The Effect Catheter Care on Length of Catheter Installation

Wardah Fauziah[1]*, Aat Agustini[2], Novian Mahayu Adiutama[1]

[1]*Politeknik Negeri Subang, Subang, Indonesia*
[2]*STIKes YPIB Majalengka, Majalengka, Indonesia*
*Corresponding author: wardah.fauziah@polsub.ac.id

ABSTRACT

Background: Urinary tract infections may increase the prevalence of healthcare-associated infections, which reaches 40%. Catheter Associated Urinary Tract Infections (CAUTI) can cause unnecessary postoperative morbidity, and increase the length of stay and mortality, which can lead to complications of urosepsis and even death. Many interventions of evidence-based nursing are practiced by nurses to prevent CAUTI. One of them is catheter care based on evidence-based nursing.

Purpose: The study aimed to determine the effects of catheter care on the duration of catheter installment.

Methods: The research described a quantitative study with a quasi-experimental approach with post-test only design with control group. The samples were 66 patients, consisting of 33 patients in the intervention group and 33 patients in the control group.

Results: Data were collected using observation sheets and analyzed using Fisher E and Mann Whitney tests.

Conclusion: The duration of catheter installment in the control group and the intervention group was 5-11 days and 4-8 days, respectively. Catheter of care could reduce the duration of catheter installment.

Keywords: catheter care, catheter duration, urinary tract infection

BACKGROUND

Urinary Tract Infections (UTI) due to installation, which is then referred to as Catheter Associated Urinary Tract Infections (CAUTI). The impact of Urinary Tract Infections (UTI) will result in an increase in length of stay and an increase in urosepsis complications an also cause secondary diseases such as urethral structures, hematuria, bladder perforation, cystitis, pyelonephritis, prostatitis, bacteremia, and sepsis if not treated immediately. Good infection control can reduce the risk of CAUTI by 17%-69% (Ozden et al., 2015). The impacts are so many, it is important to act based on evidence based on nursing in catheterized patients, one of which is catheter care.

The purpose of catheter care is to prevent infection in patients and reduce the length of catheter insertion in patients (Chenoweth & Saint, 2013; Fauziah et al., 2022). Previous research conducted in Indonesia by Perdana, Haryani and Aulawi regarding the implementation of catheter care treatment that focused on nursing interventions there was a relationship between the implementation of catheter care and the incidence of urinary tract infections (Perdana et al., 2017). Meanwhile, research conducted by Susantiningdyah, Kurniawati, and Sriyono regarding the treatment of indwelling urinary catheters with 2% Chlorhexidine Gluconate in preventing urinary tract infections showed no difference in the incidence of urinary tract infections between treatment and control patients (Susantiningdyah et al., 2019). Another study conducted regarding the effect of urinary catheter care model of the American Association of Colleges of Nursing (AACN) on bacteriuria results were significant compared to the control group (Williams, 2016).

The Preliminary Study carried out came from the results of observations and the application of catheter care on February 14 to February 28, 2022 at a Subang hospital in West Java, with 5 patients being applied and with significant results based on the length of catheter insertion, showing 4 out of 5 given The catheter treatment procedure did not show signs and symptoms of CAUTI and also the length of time it was different from the control group. Then, the number of catheter installations in a hospital in West Java reached an average of 94 installations per month. The high rate of catheter insertion leads to an increased risk of CAUTI (Zingg et al., 2009). In hospitals, screening to determine and installation is carried out based on advice from medical personnel, for the selection of catheter numbers based on measurements on the patient, for catheter care based on Standart Operational Procedure in hospitals not using the latest updates based on evidence-based practice. Based on the description above, researchers are interested in conducting research on the effectiveness of catheter care for the length of catheter insertion.

OBJECTIVE

The study aimed to determine the effects of catheter care on the duration of catheter installment.

METHODS

This research is a quantitative study with a quasi-experimental approach with post-test only design. This study uses a quasi-experimental design research type, namely research by providing intervention to a group of research subjects. The design used was a posttest only design with control group where respondents were measured on the day when the catheter was removed after being given the application of catheter care. The population of the study was all patients indicated for indwelling urinary catheters at the Subang District Hospital, West Java Province during the study period. The sampling technique in this study used a non-probability sampling

technique with consecutive sampling type, namely patients indicated for catheter insertion by meeting certain inclusion criteria until the desired number of samples. Samples were taken using the washout period method, namely using a certain period in accordance with the number of samples determined before the intervention was given, hereinafter referred to as the control group, then continued with the intervention and the group that was given the intervention was then called the intervention group.

The researcher used the power and effect size method based on Cohen (Cohen, 1992). Effect Size in previous research conducted by Magers was 0.65. In an effort to achieve 80% power, the sample size in this study used w=0.6, =3, and =0.05 with a sample of 30 respondents for each group. However, to prevent sample reduction due to drop out during the study, the number of samples was enlarged to become respondents for each group (total sample 33) with a drop out of 10%. The total sample obtained in this study for the control group was 35 respondents, but 2 respondents experienced a drop out, namely they died with the catheter not yet removed, and returned home with the catheter still attached. The intervention group, the total sample obtained was 36 respondents, but 4 respondents dropped out because the respondent died before the catheter removed and the patient went home with a catheter attached.

RESULTS

Table 1. Effect of Catheter Care on the Length of Catheter Installation in the Control Group and Intervention Group

Respondent group	Mean	Standar Deviation	95% CI	p^{a}
Control (n=33)	7.64 day	1.319	7.17-8.10	0.001
Intervention (n=33)	6.09 day	1.042	5.72-6.46	

^{a}Maan Whitney

Based on the statistical results, the p-value (0.001) showed less than 0.05. Therefore, it can be concluded that statistically there is a significant difference in the length of installation in the intervention group (7.64 days) compared to the control group (6.09 days). Thus, it can be concluded that there is a significant difference in the length of catheter insertion between the control group and the intervention group after being given Catheter care. The results obtained effect size of 1.09%. The result means that the effect of catheter care on the length of catheter insertion in the control group and the intervention group has a large effect size.

DISCUSSION

The results of this study showed that the length of catheter insertion in the control group was 7.64 days. The duration in the control group is longer than the intervention group (6.09 days). The length of time a patient has a catheter greatly affected the incidence of urinary tract infections. If the catheter is inserted for no good reason and the catheter removal is not carried out even though the indications have expired. This is because the catheter can cause irritation of the urethral mucosa and as an entry points for microorganisms, so the longer the catheter is in place, the higher the risk of urinary tract infections (Gould et al., 2017).

The use of high urinary catheters is one of the causes of an increase in the incidence

of infection, causing an increase in health care costs and length of stay in hospital. The installation of a urinary catheter in the long term is a major risk factor for urinary tract infections (Mody et al., 2017). There is an increased risk of bacteriuria related to the length of catheterization. The prevalence of urinary catheter insertion in hospitals in adults is 12-16% during hospitalization. The risk of bacteriuria increases by 5-10% per day after catheterization. Microbiologically, UTI is defined as significant bacteriuria (pathogenic microorganism 103/ml was found in mid-stream urine collected correctly) (Fasugba et al., 2017).

The prolonged of the catheterization greatly increases the risk of urinary tract infections, with daily use of a catheter increasing the risk of infection (Letica-Kriegel et al., 2019). The duration of urinary catheter insertion is a major risk for urinary tract infections. Various preventive measures aimed at limiting the placement and early removal of urinary catheters have a significant impact on reducing infection (Peter et al., 2018). The main risk factor for urinary tract infections is the prolonged use of catheters. Therefore, the use should be minimized as much as possible.

CONCLUSION

The duration of catheter insertion in the intervention group was lower than in the control group. Catheter care significantly reduced the length of catheter insertion compared to the control group.

CONFLICTS OF INTEREST

The authors declare there is no conflict of interest.

REFERENCES

Chenoweth, C., & Saint, S. (2013). Preventing catheter-associated urinary tract infections in the intensive care unit. *Critical Care Clinics*, *29*(1), 19–32. https://doi.org/10.1016/j.ccc.2012.10.005.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155.

Fasugba, O., Koerner, J., Mitchell, B. G., & Gardner, A. (2017). Systematic review and meta-analysis of the effectiveness of antiseptic agents for meatal cleaning in the prevention of catheter-associated urinary tract infections. *Journal of Hospital Infection*, *95*(3), 233–242. https://doi.org/10.1016/j.jhin.2016.10.025.

Fauziah, W., Adiutama, N. M., & Mandhatyi, F. A. (2022). Karakteristik pasien dengan Catheter Urinary Tract Infections (CAUTI). *Jourkep : Journal Keperawatan*, *1*(1), 54–58.

Gould, D., Gaze, S., Drey, N., & Cooper, T. (2017). Implementing clinical guidelines to prevent catheter-associated urinary tract infections and improve catheter care in nursing homes: Systematic review. *American Journal of Infection Control*, *45*(5), 471–476. https://doi.org/10.1016/j.ajic.2016.09.015.

Letica-Kriegel, A. S., Salmasian, H., Vawdrey, D. K., Youngerman, B. E., Green, R. A., Furuya, E. Y., Calfee, D. P., & Perotte, R. (2019). Identifying the risk factors for catheter-associated urinary tract infections: a large cross-sectional study of six hospitals. *BMJ Open*, *9*(2), e022137. https://doi.org/10.1136/bmjopen-2018-022137.

Mody, L., Greene, M. T., Meddings, J., Krein, S. L., McNamara, S. E., Trautner, B. W., Ratz,

D., Stone, N. D., Min, L., Schweon, S. J., Rolle, A. J., Olmsted, R. N., Burwen, D. R., Battles, J., Edson, B., & Saint, S. (2017). A National Implementation Project to Prevent Catheter-Associated Urinary Tract Infection in Nursing Home Residents. *JAMA Internal Medicine*, *177*(8), 1154. https://doi.org/10.1001/jamainternmed.2017.1689.

Ozden, S., Iscimen, R., Akalin, H., Girgin, N., Kahveci, F., & Sinirtas, M. (2015). Preventing catheter-related infections in ICUs: comparing catheter care techniques. *Critical Care*, *19*(Suppl 1), P72. https://doi.org/10.1186/cc14152.

Perdana, M., Haryani, H., & Aulawi, K. (2017). Hubungan Pelaksanaan Perawatan Indwelling Kateter dengan kejadian Infeksi Saluran Kemih. *Jurnal Keperawatan Klinis Dan Komunitas*, *1*(1), 17–27. https://doi.org/doi.org/10.22146/jkkk.29012.

Peter, S., Devi, E. S., & Nayak, S. G. (2018). Effectiveness of clinical practice guidelines on prevention of catheter-associated urinary tract infections in selected hospitals. *Journal of Krishna Institute of Medical Sciences University*, *7*(1), 55–66.

Susantiningdyah, N. N., Kurniawati, N. D., & Sriyono, S. (2019). Perawatan Kateter Urine Indwelling Dengan Chlorhexidine Gluconate 2 % Dalam Mencegah Infeksi Saluran Kemih. *Critical Medical and Surgical Nursing Journal (CMSNJ)*, *3*(2), 8–14. https://doi.org/https://doi.org/10.20473/cmsnj.v3i2.12238.

Williams, L. (2016). Zeroing in on Safety: A Pediatric Approach to Preventing Catheter-Associated Urinary Tract Infections. *AACN Advanced Critical Care*, *27*(4), 372–378. https://doi.org/10.4037/aacnacc2016297.

Zingg, W., Imhof, A., Maggiorini, M., Stocker, R., Keller, E., & Ruef, C. (2009). Impact of a prevention strategy targeting hand hygiene and catheter care on the incidence of catheter-related bloodstream infections*. *Critical Care Medicine*, *37*(7), 2167–2173. https://doi.org/10.1097/CCM.0b013e3181a02d8f.