JUKIM ADMI Jurnal Ilmiah Multidisiplin

OPEN ACCESS

JURNAL JUKIM Vol 5 No. 3 May 2026 | P-ISSN: 2829-0488 E-ISSN: 2829-0518, page 1-6

The Effect of Deep Breathing Relaxation and Imagery Distraction on Pain Intensity Using the Visual Analog Scale (VAS) in CAPD Patients After Double-Lumen Catheter Insertion

Shafa Puspita Maharani[1], Chairul Huda Al Husna[2]
[1,2,] Faculty of Health Sciences, Universitas Muhammadiyah Malang, Indonesia

Article History
Received : March-2026
Revised : April-2026
Published : May-2026

Corresponding author*:
Shafa Puspita Maharani

Contact:
shafapuspita11@gmail.com

Cite This Article (IEEE Style):
S. P. Maharani and C. H. Al Husna, "The effect of deep breathing relaxation and imagery distraction on pain intensity using the Visual Analog Scale (VAS) in CAPD patients after double-lumen catheter insertion," *Jurnal Ilmiah Multidisiplin*, vol. 5, no. 3, pp. 1–6, 2026

DOI:
https://doi.org/10.56127/jukim.v5i03.2741

Abstract: Introduction: Patients with Continuous Ambulatory Peritoneal Dialysis (CAPD) undergoing double lumen placement may experience acute pain due to tissue trauma from invasive procedures. Untreated pain can reduce comfort, interfere with activities, and slow the recovery process. Non-pharmacological interventions such as deep breathing relaxation and distraction (including imaginative distraction) can help reduce pain intensity through physical relaxation and diverting the patient's focus of attention. Objective: To determine the effect of deep breathing relaxation and distraction (including imaginative distraction) on reducing pain intensity using the Visual Analog Scale (VAS) in CAPD patients after double lumen placement. Methods: The research method used was a case report with a case study approach involving one patient undergoing Continuous Ambulatory Peritoneal Dialysis (CAPD) who experienced acute pain after double lumen insertion. Nursing interventions in the form of deep breathing relaxation and distraction techniques (music, conversation, and guided imagery distraction) were administered for one week according to the patient's condition. Pain evaluation was conducted using the Visual Analog Scale (VAS) and observation of nonverbal responses before and after the intervention to assess changes in pain intensity and the patient's response to the interventions provided. Results: At the initial measurement, the patient experienced VAS pain of 5–6 (moderate pain) accompanied by grimacing and a protective attitude. After 1 weeks of intervention, pain decreased to VAS 1–2 (mild pain). The patient appeared more relaxed, had improved facial expression, and was able to perform light activities. Imaginary distraction helped the patient shift focus from pain by imagining a calm and pleasant environment. Conclusion: Deep breathing relaxation and distraction (including imaginative distraction) effectively reduced pain intensity based on the VAS in patients with CAPD after double-lumen placement, thus it can be used as a supportive non-pharmacological therapy in nursing care.

Keywords: CAPD, acute pain, double-lumen placement, deep breathing relaxation, imaginative distraction, Visual Analog Scale (VAS), non-pharmacological intervention.

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, which may be acute or chronic and can affect both the physical and psychological conditions of patients [1]. Pain frequently occurs in patients undergoing invasive procedures such as double-lumen catheter insertion, including patients receiving Continuous Ambulatory Peritoneal Dialysis (CAPD). This procedure may cause discomfort and interfere with the patient's adaptation to therapy. Therefore, post-invasive procedural pain requires appropriate management, both pharmacological and non-pharmacological, to improve patient comfort and quality of care [2].

Pain resulting from invasive procedures remains a common issue in healthcare facilities [3]. The World Health Organization (WHO) reports that more than 70% of patients undergoing invasive procedures experience pain ranging from mild to severe intensity, and approximately 30–50% of these patients do not receive adequate pain management [4]. Data from the Ministry of Health of the Republic of Indonesia indicate that invasive procedures are among the leading causes of pain complaints among hospitalized patients, particularly during vascular access placement and catheterization procedures [16]. These

findings suggest that pain management continues to be a challenge in nursing care, especially for patients who undergo repeated invasive procedures, such as those receiving CAPD therapy [6].

Continuous Ambulatory Peritoneal Dialysis (CAPD) is a renal replacement therapy commonly used for patients with chronic kidney disease, utilizing the peritoneal cavity as a dialysis membrane [7]. One of the procedures frequently performed in CAPD patients is the insertion of a double-lumen catheter to provide vascular access for medical treatment [8]. This invasive procedure may cause pain due to tissue trauma, stimulation of nerve endings, and local inflammatory responses. Inadequately managed pain can increase anxiety, delay recovery, and reduce patient adherence to therapy [9].

Pain following catheter insertion may trigger physiological stress responses, including increased heart rate, elevated blood pressure, and activation of the sympathetic nervous system [9]. Furthermore, pain can lead to psychological disturbances such as anxiety and fear regarding subsequent medical procedures. Therefore, effective interventions are needed to reduce pain intensity, particularly through non-pharmacological approaches that are safe, easy to implement, and free from adverse effects [10].

Deep breathing relaxation is a non-pharmacological pain management technique that works by activating the parasympathetic nervous system, thereby reducing muscle tension, slowing the respiratory rate, and decreasing pain perception [1]. In addition, imagery distraction is an effective technique that redirects the patient's attention away from painful sensations toward pleasant mental images, thereby reducing subjective pain perception [11]. The combination of these two techniques has the potential to provide a synergistic effect in reducing pain intensity among patients following invasive procedures [12].

Pain intensity can be measured using the Visual Analog Scale (VAS), a linear scale designed to assess pain severity ranging from no pain to severe pain [13]. The VAS is a simple, valid, and widely used instrument in nursing research to evaluate changes in pain levels before and after interventions [14]. Based on the aforementioned background, the researchers were interested in investigating the effects of deep breathing relaxation and imagery distraction on pain intensity measured using the Visual Analog Scale (VAS) among CAPD patients following double-lumen catheter insertion [15].

RESEARCHMETHOD

This study employed a case report design using a case study approach that involved an in-depth and systematic examination of the patient's condition. The process included observation, data collection, information analysis, nursing diagnosis formulation, intervention implementation, and outcome reporting. The independent variables in this case report were deep breathing relaxation and imagery distraction techniques, while the dependent variable was pain intensity in a Continuous Ambulatory Peritoneal Dialysis (CAPD) patient following double-lumen catheter insertion, measured using the Visual Analog Scale (VAS). The case focused on Mrs. E, a patient diagnosed with CAPD-related peritonitis and treated in the Parangtritis Ward of Dr. Saiful Anwar Regional General Hospital. The primary nursing diagnosis was acute pain related to a physiological injury agent, namely inflammation at the double-lumen catheter insertion site, as evidenced by a pain score of 4–6, facial grimacing, protective behavior, and complaints of stabbing pain in the neck/chest area.

The implementation of deep breathing relaxation and imagery distraction therapy in CAPD patients following double-lumen catheter insertion required specific inclusion and exclusion criteria to ensure that the intervention was conducted safely and effectively. The inclusion criteria were patients diagnosed with CAPD-related peritonitis, experiencing acute pain following an invasive procedure, aged $\geqslant$18 years, fully conscious or compos mentis, hemodynamically stable, able to communicate effectively, and willing to participate in the study. The exclusion criteria included patients with impaired consciousness, unstable hemodynamic status, severe psychiatric disorders, or clinical conditions that contraindicated non-pharmacological interventions.

The case study was conducted on Mrs. E through the application of the nursing process, including assessment, nursing diagnosis, intervention planning, implementation, and evaluation. In addition to acute pain, the patient was also diagnosed with hypervolemia related to excessive fluid intake, as evidenced by peripheral edema, an increase in body weight from 73 kg to 76 kg, and an imbalance between fluid intake and output. Nursing interventions primarily focused on pain management using deep breathing relaxation and imagery distraction as non-pharmacological therapies.

The operational definition in this case study was the administration of deep breathing relaxation and imagery distraction interventions for approximately 10–15 minutes per session, followed by the assessment of pain intensity before and after the intervention using the Visual Analog Scale (VAS) [14]. The study was conducted over a one-week period, from April 6 to April 12, 2026, in the Parangtritis Ward of Dr. Saiful Anwar Regional General Hospital.

Pain intensity was assessed using the Visual Analog Scale (VAS) by asking the patient to indicate their level of pain on a 10-cm horizontal line, where 0 represented "no pain" and 10 represented "the worst pain imaginable." The measurement results were used to evaluate changes in pain intensity before and after the nursing intervention [11].

The deep breathing relaxation intervention was performed by instructing the patient to inhale slowly and deeply through the nose, hold the breath for 3–5 seconds, and then exhale slowly through the mouth. This procedure was repeated for approximately 10 minutes to reduce muscle tension and activate the parasympathetic nervous system [3].

The imagery distraction intervention was conducted by encouraging the patient to imagine pleasant situations, such as being in a calm and comfortable environment or recalling positive experiences that were personally meaningful. This technique aimed to divert the patient's attention away from painful sensations, thereby reducing the subjective perception of pain [12].

RESULTS AND DISCUSSION

The case study findings for Mrs. E, a 58-year-old patient diagnosed with CAPD-related peritonitis at Dr. Saiful Anwar Regional General Hospital, revealed that the primary nursing problem was acute pain associated with a physiological injury agent resulting from double-lumen catheter insertion. Prior to the intervention, the patient reported pain in the neck/chest area characterized as stabbing and pressing in nature. The pain was intermittent and intensified during movement, with an initial pain score ranging from 5 to 6 on the Visual Analog Scale (VAS). The patient also exhibited facial grimacing, protective behavior, and limited movement around the painful area.

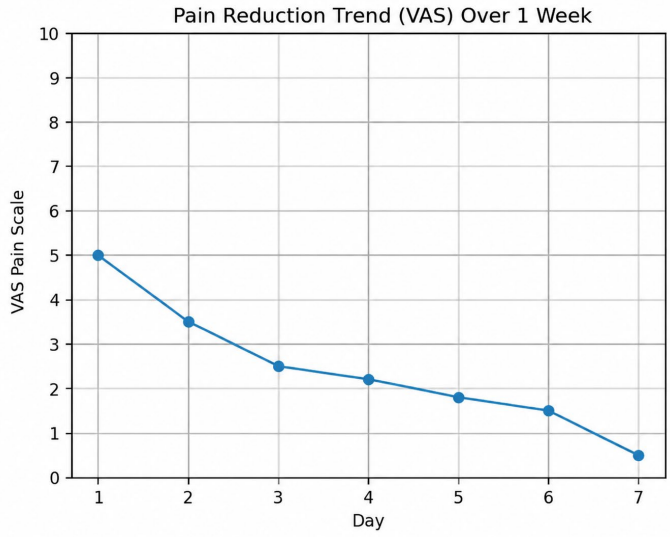

Figure 1. Trend of Visual Analog Scale (VAS) Scores

During the one-week implementation of nursing interventions consisting of deep breathing relaxation and imagery distraction performed routinely each day, a gradual reduction in pain intensity was observed as measured by the Visual Analog Scale (VAS). On the first day, the patient's pain score was 6 before the intervention and decreased to 5 afterward, although the pain still interfered with daily activities. On the second day, the pain score ranged from 4–5 before the intervention and decreased to 3–4 afterward, accompanied by increased relaxation and better participation in the therapy process.

From the third to the fourth day, pain intensity continued to decrease, with scores of approximately 3 before the intervention and 2–3 afterward. The patient appeared less distressed and reported improved comfort. On the fifth and sixth days, pain levels further decreased from 2–3 before the intervention to 1–2 afterward. The patient was able to perform light mobilization with minimal pain complaints. By the seventh day, pain intensity ranged from 1–2 before the intervention and decreased to 0–1 after the intervention, indicating that pain was almost completely relieved.

In addition to the reduction in pain scores, observational findings demonstrated positive changes in the patient's nonverbal responses. Facial expressions that initially appeared tense and painful became more relaxed, protective behavior toward the painful area diminished, and the patient became more cooperative during nursing care. The patient also demonstrated improved ability to perform deep breathing relaxation techniques independently and responded more effectively to guided imagery distraction. Throughout the intervention period, vital signs remained stable, and improvements in comfort and sleep quality were observed.

Based on these findings, it can be concluded that within one week, the combination of deep breathing relaxation and imagery distraction effectively reduced pain intensity in a patient with CAPD-related peritonitis following double-lumen catheter insertion, as evidenced by a progressive decrease in VAS pain scores and improvements in both physical and psychological responses.

Discussion

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage [16]. Invasive procedures such as double-lumen catheter insertion in Continuous Ambulatory Peritoneal Dialysis (CAPD) patients frequently induce pain due to stimulation of nerve endings, tissue inflammation, and physiological responses to procedural trauma [17]. Inadequately managed pain can negatively affect patient comfort, increase anxiety levels, and delay the recovery process [18].

Based on the assessment findings, Mrs. E experienced pain at the catheter insertion site characterized as stabbing and pressing, intermittent in nature, and aggravated by movement. The initial pain score ranged from 5 to 6 on the Visual Analog Scale (VAS), indicating moderate pain requiring both pharmacological and non-pharmacological nursing interventions.

Pain following invasive procedures occurs through the activation of nociceptors that respond to mechanical and inflammatory stimuli [3]. These stimuli are transmitted through the peripheral nervous system to the central nervous system, resulting in pain perception. Furthermore, psychological factors such as anxiety can amplify pain perception and increase patient discomfort [16]. In this case, the primary contributing factor to pain was the insertion of a double-lumen catheter as part of CAPD management. The invasive nature of this procedure causes local tissue trauma, inflammatory responses, and activation of pain pathways. These findings are consistent with previous studies reporting that vascular access and catheterization procedures can produce moderate to severe acute pain in patients with chronic kidney disease [19].

The assessment also identified anxiety as a contributing factor that potentially exacerbated pain perception. Psychological distress may activate the sympathetic nervous system, increasing sensitivity to painful stimuli. Therefore, comprehensive pain management should incorporate non-pharmacological approaches to address both physiological and psychological aspects of pain [1].

Pain management can be achieved through pharmacological and non-pharmacological interventions [7]. Among non-pharmacological approaches, deep breathing relaxation and imagery distraction have been recognized as effective methods for reducing pain intensity [3]. Deep breathing relaxation stimulates the parasympathetic nervous system, resulting in reduced muscle tension, slower respiratory rates, and decreased pain perception. Meanwhile, imagery distraction redirects the patient's attention from painful sensations toward pleasant mental experiences, thereby reducing the subjective perception of pain [19].

In the present case study, the intervention was conducted from April 6 to April 12, 2026. Prior to the intervention, the patient reported pain scores ranging from 5 to 6 on the VAS. Following routine implementation of deep breathing relaxation and imagery distraction, pain intensity gradually decreased,

reaching a score of 0–1 by the end of the intervention period. These findings indicate a substantial reduction in pain following the application of non-pharmacological pain management strategies.

The deep breathing relaxation technique involved slow inhalation through the nose, brief breath retention, and gradual exhalation through the mouth for approximately 10–15 minutes. This technique promotes parasympathetic activation, reduces sympathetic nervous system activity, and enhances feelings of calmness and relaxation. Imagery distraction was implemented by guiding the patient to visualize pleasant and peaceful environments, thereby diverting attention away from pain sensations [12].

Observational findings further demonstrated positive behavioral changes following the intervention. The patient's facial expression became more relaxed, protective behavior toward the painful area decreased, and cooperation with nursing procedures improved. Additionally, the patient became increasingly capable of independently performing relaxation techniques, suggesting enhanced self-management of pain. These findings support previous evidence indicating that combining deep breathing relaxation and imagery distraction can effectively reduce pain intensity and improve overall patient comfort following invasive procedures [12].

CONCLUSION

Based on the findings of this case study, it can be concluded that the implementation of deep breathing relaxation and imagery distraction interventions was effective in reducing pain intensity in Mrs. E, a patient with CAPD-related peritonitis following double-lumen catheter insertion. The reduction in pain intensity from a Visual Analog Scale (VAS) score of 5–6 to 0–1 within one week indicates that these non-pharmacological interventions had a significant positive effect on pain management and patient comfort. Therefore, deep breathing relaxation and imagery distraction may be considered effective complementary nursing interventions for managing acute pain in patients undergoing invasive procedures.

REFERENCES

[1] Y. Shi and W. Wu, “Multimodal non-invasive non-pharmacological therapies for chronic pain: Mechanisms and progress,” *BMC Medicine*, vol. 21, no. 1, p. 372, Sep. 2023, doi: 10.1186/s12916-023-03076-2.

[2] E. Niyonkuru, M. A. Iqbal, X. Zhang, and P. Ma, “Complementary approaches to postoperative pain management: A review of non-pharmacological interventions,” *Pain and Therapy*, vol. 14, no. 1, pp. 121–144, Feb. 2025, doi: 10.1007/s40122-024-00688-1.

[3] E. Rustiawati *et al*., “Efektifitas teknik relaksasi napas dan imajinasi terbimbing terhadap penurunan nyeri pada pasien pasca operasi di ruang bedah,” *Faletehan Health Journal*, vol. 9, no. 3, pp. 262–269, 2022.

[4] U. M. Stamer, P. Lavand’homme, D. M. Hofer, A. Barke, and B. Korwisi, “Definition of chronic postsurgical pain in the ICD-11: A narrative review of implications for anaesthesiology and pain medicine,” *British Journal of Anaesthesia*, vol. 136, no. 4, pp. 1319–1329, Apr. 2026, doi: 10.1016/j.bja.2025.02.005.

[5] Kementerian Kesehatan Republik Indonesia, *Ebook Saku Anemia, Jantung dan Nyeri di Indonesia*. Jakarta, Indonesia: Kementerian Kesehatan RI, 2023. [Online]. Available: https://ayosehat.kemkes.go.id/pub/files/197ed157db03c65a4d1be68182613638.pdf

[6] S. Hadiyani *et al*., “Literatur review: Upaya meningkatkan pelayanan ruang tindakan di rumah sakit,” 2023.

[7] D. K. Y. Leung, A. P. C. Fong, F. H. C. Wong, T. Liu, G. H. Y. Wong, and T. Y. S. Lum, “Nonpharmacological interventions for chronic pain in older adults: A systematic review and meta-analysis,” *The Gerontologist*, vol. 64, no. 6, Jun. 2024, doi: 10.1093/geront/gnae010.

[8] Y. Wang, R. Aaron, N. Attal, and L. Colloca, “An update on non-pharmacological interventions for pain relief,” *Cell Reports Medicine*, vol. 6, no. 2, p. 101940, Feb. 2025, doi: 10.1016/j.xcrm.2025.101940.

[9] B. C. A. Pangkey, F. Yesayas, and F. U. Pabane, “Kajian literatur: Pengaruh telenursing terhadap kualitas hidup pasien dengan penyakit ginjal kronik yang menjalani Continuous Ambulatory Peritoneal Dialysis (CAPD),” 2021.

[10] M. S. D. Simanullang, F. Sembiring, and F. Zendrato, “Gambaran dukungan keluarga pada pasien gagal ginjal kronik yang menjalani hemodialisa di Rumah Sakit Santa Elisabeth Medan tahun 2024,” 2024. [Online]. Available: http://journalbalitbangdalampung.org

[11] S. Modarresi, M. J. Lukacs, M. Ghodrati, S. Salim, J. C. MacDermid, and D. M. Walton, "A systematic review and synthesis of psychometric properties of the Numeric Pain Rating Scale and the Visual Analog Scale for use in people with neck pain," *The Clinical Journal of Pain*, vol. 38, no. 2, pp. 132–148, Feb. 2022, doi: 10.1097/AJP.0000000000000999.

[12] N. K. Wati, T. Kesumadewi, A. Inayati, and W. Dharma, "Penerapan guided imagery (imajinasi terbimbing) terhadap skala nyeri pasien thalasemia dan dispepsia di RSUD Jend. Ahmad Yani Kota Metro," *Jurnal Cendikia Muda*, vol. 2, no. 3, 2022.

[13] J. Bielewicz, B. Daniluk, and P. Kamieniak, "VAS and NRS, same or different? Are Visual Analog Scale values and Numerical Rating Scale equally viable tools for assessing patients after microdiscectomy?," *Pain Research and Management*, vol. 2022, 2022, doi: 10.1155/2022/5337483.

[14] M. Åström, Z. M. T. Lwin, F. S. Teni, K. Burström, and J. Berg, "Use of the Visual Analogue Scale for health state valuation: A scoping review," *Quality of Life Research*, 2023, doi: 10.1007/s11136-023-03411-3.

[15] T. S. Shafshak and R. Elnemr, "The Visual Analogue Scale versus Numerical Rating Scale in measuring pain severity and predicting disability in low back pain," *Journal of Clinical Rheumatology*, vol. 27, no. 7, pp. 282–285, Oct. 2021, doi: 10.1097/RHU.0000000000001320.

[16] I. Iriani, "Implementasi manajemen nyeri dengan teknik imajinasi terbimbing pada pasien post sectio caesarea dalam upaya penurunan skala nyeri di ruangan nifas RS Bhayangkara Polda Sulawesi Tengah," *Jurnal Kolaboratif Sains*, vol. 8, no. 1, pp. 1010–1015, 2025, doi: 10.56338/jks.v8i1.4431.

[17] Rini Safitri and Agus Sutanto, "Continuous Ambulatory Peritoneal Dialysis (CAPD) sebagai terapi pengganti ginjal," 2025. [Online]. Available: https://www.journalofmedula.com/index.php/medula/article/download/1669/1194

[18] I. Fauzi, I. Rosidawati, and A. Muksin, "Penerapan relaksasi Benson untuk mengurangi nyeri pada pasien cedera kepala di Instalasi Gawat Darurat RSUD Dr. Soekardjo Kota Tasikmalaya," 2026. [Online]. Available: https://journal.umtas.ac.id

[19] A. P. Sari, N. L. Fitri, and A. Inayati, "Implementasi pursed lips breathing terhadap fatigue pada pasien gagal ginjal kronik," *Jurnal Cendikia Muda*, vol. 5, no. 1, 2025.