



COMPARATIVE EDUCATIONAL STUDY ON THE EFFICACY OF NORMAL SALINE SOLUTIONS AND SAVLON SALUTIONS IN PERIURETHRA CLEANING TO REDUCE CATHETER-ASSOCIATED BACTERIURIA AT HARAPAN MULIA HOSPITAL IN 2023

Trinito Abilio Ximenes¹, Achmad Fauzi^{2*}

¹ Registered Nurse, Nursing Department, RS Harapan Mulia

Jl. Raya Jatiwaringin No.133, RT.002/RW.003, Jatiwaringin, Kec. Pd. Gede, Kota Bks, Jawa Barat 17411, Indonesia

² Head of Research and Development Agency, Department of Nursing, Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara

Jl. Swadaya No.7, RT.001/RW.014, Jatibening, Kec. Pd. Gede, Kota Bks, Jawa Barat 17412, Indonesia

Email: fauzi.umay@gmail.com

Abstract

Background: According to the *World Health Organization* (WHO) report in 2016, it is stated that in Europe the prevalence of nosocomial infections each year is more than 4 million – 4.5 million patients, while in the United States the prevalence of patients affected by nosocomial infections per year is estimated at around 1,000. 7 million patients. This prevalence represents 4.5% for 99,000 deaths (WHO, 2016). In Indonesia, through the Indonesian Ministry of Health, conducted a survey in 2013 of 10 General Teaching Hospitals, it was found that the number was quite high, 6-16% of nosocomial infections, with an average of 9.8%. A survey conducted in 10 hospitals in DKI Jakarta showed that 9.8% of inpatients received new infections while being treated in hospital (MOH RI, 2013). **Research Objectives** To determine the description of the frequency distribution of knowledge Nurse *hand hygiene* as a preventative measure for nosocomial infections in Comparison of the efficacy of normal saline and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria in the inpatient room at Harapan Mulia Hospital 2023 **Research Methodology:** Analytical with a cross sectional approach. The sample in this study was all inpatients who had catheters installed at Harapan Mulia Hospital, totaling 25 people, the sampling technique was total sampling. **Research Findings:** The results of the analysis show that the majority of respondents who underwent re-hospitalization had good knowledge (100%), but there was no significant relationship with the incidence of re-hospitalization (p-value = 0.09). Likewise, most respondents understood (93.3%), but there was no significant relationship with the incidence of re-hospitalization (p-value = 1.000). In other words, there is no significant relationship between understanding periurethral cleaning and the incidence of re-hospitalization (p-value = 0.09), and there is no significant relationship between understanding nasocomial infections and the incidence of re-hospitalization (p-value = 1,000). **Conclusions and Recommendations:** The majority of respondents were women (52%), aged 41-50 years (40%), and underwent treatment for 1-3 weeks (80%). However, there was no significant relationship between the efficacy of normal saline against nasocomial infections and the incidence of re-hospitalization in indwelling catheter patients at Harapan Mulia Hospital (p-value > 0.05). **Suggestion:** increase patient motivation to better understand preventing nasocomial infections to prevent re-hospitalization in patients with indwelling catheters.

Keywords: Catheter Related, Educational, Efficacy

Introduction

Sodium chloride (NaCl) or *saline* is a salt solution that has many functions. This liquid can be used as an infusion, wound cleanser, nasal irrigation fluid, phlegm thinner, or mouthwash to maintain oral hygiene. Based on the concentration of the solution, sodium chloride (NaCl) is divided into isotonic and hypertonic NaCl. Isotonic sodium chloride has the same salt concentration as human body fluids. This type of NaCl is usually used to replace body fluids, clean wounds, and clean the nose. Meanwhile, hypertonic sodium chloride has a higher salt concentration than human body fluids. Under certain conditions, hypertonic NaCl can be used to clean the oral cavity (gargled) or to thin phlegm (inhaled). However, isotonic NaCl can also be used for this purpose. Merek dagang Natrium chlorida (NaCl): Ecosol NaCl, Ladas-NS, Natrium chlorida 0,9%, Otsu-NS, Otsu Salin 3, Sodium Chloride 0,9%, Sodium Chloride. (Natrium Klorida (NaCl) - Manfaat, dosis dan efek samping - Alodokter 2023) Catheter-associated urinary tract infection (CAUTI) is a common nosocomial infection. However, there have been no randomized control trials (RCTs) comparing the efficacy of periurethral cleansing solutions in reducing CAUTIs. This study aims to compare the efficacy of normal saline solution (NSS) and Savlon solution. Urinary tract infections (UTIs) are common healthcare-associated infections (Magill et al., 2014). This was reported by Klevens et al. (2007) that the rate of catheter-associated urinary tract infection (CAUTI) per 1000 patients per day was 3.38. According to a survey at King Chulalongkorn Memorial Hospital, approximately 12%–16% of adult inpatients had urinary catheters placed during hospitalization, and most had urethral catheters for 5–7 days. Lo et al. (2014) showed that for every day the urinary catheter remained in place, the patient had a 3%–7% increased risk of CAUTI. Complications of this infection include pyelonephritis and blood poisoning, leading to increased morbidity, prolonged hospitalization, and higher inpatient costs (Scott, 2009). More than 55% of patients also report non-infectious complications such as restrictions on daily activities (Saint et al., 2018). During the stay in the urinary catheterization, microorganisms can enter the bladder through 2 main mechanisms: i) extraluminal mechanism, where microorganisms enter along the catheter-mucosa interface during catheter insertion or during indwelling; ii) intraluminal mechanism, where microorganisms enter through the catheter lumen from a colonized drainage bag (Tambyah et al., 1999). Per Garibaldi et al. (1980), colonization of flesh by potentially pathogenic bacteria is the main risk factor for catheter-related bacteriuria (TAXI).

Current guidelines for CAUTI prevention (Gould et al., 2010) recommend interventions for CAUTI prevention, including appropriate use of urinary catheters, aseptic insertion techniques, and use of closed drainage system. However, there are no recommendations regarding the use of antiseptics in periurethral cleaning before catheterization (Lo et al., 2014, Gould et al., 2010). Due to lack of guidance, the unit at King Chulalongkorn Memorial Hospital uses a different periurethral cleanser. Although most use antiseptic solutions, some do not, perhaps due to local allergic reactions (Liippo et al., 2011). Numerous studies have shown no additional benefit from using an antiseptic solution in cleaning the flesh before urinary catheter placement. Carapeti et al. (1996) compared sterile techniques, using 0.3% chlorhexidine gluconate combined with 3% cetrimide, with a clean technique using tap water. The incidence of UTI in the 2 groups of patients who both underwent general surgery was similar: sterile 9.5% (N = 74); net 11% (N = 84) (OR 0.84, P > 0.1). Webster et al. (2001) compared water and chlorhexidine gluconate 0.1% as periurethral cleansing solutions and found similar levels of SB among groups of pregnant women at delivery: water 8.2% (N = 19); antiseptic 9.2% (N = 217) (OR 1.13; 95% CI: 0.58-2.21). Cheung et al. (2008) compared sterile water and chlorhexidine gluconate 0.05% and found no difference in the number of SB colonies in a study group of 20 elderly patients undergoing home treatment (water 8; chlorhexidine gluconate 12), none of whom experienced UTI. Nasiriani et al. (2009) compared sterile water and povidone-iodine and found no statistically significant difference in SB rates between 2 groups of women undergoing gynecologic surgery: water 20% (N = 30); antiseptic 16.7% (N = 30) (OR 1.25; 95% CI: 0.34–4.64). Duzkaya et al. (2017) comparing 0.05% chlorhexidine

gluconate, 10% povidone-iodine and sterile water. Based on 122 PICU patients, 3 solutions showed no statistically significant difference in CAUTI rates: chlorhexidine gluconate 4.8%; povidone-iodine 15%; sterile water 7.5% ($P > 0.05$). Based on Hooton et al. (2010), evidence suggests that the most effective strategy to reduce CAB and CAUTI is to reduce the use of catheters themselves. The above studies were not randomized control trials (RCTs), and the study population was limited to certain groups, such as patients undergoing general surgery (Carapeti et al., 1996) or pregnant women at the time of delivery (Webster et al. 2001). This study was conducted as an RCT in the general population group. This study aims to evaluate whether the use of NSS in cleaning meat before installing a urinary catheter is not inferior to the use of Savlon antiseptic solution in terms of preventing CAB and CAUTI (A comparison of the efficacy of normal saline and Savlon solutions in periurethral cleaning to reduce catheter-associated bacteriuria: A randomized control trial - ScienceDirect) (International Journal of Infectious Diseases April 2021) Hospitals as health service facilities have an important role in improving the level of public health, therefore hospitals are required to provide quality, effective and efficient health services that guarantee patient safety in accordance with predetermined standards. One indicator of patient safety is reducing the risk of infection associated with health services (WHO, 2012). *World Health Organization* (WHO) declared a patient safety program by initiating the Global Patient Safety Challenge "*clean care is safe care*", and launched Save Lives: Clean Your Hands with the 5 moment hand hygiene strategy (My Five Moments for Hand hygiene), namely before contact with patients, before carrying out aseptic procedures, after exposure to the patient's body fluids, after contact with the patient, after contact with the environment around the patient." Health care associated or "*Healthcare Associated Infections*" (HAIs), also referred to as "*Nosocomial*" or "Hospital" infections, are infections that occur in patients during treatment in a hospital or nursing facility. Southeast Asia (WHO, 2012). And from the results of *the World Health Organization* (WHO) survey in 2016, it was stated that in Europe the prevalence of nosocomial infections each year was more than 4 million - 4.5 million patients, while in the United States the prevalence of patients affected Annual nosocomial infections are estimated at around 1.7 million patients. This prevalence represents 4.5% for 99,000 deaths (WHO, 2016). In Indonesia, through the Indonesian Ministry of Health, conducted a survey in 2013 of 10 General Teaching Hospitals, it was found that the number was quite high, 6-16% of nosocomial infections, with an average of 9.8%. A survey conducted in 10 hospitals in DKI Jakarta showed that 9.8% of inpatients received new infections while being treated in hospital (MOH RI, 2013).

Phlebitis is the highest infection in private or government hospitals with a total of 2,168 patients out of a total of 124,733 patients at risk (1.7%) (Ministry of Health RI, 2010). Cases of nosocomial infections in several hospitals can worsen the patient's health condition, and in some cases can even cause death. The impact of nosocomial infections not only causes losses in terms of the patient's material but also in terms of the patient's health. Cases of nosocomial infections in several hospitals can worsen the patient's health condition, and in some cases can even cause death. The impact of nosocomial infections not only causes losses in terms of the patient's material but also in terms of the patient's health. other health conditions after the patient is admitted to hospital within 48–72 hours (WHO, 2016). Nosocomial infections that occur in patients can only be categorized if when the patient begins to be treated in hospital there is no infection or clinical signs of infection, and they are not in the incubation period of infection (Kozier, 2010). In 2017 the Indonesian Minister of Health issued a policy for preventing infections in hospitals and other health facilities as stated in the Decree of the Minister of Health of the Republic of Indonesia Number: 27/Menkes/III/2017, concerning Guidelines for Infection Prevention and Control in Hospitals and Health Facilities (Ministry of Health, 2017). Minister of Health Decree Number 129 of 2008 concerning Minimum Hospital Service Standards in setting standards for the incidence of nosocomial infections in hospitals $\leq 1.5\%$ (Darmadi 2008). Based on the prevalence of nosocomial infections in hospitals in the world, more than 1.4 million or at least 9% of inpatients worldwide have nosocomial infections, research conducted by WHO from 55 hospitals from 14

countries representing 4 regions (Europe, Middle East, Southeast Asia and the West Pacific) there were around 8.7% showing nosocomial infections and 10.0% for In Indonesia, through the Indonesian Ministry of Health, conducted a survey in 2013 of 10 General Teaching Hospitals, it was found that the number was quite high, 6-16% of nosocomial infections, with an average of 9.8%. A survey conducted in 10 hospitals in DKI Jakarta showed that 9.8% of inpatients received new infections while being treated in hospital (MOH RI, 2013). Phlebitis is the highest infection in private or government hospitals with a total of 2,168 patients out of a total of 124,733 patients at risk (1.7%) (Ministry of Health RI, 2010). Cases of nosocomial infections in several hospitals can worsen the patient's health condition, and in some cases can even cause death. The impact of nosocomial infections not only causes losses in terms of the patient's material but also in terms of the patient's health. From these findings it can be concluded that understanding nasocomial infections in indwelling catheters in patients greatly influences the success of comparing the efficacy of normal saline solutions in cleaning the periurethra to reduce catheter-related bacteriuria. Important for nurses hospitalization with unused catheter placement normal saline solution proper implementation. A preliminary study conducted at Harapan Mulia Hospital showed that there were 1,050 patients undergoing treatment, while in the Inpatient Room the number of patients with catheters in June-August was 75 people. Most nurses do not understand what causes nasocomial infections. Based on the description above, researchers are interested in studying the understanding of nurse respondents and prevention of care for nasocomial infections in the Inpatient Room at Harapan Mulia Hospital

Method

This research is analytical with a cross-sectional method, aiming to determine the relationship between the independent variable and the dependent variable which are measured together. Conducted in the inpatient room of Harapan Mulia Hospital in November 2023, this research focused on patients with indwelling catheters. The population was 25 patients registered in the hospital's inpatient unit. Using Total Sampling, all 25 patients were sampled. Inclusion criteria include patients with good mental awareness, which is important in data collection because respondents must be able to answer questions in the questionnaire about understanding daily prevention. Willingness to be a respondent in research is also important. When collecting data, researchers provide informed consent forms to patients, giving them the freedom to determine whether they want to be respondents in the study or not.

Results

The results of data collection were processed using the SPSS version 24.0 computer program then edited, coding, tabulated and analyzed. presented in table form along with explanations.

Characteristics of a comparative study of the efficacy of normal saline and salvon solutions in periurethral cleansing to reduce catheter-related bacteriuria In patients who are hospitalized for a long time In this section, we will discuss the characteristics of inpatients who undergo long periods of hospitalization. Gender, age, length of treatment The characteristics of inpatients undergoing long-term hospitalization in this study were analyzed using a frequency distribution, as presented in table 5.1.

Table 5.1. Frequency distribution of respondent characteristic Inpatients undergoing long-term treatment at Harapan Mulia Hospital

| Characteristics | Amount | Percent |
|----------------------------|--------|---------|
| Gender | | |
| 1. Man | 12 | 48% |
| 2. Woman | 13 | 52% |
| Age | | |
| 1. >20 years | 1 | 4% |
| 2. 21-30 years old | 1 | 4% |
| 3. 31-40 years old | 4 | 16% |
| 4. 41-50 years old | 10 | 40% |
| 5. 51-60 years old | 8 | 32% |
| 6. > 60 years | 1 | 4% |
| Length of Treatment | | |
| 1. < 3 Sunday | 3 | 12% |
| 2. 1-2 weeks | 20 | 80% |
| 3. > 2 weeks | 2 | 8% |

Gender. Based on table 5.1, it can be concluded that the majority of genders are 13 (52%) women and the remaining 12 (48%) are men. Age Based on table 5.1. concluded that the largest age group was 41-50 years with 10 (40%) people, then the age group 51-60 years, 31-40 years and the age group 21-30 years, >20 years, >60 years were the same number. This shows that the largest number of respondents in this study were aged 41-50 years. Length of Treatment. Based on table 5.1. concluded that the length of treatment was 1 - 2 weeks morethan the group with length of treatment < 3 weeks and > 2 weeks, periurethral cleaning to reduce catheter-related bacteriuria

Research results of the efficacy of normal saline and salvon solutions in periurethral cleansing to reduce catheter-related bacteriuria who underwent a long period of hospitalization are shown in table 5.2.

Table 5.2. Frequency distribution of efficacy Inpatients undergoing a long period of treatment

| No | Efficacy | Amount | Percentage (%) |
|-------|------------|--------|----------------|
| 1 | Good | 8 | 32% |
| 2 | Enough | 16 | 64% |
| 3 | Not enough | 1 | 4% |
| Total | | 25 | 100% |

Based on table 5.2. comparative overview of the efficacy of normal saline and savlon salutions in periurethral cleansing to reduce catheter-associated bacteriuria enough 16 respondents (64%).

Efficacy comparison, The results of the efficacy comparison in this study are shown in table 5.3.

Table 5.3. Frequency distribution Comparison of the efficacy of normal saline and salvon solutions in periurethral cleansing to reduce catheter-related bacteriuria who underwent re-hospitalization

| No | Comparison | Amount | Percentage (%) |
|-------|---------------|--------|----------------|
| 1 | Efficacy | 15 | 60% |
| 2 | Not effective | 10 | 40% |
| Total | | 25 | 100% |

Based on table 5.3. description of the efficacy of salvon solutions, almost all of them were effective against salvon solutions, 10 respondents (40%) were not effective.

1.2. Bivariate analysis

Comparison of the efficacy of normal saline solution and deep savlon solutions periurethral cleaning to reduce catheter-related bacteriuria re-hospitalization events The results of the bivariate analysis of infection and the incidence of length of stay are shown in table 5.4.

Table 5.4. Efficacy of normal saline solution in periurethral cleansing to reduce catheter-related bacteriuria with the incidence of long stay in hospitalized patients

| No | Comparison | Re-hospitalization | | | | Total | <i>p-value</i> |
|----|------------|--------------------|-----|------|------|-------|----------------|
| | | Low | | Tall | | | |
| | | N | % | N | % | | |
| 1 | Good | 2 | 25% | 6 | 75% | 8 | 0.09 |
| 2 | Enough | 0 | 0% | 16 | 100% | 16 | |
| 3 | Not enough | 0 | 0% | 1 | 100% | 1 | |

Results of the efficacy of normal saline solution in periurethral cleansing to reduce catheter-related bacteriuria

who underwent a long period of treatment, it was found that the majority of respondents who underwent a long period of hospitalization had good knowledge, namely 16 respondents (100%). Because the p-value is $0.09 > 0.05$, it can be concluded that H_0 is accepted and H_a is rejected, which means there is no comparison between the incidence of length of stay in the an

Comparison between the efficacy of solutions normal saline and salvon solutions in periurethral cleansing to reduce catheter-related bacteriuria The results of bivariate analysis with the incidence of length of stay in hospital are shown in table 5.5.

Table 5.5. Efficacy of normal saline and salvon solutions in periurethral cleansing to reduce catheter-related bacteriuria

| No | Comparison | Length of hospitalization | | | | Total | <i>p-value</i> |
|----|------------------|---------------------------|------|------|-------|-------|----------------|
| | | Low | | Tall | | | |
| | | N | % | N | % | | |
| 1 | Normal Saline | 1 | 10% | 9 | 90% | 10 | 1,000 |
| 2 | Salvon Solutions | 1 | 6.7% | 14 | 93.3% | 15 | |

The results of the analysis of the efficacy of normal saline and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria and the incidence of prolonged hospitalization in treatment patients showed that the majority of respondents to salvon solutions were for catheters (93.3%). The results of the Chi Square test obtained a p-value of 1,000, which means >0.05 , meaning H_0 is accepted and H_a is rejected, meaning there is no comparison between the efficacy of normal saline and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria and the incidence of long hospitalization.

Discussion

1. Respondent characteristics

b. Age

The research results show that the characteristics of respondents based on age are mostly those aged 51-60 years (40%). These results are in line with Suryanti's 2014 research, which found that the average age was 51-60 and the majority were female, 28 (58.3%) of the respondents.

Arya's research (2013) stated that most of the respondents in his research were aged between 50-69 years, 80%. According to Arya, this is because in old age the body's immunity will decrease and cause an increased risk of nasocomial infections.

According to researchers' assumptions, patients who are aged 50-65 years are predicted to have a higher rate of re-admission to the hospital. This increase is closely related to the increasing age of a person, who will experience anatomical, physiological and pathological changes.

c. Gender

The research results showed that 13 (52%) were female and 12 (48%) were male. In accordance with Suryati's 2014 research, 28 people (58.3%) suffered from nasocomial infections related to indwelling catheters, while 20 men (41.7%) suffered from nasocomial infections related to indwelling catheters.

According to Grossman and Born (2009), male and female nasocomial infection patients have a greater prevalence in women.

Women have special conditions that make them more at risk of nasocomial infections. In fact, it is currently the 8th highest cause of death in women and accounts for almost 600 thousand deaths every year. Women who experience preeclampsia (eclampsia during pregnancy), urinary tract infections, and cervical cancer, and suffer from lupus (autoimmune) must be well aware of how to manage these diseases. They are at risk of contracting nasocomial infections.

d. Long time undergoing treatment

Respondents in this study on average underwent treatment 1 - 3 week, 20 respondents (80%). In line with Tresna's research (2021), the response in the treatment study for 1-3 weeks was 23 people (50%) who installed indwelling catheters provided an opportunity for nurses to be more cooperative regarding indwelling catheter infections. On the other hand, the longer you undergo treatment, the higher the potential for complications to arise which can actually hinder treatment.

1. Bivariate analysis

Comparison of the efficacy of normal saline and salvon solutions in periurethral cleansing to reduce catheter-associated bacteriuria

e. who underwent re-hospitalization

Based on the data, 16 respondents (64%) had sufficient knowledge about the program Comparison of the efficacy of normal saline solutions and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria, and from the results of the analysis of the relationship between efficacy and the incidence of length of stay using the *Chi Square test*, a *p-value* of 0.09 was obtained. Because the *p-value* is >0.05 , it can be concluded that H_a is rejected and H_o is accepted, meaning there is no relationship between the comparison of the efficacy of normal saline and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria. in the Inpatient Room at Harapan Mulia Hospital, Cibarusah.

These results are in line with Suryati's (2014) research, which showed that there was no comparison between efficacy and the incidence of length of stay in catheter-related patients at Harapan Mulia Hospital with a *p value of 1,000*.

This research is in accordance with existing theory, where patient knowledge of the disease and nurse precautions are important things to pay attention to. The aim of developing knowledge is to prevent the occurrence of long hospital stays to reduce catheter-related bacteriuria

Research has shown that increasing knowledge does not necessarily increase nurse compliance, most importantly, one must have the resources and motivation to comply with health care providers' recommendations regarding prevention to reduce catheter-related bacteriuria for continuity during care (Morgan, 2000 in Kamerrer, 2007).

- a. Comparison of the efficacy of normal saline and salvon solutions in periurethralcleansing to reduce catheter-associated bacteriuria

The results of the analysis obtained a *p-value of 1.000*, which means H_a was rejected and H_o was accepted. Research conducted by Hartono (2013) shows that the higher a person's level of knowledge, the more it makes patients disobedient to their illness.

Research limitations

1. The research used *accidental sampling technique* so the sample used was too small.
2. Researchers only examined patient factors (knowledge and understanding), did not also examine family factors, such as the family's role in cleaning the periurethra to reduce catheter-related bacteriuria.

Conclusion

Dari hasil penelitian kemanjuran larutan salvon solution terkait kateter who underwent a long hospitalization at Harapan Mulia Hospital. Based on the results of research of 25 respondents, it was concluded that there was Comparison between the efficacy of normal saline and salvon solutions in cleaning the periurethra to reduce catheter-related bacteriuria in the inpatient room at Harapan Mulia Hospital, with a *p-value of 0.09*.

Which means the efficacy of salvon solutions in periurethral cleansing for reduces catheter-related bacteriuria in the inpatient room at Harapan Mulia Hospital, with a *p-value of 1,000*. More effective

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