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The Implementation of the Asepsis Principle in The Central Surgery Installation of St Antonius Pontianak's Surgery Team

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Abstract

Background: Surgical site infection (SSI) accounts for 14-16% of infections and occurs in approximately 5% of surgical patients. Transmission of microorganisms can be minimized with the asepsis technique. Asepsis procedures before surgery are essential to protect patients from microbial exposure and prevent Health care-associated infections (HAI). **Objective:** This research aims to identify the implementation of the asepsis principle in the central surgery installation of St Antonius Pontianak. **Methods:** This research used the quantitative method. The population used in this research is all of the surgery team members, which consists of 33 people, with the total sampling technique. The tools used in this research to collect all the data are the SPO sheet for the surgery's hand wash and the SPO for using the surgery suit and gloves. **Result:** The result shows that almost all respondents, namely 90,9%, did according to the standard when washing the surgeon's hands, 97% performed according to the standard when using a surgery gown, and 90,9% performed according to the standard the use of surgery gloves. Conclusion: Almost all respondents performed according to standards in asepsis, suggesting that every officer should be able to maintain sterility. Most of the asepsis procedures, which included scrubbing, gowning, and gloving, were carried out according to the procedure. However, there were still phases that were not by the procedure.

Keywords: Principles of Asepsis, Operating Room

Abstrak

Latar belakang: Infeksi situs bedah (*SSI)* menyumbang 14-16% infeksi dan terjadi pada sekitar 5% pasien bedah. Penularan mikroorganisme dapat diminimalkan dengan teknik asepsis. Prosedur-prosedur asepsis sebelum tindakan bedah sangatlah penting untuk menjaga pasien dari pajanan mikroba, pencegahan dari *Health Care Associated Infections* (HAI). **Tujuan:** untuk mengidentifikasi pelaksanaan prinsip asepsis di kamar operasi Instalasi Bedah Sentral Rumah Sakit Santo Antonius Pontianak. *Metode:* Desain penelitian ini menggunakan metode kuantitatif dengan desain deskriptif kuantitatif. Populasi penelitian adalah semua tim bedah yang berjumlah 33 orang, dengan menggunakan teknik total sampling. Pengamatan dilakukan saat petugas melakukan tindakan cuci tangan bedah, cara memakai jas dan sarung tangan dengan menggunakan lembar observasi SPO cuci tangan bedah dan SPO memakai jas operasi dan sarung tangan. **Hasil:** Menunjukkan bahwa hampir seluruh responden yaitu 90,9% melakukan dengan baik saat mencuci tangan bedah, 97% melakukan dengan baik saat memakai jas operasi dan 90,9% melakukan dengan baik saat memakai sarung tangan. **Kesimpulan:** Tindakan asepsis yang meliputi *scrubbing, gowning dan gloving* sebagian besar dilakukan sesuai dengan prosedur, meskipun masih ada fase yang tidak sesuai dengan prosedur.

Kata Kunci: Prinsip Asepsis, Kamar Operasi

Introduction

Aseptic procedures before surgical interventions are crucial for protecting patients from microbial exposure and preventing healthcare-associated infections (HAI) for healthcare providers, hospital workers, and patients (Zakaria, 2018). Surgical procedures are invasive actions often performed to relieve patients, apart from medical treatment. Surgery is a surgical procedure in which doctors treat complex conditions or those that cannot be cured with simple medications (Potter & Perry, 2021).

In 2020, there were 234 million patients treated in hospitals worldwide. Of these, 6.3% and 23.1% of surgeries were performed in low-expenditure countries (WHO, 2020). The incidence of post-surgery infections reported in advanced countries such as the UK and the United States is around 5% and 5-6%, while in developing countries like India, it is significantly higher, estimated at around 10-25% (WHO, 2021).

According to data from the Ministry of Health (Kemenkes), in 2021, surgical procedures ranked 11th out of 50 treatment options in Indonesia, with 32% being elective surgeries. Based on Riskesdas data from 2020, the prevalence of elective surgeries in West Sumatra amounted to 35,265 cases, with a significant decrease in 2019, totaling 26,764 cases. In Aceh, the prevalence of surgeries shows various cases, including 114 pediatric surgeries, 73 oncological surgeries, 36 eye surgeries, eight dermatological and genital surgeries, as well as 547 obstetrics and gynecology cases, totaling 851 surgical cases each year (Bashir, 2020).

Asepsis is an absolute requirement in surgical procedures. The likelihood of infection significantly decreases with strict adherence to aseptic principles during the pre-surgery, intra-surgery, and post-surgery phases (Muttaqin, 2020). In aseptic techniques, a "no-touch" approach is applied to ensure that sterile objects used during surgery do not come into direct contact with the user's skin. This "no-touch" technique should be applied during hand scrubbing, donning surgical gowns, and wearing gloves (Jong, 2017).

Hand hygiene in the surgical team is a highly efficient way to reduce the risk of infection spread (Bali, 2021). Gowning is an action that prevents the contamination of microorganisms by using a sterile surgical gown set in the operating room (Rondianto, 2018). Gloving is a standard practice to protect the surgical team and prevent Surgical Site Infections (SSI). In contrast, sterile gowns prevent bacteria on the skin or clothing from the surgical team from transferring to the patient (Janelle Yu, 2019). Pre-surgical aseptic procedures consist of several components, such as hand washing, scrubbing, drying hands, wearing surgical gowns, and donning sterile gloves (Handaya, 2019). The fact that 18.6% of sterile surgical gloves were reported to have holes during surgical procedures emphasizes the importance of proper hand scrubbing to reduce infection agents on hands before wearing gloves (Shenoy, 2023).

In 2015, data from the Hospital Infection Control and Prevention Program at Cipto Mangkusumo Hospital (RSCM) recorded a prevalence of approximately 4.3% of surgical teams performing aseptic techniques incorrectly. In a study conducted in the Emergency Room (IGD) of Sanglah Denpasar General Hospital (RSUP), the results from 24 surgical team respondents indicated that the majority, 13 individuals (54.2%), did not comply. A minority of 11 respondents (45.8%) complied with aseptic techniques.

According to Regulation No. 27 of the Ministry of Health in 2017, surgical wound infections are divided into three categories: superficial surgical site infection (SSI), deep incisional surgical site infection (SSI), and organ/cavity surgical site infection. Surgical

procedures are categorized as clean and clean-contaminated, with a target achievement rate of 2% (PERMENKES, 2017).

Data regarding surgical teams' preparedness to perform incorrect aseptic techniques must be available at Santo Antonius Hospital in Pontianak. However, data from the Hospital Infection Control and Prevention Program (PPIRS) in January-September 2022 reported 3 cases, or 0.19%, of surgical site infections (SSI) in clean surgeries.

The Central Surgery Installation (IBS) at Santo Antonius Hospital in Pontianak consists of 4 operating rooms with 16 surgical nurses, where 90% of them have essential surgical nurse training certificates. There are 3 Anesthesiologists and 5 Anesthesia Nurses. The surgical team includes 21 operating doctors and three anesthesiologists. They provide surgical services in orthopedics, neurosurgery, ophthalmology, obstetrics and gynecology, thoracic and cardiovascular surgery, ENT surgery, general surgery, digestive surgery, oncology surgery, oral surgery, and urology. The average number of surgeries per day is about 8-10, with a monthly average of 270 patients undergoing various operations using general, regional, and local anesthesia.

On January 11, 2023, the researcher conducted an initial survey using Standard Operating Procedures (SOP) for surgical handwashing and SOP for wearing surgical gowns and gloves. It was observed that some scrubbed sterile team members did not comply with the standards for handwashing and wearing surgical gowns and gloves. This research aims to systematically describe the surgical teams' implementation of aseptic principles in the operating room.

Methods

This research used a quantitative method with a quantitative descriptive design. In this study, the researcher observed how surgical teams implement aseptic principles. The population in this study consists of all surgical teams, totaling 33 individuals, including 14 nurses and 19 surgeons. The study used total sampling, which means all 33 individuals were included in the research. The research tools for data collection were observation sheets for the SOP for surgical handwashing and the SOP for wearing surgical gowns and gloves in the hospital. During observation, the researcher was assisted by two enumerators, both operating room nurses.

Data collection was conducted through concealed observations using the SOP for surgical handwashing and the SOP for wearing surgical gowns and gloves, with three assessments labeled as Observation I, Observation II, and Observation III. A score of 1 was given for proper execution, while 0 indicated less adequate execution. Data analysis in this study utilizes univariate analysis focused on single variables. Descriptive analysis was also used to describe the frequency characteristics of respondents grouped by gender, team status, education level, and length of service.

Results

The data in this research is derived from primary data in the form of observation sheets with checklists marked for each statement. These checklists are used for the Surgical Hand Washing SOP and the SOP for Wearing Surgical Gowns and Gloves, and they are based on the SOPs applicable in the hospital's operating rooms. The observation is conducted on the scrubbed sterile surgical team, including surgeons, assistant surgeons, and scrub nurses, in the Central Surgical Installation operating room of Santo Antonius Hospital in Pontianak.

The characteristics of the respondents in this study include gender, surgical team status, educational level, and length of service. More detailed characteristics of the respondents can be seen in the table below.

Table 1. Characteristics of Respondents in the Central Surgical Installation Operating Room of Santo Antonius Hospital Pontianak

Description	Frequency	Percentage
Respondent type		
Nurse	14	42,4%
Permanent Doctors	5	15,2%
Visiting Doctors	14	42,4%
Gender		
Male	27	81,8%
Female	6	18,2%
Surgical Team Status		
Permanent employee/Doctors	19	57,6%
Visiting	14	42,4%
Education Level		
DIII	14	42,4%
Specialist Doctors	19	57,6%
Residents	0	0
Length Of Services		
< 6 Years	11	33,3%
6-10 Years	3	9,1%
>10 Years	19	57,6%

Source: Primary Data Processed, 2023

From the table above (Table 1), we can observe the composition of the surgical team as follows: there are 14 nurses (42.4%), five permanent doctors (15.2%), and 14 visiting doctors (42.4%). Regarding gender distribution, male respondents comprise the majority of the surgical team (81.8%), while female respondents represent a smaller proportion (18.2%). Regarding team status, permanent employees/doctors account for 57.6%, while visiting team members comprise 42.4% of the respondents. Looking at their educational backgrounds, most respondents are specialists, totaling 19 individuals (57.6%), while 14 individuals (42.4%) have a DI in nursing. Regarding years of experience, 11 respondents (33.3%) have less than six years of experience, three respondents (9.1%) have 6-10 years of experience, and 19 respondents (57.6%) have more than ten years of experience.

Based on the research results and univariate analysis of the implementation of aseptic principles in surgical hand scrubbing (scrubbing), donning surgical gowns (gowning), and wearing gloves (gloving), the following findings were obtained:

Surgical Hand Scrubbing (Scrubbing)

In this study, the results of statements were measured using frequency distribution. Based on the Surgical Hand Scrubbing Standard Operating Procedure (SOP) observations, out of 21 statement points, they were categorized as either good or not good. If it was good,

the score was 1; if not, it was 0. Observations on surgical hand scrubbing were conducted three times on each scrubbed sterile team.

It can be seen that the surgical hand scrubbing (scrubbing) procedure had the following results: In the first observation, the surgical team performed well, with 93.9% compliance and 6.1% non-compliance. In the second observation, the surgical team had a compliance rate of 84.8% and a non-compliance rate of 15.2%. In the third observation, the surgical team had a compliance rate of 90.9% and a non-compliance rate of 9.1%.

Donning Surgical Gowns (Gowning)

The variable for donning surgical gowns was analyzed using frequency distribution. Based on observations from the Surgical Gown Standard Operating Procedure (SOP), which consisted of 10 statement points, compliance was categorized as good or not. A score of 1 indicated good compliance, while a 0 indicated not good compliance. Donning surgical gowns was observed thrice on each scrubbed sterile team.

The analysis revealed the following results for donning surgical gowns (gowning): In the first observation, the surgical team showed good compliance, with 93.9% and 6.1% non-compliance. In the second observation, the surgical team had a compliance rate of 97% and a non-compliance rate of 3%. In the third observation, the surgical team had a compliance rate of 97% and a non-compliance rate of 3%.

Wearing Gloves (Gloving)

The variable for wearing gloves (gloving) was analyzed using frequency distribution. Based on observations from the Standard Operating Procedure for wearing surgical gowns and gloves (SOP), which consisted of 5 statement points, compliance was categorized as good or not good. A score of 1 indicated good compliance, while a 0 indicated not good compliance. Observations on wearing surgical gowns and gloves were conducted three times on each scrubbed sterile team.

It can be seen that the wearing of gloves (gloving) had the following results: In the first observation, 100% of the surgical team complied with the procedure. In the second observation, 93.9% complied well, while 6.1% did not. In the third observation, 97% complied well, while 3% did not.

Discussion

The act of scrubbing involves the removal of pathogenic microorganisms from the hands and lower arms using disinfectants and running water. Surgical hand scrubbing is a sterile handwashing activity for personnel directly involved in surgery (Muttaqin, 2020). Some staff members may need to pay more attention to sterility, and the lack of supervision may lead to inadequate and incorrect scrubbing procedures. Some staff members may not remove accessories attached to their hands, such as watches and rings, and may not wash their hands using antiseptic solutions, applying and rubbing the entire surface of both hands alternately up to 5 cm above the elbow. This can be observed in the results of the second observation, where the surgical team performed well at 84.8%, but 15.2% did not comply. This may be due to staff members' non-compliance with established procedures and a rush to complete the task. According to Yu et al., surgical teams should adhere to established procedures to prevent surgical site infections when carrying out aseptic procedures.

The study by Septiani (2016) emphasized that proper handwashing is fundamental in preventing and controlling the spread of diseases. Shenoy (2023) highlighted the importance of thorough scrubbing since 18.6% of sterile surgical gloves had punctures during surgical procedures. The research using the Surgical Hand Scrubbing Standard Operating Procedure (SOP) showed that most respondents performed well at 90%, with 10% performing inadequately in surgical hand scrubbing (scrubbing).

Wearing surgical gowns (Gowning) is an activity that involves donning surgical attire using a 'no-touch' technique to maintain sterility for personnel directly participating in surgery (Muttaqin, 2020). Radiant (2018) describes 'Gowning' as a preventive measure against microorganism contamination through surgical clothing. According to HIPKABI (2019), donning surgical gowns is part of the preparation before surgical procedures. Surgical gowns are loose-fitting garments worn during surgery to protect patients and surgical personnel from transferring microorganisms, blood, or bodily fluids (Bali, 2019). The results of the research using the Standard Operating Procedure (SPO) for wearing surgical gowns and gloves show that the majority of respondents performed well, with 96% doing so adequately and 4% inadequately in wearing surgical gowns (gowning)."

Gloving is an action taken to prevent contamination from microorganisms by using sterile gloves with aseptic principles (Rodianto, 2018). According to HIPKABI (2019), wearing gloves involves using sterile gloves after donning surgical gowns with a closed method. According to Janelle Yu (2019), gloving is a standard practice to protect the surgical team and prevent SSIs, while sterile gowns prevent surgical experts from transferring bacteria on the skin or clothing to patients. Gloves protect the surgical team and patients from bloodborne viruses and prevent wounds from contaminating the surgical expert's skin surface (Bali, 2019). The research results using the Standard Operating Procedure (SOP) for wearing surgical gowns and gloves show that most respondents performed well, with 97% doing so adequately and 3% inadequately wearing gloves (gloving).

Based on the characteristics of the respondents in this study, they are influenced by several factors, including gender, surgical team status, education level, and years of experience. The research results show that male respondents performed well in surgical hand scrubbing (scrubbing), with 22 individuals (88%), while female respondents had a 100% compliance rate, with six individuals. In the case of wearing surgical gowns (gowning), male respondents performed well, with 25 individuals (94%), and female respondents also had a 100% compliance rate, with six individuals. Regarding gloves (gloving), male respondents performed well, with 26 individuals (96%), and female respondents had a 100% compliance rate, with six individuals. It can be observed from the research that females tend to be more compliant than males. This could be influenced by the personality traits typically associated with females, such as being gentle, caring, sensitive, emotional, anxious, and obedient, which may contribute to higher compliance among female respondents (Febriansyah, 2021).

In terms of education level, it was found that respondents performed well. In the case of surgical hand scrubbing (scrubbing), data revealed that 13 individuals with a D III education level exhibited proper compliance, constituting 95% of the participants. In contrast, among specialist doctors, 16 individuals, equivalent to 86%, demonstrated satisfactory adherence to the procedure. Regarding the donning of surgical gowns (gowning), the data illustrated that those with a D III education level performed exceptionally well, with 14 individuals achieving a compliance rate of 100%, while among specialist doctors, 17 individuals, making up 93%, were observed to be following the protocol effectively. Regarding wearing gloves (gloving),

proper compliance was observed at the educational level, with 14 individuals having a D III education, corresponding to 100%, and among specialist doctors, 18 individuals, or 95%, adhering to the procedure. The data on education levels indicate that D III-educated respondents are more compliant than specialist doctors. This contradicts Lawrence Green's theory (1980), which states that knowledge is a learning process that involves growth, development, or change toward a better, more mature, and more mature state in individuals and communities. The research results suggest that D III education level respondents exhibit higher compliance.

In terms of the characteristics of work experience, the data showed good compliance among various work tenure categories. For surgical hand scrubbing (scrubbing), individuals with less than six years of work experience demonstrated proper compliance, with nine individuals, or 79%, following the procedure effectively. In the 6-10 years work experience category, two individuals, or 89%, complied well, while those with over ten years of work experience exhibited excellent compliance, with 18 individuals, or approximately 96.67%, adhering to the procedure.

Regarding wearing surgical gowns (gowning), individuals with less than six years of work experience exhibited good compliance, with nine individuals, or 88%, following the procedure effectively. In the 6-10 years work experience category, three individuals, or 100%, appropriately adhered, and those with over ten years of work experience displayed outstanding compliance, with 19 individuals, or 100%, adhering effectively.

For wearing gloves (gloving), individuals with less than six years of work experience demonstrated proper compliance, with 13 individuals, or 94%, following the procedure effectively. In the 6-10 years work experience category, three individuals, or 100%, complied well, and those with over ten years of work experience exhibited good compliance, with 18 individuals, or approximately 98.33%, adhering effectively. The data on work tenure indicate that individuals with more than ten years of work experience exhibited better compliance with aseptic principles. According to Notoadmodjo (2012), work tenure is part of the workforce's characteristic factors, where an individual's behavior becomes more familiar with the work environment and its potential hazards based on their work experience. If an individual is well-acquainted with their work environment and its risks, they are more likely to adhere to safety measures for their well-being and that of others (Zulkifli, 2019). The research results suggest that individuals with over ten years of work experience comply more with aseptic procedures.

Asepsis aims to isolate the surgical wound from the surrounding environment (Shenoy, 2023). According to HIPKABI (2019), the outcome of surgery is influenced by the creation and maintenance of an aseptic environment. Practices such as handwashing, wearing surgical gowns, and using surgical gloves are integral in minimizing the risk of infection from microorganisms during procedures, interventions, and surgeries. In the Standard Operating Procedure (SOP) for surgical hand scrubbing in the operating room, there are areas for improvement in organizing sterile handwashing (scrubbing) steps. Therefore, a review must align it with the World Health Organization (WHO) standards. In this research, the SOP combines the steps for wearing surgical gowns and gloves. It is advisable to separate the SOP for wearing surgical gowns and gloves, creating distinct procedures for each because each step in executing these actions is different. This separation will allow for a better assessment of the level of sterility in each action.

Conclusion

Based on the research results on the Implementation of Aseptic Principles by the Surgical Team in the Central Surgery Installation Operating Room, it can be concluded that almost all members of the surgical team perform surgical hand scrubbing (scrubbing), don surgical gowns (gowning), and wear gloves (gloving) effectively. However, there is a need for further actuating, controlling, re-education, and reinforcement to enhance and maintain the aseptic principles that have been implemented successfully.

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