Andita, H. F., et al. (2024). *Nurse and Health: Jurnal Keperawatan. 13 (2): 334-346*
http://ejournal-kertacendekia.id/index.php/nhjk/index

Original Research Article

EFFECTIVENESS OF DOUBLE LUMEN CATHETER WOUND CARE USING 0.9% NaCL, 7.5% CHLORHEXIDINE, 15% CETRIMIDE ON DOUBLE LUMEN CATHETER INFECTION IN REGULAR HEMODIALYSIS PATIENTS

Heru Firman Andita[1*], Zainal Abidin[2], Nur Hamim[1]

[1]Bachelor of Nursing Study Program, Faculty of Health Sciences, Hafshawaty Zainul Hasan University
[2] Bachelor of Nursing Study Program, Faculty of Nursing, Jember University

***Correspondence:**
Heru Firman Andita
Bachelor of Nursing Study Program, Faculty of Health Sciences, Hafshawaty Zainul Hasan University
Probolinggo, East Java 071114, Indonesia
Email: herufirman@gmail.com

Article Info:
Received: November, 19th, 2024
Revised: -
Accepted: December, 2nd, 2024

DOI:
https://doi.org/10.36720/nhjk.v13i2.731

Abstract

Background: The high incidence of double lumen catheter infections in Hemodialysis patients requires a solution including wound care using the antiseptic chlorhexidine 7.5% and cetrimide 15%.
Objectives: The aim of this study was to identify the effect of double lumen catheter wound care using NaCL 0.9%, Chlorhexidine 7.5%, and Setrimide 15% on double lumen catheter infection in regular hemodialysis patients at Bhayangkara Lumajang Hospital.
Methods: The research design used was quantitative research with Pre-Experimental One-Group Pretest-Posttest Design approach. The population in this study was hemodialysis patients with double lumen access who meet the inclusion and exclusion criteria, with a sample of 31 respondents. The sampling technique uses accidental sampling.
Results: The research results were obtained before wound treatment using NaCL 0.9%, Chlorhexidine 7.5%, and Setrimide 15%. From 31 respondents 12 (38.7%) respondents experienced infection and after wound treatment using NaCL 0.9%, Chlorhexidine 7.5%, and Setrimide 15%. From 31 respondents 7 (22.6%) respondents experienced infection. After statistical tests were carried out using the Willcoxon test, the result was P = (0.025 < α 0.05), which means that there is a significant effect between treating double lumen catheter wounds using Nacl 0.9%, chlorhexidine 7.5 %, and cetrimide 15% against double lumen catheter infections in regular hemodialysis patients.
Conclusion: The results of this study are expected to be a useful source of reference or reference for learning media or research on double lumen catheter wound care using 0.9% NaCl, 7.5% chlorhexidine, 15% cetrimide as a therapy that can be done to reduce the incidence of double lumen catheter infection in hemodialysis patients with Double lumen access.

Keywords: *Double Lumen Catheter, Hemodialysis, Infection, Nacl 0.9%-Chlorhexidine 7.5%-Setrimide 15%*

E-ISSN
2623-2448
P-ISSN
2088-9909

INTRODUCTION

Chronic Kidney Failure Disease in the world is currently increasing and becoming a serious health problem. In the final stages of this disease, patients need renal replacement therapy to survive (Nusantara et al., 2021). Hemodialysis is one of the renal replacement therapies of choice for patients with end-stage kidney disease, which is the most widely performed and the number continues to increase from year to year (Ministry of Health, 2017). In the hemodialysis process, vascular access is needed and a double lumen non-tunneled catheter is one of the vascular accesses that is often used in Indonesia as temporary access before arteriovenous access can be used. The use of a double lumen catheter causes several complications in patients, in addition to thrombosis, infection is one of the complications of vascular access that can cause morbidity, loss of access, and even higher mortality. Hemodialysis patients with double lumen catheters (DLC) have a two to three times higher risk of infection and death than patients using permanent access (Luh Widani & Suryandari, 2021).

The prevalence of chronic kidney failure globally is > 10% of the population worldwide, with a total of around 843.6 million patients (Kovesdy, 2022). The results of the Basic Health Research (RISKESDAS, 2018) by the Health Research and Development Agency show that the prevalence of CKD in Indonesia is 0.38% or 3.8 people per 1000 population, and 19.33% (2,850 people) are undergoing hemodialysis therapy.

Meanwhile, according to data (12th Annual Report Of Indonesian Renal Registry, 2019) reported a consistent increase in the number of new patients and active patients undergoing hemodialysis. From the data, it was found that the number of new patients increased compared to 2018 with the number of new patients in 2018, namely 66,433 to 69,124 in 2019, while active Hemodialysis patients in 2018 amounted to 135,486 in 2019 increasing to 185,901. From the type of vascular access used by Hemodialysis patients in Indonesia, 76% have used Av Shunt while 23% still use Double lumen, the data has increased compared to 2018. The increase in the use of double lumen catheters is directly proportional to the incidence of double lumen infections. The data is also supported by several studies, including those quoted from the journal (Luh Widani & Suryandari, 2021) of 123 patients with CDL 8.94% (11 patients) experienced infection, 41 patients with CDL in Nepal found an infection incidence of 39.02% local infection and 60.98% infection in the blood, at Sanglah Hospital Bali against 42 GGK patients with CDL diagnosed with bacteremia as much as 41.2%, data at the Bhayangkara Lumajang hospital there was an increase in patients with double lumen access in 2022 as many as 97 patients while in 2023 there were 181 patients, after conducting a preliminary study by looking at the medical record data of patients both outpatients and inpatients with double lumen infections, it was found that there was an increase in the incidence of double lumen infections in 2022 there were 62 cases of double lumen infections or around 63.9% while in 2023 there were 124 patients or around 68.5%.

The high incidence of Double lumen infection requires serious handling from patient caregivers. Quoted from the National Library of Medicine America 2022 that the causes of Double lumen infection include: Too long duration of catheter use, Heavy microbial colonization in the insertion area, substandard catheter wound care. Of these problems that often occur in hospitals are heavy microbial colonization in the insertion area and substandard catheter wound care. The emergence of heavy microbial colonization in the insertion area can be caused by substandard wound care and inaccurate selection of antiseptics that match the type of microbe that causes CDL infection. According to the journal from (Setiabudy et al., 2021) the microbes that often cause double lumen

colonization and infection are Staphylococcus especially Staph.aureus. Wound care that is still below standard and the selection of antiseptics that do not match the type of bacteria will actually cause microbial colonization and the emergence of Biofilms in the double lumen insertion / exit site area which will prolong the incidence of double lumen infection. Antiseptics that are often used in double lumen treatment so far are povidone iodine, this antiseptic material can kill germs both gram-positive and gram-negative bacteria. However, this material has several weaknesses including being irritating and more toxic when entering the blood vessels and can inhibit wound granulation and the substances contained in this antiseptic material are considered foreign objects by the body (Sudarma et al, 2018). In addition, according to the journal (Bangun et al., 2019) Povidone Iodine is also considered less strong in reducing the density of germs, especially Staphylococcus Aureus compared to chlorhexidine-based antiseptics. Choosing the right antiseptic is very important in reducing the incidence of double lumen infections. By reviewing some of the weaknesses of the Povidone Iodine antiseptic above, the use of chlorhexidine antiseptics can be the right choice and solution in double lumen care. This is supported by several references, including according to the National Library of Medicine America 2022, the use of antiseptics and dressings made from Chlorhexidine can reduce the incidence of double lumen infections. From the journal (Bangun et al., 2019) chlorhexidine antiseptic solution 2% - 70% alcohol is better than povidoneiodine solution 10% - 70% alcohol in reducing the density of germs in the installation of subclavian central venous catheters, According to the journal (Kusuma et al., 2019) the combination of chlorhexidine and alcohol has a strong inhibitory effect on growth staphylococcus aureus microbes that often cause double lumen infections, according to the journal (Widhiyanto et al., 2023) the use of Chlorhexidine 7.5% Setrimide 15% - Povidone Iodine 10% is more effective than Povidone Iodine 10% - Alcohol 70% in pre-ops skin preparation Against Caesarean Section Wound Infections.

Objective(s): To examine the effect of double lumen catheter wound care using Nacl 0.9% Chlorhexidine 7.5% Setrimide 15% - on double lumen catheter infections in regular Hemodialysis patients at RS Bhayangkara Lumajang.

METHODS

Study Design

This study uses a quantitative research type with a Pre Experimental one group pre-test and post-test design. According to (Prof. Dr. Sugiyono, 2019) this design is a design that includes only one group or class that is given a pre- and post-test to one group without a control or comparison group. So that in the study an initial test (pre-test) will be carried out before giving treatment and a final test (post-test) will be carried out after treatment or intervention is given.

Table 1. Research Design Scheme of the Effect of Double Lumen Catheter Wound Care Using 0.9% NaCl, 7.5% Chlorhexidine, 15% Cetrimide on Double Lumen Catheter Infection in Regular Hemodialysis Patients

Subject	Pre-Test	Treatment	Post-Test
S	O 1	X	O 2

Description:
S: Subject
O1: Infection assessment with double catheter wound observation sheet
Lumen before wound care using Nacl 0.9% Chlorhexidine 7.5% Setrimide 15% (post-op CDL installation day 7)
X: Intervention (wound care using Nacl 0.9% Chlorhexidine 7.5% Setrimide 15% for 1 week)
O2: Infection assessment with double catheter wound observation sheet
Lumen after wound care using Nacl 0.9% Chlorhexidine 7.5% Setrimide 15% (1 week after pre-test)

Setting

This research was conducted in June - July 2024 in the Hemodialysis room of Bhayangkara Hospital Lumajang.

Research Subject

The population in this study consisted of all hemodialysis patients with double lumen vascular access undergoing dialysis at Bhayangkara Lumajang Hospital. The sample included 31 respondents selected through non-probability sampling using the accidental sampling method.

The inclusion criteria were as follows:

1. Regular hemodialysis patients using double lumen access on the 7th day post-double lumen catheter insertion;
2. Cooperative patients and families willing to participate in the study; and
3. Patients with stable hemodynamics.

Exclusion criteria included:

1. Patients allergic to nacl, chlorhexidine, or cetrimide;
2. Uncooperative patients or those unwilling to participate; and
3. Patients with impaired consciousness or unstable hemodynamics.

Instruments

The data collection instrument in this study was an observation sheet consisting of general data and an observation checklist. The general data section included information about respondents such as name, gender, age, occupation, cause and duration of hemodialysis, and the location of the double lumen catheter (Femoral, Jugular, or Subclavian vein). The observation checklist recorded the results of wound assessments, focusing on the presence of pus, redness, pain, localized swelling, and localized warmth.

Data Analysis

Data were analyzed using the Wilcoxon Signed Ranks Test to determine the effect of double lumen catheter wound care on infection rates. Pre-test and post-test results were compared to assess changes in infection occurrence. Statistical significance was determined with a p-value threshold of 0,05. Results were presented in tables and narrative descriptions.

Ethical Consideration

This study has received ethical approval from the Health Research Ethics Committee of Hafshawaty Zainul Hasan University. The ethical clearance was granted under the reference number 214/KEPK-UNHASA/VII/2024, indicating that the study complies with ethical research standards in accordance with applicable guidelines. This demonstrates the researchers' commitment to conducting the study ethically and safeguarding the rights of research participants.

RESULTS

General Data

Based on Table 2, it was found that the majority of respondents were in the age range of 41 – 60 years with a total of 20 respondents (64.5%).

Table 2. Characteristic Respondent by Age

Age	Amount	Percentage
21-40 years old	5	16,1%
41-60 years old	20	64,5%
>60 years old	6	19,4%
Total	31	100%

Source: Data primer 2024

Based on Table 3, it was found that the majority of respondents were female with a total of 17 respondents (54.8%).

Table 3. Characteristics Based on Gender

Gender	Amount	Percentage
Male	14	45,2%
Female	17	54,8%
Total	31	100%

Source: Data Primer 2024

Based on Table 4, it was found that the majority of respondents had a Senior high school education (SMA) with a total of 12 respondents (38.7%).

Table 4. Respondent Characteristics Based on Education

Education	Amount	Percentage
elementary school/ no school	6	19,4%
JHS	5	16,1%
SHS	12	38,7%
Bachelor	8	25,8%
Total	31	100%

Source: Data Primer 2024

Based on Table 5, it was found that the majority of respondents were no longer working, with a total of 20 respondents (64.5%).

Table 5. Respondent Characteristics Based on Occupation

Occupation	Amount	Percentage
Working	11	35,5%
No Working	20	64,5%
Total	31	100%

Source: Data Primer 2024

Based on Table 6, it was found that the majority of respondents underwent HD due to Hypertension and Diabetes Mellitus, namely 13 with Hypertension and 13 with Diabetes Mellitus or 41.9%.

Table 6. Respondent Characteristics Based on Causes of Hemodialysis

Causes HD	Amount	Percentage
Hypertension	13	41,9%
Diabetes Mellitus	13	41,9%
Obstructive Nephropathy	2	6,5%
Others	3	9,7%
Total	31	100%

Source: Data Primer 2024

Based on Table 7, it was found that the majority of respondents had a double lumen catheter installed in the subclavian vein, namely 24 respondents (77.4%).

Table 7. Respondent Characteristics Based on Double Lumen Location

Double Lumen Location	Amount	Percentage
Subclavian Vein	24	77,4%
Jugular Vein	5	16,1%
Femoral Vein	2	6,5%
Total	31	100%

Source: Data Primer 2024

Double Lumen Infection Occurrence Before Intervention (Pre-Test)

Based on Table 8, the incidence of CDL infection in respondents before the intervention was carried out, from a total of 31 respondents, 19 respondents did not experience CDL infection (61.3%) and 12 respondents experienced CDL infection (38.7%).

Table 8. Respondent Characteristics Based on CDL Infection Incidents before Intervention (Pre-Test)

Infection Event	Amount	Percentage
Not Infected	19	61,3%
Infection	12	38,7%
Total	31	100%

Source: Data Primer 2024

Double Lumen Infection Occurrence After Intervention (Post Test)

Based on Table 9, the incidence of CDL infection in respondents after the intervention was carried out, from a total of 31 respondents, 24 respondents did not experience CDL infection (77.4%) and 7 respondents experienced CDL infection (22.6%).

Table 9. Respondent Characteristics Based on CDL Infection Incidents after Intervention (Post Test)

Infection Event	Amount	Percentage
Not Infected	24	77,4%
Infection	7	22,6%
Total	31	100%

Source: Data Primer 2024

Double Lumen Infection Occurrence Before and After Intervention (Pre-Post Test)

Based on Table 10, it was found that the incidence of CDL infection in respondents before the intervention was 12 respondents (38.7%) and after the intervention it became 7 respondents (22.6), the incidence of no infection before the intervention was 19 respondents (61.3%) and after the intervention increased to 24 respondents (77.4)

Table 10. Respondent Characteristics Based on Pre and Post Intervention Infection Incidents

Infection Event	PRE TEST		POST TEST	
	Amount	Presentase	Amount	Percentage
Infektion	12	38,7%	7	22,6%
Not infected	19	61,3%	24	77,4%
Total	31	100%	31	100%

Source: Data Primer 2024

Data Analysis

Based on the Wilcoxon test rank above, a negative rank of 5 was obtained, namely that there were 5 respondents who had a post-test value lower than the pre-test, meaning that there were 5 respondents who experienced a decrease in the incidence of infection from infection to non-infection, positive rank 0 means that there was no post-test value lower than the pre-test, meaning that there was no increase in the amount of double lumen catheter infection.

Table 11. The effect of double lumen catheter wound care using 0.9% NaCl, 7.5% Chlorhexidine, 15% Cetrimide on double lumen catheter infection using the Wilcoxon Test

Ranks

		N	Mean Rank	Sum of Ranks
POST TEST - PRE TEST	Negative Ranks	5[a]	3.00	15.00
	Positive Ranks	0[b]	.00	.00
	Ties	26[c]		
	Total	31		

a. POST TEST < PRE TEST
b. POST TEST > PRE TEST
c. POST TEST = PRE TEST

Table 11. Wilcoxon Test Statistical Test The effect of double lumen catheter wound care using 0.9% NaCl, 7.5% Chlorhexidine, 15% Cetrimide on double lumen catheter

Test Statistics[a]

	POST TEST - PRE TEST
Z	-2.236[b]
Asymp. Sig. (2-tailed)	.025

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Based on Table 11 above, it shows that after being analyzed using the Wilcoxon Signed Ranks Test, to see whether there is an effect of double lumen catheter wound care using Nacl 0.9% Chlorhexidine 7.5% Setrimide 15% on double lumen catheter infections in regular hemodialysis patients at Bhayangkara Lumajang Hospital, it shows significant results with a value of -2.236 with p-Value = 0.025 (p Value <alpha 0.05). Interpretation of the p-Value results less than 0.05 means rejecting Ho and accepting H1, indicating that there is an effect of double lumen catheter wound care using Nacl 0.9%

Chlorhexidine 7.5% Setrimide 15% on double lumen catheter infections in regular hemodialysis patients at Bhayangkara Lumajang Hospital. Based on the results of the data analysis above, double lumen catheter wound care using 0.9% NaCl, 7.5% Chlorhexidine, 15% Cetrimide has been proven effective in reducing the incidence of double lumen catheter infections.

DISCUSSION

Infection of Double Lumen Catheter Before Wound Treatment Using NaCl 0.9% Chlorhexidine 7.5% Cetrimide 15%

Based on the research data in Table 8, it shows that the incidence of double lumen catheter infection before the intervention shows that out of a total of 31 respondents, most respondents did not experience infection, namely 19 respondents (61.3%) and 12 respondents experienced double lumen catheter infection or around 38.7% of the total respondents. This is in line with the research journal conducted by (Luh Widani & Suryandari, 2021) at the Dr. Cipto Mangunkusumo General Hospital that patients undergoing hemodialysis after double lumen installation in less than 2 weeks, 81% had not experienced double lumen catheter infection or CRBSI. And the occurrence of infection in this study is in line with research conducted by (Sedhain, 2021) 41 patients with double lumen catheters undergoing hemodialysis in Nepal, an infection incidence of 39.02% was found. Management of patients with chronic renal failure in the end stage requires kidney function replacement therapy through hemodialysis (HD) in the early stages of HD patients require temporary access through double lumen catheter access (CDL) Double lumen catheter (CDL) is a procedure for installing a catheter in a central vein in the neck or in the groin/femoral area. This access is not ideal because it can cause various complications such as local and systemic infections. Patients with chronic kidney disease are more susceptible to several infections, because azotaemia (biochemical abnormalities) reduces immunity with reduced monocytes, reduced B-lymphocyte cells and impaired polymorphonuclear chemotaxis (when white blood cells affect cells from the body) and phagocytosis. In addition, decreased immune response will also be disrupted due to poor nutritional status, malnutrition and vitamin D deficiency. Infection is one of the complications of vascular access that can cause morbidity, loss of access, and even higher mortality (Siregar, 2020). There are several factors that cause double lumen catheter infections, including migration of skin flora from patients through the exit site or tip of the catheter during insertion which causes bacteremia colonization, contamination through the lumen and its lid during flushing (Pre-Post HD) and HD connection (Anang Maruf, 2018) According to the National Kidney Foundation and Kidney Disease Outcomes Quality Initiative ((Lok et al., 2020), predisposing factors for bloodstream infections in HD patients are diabetes, peripheral atherosclerosis, long duration of catheter use, history of previous similar infections, local infections and Staphilococcus Aureus in the nasal passages and substandard wound care. According to the researcher's assumption based on the facts and theories above, most respondents did not experience infection because when the data was collected it was still on the 7th day after CDL installation so that the inflammatory process was still ongoing and the catheter insertion wound was still in good condition, while the occurrence of double lumen catheter infections pre-Intervention in chronic kidney failure patients is due to decreased immunity from CKD patients, due to azotaemia (biochemical disorder). In addition, decreased immune response is also due to poor nutritional status, malnutrition (patients with anorexia due to nausea and vomiting) and vitamin D deficiency, in addition, wound care that is still below standard and does not comply with Standard Operating Procedures will actually

worsen the incidence of double lumen catheter infections.

Infection of Double Lumen Catheter After Wound Treatment Using NaCl 0.9% Chlorhexidine 7.5% Cetrimide 15%

Based on the research data in Table 9, it shows that the incidence of double lumen catheter infection after the intervention shows that out of a total of 31 respondents, most respondents did not experience infection, namely 24 respondents (77.4%) and 7 respondents experienced double lumen catheter infection or around 22.6%. This is in line with research conducted by (Bangun et al., 2019) that chlorhexidine antiseptic solution 2% - 70% alcohol is effective in reducing the amount of germ density in the installation of subclavian central venous catheters so that in the end it can reduce the risk of CRBSI (catheter related blood stream infections) in the Intensive Care Unit of Haji Adam Malik General Hospital, Medan.

According to (Risal Wintoko1, 2020) Wound care is a series of activities carried out to treat wounds in order to prevent trauma to the skin, mucous membranes, and other tissues caused by trauma, fractures, surgical wounds that can damage the skin surface., in wound care cannot be separated from antiseptic materials. The main purpose of using antiseptics is to kill or inhibit bacterial growth by inhibiting the bacterial enzyme system and changing the permeability of the cell membrane through the oxidation, halogenation and precipitation processes of bacteria. Quoted from the National Library of Medicine America 2022 that the causes of Double lumen infections include the duration of catheter use that is too long, heavy microbial colonization in the insertion area, substandard double lumen catheter wound care. According to (Chaiyakunapruk et al., 2021) the use of antiseptics and dressings based on Chlorhexidine can reduce the incidence of double lumen infections. Chlorhexidine is a broad-spectrum biocide effective against gram-positive bacteria, gram-negative bacteria and Fungi. Chlorhexidine inactivates microorganisms with a broader spectrum than other antimicrobials (eg: Antibiotics), and has an average faster killing rate than other antimicrobials (eg: Povidone Iodine). Has a bacteriostatic mechanism (inhibits bacterial growth) and bactericidal (kills bacteria), depending on the concentration. According to research conducted by (Setiabudy et al., 2021) that the microorganism that most often causes CDL infections is Staphylococcus aureus, this bacterium is a gram-positive bacterium that produces yellow pigment, is facultative anaerobic, does not produce spores, and is not motile and can be destroyed or damaged with antiseptics such as Chlorhexidine

According to the researcher's assumption based on the facts and theories above, the decrease in the amount of post-intervention double lumen catheter infection in this study was due to the wound care process according to SOP using 7.5% Chlorhexidine antiseptic Setrimid 15% which is indeed able to fight gram-positive bacteria including Staphylococcus aureus, the most common cause of double lumen catheter infections. And the increase in the number of patients who did not experience infection could occur due to wound care that was in accordance with SOP and the selection of the right antiseptic solution so that there was no prolonged inflammatory phase and prevented the formation of biofilms so that it could reduce and prevent the occurrence of double lumen catheter infections in regular Hemodialysis patients at the Bhayangkara Lumajang Hospital.

The effect of double lumen catheter wound care using 0.9% NaCl, 7.5% Chlorhexidine, 15% Cetrimide on double lumen catheter infection in regular hemodialysis patients at Bhayangkara Lumajang Hospital.

Based on the results of the study in Table 10, it shows that there was a decrease in the number of respondents who experienced

double lumen catheter infections pre and post intervention from 12 respondents (38.7) to 7 respondents (22.6%)

After the Wilcoxon non-parametric statistical test analysis, the p-value was 0.025 (p <0.05) which means that the hypothesis in this study was accepted. This means that there is an effect of double lumen catheter wound care using 0.9% NaCl, 7.5% chlorhexidine, 15% cetrimide on double lumen catheter infections in regular hemodialysis patients. The results of this study are more or less in line with the study conducted by (Bangun et al., 2019) that antiseptic solution chlorhexidine 2% - 70% alcohol is effective in reducing the amount of germ density in the installation of subclavian central venous catheters. According to (El Khudari et al., 2022) Infection is the entry and multiplication of an organism (infectious agent) in the host's body. The use of catheters in blood vessels in patients with dialysis therapy is at high risk of infection. Several factors that cause double lumen catheter infection include internal and external factors, Internal factors are due to decreased body immunity in GGK patients supported by a history of DM and a history of previous infections, while external factors are quoted from the National Library of Medicine America 2022 that the causes of Double lumen infection include the duration of catheter use that is too long, Heavy microbial colonization in the insertion area, double lumen catheter wound care below standard. Meanwhile, according to (Bangun et al., 2019) One of the factors causing bacterial infection is the equipment used, incorrect aseptic techniques, or the antiseptic solution used. The main source that often causes double lumen catheter infections is the invasion of normal flora microorganisms from the patient's skin. The main cause is often dominated by Staphylococcus species, especially Staph. aureus and Staph. Epidermidis. According to (Chaiyakunapruk et al., 2021) the use of antiseptics and dressings based on Chlorhexidine can reduce the incidence of double lumen infections. Chlorhexidine is a broad-spectrum biocide effective against gram-positive bacteria including Staphylococcus, especially Staph. aureus and Staph. Epidermidis gram-negative bacteria and Fungi. Chlorhexidine inactivates microorganisms with a broader spectrum than other antimicrobials (eg: Antibiotics), and has an average faster killing rate than other antimicrobials (eg: Povidone Iodine) The effectiveness of antiseptic solutions is important to prevent infection. Colonization of germs on the skin is very risky to contaminate double lumen catheter wounds, which can cause bacteria to move locations (migration) to new environments and can grow as pathogenic germs. According to the researcher's assumption based on the facts and theories above, there is a significant influence on double lumen catheter wound care using NaCl 0.9% chlorhexidine 7.5% cetrimide 15% on double lumen catheter infections, due to wound care that is in accordance with standards, and the effectiveness of NaCl 0.9% chlorhexidine 7.5% cetrimide 15% antiseptics in fighting gram-positive bacteria, especially Staph. Aureus, the most common cause of double lumen catheter infections. NaCl 0.9% chlorhexidine 7.5% cetrimide 15% antiseptics also play a role in preventing the appearance of biofilms in CDL wounds so that they can support the reduction in the incidence of double lumen catheter infections in this study.

CONCLUSION

There is a significant effect between double lumen catheter wound care using 0.9% NaCl, 7.5% chlorhexidine, 15% cetrimide on double lumen catheter infection in regular hemodialysis patients at Bhayangkara Lumajang Hospital, as evidenced by the Wilcoxon Statistical Test, the p-value is 0.025 (p <0.05) in the SPSS 27 for Windows program. so that H1 is accepted.

SUGGESTIONS

The results of this study are expected to be able to increase knowledge and insight as well as experience in carrying out double lumen catheter wound care as an additional therapy that can be done to reduce the incidence of infection in regular hemodialysis patients with double lumen access.

ACKNOWLEDGMENT

In the preparation of this research, I faced various challenges that were overcome thanks to the guidance and support of many individuals. I would like to extend my gratitude to KH. Moh. Hasan Mutawakil Alallah, SH., M.M., as the Chair of the Hafshawaty Zainul Hasan Genggong Probolinggo Foundation, and Dr. Nur Hamim, S.KM., S.Kep, Ns., M.Kes., as the Rector and my second advisor. My thanks also go to Mr. Widya Addiarto, S.Kep.Ns, M.Kep, Mr. Nafolion Nur Rahmat, S.Kep.Ns, M.Kes, and my primary advisor, Mr. Zainal Abidin, S.Kep.Ns., M.Kes. Sincere appreciation as well to the entire team of Bhayangkara Lumajang Hospital, my beloved family, and the hemodialysis patients who served as respondents. Thank you for all the support that enabled the successful completion of this thesis.

DECLARATION OF CONFLICTING INTEREST

The authors declared no competing interests in the production of this manuscript.

FUNDING

The funds used in this research came from the Research Section of the University of Jember through a competitive research program in 2023.

AUTHOR CONTRIBUTION

Heru Firman Andita: Preparing research proposals, leading research, conducting research permits, cross-sectoral approach, collecting research data, presenting results reports, and compiling articles.

Nur Hamim: as the main supervisor, providing direction, ensuring and focusing on relevant and valid research content and results

Zainal Abidin: as a second supervisor, directing the details of writing and research structure to ensure the clarity and order of the article

ORCID

Heru Firman Andita: None

Nur Hamim: None

Zainal Abidin:
https://orcid.org/0000-0002-9744-8041

REFERENCES

Amalia, A., Mufida, N., Program, A., S1, S., Stikes, F., & Putra Bangsa, K. (2021). Analisis Efektivitas Single Use dan Reuse Dialyzer pada Pasien Gagal Ginjal Kronik di RSUD Mardi Waluyo Kota Blitar Analysis of the Effectiveness of Single Use and Reuse Dialyzers in Patients with Chronic Kidney Failure at Mardi Waluyo Hospital, Blitar City. J. Sains Kes. 2021, 3(5). https://doi.org/10.25026/jsk.v3i5.572

anang maruf. (2018). penatalaksanaan-akses-vaskuler. In PITDA JATIM 2018 (Ed.), PERAWATAN AKSES VASKULER HEMODIALISIS.

Bangun, P., Hanafie, A., & Wahyu Wijaya, D. (2019). Nomor 1, Tahun 2016 Terakreditasi DIKTI dengan masa berlaku 3 Juli 2014-2 Juli 2019 Dasar SK Menteri Pendidikan dan Kebudayaan RI Nomor: Vol. VIII.

Chaiyakunapruk, N., Veenstra, D. L., Lipsky, B. A., Sullivan, S. D., & Saint, S. (2021). Vascular Catheter Site Care: The Clinical and Economic Benefits

of Chlorhexidine Gluconate Compared with Povidone Iodine. Clinical Infectious Diseases, 37(6), 764–771. https://doi.org/10.1086/377265

Chen, J., & Zeng, R. (2020). Oliguria, Anuria and Polyuria. In Handbook of Clinical Diagnostics (pp. 77–78). Springer Singapore. https://doi.org/10.1007/978-981-13-7677-1_25

Diah Prihatiningsih. (2022). GAMBARAN DIAGNOSIS PASIEN PRA-HEMODIALISA DI RSUD WANGAYA. Jurnal Ilmiah Hospitality 661, Vol.11.

Doni Kurniawan1, M. I. B. T. D. Y. R. (2018). Perbandingan Efektifitas Chlorhexidine Gluconate 4% dan Povidone Iodine 10% Pada Perawatan Luka Patah Tulang Terbuka Derajat III. In OKTOBER (Vol. 1, Issue 1).

El Khudari, H., Ozen, M., Kowalczyk, B., Bassuner, J., & Almehmi, A. (2022). Hemodialysis Catheters: Update on Types, Outcomes, Designs and Complications. Seminars in Interventional Radiology, 39(1), 90–102. https://doi.org/10.1055/s-0042-1742346

Henny Syapitri. (2021). METODOLOGI PENELITIAN KESEHATAN: Vol. I (Aurora Hawa Adana, Ed.). Ahlimedia Press.

IRR. (2018). 1 th Report Of Indonesian Renal Registry 2018.

KEPPKN. (2021). Pedoman Dan Standar Etik Penelitian Dan Pengembangan Kesehatan Nasional.

Keputusan Menteri Kesehatan Republik Indonesia Hk.01.07/Menkes/642/2017 Nasional Pelayanan Kedokteran Tata Laksana Ginjal Tahap Akhir (2017).

Keputusan Menteri Kesehatan Republik Indonesia Hk.01.07/Menkes/1634/2023 Nasional Pelayanan Kedokteran Laksana Ginjal Kronik (2023).

Kusuma, Y., Januartha, K., Pinatih, P., & Hendrayana, A. (2019). EFEK SINERGIS KOMBINASI CHLORHEXIDINE DAN ALKOHOL TERHADAP DAYA HAMBAT PERTUMBUHAN STAPHYLOCOCCUS AUREUS. In JURNAL MEDIKA (Vol. 8, Issue 3). https://ojs.unud.ac.id/index.php/eum

Lok, C. E., Huber, T. S., Lee, T., Shenoy, S., Yevzlin, A. S., Abreo, K., Allon, M., Asif, A., Astor, B. C., Glickman, M. H., Graham, J., Moist, L. M., Rajan, D. K., Roberts, C., Vachharajani, T. J., & Valentini, R. P. (2020). KDOQI Clinical Practice Guideline for Vascular Access: 2019 Update. American Journal of Kidney Diseases, 75(4), S1–S164. https://doi.org/10.1053/j.ajkd.2019.12.001

Lok, C. E., & Moist, L. (2020). KDOQI 2019 Vascular Access Guidelines: What Is New? In Advances in Chronic Kidney Disease (Vol. 27, Issue 3, pp. 171–176). W.B. Saunders. https://doi.org/10.1053/j.ackd.2020.02.003

Luh Widani, N., & Suryandari, H. (2021). FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN KEJADIAN INFEKSI CATETER DOUBLE LUMEN PADA PASIEN GAGAL GINJAL KRONIK DENGAN HEMODIALISIS DI RS X JAKARTA. http://jurnal.globalhealthsciencegroup.com/index.php/JPPP

McDonnell, G., & Russell, A. D. (2018). Antiseptics and disinfectants: activity, action, and resistance. Clinical Microbiology Reviews, 12(1), 147–179. https://doi.org/10.1128/CMR.12.1.147

Narsa, A. C., Maulidya, V., Reggina, D., Andriani, W., & Rijai, H. R. (2022). Studi Kasus: Pasien Gagal Ginjal

Kronis (Stage V) dengan Edema Paru dan Ketidakseimbangan Cairan Elektrolit. Jurnal Sains Dan Kesehatan, 4(SE-1), 17–22. https://doi.org/10.25026/jsk.v4iSE-1.1685

NORFAI. (2019). ANALISIS DATA PENELITIAN (Nur Fahmi, Ed.; Vol. 1). Penerbit Qiara media.

Nusantara, D. T. H., Irawiraman, H., & Devianto, N. (2021). Perbandingan Kualitas Hidup Antara Pasien Penyakit Ginjal Kronik yang Menjalani Terapi CAPD dengan Hemodialisis di RSUD Abdul Wahab Sjahranie Samarinda. Jurnal Sains Dan Kesehatan, 3(3). https://doi.org/10.25026/jsk.v3i3.299

O'Grady, N. P., Alexander, M., Burns, L. A., Dellinger, E. P., Garland, J., Heard, S. O., Lipsett, P. A., Masur, H., Mermel, L. A., Pearson, M. L., Raad, I. I., Randolph, A. G., Rupp, M. E., Saint, S., & Healthcare Infection Control Practices Advisory Committee (HICPAC). (2019). Guidelines for the prevention of intravascular catheter-related infections. Clinical Infectious Diseases : An Official Publication of the Infectious Diseases Society of America, 52(9), e162-93. https://doi.org/10.1093/cid/cir257

Parawansah1, S. A. E. N. A. Y. W. O. C. F. A. , I. N. A. F. B. , P. F. R. (2021). PEMBUATAN DAN PEMANFAATAN ANTISEPTIK DAN DESINFEKTAN DALAM PENCEGAHAN COVID-19. Jurnal Pengabdian NUSANTARA Universitas HaluOleo.

Pernefri. (2019). Annual Report Of Indonesian renal registry 2019. www.indonesianrenalregistry.org

Prof. Dr. Sugiyono. (2019). Metode Penelitian Kuantitatif Kualitatif Dan R&D. Alphabet.

Risal Wintoko1, A. D. N. Y. (2020). Manajemen Terkini Perawatan Luka. Fakultas Kedokteran Universitas Lampung, Bandar Lampung, Lampung, Indonesia .

Santoro, D., Benedetto, F., Mondello, P., Pipitò, N., Barillà, D., Spinelli, F., Ricciardi, C. A., Cernaro, V., & Buemi, M. (2019). Vascular access for hemodialysis: current perspectives. International Journal of Nephrology and Renovascular Disease, 7, 281–294. https://doi.org/10.2147/IJNRD.S46643

Saputra, A., & Wiryansyah, O. A. (2023). Babul Ilmi_Jurnal Ilmiah Multi Science Kesehatan HUBUNGAN LAMA MASA HEMODIALISIS DENGAN KUALITAS HIDUP PASIEN GAGAL GINJAL KRONIK. 15(1), 126. https://jurnal.stikes-aisyiyah-palembang.ac.id/index.php/Kep/article/view/

Sedhain, A. S. A. M. N. B. (2021). Infeksi Terkait Kateter Hemodialisis di Rumah Sakit Pendidikan di Nepal Tengah.

Setiabudy, M., Agus, K., Adhiputra, I., Eka Darwinata, A., Nengah, N., & Fatmawati, D. (2021). Mikroorganisme Penyebab Infeksi Kateter Lumen Ganda pada Pasien Hemodialisis Dengan dan Tanpa Diabetes Mellitus. Fakultas Kedokteran Universitas Udayana | Medicina, 52(2), 97–102. https://doi.org/10.15562/medicina.v52i2.1092

Siregar, T. C. (2020). Buku Ajar Manajemen Komplikasi Pasien Hemodialisa. In Depublish Publisher.

Soekidjo Notoatmodjo...[et al.]. (2018). Metodologi penelitian kesehatan (Vol. 1). rineka cipta.

Widhiyanto, A., Budi Laksono, S., & Abidin, Z. (2023). EFEKTIFITAS PREPARASI KULIT

MENGGUNAKAN KLORHEXIDIN 7,5% SETRIMID 15%. In Special Issue (Vol. 5). https://www.ojsstikesbanyuwangi.com/index.php/PHJ

Wilcox, T. A. (2019). Catheter-related bloodstream infections. Seminars in Interventional Radiology, 26(2), 139–143. https://doi.org/10.1055/s-0029-1222458

Wiwin Yuliani. (2023). METODOLOGI PENELITIAN BAGI PEMULA (Prio Utomo, Ed.; Vol. 1). Widina bakti persada.

Cite this article as: Andita, H. F., et al. (2024). Effectiveness of Double Lumen Catheter Wound Care Using 0.9% Nacl, 7.5% Chlorhexidine, 15% Cetrimide on Double Lumen Catheter Infection in Regular Hemodialysis Patients. Nurse and Health: Jurnal Keperawatan, 13 (2), 334-346. https://doi.org/10.36720/nhjk.v13i2.731