# Overview of Nurses' Efforts in Preventing Urinary Tract Infections in Catheterized Patients

**Miftahul Janah[1] Erwin[2] Ns. Darwin Karim[3]**
Nursing Study Program, Faculty of Nursing, University of Riau, Pekanbaru City, Riau Province, Indonesia [1,2,3]
Email:

**Abstract**
Urinary tract infection (UTI) is a common infection that occurs when bacteria, often from the skin or rectum, enter the urethra and infect the urinary tract. UTI is included in the category of the most common nosocomial infections, with catheterization being the cause of about 80% of all nosocomial infections. This study aims to determine the description of nurses' efforts in preventing urinary tract infections in catheterized patients. This study used a quantitative descriptive design with a simple descriptive approach technique. A sample of 40 people was taken using a purposive sampling technique. Data collection used a standard questionnaire that had been adopted from previous studies. The analysis used was univariate. The results of the univariate analysis showed that the majority of respondents were early adults (26-35 years) as many as 24 respondents (60.0%), as many as 33 respondents (82.5%) were female. The majority of respondents' last education was a Bachelor's degree in Profession as many as 22 respondents (55%), with a length of work of more than or equal to 1 year as many as 40 respondents (100%). The majority of 39 respondents (97.5%) had good efforts in preventing urinary tract infections in catheterized patients. The results of this study showed an assessment of nurses' efforts in preventing UTI from several aspects, namely hand hygiene (100%), use of sterile equipment (100%), perineal hygiene (95%) and SOP (97.5%). The majority of 39 respondents (97.5%) had good efforts in preventing urinary tract infections in catheterized patients, and 1 respondent (2.5%) had sufficient efforts in preventing urinary tract infections.
**Keywords:** Nosocomial Infection, UTI, Catheter, Prevention



## INTRODUCTION

Hospitals serve as a place for people to seek healing but also have the potential to be a source of infection. Hospitals have a high risk of becoming a place for the spread of infection due to the high population of microorganisms (Hapsari, Wahyuni & Mudjianto 2018). Healthcare Associated Infection or known as nosocomial infection is an infection that often occurs in times occur in hospitals and are experienced by patients while receiving treatment either in hospitals or other health facilities, where symptoms of this infection will appear after the patient has been treated for 48 hours (Nugraha et al., 2019). The risk of nosocomial infection can not only occur in patients who are treated in hospital, but it can also happen to hospital staff. Various patient care procedures can increase the risk of staff being exposed to germs from patients. The ability of nurses to prevent the transmission of infections in hospitals and prevention efforts are important aspects in providing quality services. Nurses play an important role in preventing nosocomial infections, this is because nurses are one of the health teams that are in direct contact with clients and infectious materials in the treatment room. The high and rapid activity of nurses causes nurses to pay less attention to septic techniques in carrying out nursing actions (Potter, 2005). However, nurses are also responsible for maintaining patient safety in hospitals by preventing accidents, injuries, trauma, and through the spread of nosocomial infections (Puspasari, 2015). One of the most common types of HAIs

or nosocomial infections besides surgical site infections (SSI), pneumonia, gastrointestinal nosocomial infections (GI) is urinary tract infections (UTIs) (Nugraha et al., 2019). According to the National Institute of Diabetic and Digestive and Kidney Disease (2019), catheter-associated urinary tract infections (CAUTI) are the most common type of healthcare-associated infection.

Approximately 12-25% of inpatients receive urinary catheterization during their hospitalization (Maitsa, 2021). In addition to inpatient rooms, patients in the Intensive Care Unit (ICU) who require long-term care also receive urinary catheterization. Therefore, urinary catheter care with antiseptics in patients in the ICU is very important to prevent complications due to catheter placement (Burnett, 2018). Complications due to the use/installation of urinary catheters for a long time and not paying attention to their cleanliness can be a risk factor for urinary tract infections (UTIs). Another risk factor that can cause UTIs in catheterized patients is age. As age increases, the body's defenses against microorganisms decrease, making it more susceptible to infection. The incidence of urinary tract infections due to catheter placement can increase with aging. According to Irawan and Hilman (2018), the incidence of urinary tract infections increases in people aged 40 years and over. This is also supported by research conducted by Musdalipah (2018), which found that the incidence of urinary tract infections increases in people over 50 years of age, with the highest incidence occurring in the 50–59 year age group (Sumolang et al., 2013). According to Sari (2018), most patients diagnosed with nosocomial urinary tract infections are >55 years old, reaching 75%. In old age, there are significant changes, namely weakness of the urethral sphincter and reduced bladder volume, which can cause urinary tract infections. At the age of over 50 years, there is a decrease in immunity, this is caused by decreased thymus atrophy function. The results of this study are in line with Hardyati (2018), Lina (2019) who stated that age is related to the incidence of urinary tract infections.

In terms of gender prevalence, the risk factor for UTI during the first 2 decades after birth is 3% in women and 1% in men (Wahyudi, 2015). UTI is more common in women. Women usually experience UTI between the ages of 16 and 35 years with 10% of women experiencing infection each year and more than 40% to 60% experiencing infection at least once in their life (NCBI, 2021). relapses are common in women, in where almost half of them experience a second infection within a year. UTIs occur four times more often in women than in men (NCBI, 2021). This is related to a number of predisposing factors such as the anatomical structure of the female urinary tract, history of pregnancy, menopause, sexual activity and others. Women are more at risk of experiencing UTIs than men because the female urethra is shorter, so that microorganisms can more easily gain access to the urinary bladder which is located close to the perianal and vaginal areas (Kumala et al., 2023). Other factors that influence the incidence of urinary tract infections include disease factors such as HIV, type 2 diabetes, urinary incontinence and other factors such as multi-drug resistance, prolonged use of diapers, poor hand washing habits, and children who have not been circumcised (Irawan & Mulyana, 2018). Gender, urinary tract stones, and diabetes mellitus are also risk factors for the incidence of UTIs (Hermiyanty, 2016).

Urinary tract infection (UTI) is a common infection that occurs when bacteria, often from the skin or rectum, enter the urethra and infect the urinary tract . This infection can affect any part of the urinary tract, but the most common type is a bladder infection (cystitis) (Centers for Disease Control, 2024). According to the World Health Organization (WHO) (2013), UTIs are the second most common infection after respiratory infections and can lead to sepsis. UTIs are included in the category of the most common nosocomial infections, with catheter placement being the cause of about 80% of all nosocomial infections. According to the National Kidney and

Urologic Diseases Information Clearinghouse (2012), UTIs are ranked second as the most common infection after respiratory infections, with a total of 8.3 million cases per year. year. According to the National Center for Biotechnology Information (2020), more than 60% of cases (407 of 670 patients), nosocomial urinary tract infections are always related to catheter installation. The incidence of bacteriuria in medical facilities increases by 3-8% per day after catheter installation and almost all patients experience bacteriuria after 30 days of catheterization. Approximately 15-25% of all hospitalized patients are catheterized at some point during their hospitalization, with the corresponding percentage reported between 18% and 81.7% in intensive care units. According to WHO, approximately 150 million people worldwide are diagnosed with urinary tract infections each year and in 2011 it was reported that 25 million people died from UTIs (Rajabnia et al., 2012). Meanwhile, according to the Ministry of Health of the Republic of Indonesia (2014), the number of urinary tract infection cases in Indonesia can reach 90-100 cases per 100,000 population per year or around 180,000 new cases per year.

The results of the study by Gould, Umscheid, Agarwal, Kuntz, and Pegues (2017) stated that the implementation of good infection control is estimated to prevent UTI by around 17% - 69%. Reducing the risk of UTI can be done by using the catheter properly, the right technique for catheter installation, and the right technique for catheter care. Research conducted by Gultom and Famaugu (2018) stated that the installation of a urinary catheter is believed to be a risk factor for UTI. Therefore, health workers, especially nurses, must be able to prevent UTI. recurrence or incident of UTI by taking preventive measures in patients using urinary catheters. Research by Selano, Panjaitan, and Raharjo (2019) found a relationship between nurses' compliance in implementing the Standard Operating Procedure (SOP) for catheter care and the incidence of UTI. Perdana's research (2017) also showed a significant relationship between the implementation of catheter care and the incidence of urinary tract infections. This is due to the lack of implementation of proper catheter care and installation by nurses. The results of a preliminary study conducted by Ponika (2023) in the ICU room of Dr. (HC) Ir. Soekarno Hospital, Bangka Belitung Province, found that catheter installation in hospital was performed on patients in the ICU, but catheter care in the ICU was carried out when the catheter tube leaked, so there was no catheter care for the patient. This is in line with the results of a preliminary study conducted by researchers at Arifin Achmad Hospital on March 22, 2022 in where it was found that 3 out of 5 nurses interviewed only performed catheter installation and rarely performed regular catheter maintenance, then in the last 5 years the patients with the most UTI diagnoses were also found in the Kenanga room with a total of 33 inpatients, the Edelweis Room with 10 people and the use of urinary catheters was most often found in the ICU room.

## RESEARCH METHODS

Research design is a research plan that is arranged in such a way that researchers can obtain answers to research questions (Setiadi, 2013). The research design used in this study is quantitative descriptive with a simple descriptive approach technique in where data collection is carried out at one time. Descriptive research is a study conducted to describe or depict a phenomenon that occurs in society (Notoatmodjo, 2018). This quantitative method is used to describe certain characteristics, using numbers with univariate analysis. This study aims to obtain information about the description of nurses' efforts in preventing urinary tract infections in catheterized patients. This research was conducted in Pekanbaru City. The place of this research was carried out at the Arifin Achmad Hospital, Pekanbaru. The researcher chose this place because the Arifin Achmad Hospital is a referral hospital in Riau Province. This

research activity will start from the submission of the research proposal to the research results seminar, namely from January 2022 to June 2024.

**Population and Sample**

According to Handayani (2020), population is the totality of each element to be studied that has the same characteristics, it can be an individual from a group, an event, or something to be studied. The population taken by the researcher was nurses working at Arifin Achmad Hospital, Pekanbaru. The number of nurses working in the inpatient room (Kenanga, Edelweis) and ICU of Arifin Achmad Hospital is 66 people. The research sample is part of the population to be studied or part of the number of characteristics possessed by the population (Sugiyono, 2019). The sampling technique used by the researcher in this study is purposive sampling, which is a sampling procedure determined by the researcher with certain considerations (Sugiyono, 2015). The researcher selected the sample based on the desired criteria. In determining the number of samples, the researcher used the Slovin formula:

$$n = \frac{N}{1 + N\,(d)2}$$

Information:
n: sample size
N: number of nursing population
d: error rate (10%)

The calculation results above obtained the number of samples to be studied as many as 40 respondents. This study was conducted on nurses with the following inclusion criteria: Nurses who have worked for min. 1 year Nurses who work in the kenanga, edelweis and ICU rooms of Arifin Achmad Hospital Minimum Education D3 - Nursing Profession Exclusion criteria that can be adjusted to the respondent's condition are: Nurses who refuse to be research respondents.

**Research Ethics**

Research ethics is an important part that must be done in conducting research. This research ethics emphasizes the ethical principles that must be upheld by a researcher starting from the proposal stage until the research results are obtained (Notoatmodjo, 2018). According to Notoatmodjo (2018) research ethics is divided into four principles as follows:

1. Respect for human dignity. Researchers give research subjects the freedom to provide information or not and respect the dignity and honor of research subjects by providing information about the research (informed consent) including the objectives, benefits, risks and disadvantages. comfort arising in the research, respondent's agreement to answer every question asked and guarantee of confidentiality of identity and information provided by respondents.
2. Respecting the privacy and confidentiality of research subjects. Researchers must respect the privacy of research subjects by keeping secret or not disseminating the identity that has been given to researchers because every human being has their own right to privacy.
3. Fairness and openness. The principles of fairness and openness must be maintained by researchers and honesty and caution must be observed by researchers. Researchers explain research procedures openly and each subject receives equal treatment without distinguishing status, ethnicity and race.

4. Taking into account the benefits and disadvantages that arise. The research conducted should obtain maximum benefits for the research subjects and the community, so researchers must reduce the impacts that can harm the research subjects by taking into account the benefits and disadvantages that can arise in the research.

**Data Collection Procedure**

Research procedures are the ways or steps taken by researchers to conduct research and collect data. Data collection is a process of approaching the subject and the process of collecting the characteristics of the subject needed in a study (Nursalam, 2015). Research procedures start from the preparation stage, implementation stage and final stage.

1. Preparation stage. First, the researcher looks for the phenomenon, formulates the research problem and submits the title to the supervisor. After the title is accepted, the researcher then compiles a research proposal and conducts a preliminary study by submitting a letter of application for the implementation of pre-research permits to the Faculty of Nursing, University of Riau and forwarded to Arifin Achmad Hospital. After obtaining permission from Arifin Achmad Hospital, the researcher then collects data based on the medical records at Arifin Achmad Hospital. After that, it is continued at continue with the completion of the proposal, followed by a proposal seminar. After being approved, the researcher submitted an ethical test to the Ethics Committee of the Faculty of Nursing, University of Riau. Then the researcher requested a research permit from the Faculty of Nursing, University of Riau and continued by taking care of the research permit at Arifin Achmad Hospital so that he could carry out the administrative process for the application for data collection at Arifin Achmad Hospital.
2. Implementation stage. After the researcher obtained permission from Arifin Achmad Hospital, the researcher collected and collected data. The researcher collected data by distributing questionnaires in the rooms that were the research locations, namely Kenanga, Edelweis and ICU inpatient rooms at Arifin Achmad Hospital. Before the researcher asked the respondents to fill out the questionnaire, the researcher introduced himself, explained the purpose and benefits and explained that the study guaranteed the confidentiality of the respondents' data. The researcher also asked the respondents to sign/fill out the informed consent form. Respondents were given 30 minutes to fill out the questionnaire.
3. Final Stage. In the final stage, the researcher collects data and re-checks the data that the researcher has obtained. If there is any missing data, the researcher will contact the respondents again to complete the missing data. Furthermore, the researcher processes the data and ends with data presentation and preparation of the research report. In the final stage, the data will be analysis and processed by researchers using the SPSS-20 application that is appropriate to the type of data. Furthermore, researchers compile research report results and present research results.

**RESEARCH RESULTS AND DISCUSSION**

This study was conducted on March 6, 2024 to March 10, 2024, which was conducted on 40 respondents, namely nurses at Arifin Achmad Pekanbaru Regional Hospital. The results of the study obtained the following data:

**Univariate Analysis**

Univariate analysis is an analysis used to explain or describe the characteristics of each research variable. Univariate analysis aims to see the description of each variable using a frequency distribution in the form of a percentage, including: age, gender, education and length of service, as well as a description of nurses' efforts in preventing urinary tract infections in patients in the inpatient room.

## Respondent Characteristics

**Table 1. Frequency Distribution of Respondents Based on Age, Gender, Last Education, and Length of Service**

| No | Respondent Characteristics | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Age | | |
| | a. Early Adulthood | 24 | 60.0 |
| | b. Late Adulthood | 11 | 27.5 |
| | c. Early Elderly | 5 | 12.5 |
| | Amount | 40 | 100.0 |
| 2 | Gender | | |
| | a. Woman | 33 | 82.5 |
| | b. Man | 7 | 17.5 |
| | Amount | 40 | 100.0 |
| 3 | Last education | | |
| | a. D3 | 18 | 45.0 |
| | b. S1 Profession | 22 | 55.0 |
| | Amount | 40 | 100.0 |
| 4 | Length of work | | |
| | More or equal to 1 year | 40 | 100.0 |
| | Amount | 40 | 100.0 |

Table 1 shows that out of 40 respondents, the majority of respondents' ages are early adulthood (26-35 years) as many as 24 respondents (60.0%), then as many as 11 (27.5%) respondents are late adulthood (36-45 years). As many as 33 respondents (82.5%) are female. The majority of respondents' last education is a Professional Bachelor's degree as many as 22 respondents (55%), length of work more than or equal to 1 year as many as 40 respondents (100%).

## Overview of Nurses' Efforts in Preventing Urinary Tract Infections

**Table 2. Assessment of Nurses' Efforts in Preventing UTI in Catheterized Patients in the Aspects of: Hand Hygiene, Sterility, Perineal Hygiene, and SOP**

| No | Assessment Aspects | Category | Frequency | Percentage (%) |
|---|---|---|---|---|
| 1 | *Hand Hygiene* | In accordance | 40 | 100.0 |
| | Amount | | 40 | 100.0 |
| 2 | Use of Sterile Instruments | Are not done | 6 | 15.0 |
| | | Done | 34 | 85.0 |
| | Amount | | 40 | 100.0 |
| 3 | *Perineal Hygiene* | Are not done | 2 | 5.0 |
| | | Done | 38 | 95.0 |
| | Amount | | 40 | 100.0 |
| 4 | Compliance of Actions with SOP | Enough | 1 | 2. |
| | | Good | 39 | 97.5 |
| | Amount | | 40 | 100.0 |

Table 2 shows the results of the assessment of nurses' efforts in preventing urinary tract infections in catheterized patients with several assessment aspects, namely hand hygiene, use of sterile equipment, perineal hygiene and SOP. Based on data analysis on several aspects of the assessment, the results of the hand hygiene aspect were obtained, all respondents had complied with hand hygiene as many as 40 respondents (100%), all respondents had complied with the use of sterile equipment in catheter installation as many as 40 respondents (100%), the

majority of respondents who had performed perineal hygiene were 38 respondents (95%), and the majority of respondents had performed catheter installation in accordance with the SOP as many as 39 (97.5%).

**Table 3. Frequency Distribution of Nurses' Efforts in Preventing Urinary Tract Infections**

| No | Nurses' efforts in preventing urinary tract infections | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Enough | 1 | 2.5 |
| 2 | Good | 39 | 97.5 |
| | Amount | 40 | 100.0 |

Table 3 shows the results of the description of nurses' efforts in preventing urinary tract infections in catheterized patients. It is known that the majority of respondents in performing catheter installation are good, as many as 39 respondents (97.5%) and the rest, namely 1 (2.5%) respondents, have sufficient efforts in preventing urinary tract infections in catheterized patients. From the results of this study, it can be seen that urinary tract infections can occur due to other factors such as age, gender, length of hospitalization, length of catheter installation, comorbidities such as diabetes mellitus, HIV and urinary tract stones.

## Discussion

The researcher will discuss the results of the study on the description of the characteristics of the respondents including age, gender, last education, length of service and description of nurses' efforts in preventing urinary tract infections in catheterized patients with aspects of hand hygiene, use of sterile equipment, perineal hygiene and suitability of actions with SOPs with existing theories with the results that researchers found in the field and compared with related research. The discussion of the study is as follows:

### Univariate Analysis

### Respondent Characteristics

### Age

The results of the study conducted on 40 respondents showed that the majority of respondents were in the early adulthood category, namely 26-35 years old, as many as 24 respondents (60%), then 11 respondents (27.5%) were in the late adulthood category and the remaining 5 respondents (12.5%) were in the early elderly category. In line with the research conducted by Ritonga (2018), the results of the study showed that the majority of respondents were aged <36 years (46.2%) and the minority were aged> 36 years, namely 4 respondents (10.2%). According to the Central Statistics Agency (BPS, 2022), the majority of the active working population is in the 25-29 year age range, namely 17.18 million people, followed by the 30-34 year age group of 16.78 million people.

### Gender

The results of the research conducted by the researcher showed that the majority of respondents were female, namely 33 respondents (82.5%) and 7 respondents (17.5%) were male. The results of the study showed that the proportion of respondents between women and men who were more dominant was female. This is in line with research conducted by Suranadi (2017) at Udayana University also showed that most students in the Faculty of Health were female. This has similarities with the theory put forward that the gender of nurses is dominated by women, because in the history of nursing emerged as a traditional care-taking role in families and communities (Rollinson & Kish, 2017).

**Last education**

The results of the study showed that the majority of respondents' last education was a Professional Bachelor's degree, namely 22 respondents (55%) and the remaining 18 respondents (45%) were respondents with a D3 degree. In line with research conducted by Rahmawati, et al. (2021) showed that the majority of the last education was a Nursing Bachelor's degree. The researcher assumed that respondents had received learning materials both in lectures and in field practice during their Bachelor's degree so that they had good knowledge and experience in preventing infection. According to Ritonga (2018), the higher a person's education, the more it will affect a person's knowledge. This is also in accordance with Notoatmodjo's theory (2010) that a person's knowledge is influenced by a person's education.

**Length of work**

The results of the study conducted by the researcher showed that the length of work of all respondents was more than or equal to 1 year as many as 40 respondents (100%). The length of work is calculated from when the nurse started work until now as long as the nurse is still actively working. The length of work of a person in an organization or agency is not identical to high productivity. People with a long working period does not mean that the person concerned has a low level of expertise. According to Nursinah, et al. (2023) it was found that the longer a person works, the more skilled and experienced they will be in their work. The length of work of a person is related to the behavior of preventing nosocomial infections in hospitals.

**Overview of Nurses' Efforts in Preventing Urinary Tract Infections in Catheterized Patients in the Aspects of Hand Hygiene, Use of Sterile Equipment, Perineal Hygiene and SOP**

**Hand Hygiene**

Based on the results of the research that has been conducted by giving questionnaires to nurses, it was found that from the aspect of hand hygiene such as washing hands before and after performing catheter installation, 40 respondents (100%) have complied with hand hygiene efforts. This can be seen in questionnaire questions no. 13 and 23 regarding washing hands before and after performing the procedure, in where respondents who answered always/often amounted to 40 respondents. One of the preventions that can be done to prevent urinary tract infections in catheterized patients is by washing hands. Washing hands is the most important health procedure that can be done by everyone to prevent the spread of germs. Washing hands must be done properly before and after carrying out nursing actions even when wearing gloves or other protective equipment so that the spread of disease can be reduced and the environment is protected from infection. Washing hands cannot be replaced by wearing gloves (Ritonga, 2018). According to Lawrence Green's theory, there are three main factors that influence each individual in carrying out a behavior in this case hand hygiene behavior, namely the predisposing factor, which is manifested in knowledge, attitudes, beliefs, values, perceptions. Reinforcing factors that are manifested in supervision, the role of cadres, religious leaders, community leaders. Enabling factors, which are manifested in facilities and infrastructure, resources, policies, training (Indri, 2016).

**Use of Sterile Instruments**

Based on the results of the study from the aspect of the use of sterile tools that have been carried out, it was found that all respondents were in accordance with the use of sterile equipment in catheter installation as many as 40 respondents (100%). Nurses' efforts to

prevent UTI in catheterized patients include using sterile tools such as sterile gloves, sterile catheters and sterile drapes when performing catheter installation. This can be seen in the questionnaire questions no. 1, 2, 3, 5, 16 & 17, in where as many as 40 respondents always use sterile tools such as sterile gloves, sterile catheters and sterile drapes. According to the Journal of the American Medical Association (JAMA) Internal Medicine (2018), 50% of HAIs, especially UTIs, can be prevented by using aseptic techniques depending on whether health workers follow all procedures thoroughly or not. Actions that need to be considered are being careful about sterility, being sensitive to patients and being careful about complications. The purpose of catheter care is to prevent infection and maintain patient hygiene and prevent complications by using sterile techniques in its implementation (Potter & Perry, 2005).

**Perineal Hygiene**

Another effort made by nurses to prevent UTI in catheterized patients is to perform perineal hygiene when performing catheterization which aims to prevent the formation of secretions or crusts. Based on the results of the study that has been conducted by giving questionnaires to nurses, it was found that from the aspect of perineal hygiene, the majority of respondents, namely 38 respondents (95%) have performed perineal hygiene. This can be seen in questionnaire question no. 18, where 38 respondents always/often perform perineal hygiene (vulva hygiene/penis hygiene), while the remaining 2 respondents rarely perform perineal hygiene on patients who will be catheterized. In a study conducted by Furqan (2013), 38% of cases of urinary tract infections in catheterized patients were found to be due to lack of implementation of perineal hygiene. Therefore, special care and installation measures are very important to prevent infection in catheterized patients. Closed catheter care or installation can reduce infection, this greatly helps reduce the number of urinary tract infections after implementing perineal hygiene (Mahanani & Sanbein, 2015).

**Compliance of Actions with SOP**

Based on the results of the study that has been conducted by giving questionnaires to nurses, it was found that the majority of 39 respondents (97.5%) had good efforts in preventing urinary tract infections in patients with catheters, and 1 respondent (2.5%) had sufficient efforts in preventing urinary tract infections. This is shown from the results of the questionnaire that has been distributed to each respondent and data processing was carried out, which found that 39 respondents (97.5%) showed good compliance in the catheter installation action with the existing SOP. While the remaining 1 respondent (2.5%) showed sufficient compliance in the catheter installation action with the SOP. According to Kresna, et al. (2016) SOP (Standard Operating Procedure) is a standardized procedure or stage that must be passed to complete a certain work process. Nurses play an important role in implementing SOPs, especially regarding the installation and care of urinary catheters. If the installation and care are not carried out according to standards, it can increase the risk of urinary tract infections in patients treated with urinary catheters.

**Overview of Nurses' Efforts in Preventing Urinary Tract Infections in Catheterized Patients**

Based on the results of the study that has been conducted by providing a questionnaire containing aspects of assessment in the SOP to nurses, it was found that the majority of 39 respondents (97.5%) had good efforts in preventing urinary tract infections in patients with catheters, and 1 respondent (2.5%) had sufficient efforts in preventing urinary tract infections. This is shown from the results of the questionnaire that has been distributed to each respondent and data processing was carried out, which found that 39 respondents (97.5%)

showed good compliance in catheter installation actions seen from the assessment aspects, namely hand hygiene, use of sterile equipment, perineal hygiene and existing SOPs. While the remaining 1 respondent (2.5%) showed sufficient compliance in catheter installation actions seen from the assessment aspects, namely hand hygiene, use of sterile equipment, perineal hygiene and SOP. The solution to improve prevention and treatment of UTI in catheterized patients by nurses is to provide catheter care training to nurses in accordance with the SOP implemented by the hospital, this is to ensure the correct catheter installation technique is carried out, and it is recommended that it be carried out by medical personnel who have received special training through the hospital's education and training department. In addition, it is necessary to carry out regular supervision of the care carried out by the hospital through the head of the room or the nursing department for each catheter care action by nurses (Mahanani & Sanbein, 2015).

Installation procedures that are not carried out in accordance with SOPs increase the risk of urinary tract infections (Kausuhe et al., 2017). In addition, nurses also need to assess the risk factors for UTIs other than catheter installation that is not in accordance with SOPs such as age, gender and the presence of other comorbidities such as HIV, type 2 diabetes, urinary incontinence and urinary tract stones. This is in line with the results of a study obtained by Omer, et al. (2020), which found that risk factors for UTIs are female gender, comorbidities and longer duration of hospitalization. This is in line with the results of a study by Magrahi, et al. (2022) which stated that age, gender, duration of catheterization, and diabetes were found to be significant risk factors associated with CAUTI. Therefore, the role of nurses in observing catheterized patients in the inpatient room and ICU is important. The role of nurses in preventing and controlling urinary tract infections related to catheter insertion is an important aspect in maintaining patient health and safety, because with the increasing complexity of care and health care interventions, patients are becoming increasingly vulnerable to health care-related infections (Burnett, 2018).

**Research Limitations**

The assessment of nurses' efforts in preventing urinary tract infections is better assessed directly by matching each action with the questionnaire when the respondent performs urinary catheter installation, but due to limited research time, the researcher did not assess directly and only distributed questionnaires to the respondents. In the research questionnaire, the researcher did not provide a time span for the implementation of urinary catheter installation by the respondents. The time span for the implementation of urinary catheter installation actions to patients by respondents within a certain period of time may provide different assessments.

## CONCLUSION

The results of the study conducted on 40 respondents showed that the characteristics of the majority of respondents were early adulthood (26-35 years) as many as 24 respondents (60.0%), then as many as 11 (27.5%) respondents were late adulthood (36-45 years). As many as 33 respondents (82.5%) were female. The majority of respondents' last education was a Professional Bachelor's degree as many as 22 respondents (55%), length of service more than or equal to 1 year as many as 40 respondents (100%). The efforts of nurses in preventing urinary tract infections showed that there were 1 respondent (2.5%) who had sufficient efforts in preventing urinary tract infections, and as many as 39 respondents (97.5%) had good efforts in preventing urinary tract infections in patients with catheters in the inpatient room.

**BIBLIOGRAPHY**

A. Aziz, Alimul Hidayat. (2009). Introduction to the basic concepts of nursing. First Edition, Jakarta: Salemba Medika

Accardi, R., Castaldi, S., Marzullo, A., Ronchi, S., Laquintana, D., & Lusignani, M. (2017). Prevention of healthcare associated infections: a descriptive study. Ann Ig, 29(2), 101-115.

Ana, KD, Riwayati, NY, & Jayanti, SF (2020). The relationship between the length of catheter installation and the incidence of urinary tract infections in patients in the internal medicine ward of the dr. Soepraoen Malang Level II Hospital. Care: Scientific Journal of Health Sciences, 8(2) , 138-145.

Central Bureau of Statistics. (2022). Results of the 2021 Indonesian Population Census. Official Statistics News.

Baldini, G., Bagry, H., Aprikian, A., Carli, F., Warner, D.S., & Warner, M.A. (2009). Postoperative urinary retention: anesthetic and perioperative considerations. The Journal of the American Society of Anesthesiologists, 110(5), 1139-1157.

Bonkat, G., et al. (2017). EAU guidelines on urological infections. European Association of Urology, 18, 22-26.

Bono, MJ, Leslie, SW, Reygaert, WC, & Doerr, C. (2021). Urinary Tract Infection (Nursing). National Center for Biotechnology Information. Retrieved March 11, 2022, from https://www.ncbi.nlm.nih.gov/books/NBK470195/

Brunner, L. S. (2010). Brunner & Suddarth's textbook of medical-surgical nursing. Vol. 1. Lippincott Williams & Wilkins.

Burnett, E. (2018). Effective infection prevention and control: the nurse's role. Nursing Standards, 33(4).

Centers of Disease Control and Prevention. (2024). Urinary tract infection. Retrieved June 18, 2024 from https://www.cdc.gov/uti/about/index.html

Chenoweth, C.E., Gould, C.V., & Saint, S. (2014). Diagnosis, management, and prevention of catheter-associated urinary tract infections. Infectious Disease Clinics, 28(1), 105-119.

Department of Health. (2014). Indonesian demographic and health survey. Jakarta: Ministry of Health of the Republic of Indonesia.

El Magrahi, H., Ashur, AB, Khalil, MB, Taboun, MB, & Bleha, Z. (2022). Study of Risk Factors for Catheter-Associated Urinary Tract Infection. AlQalam Journal of Medical and Applied Sciences, 411-418.

Gould, CV, Umscheid, CA, Agarwal, RK, Kuntz, G., Pegues, DA, & Healthcare Infection Control Practices Advisory Committee. (2017). Guideline for prevention of catheter-associated urinary tract infections 2009. Infection Control & Hospital Epidemiology, 31(4), 319-326.

Gultom, R., & Famaugu, P. (2018). Analysis of catheterization on urinary tract infection incidence in inpatients at the Imelda Buruh Indonesia (IPI) Hospital, Medan in 2017. JIFI (Imelda Scientific Journal of Pharmacy), 2(1), 1-7.

Hapsari, AP, Wahyuni, CU, & Mudjianto, D. (2018). Surveillance officers' knowledge about identifying healthcare-associated infections in Surabaya. Periodic Journal of Epidemiology, 6(2), 130-138.

Hardyati, A. (2018). Urinary Tract Infection in Diabetes Mellitus Patients at Budhi Asih Regional Hospital, East Jakarta. Scientific Journal of Health, 10(2), 199-204.

Harrison, S.C., Lawrence, W.T., Morley, R., Pearce, I., & Taylor, J. (2011). British Association of Urological Surgeons' suprapubic catheter practice guidelines. BJU international, 107(1), 77-85.

Hasin, A., & Nugraha, C. (2019). The effect of urine sample centrifugation time on urine

leukocyte sediment examination results in patients with urinary tract infections (UTIs) at the D-III Health Analyst Laboratory, University of East Indonesia. Jurnal Media Laboran, 9(2), 6-12.

Hermiyanty, H. (2016). Risk factors for urinary tract infections in the inpatient department of Mokopido Tolitoli Hospital in 2012. Healthy Tadulako Journal, 2(2), 53-59.

Igawa, Y., Wyndaele, J. J., & Nishizawa, O. (2008). Catheterization: possible complications and their prevention and treatment. International journal of urology, 15(6), 481-485.

Indri, P. (2016). The relationship between behavioral factors and the implementation of hand hygiene steps by nurses in the inpatient ward of Dr. Rasidin Padang Regional Hospital in 2016. Doctoral dissertation, Andalas University.

Irawan, E. (2018). Factors causing urinary tract infection (UTI) (literature review). In Proceedings of the National Seminar and Health Research 2018 (Vol. 1, No. 1).

Kausuhe, J., Pangemanan, DH, & Onibala, F. (2017). The relationship between urinary catheter installation and the incidence of urinary tract infections at GMIM Pancaran Kasih Manado Hospital. Nursing Journal, 5(2).

Kranz, J., Schmidt, S., Wagenlehner, F., & Schneidewind, L. (2020). Catheter-associated urinary tract infections in adult patients: Preventive strategies and treatment options. Deutsches Ärzteblatt International, 117(6), 83.

Kresna, TA, Maratning, A., & Warjiman, W. (2016). Description of the implementation of SOP (standard operating procedure) for indwelling urinary catheter care by nurses in the Medical Surgical Room of Suaka Insan Hospital, Banjarmasin. Suaka Insan Nursing Journal (JKSI), 1(1), 1-9.

Kumala, I., Farich, A., Yanti, DE, Hermawan, D., & Amirus, K. (2023). Risk factors associated with the incidence of urinary tract infections in patients with catheters in the internal medicine inpatient ward of DR. H. Abdul Moeloek Hospital, Lampung Province. Jurnal Medika Malahayati, 7(4), 1109-1116.

Kurniasih, D., Rusfiana, Y., Subagyo, A., & Nuradhawati, R. (2021). Analysis Techniques. Bandung: Alfabeta

Li, R., & Leslie, S. W. (2023). Cystitis. In StatPearls. StatPearls Publishing

Loveday, H.P., Wilson, J.A., Pratt, R.J., Golsorkhi, M., Tingle, A., Bak, A., ... & Wilcox, M. (2014). epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital Infection, 86, S1-S70.

Mahanani, S., & Sanbein, MM (2015). Catheter care in hospitalized patients at Kediri Baptist Hospital. Journal of STIKES, Kediri Baptist Hospital, 8(1).

Maitsa, N. (2021). Catheter-associated urinary tract infection: management and prevention. Journal of Professional Nursing Research, 3(4), 791-798.

Mobalen, O., Tansar, T., & Maryen, Y. (2019). Differences in catheter installation using jelly inserted into the urethra and jelly applied to the catheter on patient pain levels at Sele Be Solu Regional Hospital, Sorong City. Nursing Arts, 13 (2), 109–116.

Musdalipah, M. (2018). Identification of drug related problems (DRP) in urinary tract infection patients at Bhayangkara Hospital, Kendari. Health Journal, 11(1), 39-50.

Naldi, Y. (2015). The relationship between catheter installation and the incidence of urinary tract infections in patients in the Internal Inpatient Room of Pariaman Regional Hospital in 2015. Thesis, 32. https://id.scribd.com/doc/286762168/Print-Abstrak.

National Institute of Diabetic and Digestive and Kidney Disease. (2019). Catheter-Associated Urinary Tract Infections Technology Workshop.

Notoatmodjo. (2010). Health promotion and behavioral science. Jakarta: PT Rineka Cipta.

Nursalam. (2015). Methodology of nursing science. 4th edition. Jakarta: Salemba Medika.

Nursinah, A., Prihatini, S., Rusli, R., Wijayanti, LA, & Saputra, MKF (2023). Nurses' behavior in preventing catheter insertion infections in the ER. Amanah Akademika Scientific Journal, 6(1), 25-29.

Omer, S.A., Zahran, F.E., Ibrahim, A., Sidahmed, L.A., Karam, G., Almulhim, F., & Soltan, S.A. (2020). Risk factors for catheter associated urinary tract infections (CAUTI) in medical wards and intensive care units (ICU).

Perdana, M., Haryani, H., & Aulawi, K. (2017). The relationship between the implementation of indwelling catheter care and the incidence of urinary tract infections. Clinical and Community Nursing Journal, 1(1), 17- 27.

Permenkes. (2017). Regulation of the Minister of Health Number 27 of 2017 concerning guidelines for prevention and control of infections in health care facilities. Jakarta: Ministry of Health of the Republic of Indonesia.

Ponika, Yasin, DD F & Widyaastuti, EE (2023). Application of catheter care with chlorhexidine disinfectant to prevent the risk of urinary tract infection in cerebro vascular accident (CVA) patients in the ICU Room of Dr. (HC) Ir. Soekarno Hospital, Bangka Belitung Province. Journal Of Nursing Care And Biomoleculer, 8(1), 119–125.

Potter & Perry. (2005). Fundamental textbook of nursing. EGC: Jakarta.

Potter A., Perry G., Stockert P., Hall A. (2013). Fundamentals of nursing. (8th ed.). St. Louis: Mosby

Puspasari, Y. (2015). The relationship between knowledge, attitudes and nursing practices in preventing nosocomial infections in the Inpatient Ward of Kendal Islamic Hospital. FIKkeS, 8(1).

Putri, RA, Armiyati, Y., & Supriyono, M. (2012). Factors influencing the incidence of urinary tract infections in hospitalized patients aged 20 years and over with indwelling catheters at Tugurejo Regional Public Hospital, Semarang. Scientific Paper.

Rahmawati, W., D., Sukmaningtyas, W., & Muti, R., T. (2021). The relationship between gender and study program in influencing basic life support knowledge in students. Borneo Nursing Journal (BNJ), Vol. 4.

Rajabnia-Chenari, M., Gooran, S., Fazeli, F., & Dashipour, A. (2012). Antibiotic resistance pattern in urinary tract infections in Imam-ali Hospital, Zahedan (2010-2011). Zahedan Journal Of Research In Medical Sciences, 14(8).

Ramli, R. (2020). The relationship between catheter installation and the incidence of urinary tract infections in patients in the Internal Medicine Inpatient Ward of Nene Mallomo Regional Hospital, Sidenreng Rappang Regency in 2020. Journal of Research Innovation, 1(6), 1259-1268.

Ritonga, EP (2018). Efforts to prevent urinary tract infections by nurses in patients with catheters at the Imelda Buruh Indonesia General Hospital, Medan. Imelda Scientific Journal of Nursing, 4(1), 431-43.

Rollinson, D., & Kish. (2017). Care concept in advanced nursing. (St. Louis Mosby A Harcourt Health Science Company. (Ed.)). St. Louis Mosby A Harcourt Health Science Company. (Ed.)).

Sari, RP, & Muhartono. (2018). Incidence of urinary tract infections (UTIs) and risk factors affecting them in female employees at the University of Lampung. Majority, 7(3), 115–120.

Selano, MK, Panjaitan, RN, & Raharjo, SB (2019). The relationship between nurses' compliance in implementing standard operating procedures for indwelling catheter care and the incidence of urinary tract infections. Smart Nursing Journal, 6(1), 1-7.

Setiadi, (2013). Concept and practice of writing nursing research. Yogyakarta: Graha Ilmu.

Setyabakti, S. (2015). Differences in the risk of nosocomial urinary tract infections based on urinary catheterization, age, and diabetes mellitus. Department of Epidemiology, Faculty of Public Health, Airlangga University, Surabaya, East Java.

Sugiyono. (2015). Mixed methods research method. (Sutopo, Ed). Bandung: Alfabeta.

Sugiyono. (2019). Statistics for research. Bandung: Alfabeta.

Sumolang, SAC, Porotu'o, J., & Soeliongan, S. (2013). Bacterial patterns in patients with urinary tract infections at Prof. Dr. RD Kandou Manado General Hospital. eBiomedik, 1(1).

Suranadi, IW (2017). Level of Knowledge About Basic Life Support (BLS) of Students of the Faculty of Medicine, Udayana University. Simdos. Unud. Ac. Id, 2.

Suryarinilsih, Y., & Aulia, M. (2018). Duration of catheter use with urinary tract infection incidence in catheterized patients. Journal of the Indonesian National Nurses Association (JPPNI), 2(3), 152-159.

Tusino, A., & Widyaningsih, N. (2018). Characteristics of urinary tract infections in children aged 0-12 years at X Hospital, Kebumen, Central Java. Biomedika, 9(2).

Vellyana, D., Irianto, G., & Rahmad, R. (2020). The technique of catheter insertion in urinary tract infection cases in the Inpatient Room of Pringsewu Regional Hospital. Indonesian Health Journal, 10(2), 115-121.

Wahyudi I. (2015). Urinary tract infection (UTI) in children in the guidelines for the management of urinary tract and male genitalia infections 2015. Jakarta: Indonesian Urology Association (IAUI)

WHO. (2013). Women's reproductive health UTI. Jakarta: Salemba Medika.

Widodo. (2019). Popular and practical research methods. (1st ed). Jakarta: Rajawali Pers.

Zimlichman, E., Henderson, D., Tamir, O., Franz, C., Song, P., Yamin, C.K., Keohane, C., Denham, C.R., & Bates, D.W. (2013). Health care-associated infections: a meta-analysis of costs and financial impact on the US health care system. JAMA internal medicine, 173(22), 2039–2046.