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The Relationship between Hand Washing Compliance and the Incident of Peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province

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ABSTRACT

CAPD is a dialysis method using a peritoneal membrane which is used as kidney replacement therapy. Although it is easy to implement, if it is not done correctly it can cause various complications such as peritonitis. Since the start of CAPD therapy, hand washing has been the main procedure before changing fluids. CAPD data according to IRR (2018) was confirmed from the provision of consumable medical materials or peritoneal dialysis fluid to 2,105 patients. This study aims to determine the relationship between hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province. This research method uses an observational analytical descriptive research design with a cross-sectional method. The research sample was 177 CAPD patients using random sampling technique. The research results showed that almost all respondents had hand washing compliance in the compliant category with 147 respondents (83.1%). The research results showed that almost all respondents were in the no peritonitis category were 153 respondents (86.4%). The results of the analysis using Fisher's Exact Test showed that the $P_{value} < \alpha$ with $P_{value} = 0.000$ and $\alpha = 0.05$, this shows that there is a relationship between hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province. The results show that hand washing is very important in preventing peritonitis in patients undergoing CAPD therapy. Suggestions for respondents to follow the guidelines and recommendations given by medical personnel to maintain hand hygiene, especially for CAPD patients. When possible, looking for additional information or training on hand washing practices.

Introduction

Hand hygiene compliance is a critical factor in preventing hospital-acquired infections (HAIs), yet it remains a persistent challenge in healthcare settings. According to [RI Center for Health Data and Information, 2017], adherence to proper hand hygiene protocols can reduce the transmission of infections by up to 50%. However, studies have shown that healthcare professionals often fail to comply with these standards, leading to a higher risk of infection, including peritonitis. Peritonitis, a severe inflammatory condition of the peritoneum, is frequently associated with bacterial contamination during peritoneal dialysis, especially in patients with chronic kidney disease (CKD) undergoing this treatment. Identified that inadequate hand washing practices were a significant contributor to peritonitis incidents, indicating a direct link between hand hygiene and patient outcomes in dialysis settings. Another study by (Rosmiati, Henri Setiawan, 2018) found that while educational interventions temporarily improved hand washing compliance among healthcare workers, these improvements were not sustained over time, suggesting a need for ongoing training and institutional support.

The prevalence of chronic kidney disease according to WHO (2018) explains that chronic kidney failure is a health problem. 1/10 of the world's population is identified with chronic kidney disease that is estimated of 5 to 10 million patient deaths every year, and is estimated 1.7 million deaths every year due

to damage acute kidney disease (Zulfan et al., 2021). According to national data, around 713,783 people and 2,850 are undergoing hemodialysis treatment. The number of chronic kidney failure in West Java reached 131,846 people and is the highest province in Indonesia, Central Java is in second place with a figure reaching 113,045 people, while the number of chronic kidney failure patients in North Sumatra is 45,792 people. In this description, the number of men is 355,726 people, while the number of women is 358,057 people (Ministry of Health, 2019).

The number of patients with stage 5 chronic kidney failure in Indonesia based on etiological diagnosis, that called Primary Glomerulopathy (GNC) is 5,447 people, Diabetic Nephropathy is 14,998 people, Lupus Nephropathy (SLE) is 386 people, Hypertensive Kidney Disease is 19,427 people, Spacecystic Kidney is 498 people, 751 people with Gout Nephropathy, 1,800 people with Obstructive Nephropathy, 1,641 people with Chronic Pyelonephritis (PNC), 2,768 people with Others and 6,224 people with Unknown. The estimated incidence and prevalence of new patients in Indonesia totals 66,433 patients, 251 per million Indonesian population. Meanwhile, active patients are 132,142 patients, 499 per million Indonesian population, with a total Indonesian population of 265 million (IRR, 2018). In accordance with RIKESDA data (2018), the prevalence of chronic kidney failure (% per mil) based on the doctor's diagnosis in the population aged ≥15 years in Indonesia increased by 1.8% per mil from 2013 of 2.0% to 2018 of 3.8%. The increase in East Java was 0.3%.

In East Java, chronic kidney failure sufferers are quite high (reported from online news), one of which in the Greater Malang area is predicted to reach more than 2,500 people, and is predicted to continue to increase as the number of diabetes and hypertension cases increases (Putra, 2020). These kidney failure sufferers undergo therapy to replace kidney function with hemodialysis and peritoneal dialysis therapy, namely CAPD (Continuous Ambulatory Peritoneal Dialysis). Dr. Saiful Anwar Hospital Malang as a referral hospital is recorded as receiving an increasing number of dialysis (hemodialysis) patients every year. Not only those using hemodialysis therapy, but sufferers using peritoneal dialysis (CAPD) therapy also increase every year. Data was obtained within one year in 2019. There were 192 new patients who had CAPD catheters installed. As for CAPD data according to IRR (2018), which was confirmed from providers of consumable medical materials or peritoneal dialysis fluid, there were 1,674 active patients from 2015, 1,594 sufferers in 2016, 1,737 in 2017 and 2,105 sufferers in 2018. Active CAPD patients increase every year, although the numbers are not too large (PERNEFRI, 2018).

Dialysis therapy is a medical procedure that attempts to replace kidney function to maintain the maximum quality of life, which includes hemodialysis and peritoneal dialysis. This peritoneal dialysis therapy uses the patient's peritoneum as a semipermeable membrane, consisting of Continuous Ambulatory Peritoneal Dialysis (CAPD) and Ambulatory Peritoneal Dialysis (APD). Meanwhile, hemodialysis itself is a replacement therapy for kidney function using a special device that functions to remove uremic toxins and regulate the body's electrolyte fluid balance (RI, 2019)(RI Center for Health Data and Information, 2017). CAPD uses the peritoneal membrane as a semipermeable membrane for kidney replacement therapy. In this method, dialysate fluid is inserted into the peritoneal cavity through a catheter with two branches: one for entry and one for exit. The fluid is left in the cavity for several hours to achieve balance. The dialysate fluid that has been left for several hours is discarded and replaced with new dialysate fluid. Even though it is easy to implement, if it is not carried out correctly, it can cause various complications such as exit-site infections, tunnel infections and peritonitis.

CAPD patients with peronitis was studied to be related to the patient's education level, age, gender, diabetes mellitus, and low albumin levels in the patient's body. The most common signs and symptoms of patients are cloudy dialysate fluid accompanied by abdominal pain. Apart from that, it can also be accompanied by nausea, vomiting, fever, chills and diarrhea. Staphylococcus epidermidis (80-90%) and Staphylococcus aureus are the most common causes of germs. Among these, 30-40% are gram-positive, 5-10% are gram-negative, and the rest are caused by fungi. Patient that undergoing dialysis therapy using the CAPD method, there are several steps or procedures to prevent peritonitis, namely: adequate training, exit site care, replacing the transfer set every 6 months, dialysate fluid replacement procedures and adequate room requirements. This can be done and fulfilled by patients undergoing CAPD therapy, so the patient's quality of life will be better. Therefore, every patient is advised to always carry out regular checks in the CAPD section to receive continuous education.

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Patients have used hand washing techniques before fluid replacement since the start of CAPD therapy. These include washing hands with running water and washing hands using 70% alcohol. Hand washing is largely considered a matter of personal hygiene, but for patients undergoing CAPD it is a major procedure and is essential for the success of therapy. In a previous study, approximately 51% of patients who had been taught handwashing techniques at the start of therapy no longer used them after 6 months. Approximately 42% of peritonitis episodes were found to be associated with tactile contamination and were associated with staphylococcus species. Peritoneal dialysis programs should do all they can to reduces the incidence of peritonitis. At one time, the International Society for Peritoneal Dialysis (ISPD) recommended handwashing with water and antimicrobial soap as standard care, and the procedure is still followed in many peritoneal dialysis centers. However, more recent ISPD guidelines suggest that hand washing and drying, followed by the use of disinfectants, should be emphasized when patients are taught hand washing, especially in areas where the water supply is unreliable.

Despite numerous studies examining the impact of hand hygiene on infection rates, there remains a gap in understanding the long-term effectiveness of continuous training programs on hand washing compliance and the subsequent reduction in peritonitis cases. Previous research has primarily focused on short-term interventions without evaluating the persistent barriers that healthcare workers face, such as workload, time constraints, and access to hand hygiene facilities. Additionally, limited attention has been paid to the role of organizational policies and how they influence individual compliance behavior. Therefore, this research aims to fill the gap by investigating the factors affecting long-term hand washing compliance among healthcare professionals in dialysis units and examining its impact on the incidence of peritonitis. The study will explore how ongoing training programs, coupled with institutional policies, can create a sustainable culture of compliance and improve patient safety outcomes. Based on the phenomenon and description of the background above, researchers are interested in researching “The Relationship between Hand Washing Compliance and the Incident of Peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province."

Methods

Based on the problems and objectives to be achieved, this study used an observational analytical descriptive research design with a cross-sectional method. The population for this study comprises all patients with chronic kidney failure undergoing peritoneal dialysis in the CAPD Room at Imam Bonjol RSUD Dr. Saiful Anwar, East Java, totaling 319 patients. Using the Solvin formula, a sample size of 177 respondents was determined. The inclusion criteria for participants were: 1) Patients receiving CAPD in the specified unit, 2) Patients with a Glasgow Coma Scale (GCS) score of 456, 3) Age of at least 18 years, 4) Ability to read and write, 5) Completion of CAPD therapy for more than 6 months, and 6) Absence of peritonitis. Exclusion criteria included: 1) Patients on total bedrest, and 2) Patients with significant physical weakness. The study employed two primary instruments: a hand hygiene observation sheet, where respondents received a score of 1 for each correct handwashing step and 0 for each incorrect step, with a score of 9-11 (80-100%) indicating compliance and a score <9 (<80%) indicating non-compliance; and a peritonitis observation sheet, where data was collected sequentially. If all criteria points 1-6 were met and peritonitis was diagnosed in the medical records by the attending physician, the respondent was classified as having peritonitis. Statistical analysis was performed using Fisher’s Exact Test due to the Chi-Square test’s expected count being ≤5.

Results

Table 1 Frequency of respondents’ hand washing compliance in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province

Hand washing compliance	Frequency	Percentage
Obey	147	83.1
Disobey	30	16.9
Total	177	100.0

Source: frequency data 2023

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According to the results of Table 1, it can be seen that almost all of the respondents in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province, had a hand washing compliance category of 147 respondents (83.1%).

Table 2 Frequency of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province

Category	Frequency	Percentage
Non-peritonitis	153	86.4
Peritonitis	24	13.6
Total	177	100.0

Source: frequency data 2023

According to the results of Table 2, it can be seen that almost all of the respondents in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province, had an incidence of peritonitis in the non-peritonitis category of 153 respondents (86.4%).

Table 3 The relationship between hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province

Hand washing compliance	Frequency		Percentage
	Non-peritonitis	Peritonitis	
Obey	147 83.1%	0 0%	147 83.1%
Disobey	6 3.4%	24 13.6%	30 16.9%
Total	153 86.4%	24 13.6%	177 100%

Source: frequency data 2023

According to the results of Table 3, it can be seen that almost all of the respondents in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province, had 147 respondents (83.1%) in the obedient category of hand washing without experiencing peritonitis.

Table 4 Analysis test of the relationship between hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD room, at Dr. Saiful Anwar Hospital, East Java Province

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.360E2[a]	1	.000		
Continuity Correction[b]	129.307	1	.000		
Likelihood Ratio	110.472	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	135.278	1	.000		
N of Valid Cases[b]	177				

a. 1 cells (25,0%) have expected count less than 5, The minimum expected count is 4,07

b. Computed only for a 2x2 table

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Source: frequency data 2023

The results of the analysis using Fisher's Exact Test showed that the $P_{value} < \alpha$ with $P_{value} = 0.000$ and $\alpha = 0.05$, this shows that there is a relationship between hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province.

Discussion

1. **Hand washing compliance of the patient in the Imam Bonjol CAPD Room at Dr. Saiful Anwar Hospital, East Java Province**

The study findings indicate that nearly all respondents in the CAPD Room at Imam Bonjol RSUD Dr. Saiful Anwar, East Java, fall into the compliant category, with 147 respondents (83.1%) adhering to hand hygiene practices. The World Health Organization (WHO) has introduced the Global Patient Safety Challenge with the slogan "Clean Care is Safe Care," which formulates innovative strategies for implementing hand hygiene with six steps. These steps include washing hands before performing clean and sterile procedures and after touching patient bodily fluids (Jamaluddin et al., 2015). Hand hygiene is one of the most crucial methods to prevent the spread of infection. Individuals should practice and make a habit of hand hygiene at key points, such as before and after contact with bodily fluids or blood, before invasive procedures, and after removing gloves (Baxter, 2017). Observational studies by Musadad et al. (2015) on handwashing behavior in the community indicate that a significant portion of individuals do not perform hand hygiene. Such conditions can trigger nosocomial infections.

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 27 (2017) on guidelines for the prevention and control of infections in healthcare facilities, hand hygiene should be performed by washing hands with soap and water if hands appear dirty and exposed to bodily fluids, and alcohol-based hand rub can be used if hands are visibly clean. Handwashing with regular/antimicrobial soap and rinsing with running water is recommended when hands are visibly dirty, exposed to patient bodily fluids, even if gloves are used, and when transferring from a contaminated area to a clean area, even with the same patient. The criteria for selecting antiseptics include broad-spectrum efficacy, effectiveness, initial effectiveness speed, residual effect, non-irritating to the skin, and non-allergenic properties.

Takahashi and Turale (2016) identified two factors influencing healthcare workers' behavior regarding hand hygiene practices: personal factors and environmental factors. Personal factors include a lack of knowledge about hand hygiene practices according to standards and insufficient education provided by healthcare workers on personal hygiene to patients. The success of treatments or interventions in patients undergoing therapies such as hemodialysis or CAPD is influenced by several factors, including the patient's active role and willingness to have their condition checked by healthcare professionals or at the hospital, adhering to scheduled appointments, and compliance with prescribed therapies.

The researcher believes that adherence to hand hygiene is one of the most crucial aspects of patient care in Continuous Ambulatory Peritoneal Dialysis (CAPD). Proper handwashing is a key step in preventing peritoneal infections and other issues that may arise during CAPD care. Correct hand hygiene before touching the peritoneal catheter or dialysis equipment helps prevent bacteria and germs from entering the peritoneal cavity, reducing the risk of peritonitis, a potentially life-threatening infection. Proper hand hygiene also protects patients from other infection risks that could disrupt the dialysis process and their overall health. CAPD patients who adhere to correct hand hygiene can reduce the likelihood of complications, ineffective treatment, and extended CAPD treatment time, all of which can enhance their quality of life. By preventing infections and complications, CAPD patients can lower their long-term care costs and reduce the burden on the healthcare system. Hand hygiene compliance should be thoroughly taught to CAPD patients and their family members who assist with daily care. This includes using appropriate antiseptic soap or hand sanitizers, washing hands for at least 20 seconds, cleaning under nails, and avoiding touching the face, hair, or other objects before touching the catheter or equipment. Additionally, CAPD patients should receive proper training in equipment care and sterilization and follow the treatment plan established by their medical team. By adhering to correct care procedures and

practices, CAPD patients can maximize the benefits of peritoneal dialysis therapy and minimize the risk of complications.

2. **The incident of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province**

The study results indicate that almost all respondents in the CAPD Room at Imam Bonjol RSUD Dr. Saiful Anwar, East Java, fall into the non-peritonitis category, with 153 respondents (86.4%) being free from peritonitis. Peritonitis is an infection of the peritoneal cavity caused by organisms entering through the catheter, catheter gaps, or invasions from the intestinal wall. The overall rate of peritonitis should not exceed 0.5 episodes per year at risk, although the rate achieved depends heavily on the patient population (Peritoneal Dialysis International, 2016). Peritonitis is a life-threatening condition often associated with bacteremia and sepsis syndrome (Harrison's Principles of Internal Medicine, 18th Edition, 2015).

As defined in Tarigan's 2014 study, peritonitis is an inflammatory process of the serous membrane lining the abdominal cavity and the organs within it. Peritonitis can be localized or generalized, bacterial or chemical. Inflammation of the peritoneum can be caused by bacteria, viruses, fungi, irritating chemicals, or foreign bodies. Peritonitis is also listed as one of the leading causes of death in surgical patients, with a mortality rate ranging from 10% to 40%. Diffuse secondary peritonitis, which accounts for 90% of peritonitis cases in surgical practice, is usually caused by gastrointestinal perforation or leakage (Tarigan, M.H., 2014).

For individuals undergoing CAPD (Continuous Ambulatory Peritoneal Dialysis), several steps or procedures can help prevent peritonitis, including adequate training, proper care of the exit site, replacing the transfer set every 6 months, following proper dialysis fluid replacement procedures, and maintaining suitable room conditions. If these measures are properly implemented and adhered to by CAPD patients, their quality of life will likely improve. Therefore, it is recommended that patients consistently undergo regular follow-ups in the CAPD unit to receive ongoing education.

The researcher argues that peritonitis in CAPD patients is a serious issue that can arise because CAPD procedures involve injecting and withdrawing dialysis fluid into and out of the peritoneal cavity through a peritoneal catheter. When CAPD is not performed correctly or if there is non-compliance with care guidelines, the risk of peritonitis increases significantly. One of the major risk factors for peritonitis in CAPD patients is inadequate adherence to proper hand hygiene. If a person does not thoroughly wash their hands before touching the catheter or equipment used in CAPD, bacteria on the hands can enter the peritoneal cavity during the dialysis procedure, leading to peritoneal infection. Additionally, items or equipment used in the CAPD procedure, such as the dialysis fluid bag, catheter, or tubing, must be handled with care. If these items are not sterile or become contaminated, they can become a source of infection. Proper handling, maintenance, and replacement of the peritoneal catheter are also crucial. Incorrect care or usage of the catheter can lead to damage or contamination. To prevent peritonitis in CAPD patients, it is essential to follow correct care procedures and practices, including good hand hygiene before performing any procedure involving the catheter or CAPD equipment. Furthermore, CAPD patients should receive thorough training in self-care and follow the guidelines provided by their medical team. If CAPD patients experience symptoms of peritonitis, such as abdominal pain, fever, nausea, or vomiting, they should promptly consult a medical professional, as peritonitis requires rapid treatment to avoid serious complications.

3. **The relationship between patients' hand washing compliance and the incidence of peritonitis in the Imam Bonjol CAPD Room, at Dr. Saiful Anwar Hospital, East Java Province**

The Fisher's Exact Test analysis revealed a P-value < α with a P-value of 0.000 and α = 0.05. This indicates a significant association between hand hygiene compliance and the incidence of peritonitis in the CAPD Room at Imam Bonjol RSUD Dr. Saiful Anwar, East Java. According to Table 5.7, nearly all respondents in the CAPD Room at Imam Bonjol RSUD Dr. Saiful Anwar, East Java,

demonstrated hand hygiene compliance, with 147 respondents (83.1%) having no incidence of peritonitis.

While CAPD is relatively straightforward in execution, improper practice can lead to various complications such as exit-site infections, tunnel infections, and peritonitis. Peritonitis remains a common complication, although its incidence has decreased in some renal units from 4 cases to 3 cases per year. This reduction is attributed to improved patient selection, training, and technological advancements such as connectors, in-line filters, and tubing. The most common signs and symptoms in patients include cloudy dialysis fluid accompanied by abdominal pain. Other symptoms may include nausea, vomiting, fever, chills, and diarrhea. The most frequent causative organisms are Staphylococcus epidermidis (80-90%) and Staphylococcus aureus (30-40%), which are gram-positive; 5-10% are due to gram-negative organisms, and the remainder are caused by fungi.

Individual behavior changes become optimal when such changes occur through internalization, where new behaviors are valued positively by the individual and integrated with other life values. Factors contributing to hand hygiene include patient characteristics. Factors influencing hand hygiene practice include age, gender, education level, knowledge level, work experience, availability of handwashing facilities, patient condition, and hospital policies (Lankford et al., 2015). Hospitalized patients exhibit diverse characteristics, such as varying education levels, ages, work experiences, and knowledge levels, which can impact their mastery of knowledge and skills in performing their roles.

Jody (2016) outlines the appropriate times for handwashing with soap: before and after meals to prevent contamination of food and avoid introducing germs into the body; before and after handling food ingredients to eliminate germs on hands before touching raw food; after defecation or urination to remove germs and bacteria from hands; after sneezing or coughing, as bacteria and germs are expelled from the mouth and nose and may transfer to the hands; after touching animals, particularly those with thick fur, to avoid transferring bacteria; after handling garbage, which is a major source of harmful bacteria and germs; and before treating wounds, as unwashed hands can increase the risk of infection.

The researcher asserts that proper hand hygiene compliance has significant implications for the incidence of peritonitis in CAPD (Continuous Ambulatory Peritoneal Dialysis) patients. Non-compliance with hand hygiene can significantly increase the risk of serious peritonitis. Bacteria and germs on hands can easily enter the peritoneal cavity during CAPD procedures, leading to peritoneal inflammation and infection, which are severe complications that can endanger the patient's life. Peritonitis can also disrupt the peritoneal dialysis process itself. Infection of the peritoneum can impair the membrane's ability to function as an effective filter, causing issues in removing waste and harmful substances from the patient's body. This can affect the effectiveness of peritoneal dialysis and require additional time-consuming and costly treatments. Furthermore, peritonitis can impact the quality of life for CAPD patients, causing severe abdominal pain, fever, nausea, and vomiting, which can interfere with daily activities. Frequent peritonitis may also result in permanent damage to the peritoneal membrane, potentially hindering the patient's ability to continue CAPD and necessitating more invasive dialysis options. Economically, peritonitis incurs additional costs for medical care, such as medications and hospitalization, and can lead to absences from work or other activities, affecting patient income. Therefore, adherence to proper hand hygiene is crucial in reducing the impact of peritonitis on CAPD patients, in terms of health, quality of life, and economic factors.

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