Indonesian Journal of Global Health Research
Volume 8 Number 3, June 2026
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

REDUCING POSTOPERATIVE PAIN FOLLOWING TURP IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA (BPH)

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ABSTRACT
Benign Prostatic Hyperplasia (BPH) is common in men and worsens with age. Transurethral Resection of the Prostate (TURP) is a common treatment but may cause post-operative pain. Non-pharmacological interventions such as warm and cold compresses are often used to reduce pain. Data from KHZ Musthafa Regional Hospital, Tasikmalaya Regency, recorded 302 BPH cases between April and June. This study aimed to compare the effectiveness of warm and cold compresses in reducing post-operative pain in TURP patients. A quasi-experimental pretest-posttest control group design was used. The population consisted of 101 TURP patients over three months. Purposive sampling selected 60 participants, divided into Group 1 (warm compress, n = 30) and Group 2 (cold compress, n = 30). Warm compresses were applied using a hot water bottle, and cold compresses using ice water; temperatures were monitored with a thermometer. Pain was measured using the Numerical Rating Scale (NRS) before and after intervention. Data were analyzed using central tendency, paired t-tests, and independent sample t-tests. Participants were aged 61–70 years, mostly with junior or senior high school education, and worked in private sectors or as employees. Warm compresses reduced pain from 5.53 (moderate) to 3.07 (mild), and cold compresses from 5.63 to 3.90. Both interventions significantly reduced pain (p = 0.000), with warm compresses more effective than cold (p = 0.003). Warm compresses are more effective than cold compresses in reducing post-TURP pain, though both significantly decrease pain levels.

Keywords: BPH patients; cold compress; pain; TURP; warm compress

How to cite (in APA style)
Hartono, R., Endang Setyowati, W., Retno Sulistyaningsih, D., & Wahyuningsih, I. S. (2026). Reducing Postoperative Pain Following Turp in Patients with Benign Prostatic Hyperplasia (BPH). Indonesian Journal of Global Health Research, 8(3), 415–422. https://doi.org/10.37287/ijghr.v8i3.1346.

INTRODUCTION

Benign Prostatic Hyperplasia (BPH) is a condition commonly experienced by men and its incidence increases with advancing age (Liedtke et al., 2024). BPH causes enlargement of the prostate gland, which is associated with increased levels of prostaglandins in prostatic tissue; beta-sitosterol plays a role in inhibiting prostaglandin formation (Gao et al., 2021). BPH is a common health problem that significantly affects the quality of life, impacting approximately one-third of men over the age of 50, with histological evidence found in up to 90% of men aged 85 years (Gilling et al., 2020). According to World Health Organization (WHO) data in 2020, more than 150 million patients worldwide were diagnosed with BPH. Several studies report that among sexually active men evaluated for pain, approximately 18.6% experienced pain following surgery (Nursiswati et al., 2023). Although the exact prevalence of BPH has not been comprehensively established, a meta-analysis estimated that approximately 2.5 million men are affected, with around 20% experiencing clinically significant BPH (Wijayanti, 2021). In West Java, urological cases such as BPH reached 20,497 cases in 2020, while data from RSUD KHZ Musthafa, Tasikmalaya Regency, recorded 1,148 BPH cases in 2024.

Complications that may occur in patients with BPH include thickening of detrusor muscle fibers, sacculation or protrusion of the bladder mucosa between detrusor fibers, and the formation of

diverticula as enlarge sacculations (Basirun, 2024). Other complications include vesical stone formation due to persistent residual urine after voiding, leading to urinary stasis and stone deposition. Persistently high intravesical pressure transmitted to the ureters and kidneys may result in hydroureter and hydronephrosis, ultimately causing a decline in renal function (Nuraini et al., 2023). According to Madersbacher et al. (2019), BPH may also lead to acute urinary retention due to bladder decompensation, urinary tract infections, decreased bladder contractility, vesicoureteral reflux, hydroureter and hydronephrosis due to continued urine production, accelerated renal failure in the presence of infection, hematuria due to persistent residual urine, and the development of hernias or hemorrhoids over time as patients strain during micturition.

Management of BPH includes surgical intervention, most commonly Transurethral Resection of the Prostate (TURP). TURP is a widely used technique for symptom improvement, with success rates ranging from 75% to 96% (Black & Hawks, 2023). The procedure involves inserting a resectoscope through the urethra to excise and resect obstructive prostatic tissue (Zhou et al., 2024). TURP is considered the most effective surgical option because it provides faster symptom relief compared to pharmacological therapy (Ismonah et al., 2023). Prior to treatment selection, patients undergo comprehensive evaluation, including medical history assessment, symptom severity measurement, physical examination, blood and urine tests. Urinary evaluation includes measurement of post-void residual urine, assessment of urinary flow pressure using urodynamic studies, prostate imaging with ultrasonography (USG), transabdominal ultrasound (TAUS), and transrectal ultrasound (TRUS), as well as imaging of related organs such as the kidneys and ureters using ultrasound and radiography. These assessments are followed by lower urinary tract endoscopy using cystoscopic techniques (Hardjowijoto S et al., 2014).

The TURP procedure often results in postoperative wound pain. Acute postoperative pain arises from tissue incision or stretching, leading to tissue trauma and inflammation, which generate nociceptive stimuli that activate nociceptors through complex mechanisms, ultimately resulting in the subjective experience of pain (Anggita et al., 2023). Pain in BPH patients may be influenced by several factors, particularly urinary tract obstruction caused by prostate enlargement. Psychologically, pain can lead to anxiety and concern. Nocturia associated with BPH disrupts sleep patterns and contributes to fatigue, while persistent pain and bothersome symptoms can increase stress levels in patients (Andarmoyo, 2022).

Various strategies can be used to reduce pain, including pharmacological and non-pharmacological approaches. Pharmacological management involves the use of analgesic medications, whose effects generally diminish within 24 hours. Non-pharmacological pain management includes distraction techniques, relaxation methods (such as deep breathing and progressive muscle relaxation), and cutaneous stimulation therapies, including warm compresses, cold compresses, and massage (Somantri, 2018). Each method has advantages and limitations; for example, distraction merely diverts attention, relaxation does not eliminate the underlying cause of pain and may not be effective for all individuals or situations, and massage cannot be applied to injured body areas.

A warm compress involves applying heat using a hot water bag wrapped in cloth, using conduction to transfer heat into the body. This process promotes vasodilation, reduces muscle tension, and thereby alleviates or eliminates pain (Perry & Potter, 2020). Application of warm water compresses at temperatures of 45–50.5°C in post-TURP patients, using a warm water bag placed on the lower abdomen or symphysis pubis, produces physiological effects that reduce or relieve pain (Xin et al, 2025).

In addition, cold compress therapy is used to relieve pain and reduce inflammatory symptoms by lowering tissue temperature. Cold compresses are applied as a form of cryotherapy to absorb tissue heat through conduction, resulting in decreased tissue temperature. The cooling effect depends on

the type of cold application, duration of therapy, and tissue conductivity (Fadlilah et al., 2020). Cold compresses induce vasoconstriction, leading to a numbing effect on the skin. Low temperatures slow cellular metabolism and inhibit sodium channel gating at free nerve endings, thus preventing the transmission of pain impulses to the brain. Cold compresses inhibit pain during the transduction process at the skin surface by stopping action potentials at nociceptors, preventing the generation of electrical impulses. As a result, the processes of transmission, modulation, and perception within pain-processing nerve pathways do not occur (Pranowo, 2021).

Preliminary data collected at RSUD KHZ Musthafa, Tasikmalaya Regency, showed that BPH cases totaled 99 patients in April, 103 patients in May, and 100 patients in June. Current pain management practices primarily involve pharmacological interventions such as analgesics, NSAIDs, and anesthetic agents, whose effects typically subside within 24 hours postoperatively. Interviews with post-TURP BPH patients revealed complaints of pain after the effects of analgesics diminished, while nursing staff reported that non-pharmacological interventions had not been implemented, with pain management relying solely on collaborative pharmacological treatment with physicians. This study aimed to determine the difference in effectiveness between warm compresses and cold compresses in reducing postoperative pain in patients with Benign Prostatic Hyperplasia (BPH) undergoing Transurethral Resection of the Prostate (TURP).

METHOD

This study employed a quasi-experimental approach with a pretest–posttest design, aiming to evaluate the effect of interventions on the research subjects who received treatment. The study population was determined based on the average number of patients over the previous three months, totaling 101 patients. A purposive sampling technique was used, in which all patients who met the inclusion criteria were selected, resulting in a sample of 60 participants. These participants were divided into two groups: 30 patients in Group 1 receiving warm compress intervention and 30 patients in Group 2 receiving cold compress intervention. The study was conducted in the postoperative ward of RSUD KHZ Musthafa, Tasikmalaya Regency, from August to October 2025. The interventions consisted of the application of warm compresses using a hot water bag filled and applied by the researcher, and cold compresses prepared by immersing the compress in cold water or ice; temperature measurements were monitored using a thermometer. Pain intensity was assessed using the Numeric Rating Scale (NRS), a standardized tool for measuring pain intensity. The NRS consists of a 10-cm horizontal line ranging from 0 to 10, with each end indicating levels of pain intensity (Delgado et al., 2018). Data analysis included descriptive statistics using measures of central tendency to determine minimum, maximum, mean, and standard deviation of pain scores before and after the intervention. Bivariate analysis was conducted using the paired t-test to compare pre- and post-intervention pain scores within groups, and the independent sample t-test to compare pain scores between the warm and cold compress groups.

RESULT

Table 1, it shows that the characteristics of BPH patients after TURP surgery are mostly in the age range of 61-70 years in group 1 as many as 14 people (46.7%) and in group 2 as many as 13 people (43.3%). Based on education, in group 1 most people have a high school education as many as 11 people (36.7%) and in group 2 have a junior high education as many as 11 people (36.7%). Based on occupation, in group 1 most people work in the private sector as many as 11 people (36.7%) and in group 2 as employees as many as 9 people (30%).

Based on table 2, it shows that the pain scale of respondents before being given warm compresses was at least 3 and at most 8. The average pain scale was 5.53 (moderate pain) with a standard deviation of 1.106.

Table 1.
Frequency distribution of characteristics of respondents in BPH patients after *Transurethral Resection of the Prostate* (TURP) surgery

Characteristics	Group 1		Group 2	
	f	%	f	%
Age				
40-50 years	2	6.7	1	3.3
51-60 years	8	26.7	9	30.0
61-70 years	14	46.7	13	43.3
>70 years	6	20.0	7	23.3
Education				
Elementary School	4	13.3	6	20.0
Junior High School	7	23.3	11	36.7
Senior High School	11	36.7	9	30.0
PT	8	26.7	4	13.3
Work				
Farmer	6	20.0	7	23.3
Laborer	1	3.3	2	6.7
Private	11	36.7	8	26.7
Employee	7	23.3	9	30.0
Retired	5	16.7	4	13.3

Table 2
Transurethral Resection of the Prostate (TURP) patients before warm compress intervention

Painful	N	Min-Max	Mean	Elementary School
Warm pre-compress	30	3-8	5.53	1,106

Table 3
Pain level of post- *Transurethral Resection of the Prostate* (TURP) patients after warm compress intervention

Painful	N	Min-Max	Mean	Elementary School
Post warm compress	30	1-5	3.07	1,048

Based on table 3, it shows that the pain scale of respondents after being given a warm compress was at least 1 and at most 5. The average pain scale was 3.07 (mild pain) with a standard deviation of 1.048.

Table 4
Transurethral Resection of the Prostate (TURP) patients before cold compress intervention

Painful	N	Min-Max	Mean	Elementary School
Pre-cold compress	30	3-8	5.63	1,189

Based on table 4, it shows that the pain scale of respondents before being given cold compresses was at least 3 and at most 8. The average pain scale was 5.63 (moderate pain) with a standard deviation of 1.189.

Table 5
Pain level of post- *Transurethral Resection of the Prostate* (TURP) patients after cold compress intervention

Painful	N	Min-Max	Mean	Elementary School
Post Cold Compress	30	2-6	3.90	1,062

Based on table 5, it shows that the pain scale of respondents after being given a cold compress was at least 2 and at most 6. The average pain scale was 3.9 (mild pain) with a standard deviation of 1.062.

Bivariate analysis was used to identify the effect of warm and cold compress interventions on the pain scale in BPH patients after TURP surgery. However, before conducting the bivariate analysis, a normality test was first performed using Shapirowilk on the pre-test pain scale data in both group

1 with a p-value of 0.067 and in group 2 with a p-value of 0.083 (>0.05) meaning that the data were normally distributed and the analysis used the paired t-test.

Table 6
Differences in pain levels in patients after *Transurethral Resection of the Prostate* (TURP) surgery before and after warm compress intervention

Painful	N	Mean	Elementary School	Difference	P value
Pre-test (Group 1)	30	5.53	1,106	2.5	0,000
Post test (Group 1)	30	3.07	1,048		

Based on the data in table 6, the average pain scale in group 1 before warm compresses was 5.53 (moderate pain) and after the intervention it became 3.07 (mild pain) so there was a decrease in the scale of 2.5 points. The results of the statistical test obtained a p value of 0.000. This means that there is a difference in the pain level of patients after *Transurethral Resection of the Prostate* (TURP) surgery before and after the warm compress intervention

Table 7.
Transurethral Resection of the Prostate (TURP) surgery before and after cold compress intervention.

Painful	N	Mean	Elementary School	Difference	P value
Pre-test (Group 2)	30	5.63	1,189	1.7	0,000
Post test (Group 2)	30	3.90	1,062		

Based on the data in Table 7, it shows that the average pain scale in group 2 before the cold compress was 5.63 (moderate pain) and after the intervention it became 3.9 (mild pain) so there was a decrease in the scale of 1.7 points. The results of the statistical test obtained a p value of 0.000. This means that there is a difference in the pain level of patients after *Transurethral Resection of the Prostate* (TURP) surgery before and after the cold compress intervention. Prior to the analysis, the post-test data were first tested for homogeneity, with a p-value of 0.826, indicating that the post-test data in both groups were homogeneous. The next step was to analyze the differences in effectiveness between warm and cold compresses on the two samples using an independent sample t-test.

Table 8
Transurethral Resection of the Prostate (TURP) patients with warm and cold compress interventions

Painful	N	Mean	Elementary School	Difference	P value
Post test (Group 1)	30	3.07	1,048	0.833	0.003
Post test (Group 2)	30	3.90	1,062		

The data in table 8 shows that the average pain scale in group 1 after warm compress intervention was 3.07 (mild pain), while in group 2 after cold compress intervention it was 3.90 (mild pain), the statistical test results obtained a p value of 0.003 (<0.05) meaning that there is a difference in the level of pain in post-operative patients with *Transurethral Resection of the Prostate* (TURP) with warm and cold compress intervention .

DISCUSSION

Characteristics of Respondents with BPH After TURP Surgery

Based on questionnaire results, most patients with benign prostatic hyperplasia (BPH) after transurethral resection of the prostate (TURP) were in the 61–70-year age range, both in Group 1 (46.7%) and Group 2 (43.3%). These findings indicate that this age group is particularly vulnerable to BPH, supporting the view that BPH is a common condition among older adults, although prostate enlargement may begin as early as 40 years of age and increases in prevalence with advancing age. Regarding educational background, most patients in Group 1 had a senior high school education (36.7%), while in Group 2 the majority had a junior high school education (36.7%), indicating that most respondents had a moderate level of education. Education is closely related to quality of life, particularly in younger adult BPH patients. According to Notoatmodjo (2021), educational level influences how individuals respond to external stimuli and affects the learning process; Higher

education generally facilitates easier acceptance of information. However, lower educational attainment does not necessarily indicate poor knowledge. This is consistent with findings from the National Health and Social Life Survey (1999), which reported that higher education was associated with lower rates of sexual dysfunction and anxiety (Laumann, 2019). In terms of occupation, most respondents in Group 1 worked in the private sector (36.7%), while those in Group 2 were predominantly employees (30%). Occupational factors may be related to BPH incidence and socioeconomic status. Prolonged sitting, low physical activity, and lack of exercise may contribute to hormonal imbalance, characterized by decreased testosterone and increased estrogen levels, leading to prostate enlargement. This condition can cause narrowing of the urinary tract, resulting in thickening of the bladder muscle and, over time, weakening of the bladder wall, ultimately causing difficulty in urination (Suzuki et al., 2024).

Pain Intensity Before Warm Compress Intervention

The results showed that before the warm compress intervention, the lowest pain score among respondents was 3 (mild pain) and the highest was 8 (severe pain), with a mean pain score of 5.53 (moderate pain). These findings indicate that all post-TURP patients experienced pain, which is attributable to acute tissue injury resulting from surgical intervention. Approximately 24 hours after TURP surgery performed under regional anesthesia, patients commonly experience acute postoperative pain. According to Maheni (2018), pain arises from the nervous system's ability to convert chemical, mechanical, electrical, and thermal stimuli into action potentials transmitted to the central nervous system. Age and developmental stage influence pain perception and expression, while educational level is also important in nursing assessment to determine patients' understanding of pain management.

Pain Intensity After Warm Compress Intervention

After the warm compress intervention, the lowest pain score was 1 (mild pain) and the highest was 5 (moderate pain), with a mean pain score of 3.07 (mild pain). These results indicate that although all respondents still experienced pain, there was a noticeable reduction following warm compress therapy. A decrease in pain intensity from severe to moderate or from moderate to mild indicates the effectiveness of the intervention. The warm compress was applied using a rubber hot water bag placed on post-TURP patients for 15–20 minutes at a temperature of 45–50°C, starting 24 hours after surgery. These findings are consistent with previous studies by Natalia Desi Christiana and Fransisca Winandari (2023), which reported significant reductions in pain scores following warm compress therapy. Similarly, Adimia Virnanda (2025) reported that before intervention, most respondents experienced moderate (57.9%) and severe pain (36.8%), while after cold compress therapy, 73.7% experienced moderate pain and 26.3% reported mild pain. Warm compress therapy increases blood circulation to the affected area, reduces muscle tension, and alleviates pain by improving local circulation compromised by pressure at the surgical site.

Pain Intensity Before Cold Compress Intervention

Before cold compress (cryotherapy) intervention, pain scores ranged from 3 to 8, with a mean of 5.63 (moderate pain). Most respondents experienced moderate pain (scores 4–6). These findings are consistent with a study by Anik Inayati (2022), which reported severe controlled pain on the first postoperative day that decreased to mild pain after three days of cold compress therapy. Tissue damage caused by surgical incision leads to inflammation, pain, and swelling, supporting Corwin and Lazenby's (2021) definition of pain as a subjective sensation associated with actual or potential tissue damage.

Pain Intensity After Cold Compress Intervention

After cold compress intervention, pain scores ranged from 2 to 6, with a mean of 3.9 (moderate pain). Although pain intensity decreased, it remained within the moderate category. These findings differ from Anik Inayati's (2022) study, which reported a reduction to mild pain after three days of

intervention. The results suggest that although cold compress therapy produces a positive effect, continuous application may be required to achieve optimal pain relief.

Differences in Pain Levels Before and After Warm Compress Intervention

The mean pain score in Group 1 decreased from 5.53 (moderate pain) before intervention to 3.07 (mild pain) after intervention, representing a reduction of approximately 2.5 points. Statistical analysis showed a p-value of 0.000, indicating a significant difference in pain levels before and after warm compress therapy. These results align with previous studies demonstrating the effectiveness of warm compress therapy in reducing postoperative pain (Pramesti, 2021).

Differences in Pain Levels Before and After Cold Compress Intervention

In Group 2, the mean pain score decreased from 5.63 (moderate pain) before intervention to 3.9 (moderate pain) after intervention, indicating a reduction of 1.7 points. Statistical analysis also showed a significant difference ($p = 0.000$). Cold compress therapy reduces tissue temperature, limits blood flow, and prevents fluid accumulation around the wound, thus reducing pain and swelling. These findings are consistent with studies by Adimia Virnanda (2025) and Fadila (2021), which reported significant pain reduction following cold compress therapy.

Differences in Pain Levels Between Warm and Cold Compress Interventions

Post-intervention pain scores showed that Group 1 (warm compress) had a mean pain score of 3.07 (mild pain), while Group 2 (cold compress) had a mean score of 3.90 (moderate pain). The difference of 0.833 points indicates greater pain reduction in the warm compress group. Statistical analysis revealed a p-value of 0.003 (<0.05), confirming a significant difference between the two interventions. These results suggest that warm compress therapy is more effective than cold compress therapy in reducing postoperative pain following TURP. Warm compresses promote vasodilation, muscle relaxation, sedative effects, and removal of pain-inducing metabolic byproducts, thus providing comfort and relaxation. Nevertheless, cold compresses also offer benefits by reducing muscle spasm, providing local anesthetic effects, and increasing pain threshold. This study's findings differ from those of Adimia Virnanda (2025), who reported cold compress therapy as effective in postoperative abdominal pain management, highlighting that intervention effectiveness may vary depending on surgical type and patient characteristics.

CONCLUSION

The level of pain in patients after Transurethral Resection of the Prostate (TURP) prior to intervention was in the moderate pain category. Following the intervention, both warm and cold compresses were effective in reducing pain levels; However, the reduction achieved with warm compresses was greater, reaching the mild pain category, whereas cold compresses reduced pain but remained within the moderate category. Statistically significant differences were found between pain levels before and after intervention in both groups ($p = 0.000$), as well as a significant difference between the warm and cold compress groups ($p = 0.003$). Therefore, it can be concluded that warm compress therapy is more effective than cold compress therapy in reducing postoperative pain in patients undergoing TURP.

REFERENCES

Andarmoyo, S. (2022). *The Concept and Process of Pain Nursing* . Ar-Ruzz Media.

Anggita, KD, Isrofa, Daryaswanti, PI, Masroni, Suratmi, Maghfiroh, IL, Hidayati, N., Martini, DE, Ilkafah, Hanifah, & Syah, AY (2023). Medical-Surgical Nursing. In *Medical-Surgical Nursing* .

Basirun, B. (2024). Effects of TURP Surgery on BPH Patients. *International Journal of Advanced Multidisciplinary Research and Studies*, *4* (1). https://doi.org/10.62225/2583049x.2024.4.1.2336

Black, JM, & Hawks, JH (2023). Medical-Surgical Nursing: Fundamentals of Medical-Surgical Nursing. In *Jakarta: EGC* (Issue October).

Corwin, E., & Lazenby. (2021). *Pocket Book of Pathophysiology* (8th ed.). EGC Medical Books.

Fadlilah, S., Rahil, NH, & Amestiasih, T. (2020). Warm and Cold Compresses as Alternative Treatments for Non-Traumatic Pain in Futsal Players. *Journal of Holistic Nursing Science* , *7* (2). https://doi.org/10.31603/nursing.v7i2.3065

Gao, B., Lu, S., Bhojani, N., Zorn, K.C., Chughtai, B., & Elterman, D. (2021). Office-Based Procedures for BPH. In *Current Urology Reports* (Vol. 22, Issue 12). https://doi.org/10.1007/s11934-021-01081-7

Gilling, P., Barber, N., Bidair, M., Anderson, P., Sutton, M., Aho, T., Kramolowsky, E., Thomas, A., Cowan, B., Kaufman, R.P., Trainer, A., Arther, A., Badlani, G., Plante, M., Desai, M., Doumanian, L., Te, AE, DeGuenther, M., & Roehrborn, C. (2020). Three-year outcomes after Aquablation therapy compared to TURP: results from a blinded randomized trial. *Canadian Journal of Urology* , *27* (1).

Ismonah, I., Handayani, OWK, & ... (2023). Scientific Approach Medical-Surgical Nursing Clinical Learning Model. *Proceedings of the National Postgraduate Seminar ISSN 26866404 Semarang State University* .

Liedtke, V., Stöckle, M., Junker, K., & Roggenbuck, D. (2024). Benign prostatic hyperplasia - A novel autoimmune disease with a potential therapeutic consequence? In *Autoimmunity Reviews* (Vol. 23, Issue 3). https://doi.org/10.1016/j.autrev.2023.103511

Madersbacher, S., Sampson, N., & Culig, Z. (2019). Pathophysiology of Benign Prostatic Hyperplasia and Benign Prostatic Enlargement: A Mini-Review. In *Gerontology* (Vol. 65, Issue 5). https://doi.org/10.1159/000496289

Notoatmojo, S. (2021). *Health Education and Behavioral Sciences* (Revision II). Rhineka Cipta.

Nuraini, Sari, NN, Sukarna, RA, Muhsinah, S., & Siregar, HK (2023). Introduction to Medical-Surgical Nursing. In *Introduction to Medical-Surgical Nursing* .

Nursiswati, N., Nugraha, BA, Pratiwi, SH, Harun, H., Rahayu, U., Sari, EA, Purba, CIH, & Kurniawan, T. (2023). In-House Training for Nurses Regarding Integrative Care in the Medical-Surgical Nursing Area. *Journal of Community Service Creativity (PKM)* , *6* (11). https://doi.org/10.33024/jkpm.v6i11.12169

Perry & Potter. (2020). *Fundamental Nursing Textbook: Concepts, Processes, and Practice. Translated by Renata Komalasari* (4th ed.). EGC Medical Books.

Somantri, IW (2018). *Medical-Surgical Nursing: Nursing Care for Patients with Respiratory System Disorders* . Salemba Medika.

Suzuki, Y., Kaneko, H., Okada, A., Fujiu, K., Jo, T., Takeda, N., Tanaka, A., Node, K., Morita, H., Yasunaga, H., & Komuro, I. (2024). Benign Prostatic Hyperplasia and Incident Cardiovascular Disease. *Circulation Journal* , *88* (3). https://doi.org/10.1253/circj.CJ-23-0607

Talu, YHI, Maryah, V., & Andinawati, M. (2022). Differences in the Effectiveness of Cold Compresses and Warm Compresses in Reducing Pain Intensity in Post-Appendicitis Surgery Patients at Waikabubak Regional Hospital, West Sumba - NTT. *Nursing News* , *3* (1).

Wijayanti, Z. (2021). *Guidelines for the Clinical Management of Benign Prostatic Hyperplasia* (4th ed.). Indonesian Urology Association.

Xin, Y., Li, D., Lin, S., Gan, R., Li, L., Zhao, Z., Zhao, A., Yang, C., & Li, B. (2025). Postoperative efficacy of transurethral resection of the prostate (TURP) in treating benign prostatic hyperplasia combined with detrusor underactivity. *Medicine*, *104*(50), e46527. https://doi.org/10.1097/MD.0000000000046527

Zhou, J., Peng, Z. F., Yang, L. C., Liu, S. Z., Song, P., Liu, Z. H., Wang, L. C., Chen, J. H., Ma, K., Yu, Y. F., Liu, L. R., & Dong, Q. (2024). Nomogram predicting the efficacy of transurethral surgery in benign prostatic hyperplasia patients. *Aging Clinical and Experimental Research*, *36* (1). https://doi.org/10.1007/s40520-024-02708-8.