

The Effectiveness of Deep Breathing Relaxation in Reducing Acute Pain Intensity Among Patients With Urinary Tract Infection (UTI): A Nursing Care Evaluation

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Abstract. Urinary Tract Infection (UTI) is a condition where the urinary tract is infected by pathogens, resulting in the presence of bacteria in the urine produced. The Indonesian Ministry of Health estimates that there are 90-100 cases of UTI per 100,000 population per year, or approximately 180,000 new cases per year. The incidence of UTI can be influenced by various factors, such as gender, age, urinary retention habits, genital hygiene, behavior, and kidney stone disease. To provide nursing care to clients with Urinary Tract Infections with acute pain problems to reduce complaints and improve comfort. This is a case study using a nursing process approach, including assessment, diagnosis, intervention, implementation, and evaluation. Data were collected through interviews, observations, and physical examinations, at the Regional General Hospital. The assessment showed abdominal pain and headache (scale 5/10), nausea, and decreased appetite. The main interventions included pain management (non-pharmacological therapy and deep breathing therapy), dietary education, and medication administration according to collaboration. Evaluation after 24 hours showed a decrease in pain (scale 2/10) and an increase in nutritional intake. Nursing care based on pain management and education is effective in reducing symptoms of Urinary Tract Infections. Long-term monitoring is necessary to prevent recurrence.

Keywords : Acute Pain, Pain Management, Urinary Tract Infection (UTI)

1. INTRODUCTION

Urinary Tract Infection (UTI) is a condition in which the urinary tract becomes infected due to the entry of pathogenic microorganisms, most commonly bacteria, into the urinary system. This infection leads to bacteriuria, which refers to the presence of bacteria in the urine (Anisah, 2024). UTIs can occur in various parts of the urinary tract, including the urethra, bladder (cystitis), ureter, and kidneys (pyelonephritis). Common symptoms include pain or a burning sensation during urination, increased frequency of urination, cloudy or foul-smelling urine, and pain in the lower back or flank area. One of the most frequent complications is pyelonephritis, an infection that spreads from the ureter to the kidneys. This condition can cause inflammation of the renal tubules, vesicoureteral reflux (the backward flow of urine from the bladder to the ureter), and damage to kidney tissue in one or both kidneys. If left untreated, the infection can progress to renal abscesses, sepsis, or even death.

Urinary Tract Infections (UTIs) can be caused by various types of microorganisms, including bacteria, viruses, and fungi. However, most UTIs are caused by bacteria, particularly those originating from normal intestinal flora that enter the urinary tract. The most common bacterial pathogens include *Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella*

pneumoniae. *E. coli* is the most frequent cause, but *P. aeruginosa* and *K. pneumoniae* are also commonly found, especially in nosocomial infections or in patients with long-term urinary catheters (Astuti, 2024).

According to the World Health Organization (WHO) (as cited in Yang et al., 2022), it is estimated that there are approximately 404.61 million cases of UTI globally. Among these, around 236,790 deaths and approximately 520,200 Disability-Adjusted Life Years (DALYs) are attributed to UTIs, representing the years of healthy life lost due to premature death and disability caused by the disease. These figures reflect a substantial global health burden in terms of both morbidity and mortality.

The Indonesian Ministry of Health (Kemenkes RI) estimates that there are around 90–100 cases of UTI per 100,000 population annually, equivalent to approximately 180,000 new cases each year in Indonesia (Anisah, 2024). This indicates a high national disease burden and highlights the importance of addressing the factors contributing to UTIs. The incidence of UTIs is influenced by various biological and behavioral risk factors, such as gender (women being more susceptible due to a shorter urethra), age (the elderly are at higher risk due to weakened immunity and comorbidities), urinary retention, poor genital hygiene, sexual activity, history of previous infections, anatomical abnormalities, urinary stones, and long-term catheterization.

A study published in *Nature* (2021) reported that the prevalence of UTIs in Papua was relatively high. In 2021, the prevalence reached 8,560,676 cases, with an incidence rate of 105.35 per 100,000 population. This finding indicates that UTIs are a significant public health issue in this region, with considerable impacts on quality of life. Although prevalence rates vary across regions, the high incidence in Papua underscores the need for strengthened prevention and management efforts.

Symptoms of UTIs vary depending on which part of the urinary tract is affected. Infections of the upper urinary tract, including the kidneys and ureters, are often associated with more severe symptoms such as fever, flank pain, nausea, vomiting, and chills. Severe kidney infections (pyelonephritis) can cause extreme fatigue and symptoms of sepsis if the infection spreads. Individuals with upper urinary tract infections may also experience sharp pain in the lower back or sides, indicating kidney inflammation (Muhlisin, 2020).

According to Syarifina (2021), the present illness history is an essential part of the nursing assessment, describing the patient's current health condition and main complaints. In cases of UTI, particularly those involving the upper urinary tract (such as kidney infection or pyelonephritis), patients typically report more severe systemic symptoms than those with lower UTIs. These include headache, nausea, vomiting, fever, chills, malaise, and pain in the flank

or lower back area. To assess pain, the PQRST method is applied: P (Provocation/Palliation) factors that trigger or relieve pain (e.g., body position, activity, fluid intake); Q (Quality) the nature of pain (sharp, dull, stabbing, burning, or severe); R (Region/Radiation) location and radiation of pain (e.g., flank pain radiating to the lower abdomen); S (Severity) intensity of pain using a 0–10 scale (0 = no pain, 10 = worst pain); and T (Timing) duration, frequency, and pattern (continuous or intermittent pain).

Pain is a common symptom experienced by patients with UTIs, often described as a burning sensation during urination, lower abdominal discomfort, or lower back pain. Managing pain in UTI patients is essential to maintain quality of life and support optimal recovery. Pain management involves two main approaches: pharmacological and non-pharmacological therapy. As a complement to pharmacological treatment, non-pharmacological interventions also play a vital role in pain control. These include deep breathing relaxation techniques (to reduce muscle tension and anxiety), warm compresses on the lower abdomen or back (to relieve muscle spasms and improve blood circulation), acupressure (applying pressure to specific body points to relieve pain and stimulate the nervous system), and health education (to enhance patient understanding and participation in recovery). Combining pharmacological and non-pharmacological approaches has been shown to accelerate pain reduction, improve patient comfort, and promote faster healing (Kasrin, 2024).

This study used a descriptive-analytic case study method to provide comprehensive nursing care. The results showed that after applying deep breathing relaxation techniques three times daily for two minutes over three consecutive days, postoperative appendectomy patients experienced a reduction in pain intensity from moderate to mild pain levels (Susanti, 2024).

Based on the above background, it is important to provide nursing care for acute pain management in Mrs. I.R., a patient with urinary tract infection, who received treatment in the Class III Internal Medicine Ward of Serui Regional General Hospital.

2. METHODE

This study employed a descriptive case study design, structured based on a nursing care report using the nursing process approach, which includes the stages of assessment, diagnosis, intervention, implementation, and evaluation. Data were collected directly from the patient, family, and medical records using a medical-surgical nursing care assessment instrument that covered bio-physiological, psychological, social, and spiritual aspects. The subject of this case study was Mrs. I.R., a patient experiencing acute pain due to a urinary tract infection, who was treated in the Class III Internal Medicine Ward of Serui Regional General Hospital, Yapen

Islands Regency. The nursing diagnoses were determined based on data analysis following the Indonesian Nursing Diagnosis Standards (SDKI), while the nursing interventions were developed using the Indonesian Nursing Intervention Standards (SIKI), and evaluation was documented using the SOAP format (Subjective, Objective, Assessment, Plan) (SDKI, SIKI, SLKI, 2021). Data collection techniques included observation, interviews, and documentation review. Observation was conducted to obtain objective data related to the patient's physical condition and behavior, including vital signs such as temperature, pulse, respiration, blood pressure, and oxygen saturation (SpO₂), assessed through inspection, palpation, auscultation, and percussion. Interviews were carried out personally with the patient and family to gather information about identity, main complaints, current illness history, past medical history, and family medical history. Additional data were obtained from hospital medical records to strengthen the assessment findings. The focus of this study was the management of acute pain in patients with urinary tract infections, operationally defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, in accordance with the definition by the International Association for the Study of Pain (IASP) (Zuhair, 2021). This method aims to provide a comprehensive description of the nursing care process for acute pain management in patients with urinary tract infections using a scientific and standardized nursing approach.

3. RESULT AND DISCUSSION

a. Result

1) Nursing Assessment Results

The client, identified as Mrs. I.R., is a 26-year-old female with a Bachelor of Pharmacy degree (S.Farm) who works as an honorary employee. She is of Papuan ethnicity, Christian, unmarried, and resides on Padat Karya Street. The primary source of information was obtained directly from the client. She was admitted to the Internal Medicine Ward of Serui Regional General Hospital, using a wheelchair, as a referral from the Emergency Department, with a medical record number of 088563. Data collection was conducted. The admitting diagnosis was Urinary Tract Infection (UTI).

Upon admission, the client complained of pain in the urinary bladder region (vesica urinaria) as her main complaint. Based on the PQRST assessment, the client described the pain as localized in the bladder area, stabbing in nature, and situated in the lower abdomen with a moderate intensity rated 5 on a scale of 1 to 10. The pain had been experienced for approximately one month and was usually triggered when holding urination. The client

reported having experienced similar pain one month prior and expressed hope for recovery through medical treatment. Additional complaints included dizziness and nausea. The client denied any history of hospitalization, previous medical treatments, or surgery. Her pre-illness body weight was 60 kg.

The general condition of the client was good, with *compos mentis* consciousness and a Glasgow Coma Scale score of E4V5M6. Vital signs showed blood pressure of 116/71 mmHg, pulse rate of 104 beats per minute, respiratory rate of 20 times per minute, and body temperature of 38.3°C. The client was aware of and understood her health condition.

From the physiological assessment, the client showed no respiratory complaints. Objectively, chest symmetry was normal, oxygen saturation was 99%, pulse rate was 104 beats per minute, respiratory rate was 20 times per minute, and blood pressure was within normal limits. Lung and heart sounds were normal, with no tenderness or abnormal findings. The client reported mild nausea but no shortness of breath, and no nursing problems were identified in the oxygenation category. In terms of nutritional needs, the client reported nausea, dizziness, and decreased appetite. Her body weight was 60 kg, height 160 cm, and Body Mass Index (BMI) 23, indicating a normal nutritional status. A nursing diagnosis of nausea (D.0076) was established.

Regarding elimination, the client reported no disturbances, with a bowel movement frequency of three times per day and urination seven times per day without laxative or diuretic use. The abdomen was soft with no tenderness, bowel sounds were normal (15 times per minute), and no edema or rashes were observed; thus, no nursing problems were identified in this category.

The client also did not report any disturbances in sleep patterns or rest. She typically took naps from 13:00 to 16:00 WIT and slept at night from 21:00 to 07:00 WIT. The client stated that before sleeping, she usually looked up at the ceiling as part of her routine. For daily activities, she reported slight movement limitations due to the intravenous line in her right arm but was otherwise active in the room and enjoyed singing as a leisure activity. Physical examination revealed normal posture, no deformities, no tremors or paralysis, and muscle strength of +5/5 in all extremities. She could perform activities independently but occasionally needed assistance from family members, especially when eating or drinking.

In the neurosensory category, the client complained of dizziness, though she remained alert and *compos mentis*. From the psychological assessment, the client's primary discomfort was pain associated with the urinary tract infection. The PQRST evaluation revealed stabbing pain in the lower abdomen with a moderate intensity (5/10) that appeared

intermittently for about one month, often triggered by urinary retention. Facial grimacing was observed as an emotional response to pain, and the client reported taking medication to alleviate it. A nursing diagnosis of acute pain (D.0077) was identified.

No problems were found in the ego integrity and personal hygiene assessments. The client appeared clean and well-groomed. She demonstrated adequate understanding of health education provided by healthcare personnel, including explanations regarding her prescribed medications. In terms of social interaction, the client described herself as a single woman working as an honorary employee, maintaining normal relationships with others. Regarding safety and protection, the client reported no specific complaints. Objectively, she was in fair general condition, alert and compos mentis, with a temperature of 38.3°C and an intravenous infusion of Ringer Lactate running at 20 drops per minute in her left hand..

2) Nursing Diagnosis

Based on the results of the nursing assessment, acute pain is determined as the priority nursing diagnosis because it is the most dominant problem experienced by the patient, directly affecting comfort, rest, and overall physiological stability. The patient, Mrs. I.R, a 26-year-old woman diagnosed with urinary tract infection (UTI), complained of sharp, stabbing pain in the lower abdomen and vesica urinaria, especially during urination, with a pain intensity of 5 on a 10-point scale. Objective findings showed facial grimacing, restlessness, and a body temperature of 38.3°C, indicating an inflammatory response. This condition interferes with the patient's ability to rest and perform daily activities, thus requiring immediate and effective nursing interventions to relieve pain, promote comfort, and support the healing process. In summary, the patient demonstrates acute pain secondary to malaria, evidenced by both subjective complaints and objective physiological responses. This diagnosis highlights the need for targeted nursing interventions to manage pain effectively and maintain patient comfort and functional independence.

3) Nursing Interventions

The nursing goals were established based on the Indonesian Nursing Outcome Standards (SLKI), aiming to reduce the patient's pain intensity. The expected outcomes included a decrease in pain complaints, less facial grimacing, and reduced restlessness. The nursing interventions were formulated according to the Indonesian Nursing Intervention Standards (SIKI) under the Pain Management (I.08238) category, encompassing four key components. The observation component involved identifying

the location, characteristics, duration, frequency, quality, and intensity of the pain. The therapeutic component included providing non-pharmacological interventions to alleviate pain, such as deep breathing and relaxation techniques. The educational component focused on explaining pain management strategies, emphasizing the importance of avoiding delayed urination and practicing relaxation techniques. Finally, the collaborative component involved coordinating with the medical team to ensure appropriate administration of analgesics.

4) Nursing Implementation

During the nursing care process, the nurse observed the patient's vital signs and pain responses. The findings indicated that the patient continued to experience moderate pain (scale 5), accompanied by facial grimacing and restlessness. Non-pharmacological interventions, including guided deep breathing exercises, were administered to help reduce pain intensity. The patient reported a slight decrease in pain following the exercises. Educational interventions were also provided to enhance the patient's understanding of pain management, emphasizing the importance of regular urination and independent relaxation techniques. The patient demonstrated comprehension by accurately repeating the relaxation steps and expressed willingness to continue the practice independently. In collaboration with the physician, analgesic medication (antrain) was administered. Following medication, the patient reported reduced pain and appeared calmer and more comfortable.

5) Nursing Evaluation

Evaluation was conducted periodically to assess the effectiveness of the nursing interventions. During the first evaluation, the patient reported a reduction in pain to a scale of 3, with decreased facial grimacing and restlessness, although the pain was not yet fully resolved. In the subsequent evaluation, the pain further decreased to a scale of 2, and the patient appeared more relaxed and comfortable. Overall, the problem of acute pain was deemed resolved. The patient was advised to continue performing deep breathing relaxation exercises independently at home and to maintain oral medication as prescribed.

b. Discussion

1) Assessment

According to the theory of Urinary Tract Infection (UTI), common symptoms include anorexia, nausea, vomiting, fever, dizziness, and pain. The assessment of Mrs. I.R.'s case revealed that the patient complained of pain in the lower abdomen and headache. The patient exhibited facial grimacing and signs of discomfort, with vital signs recorded as follows: pulse 104 beats per minute, respiration 21 times per minute, blood pressure 116/71 mmHg, temperature 38.3°C, and oxygen saturation (SpO₂) 99%. Pain assessment using the PQRST method showed: P (Provocation) pain occurred in the lower abdomen and head; Q (Quality) stabbing pain; R (Region) lower abdomen and head; S (Severity) pain scale 5 (moderate); and T (Time) pain appeared when holding urination, lasting 15-20 minutes.

These findings are consistent with the study by Talakoro (2024) at Muara Teweh Regional Hospital, in which UTI patients presented with bladder pain, burning sensation during urination, and cloudy yellow urine. Vital signs included BP 121/110 mmHg, pulse 98 bpm, respiration 20 bpm, temperature 36.8°C, and SpO₂ 98%. Pain assessment was the main priority in identifying nursing problems. Similarly, Damaris (2024) identified comparable clinical manifestations among UTI patients at the General Clinic of UPT Puruk Cahu Health Center, including dysuria, increased urinary frequency, urgency, suprapubic and flank pain, fever, and foul-smelling urine. Accurate initial assessment was emphasized as essential for determining effective interventions.

Theoretically, Rahmawati (2023) stated that UTI symptoms include a persistent urge to urinate, pain or burning sensation during urination (dysuria), cloudy or foul-smelling urine, hematuria or purulent urine, and pelvic pain, particularly around the lower abdomen and genital area in women. The assessment conducted in Mrs. I.R.'s case encompassed all aspects described in theory, indicating no gaps during the assessment phase.

2) Diagnosis

Based on theory, the possible nursing diagnoses for UTI include Acute Pain (D.0077), Urinary Retention (D.0050), Hyperthermia (D.0130), Impaired Urinary Elimination (D.0040), Impaired Physical Mobility (D.0054), and Risk for Nutritional Deficit (D.0032). Based on data analysis, the primary nursing diagnosis in Mrs. I.R.'s case was acute pain (D.0077) related to biological injuring agents (infection). Additional diagnoses included risk for nutritional deficit related to swallowing difficulty and hyperthermia related to the disease process.

According to Talakoro (2024), the primary nursing diagnosis for UTI patients at Muara Teweh Hospital was also acute pain, followed by impaired urinary elimination. The priority of care was directed toward pain management, which was the primary complaint limiting the patient's activity. These findings align with the Indonesian Nursing Diagnosis Standards (SDKI), which define acute pain as a sensory or emotional experience associated with actual or potential tissue damage, having a sudden or slow onset and ranging from mild to severe intensity, caused by physiological injury agents such as inflammation, ischemia, or neoplasms (PPNI, 2017).

Similarly, Septiawan (2024) reported that among UTI cases at primary health centers, hyperthermia related to infection was identified as a priority diagnosis, with warm compress therapy effectively lowering body temperature. This study based on SDKI, SIKI, and SLKI standards showed that accurate diagnosis determination contributes to successful nursing interventions with measurable outcomes. Furthermore, Purba et al. (2024) identified acute pain with moderate intensity among two UTI patients. Their study demonstrated that deep breathing relaxation effectively reduced pain from moderate to mild levels. Consistent prioritization of acute pain confirmed the validity of an evidence-based diagnostic approach in UTI nursing practice

3) Nursing Interventions

In theory, the intervention phase represents the third stage of the nursing process, aimed at determining strategies to address identified problems. Priority determination was guided by the severity of the issue and the patient's primary complaint. For Mrs. I.R.'s case, nursing interventions for acute pain included: identifying the pain's location, characteristics, frequency, and intensity; providing non-pharmacological pain relief (deep breathing relaxation); teaching pain management techniques; and collaborating with physicians for analgesic administration when necessary.

This intervention is consistent with Damaris (2024), who demonstrated that deep breathing relaxation as a non-pharmacological, evidence-based intervention effectively reduced pain intensity among UTI patients, even though the problem was only partially resolved.

According to Ali (2021), nursing interventions for acute pain in UTI cases should include pain assessment, implementation of non-pharmacological techniques, patient education, and collaboration with medical staff. The interventions developed

for Mrs. I.R. were aligned with theory, with no gaps identified in the planning stage. Similarly, Purba et al. (2024) designed UTI pain management interventions using deep breathing relaxation, which effectively reduced pain from moderate to mild. Their evidence-based approach emphasized cost-effective and practical nursing modalities. Additionally, Andriani (2023) implemented rosemary aromatherapy for acute pain in ORIF fracture patients, proving its effectiveness as a complementary method. This highlights the importance of diverse, evidence-based, and holistic nursing interventions in managing pain

4) Implementation

Implementation represents the coordinated execution of nursing actions involving patients, families, and the healthcare team according to pre-established plans, while continuously observing and documenting patient responses. In Mrs. I.R.'s case, implementation included identifying the pain's location, characteristics, and intensity using the PQRST approach (P: lower abdomen and head, Q: stabbing, R: lower abdomen and head, S: scale 5, T: during urination retention, ± 20 minutes). The patient exhibited facial grimacing as a pain response. Non-pharmacological techniques such as deep breathing and music therapy were provided, alongside education on self-management (e.g., drinking warm water in small, frequent amounts). Analgesics were administered collaboratively with the physician's order, and vital signs were monitored before and after analgesic use (BP: 121/75 mmHg, pulse: 85 bpm, SpO₂: 99%, temperature: 36.4°C, RR: 20 bpm).

This aligns with Talakoro (2024), who combined pharmacological and non-pharmacological therapies to effectively reduce acute pain in UTI patients. According to Asmandi (2020), implementation is the nursing process stage in which nurses assist patients in achieving goals, while Ali (2019) emphasized its role in reducing or eliminating patient responses. No discrepancies were found in the implementation process for Mrs. I.R.

5) Evaluation

Nursing evaluation was conducted using the SOAP method (Subjective, Objective, Assessment, Planning) on the third day of care. Subjectively, the patient reported that the pain had decreased to a scale of 1 and no longer felt significant discomfort. She stated that deep breathing relaxation helped relieve her pain, allowing her to rest comfortably. Objectively, her facial expressions no longer showed pain; the pain decreased from scale 5 to 1. Vital signs were stable (BP: 120/80 mmHg, pulse:

88 bpm, RR: 20 bpm, temperature: 36.7°C). The patient could perform light activities without pain and appeared calmer and more relaxed.

Based on the subjective and objective findings, it was concluded that the acute pain problem had been resolved after three days of nursing intervention. Daily SOAP evaluation showed progressive improvement, starting from moderate pain (scale 3) with restlessness on the first day, indicating the problem was unresolved and the intervention continued. On the second day, both pain and restlessness decreased, but the intervention was still maintained. By the third day, pain was minimal (scale 1) and the patient appeared calm, indicating that the problem had been resolved and the intervention was completed.

The patient was discharged with continued oral medication and educated on medication adherence, increased fluid intake, and ongoing relaxation techniques for pain management. These results are consistent with Damaris (2024), who found that deep breathing relaxation reduced pain and improved patient comfort among UTI cases. According to Roman and Walid (2022), evaluation involves comparing patient progress with predetermined outcomes, while Dewani (2020) emphasized the importance of reassessing nursing actions. The evaluation in Mrs. I.R.'s case confirmed that deep breathing relaxation effectively reduced pain intensity by promoting relaxation and oxygen balance in the body, as explained by Jannatiyah (2021). No gaps were found between evaluation results and planned outcomes

4. CONCLUSION

Based on the results of this study, it can be concluded that Mr. E experienced acute pain related to a physiological injurious agent due to Plasmodium vivax infection, characterized as pressing/throbbing pain localized from the frontal to temporal regions, intermittent in nature, and with an intensity of 3/10. Comprehensive pain assessment using the PQRST approach and the Numeric Rating Scale (NRS) allowed for accurate identification of pain characteristics and factors that exacerbate or relieve pain. Multimodal nursing interventions, including non-pharmacological techniques such as massage, facilitating rest, patient education for self-monitoring of pain, and collaboration in analgesic administration, proved effective in reducing pain intensity. The implementation of nursing actions consistent with evidence-based approaches resulted in a decrease in pain from a score of 3 to 1, improved facial expression, normal head movement, and stabilized vital signs. These evaluation results emphasize that a holistic and multimodal approach in managing acute pain in patients with tertian malaria can

enhance patient comfort, reduce pain perception, and support the achievement of nursing outcomes according to the Indonesian Nursing Outcome Standards (SLKI). The study also highlights the importance of systematic pain assessment as the foundation for planning effective, evidence-based nursing interventions.

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