect measures changes in pain levels after administration of analgesics. In addition, the award category scale for all combinations of pharmacological and nonpharmacological patient care includes a pain relief scale for the APS-POQ-R as measured by the widely used horizontal percentage scale (0% to 100%) adapted from the Brief Pain Inventory (BPI) (Gordon et al., 2010). The BPI is an instrument for assessing chronic pain in cancer patients (Ka'arayeno, 2020).

The second aspect is the impact of pain on activity, rest and negative emotions. This aspect evaluates how pain can interfere with function and well-being in treatment. There are two dimensions of disturbance that are measured, namely disturbances in activity/ rest (walking, work, general activities, sleep) and disturbances in emotions (mood, enjoyment of life). There are seven items of emotional distress that are measured, namely the presence of anxiety, anger, depression, fear, frustration, helplessness, and being overwhelmed. In this case study, the patient had difficulty initiating and maintaining sleep. In addition, the patient experiences disturbances in bed activities such as sitting, tilting left and right and repositioning. The patient is also unable to perform activities outside the bed. While the emotional impact experienced is feeling afraid and helpless.

Research from Budiyanto and Hamdiah (2022) found that pain is related to sleep quality in postoperative patients, for example causing patients to wake up at night and have

difficulty returning to sleep. In addition to affecting the need for rest, pain also affects the patient's activity. The problem most often experienced is limited movement, causing patients to become dependent on other people and give rise to feelings of helplessness. From the emotional aspect, the fear felt by the patient is related to the patient's fear of moving because the patient is afraid of experiencing pain. This makes the patient tend to maintain a rigid body (Dewi, Hakam, & Murtaqib, 2022). In fact, to accelerate postoperative recovery, patients need to perform early mobilization. Epstein (2014) found that early mobilization of post-spine surgery patients can provide benefits in the form of reduced infection rates and reduced length of stay (long of stay). In addition, early mobilization can also accelerate the return of the body's functional status.

The third aspect is the side effects of pharmacological pain management which are measured in this questionnaire because they can significantly harm safety, quality of life, patient compliance, and ability to recover. Pharmacological pain management can be defined as an effort or strategy for pain relief using anti-pain drugs. Multimodal therapy is recommended in the treatment of pain both to reduce pain, minimize side effects (Gordon et al., 2010). In this case study, the patient received ketorolac analgesic therapy. Ketorolac is a non-narcotic analgesic which is a non-steroidal anti-inflammatory drug (NSAID) that exhibits weak antipyretic and anti-inflammatory activity. This drug is indicated for the pending pain management of moderate to severe acute postoperative pain. Julianisa (2021) found that the main side effect that arises from the use of ketorolac is complaints of vomiting in patients after orthopedic surgery.

The fourth aspect is the usefulness of information about pain management. While the fifth aspect is patient participation in decision making and satisfaction measurement. The fourth and fifth aspects are interrelated. The goal of patient education is related to autonomous treatment decision making by the patient himself (Ingadóttir & Zoëga, 2017). Nurses have an important role in providing information or educating patients, one of which is about pain management and this can help postoperative patient recovery. Patient education refers to all educational activities for patients and/or their families (Ingadóttir & Zoëga, 2017). Research conducted by Darmawati, Febrita, Fitri, Fithria, and Audina (2022) found that there was a significant difference between patient satisfaction with pain management education compared to those who did not receive education.

Fitria (2019) found that to increase patient satisfaction, patient involvement is needed in making nursing action decisions. Patient involvement in their care is the essence of the nursing process, so that patient participation determines the quality and effectiveness of care, and this is a form of patient centered care (Rahayu & Mulyani, 2020). Patient involvement in question is an effort to empower the client so that it can increase the client's independence. Because the level of independence can only be achieved with patient participation in making treatment decisions. In this case the provision of nursing care must pay attention to the client by giving individual awards in the form of preferences, needs, values and ensuring all decision making has taken into account the values desired by the patient.

In this case study, it was found that the patient stated that he did not receive any information about pain management. However, the patient stated that he was involved in decision making and was satisfied with the pain management he received. This finding is not in accordance with research from Darmawati et al. (2022) as described above. The measurement of satisfaction with pain management is indeed very complex, because patient responses almost always tend to be positive, and difficult to interpret because of its subjective nature (Gordon et al., 2010).

The sixth aspect is the use of non-pharmacological interventions in pain management. Non-pharmacological management can be defined as efforts that can be made to overcome or minimize pain with a non-pharmacological approach (Mayasari, 2016). This action can be a complement to medical therapy, and is not intended as a substitute (Mayasari, 2016). Nonpharmacological therapies are

now widely accepted as appropriate for the treatment of pain and have demonstrated an impact on patient outcomes and satisfaction.

In this case study, the patient received non-pharmacological therapy in the form of deep breathing relaxation techniques and prayer/dhikr. Aini and Reskita (2018) found that deep breathing relaxation techniques can reduce pain intensity in fracture patients. Deep breathing relaxation technique is a method of pain management by reducing oxygen consumption, respiratory rate, heart rate and muscle tension. This can be done by stimulating the central nervous system to produce endorphins which function as pain inhibitors. The results of a literature review conducted by Suwahyu, Sahputra, and Fatmadona (2021) found that deep breathing relaxation techniques can reduce pain in postoperative fracture patients. The recommended deep breathing technique procedures include: creating a calm environment, trying to stay relaxed, inhaling through your nose and filling your lungs with air with a count of 1, 2, 3, then slowly relax your palms and feet. Try to keep concentrating with your eyes closed, then concentrate on the source of the pain. Repeat the procedure until the pain is reduced. This technique is recommended to be performed at 1, 2, 4, 8, 12, 24 hours postoperatively and when the patient feels pain. Meanwhile, research from Jannah and Riyadi (2021) found that dhikr can reduce the pain scale in postoperative patients. Dhikr is one of the religious activities that can be done by remembering Allah SWT, because it can make a person feel calm so that it suppresses the work of the sympathetic nervous system and activates the work of the parasympathetic nervous system.

Evaluation of pain management with APS-POQ-R is still receiving a lot of criticism because it is complex due to the subjective experience involved and the patient's limited knowledge regarding the structure, process and results of pain management. In addition, there are many factors that influence the quality of pain services, for example treatment assessment and behavior, treatment decision making, health service facility policies, and the patient's own condition (Gordon et al., 2010). Nonetheless, this instrument meets the basic psychometric criteria while retaining its administrative feasibility and clinical significance in its interpretation (Gordon et al., 2010).

Conclusion

Decompression surgery and posterior stabilization which can cause postoperative pain or be identified with acute pain. This problem can be treated with pain management nursing interventions. After receiving interventions consisting of observation of pain, administration of non-pharmacological therapy in the form of deep breathing techniques and prayer/dhikr, provision of education about pain management, and collaborative actions of administering ketorolac analgesics, an evaluation of the quality of pain management was carried out using the APS-POQ-R instrument. The instrument can describe the evaluation of six aspects of patient pain management.

References

Aini, L., & Reskita, R. (2018). Pengaruh teknik relaksasi nafas dalam terhadap penurunan nyeri pada pasein fraktur. *Jurnal Kesehatan*, 9(2), 262. Doi: 10.26630/jk.v9i2.905

Bekar, E. Ö., & Baykal, Ü. (2020). Investigation of the control process in nursing care management: A qualitative study. , 28(1), 61. Doi: 10.5152/FNJN.2020.18033

Budiyanto, A., & Hamdiah, D. (2022). Hubungan antara nyeri dan kecemasan dengan kualitas tidur pada pasien pasca operasi di ruang bedah. Ghidza: *Jurnal Gizi dan Kesehatan,* 6(2), 191–199. Doi: 10.22487/ghidza.v6i2.564

Carpenito, L. J. (2009). *Buku saku diagnosa keperawatan*. Jakarta: EGC.

Chou, R., Gordon, D. B., De Leon-Casasola, O. A., Rosenberg, J. M., Bickler, S., Brennan, T., … Wu, C. L. (2016). Management of postoperative pain: A clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on

regional anesthesia, executive committee, and administrative council. *The Journal of Pain*, 17(2), 131–157. Doi: 10.1016/J.JPAIN.2015.12.008

Darmawati, Febrita, Fitri, Fithria, & Audina. (2022). Efektivitas edukasi manajemen nyeri pada pasien yang menjalani sectio caesarea terhadap kepuasan pelayanan di Rumah Sakit Umum Daerah dr. Zainoel Abidin. *Journal of Medical Science*, 2(2), 54–63. Doi: 10.55572/jms.v2i2.58

Dewi, R. L., & Hakam, M., & Murtaqib, M. (2022). Gambaran activity of daily living pada pasien post operasi. *Pustaka Kesehatan*, 10(3), 157–161.

Epstein, N. E. (2014). A review article on the benefits of early mobilization following spinal surgery and other medical/surgical procedures. *Surgical Neurology International,* 5(Suppl 3), S66-73. Doi: 10.4103/2152-7806.130674

Fitria, A. Z. (2019). Hubungan keterlibatan pasien dalam pengambilan keputusan tindakan keperawatan dengan tingkat kepuasan pasien rawat inap di Rumah Sakit Lavalette Malang (Doctoral dissertation). Universitas Brawijaya, Malang.

Gordon, D. B., Polomano, R. C., Pellino, T. A., Turk, D. C., McCracken, L. M., Sherwood, G., Paice, J. A., Wallace, M. S., Strassels, S. A., & Farrar, J. T. (2010). Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) for quality improvement of pain management in hospitalized adults: Preliminary psychometric evaluation. *Journal of Pain*, 11(11), 1172–1186. Doi: 10.1016/j.jpain.2010.02.012

Hardy, P. (1997). *Chronic pain management: The essentials.* Retrieved from https://books.google.com.pr/books?id=EtZ-4eb_aDUC&lpg=PP1&rview=1&pg=PP8#v=onepage&q&f=false

Ingadóttir, B., & Zoëga, S. (2017). Role of patient education in postoperative pain management. *Nursing Standard*, 32(2), 50–63. Doi: 10.7748/ns.2017.e10939

Jannah, N., & Riyadi, M. E. (2021). Pengaruh terapi dzikir terhadap skala nyeri pasien post operasi. *Jurnal Pendidikan Kesehatan*, 10(1), 77. Doi: 10.31290/jpk.v10i1.2256

Julianisa, R. (2021). Evaluasi efek samping pasca operasi ortopedi setelah penggunaan injeksi ketorolac di RS Islam Sultan Agung Semarang (Doctoral dissertation). Universitas Islam Sultan Agung, Semarang.

Ka'arayeno, A. J. (2020). Aplikasi Brief Pain Inventory (BPI) Indonesian version untuk mengkaji nyeri kronis pada pasien kanker. Care: *Jurnal Ilmiah Ilmu Kesehatan*, 8(2), 294. Doi: 10.33366/jc.v8i2.1799

Katz, N. (2002). The impact of pain management on quality of life. *Journal of Pain and Symptom Management*, 24(1), S38–S47. Doi: 10.1016/S0885-3924(02)00411-6

Kozier, B., Glenora, E., Audrey, B., & Shirlee, J. S. (2010). *Buku ajar fundamental keperawatan* (E. Wahyuningsih, D. Yulianti, Y. Yuningsing, & A. Iusyana, Eds.). Jakarta: EGC.

Lengkong, E. E., Musba, T., Ambo Ala, A., Ahmad, M. R., Ratnawati, & Wijaya, C. (2022). Perbandingan efek pemberian gabapentin preemtif dengan gabapentin preventif terhadap kadar nerve growth factor dan nyeri pascaoperasi dekompresi dan stabilisasi posterior vertebra. *Majalah Anestesia & Critical Care*, 40(2), 67–74. Doi: 10.55497/majanestcricar.v40i2.264

Main, C. J., & Spanswick, C. C. (2000). Pain management: An interdisciplinary approach. Retrieved from https://scholar.google.com/scholar?hl=id&as_sdt=0%2C5&q=Pain+management%3A+an+interdisciplinary+approach&btnG=

Marquis, B. L., & Huston, C. J. (2017). Leadership roles and management functions in nursing: Theory and application. In Leadership Roles and Management Functions in Nursing: *Theory and Application*. Doi: 10.1097/00006216-200407000-00013

Mayasari, C. D. (2016). Pentingnya

pemahaman manajemen nyeri non farmakologi bagi seorang perawat. *Jurnal Wawasan Kesehatan*, 1(1), 35–42. Retrieved from https://stikessantupaulus.e-journal.id/JWK/article/view/13/5

Nursalam. (2014). *Manajemen keperawatan: Aplikasi dalam praktik keperawatan profesional* (4th ed.). Jakarta: Salemba Medika.

Pardede, M. K. J., Fitriani, A. D., & Hadi, A. J. (2020). Analisis implementasi manajemen asuhan keperawatan di Ruang Rawat Inap RSU Mitra Sejati Medan. Media *Publikasi Promosi Kesehatan Indonesia* (MPPKI), 3(2), 93–99. Doi: 10.56338/mppki.v3i2.1077

Prijambodo. (2014). *Monitoring dan evaluasi.* Bogor: IPB Press.

Rahayu, C. D., & Mulyani, S. (2020). Pengambilan keputusan klinis perawat. *Jurnal Ilmiah Kesehatan*, 10(1), 1-11.

Sari, F. Y. (2019). Analisis penerapan proses asuhan keperawatan terkait manajemen nyeri terhadap kepuasan pasien di Rumah Sakit Universitas Tanjungpura. *ProNers*, 4(1). Doi: 10.26418/JPN.V4I1.33513

Suwahyu, R., Sahputra, R. E., & Fatmadona, R. (2021). Systematic review: Penurunan nyeri pada pasien pasca operasi fraktur melalui penggunaan teknik napas dalam. Jurnal Ilmiah Permas: *Jurnal Ilmiah STIKES Kendal*, 11(1), 193–206.

Tantri, A. R. (2022). Nyeri pasca operasi dekompresi dan stabilisasi vertebra: Sampai dimana kita saat ini?. *Majalah Anestesia & Critical Care*, 40(2), 65–66. Doi: 10.55497/majanestcricar.v40i2.272

Tantri, A. R., Satoto, D., Rahendra, Sukmono, B., & Kusumaningati, R. W. (2018). Validity test of the Indonesia Version of Revised American Pain Society Outcome Questionnaire (APS-POQ-R) to evaluate postoperative management quality. *Advanced Science Letters*, 24(8), 6274–6279. Doi: 10.1166/ASL.2018.12711

Tim Pokja SDKI PPNI. (2017). *Standar diagnosis keperawatan indonesia.* Jakarta Selatan: DPP PPNI.