

Prevalence, Risk Factors and Effort to Reduce of Urinary Tract Infections in Hospitals PKU Muhammadiyah Gamping Yogyakarta

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ABSTRACT

Urinary tract infection is an infectious disease that commonly occurs in society and brings many disadvantages, including longer treatment, higher treatment costs. The purpose of this study was to analyze the prevalence, risk factors effort to reduce urinary tract infection (UTI) in PKU Muhammadiyah Gamping Hospital, Yogyakarta. The research design is an analytic observational study using a cross-sectional design. The sample in this study were patients diagnosed with Urinary Tract Infection (UTI) at the hospital from January 2020 to December 2021 and met the inclusion and exclusion criteria. The inclusion criteria were inpatients at the hospital from January 2020 to December 31, 2021 and patients diagnosed with UTI according to the hospital protocol. Exclusion criteria were patients diagnosed with UTI but incomplete data. Method of sample selection Sampling was conducted by Consecutive sampling. Retrieval of data from patient data stored in medical records. Ethical permit from PKU Muhammadiyah Gamping Hospital with number: 053/KEP-PKU/III/2023. The prevalence of UTI during 2 years of data collection was 65, with 16 being male and 49 female. There is a correlation between length of stay and the incidence of UTI with $p = 0.019$ and $OR = 2.56$, there is a correlation between age and UTI with $p = 0.001$ and $OR = 7.113$ and there is a correlation between gender and UTI with $p = 0.001$ and OR value = 4.136. The effect of length of care, age and gender on the incidence of UTI was 31.4%. The incidence of UTI is 65 cases. Factors that influence the incidence of UTI are length of stay, age and gender with a p value of 31.4%. The OR was 2.565 for length of stay, 7.113 for age and 4.136 for sex. By knowing the influential factors and the size of the OR , it is hoped that this will further increase motivation to make various efforts to reduce of UTI.

Keywords: Prevalence, risk factors, Urinary Tract Infection, Hospital

INTRODUCTION

Urinary tract infections (UTIs) are one of the most common infections occurring in outpatients¹ and cause significant morbidity and mortality both at the individual and community levels. UTIs are categorized as infections with

complications or without complications. The most common causative agent in both is the uropathogenic Gram-negative bacterium *Escherichia coli*, however, Gram-positive bacteria and fungi are also involved. Acute uncomplicated UTI in adults is characterized by the onset of acute cystitis that occurs in healthy individuals without known structural or functional abnormalities in the urinary tract. Complicated UTIs are associated with structural or functional abnormalities that increase the risk of treatment failure, or serious complications. The epidemiology of UTIs varies depending on factors such as age and gender. The incidence of UTI is higher in women than men. It is estimated that every woman will suffer at least one UTI throughout her lifetime and by the age of 24 years one in three women will have suffered at least one UTI diagnosed by a doctor as requiring antibiotic treatment¹.

The incidence of UTI in children varies according to different ages and ethnic groups. Evidence regarding the role of other risk factors for urinary tract infections is limited. In boys, circumcision status has been shown to reduce the incidence of UTI. In a meta-analysis of 12 studies, circumcision reduced the incidence of UTI with an OR of 0.13. Apart from circumcision, most previous studies have focused on vesicoureteral reflux (VUR) as a risk factor for UTI. Little is known about environmental, hygiene, or daily life factors that influence the occurrence of UTIs. In a narrative review, bladder and bowel dysfunction were mentioned as possible risk factors for UTI².

Premature birth can make a baby more likely to have a UTI. Premature babies have immature systems that are not fully developed, so they are not able to fight off infections like full-term babies. Uncircumcised boys have slightly more UTIs than circumcised boys (American Academy of Pediatrics), and proper foreskin hygiene can reduce the risk. Poor bathroom hygiene This can be a problem especially for girls, because bacteria will have a shorter distance to travel between the anus and the urinary tract³.

In the current investigation, the determination of the existence of clinical signs or symptoms, such as fever, pyuria, and/or bacteriuria, which may differ from person to person, was mostly dependent on the physician's assessment in the outpatient setting. In fact, because most infections are asymptomatic and the clinical indications are ambiguous and nonspecific, the precise diagnostic criteria for UTI in the elderly and disabled are yet unknown. Additionally, a significant death rate (22.7%) among our inpatients shows that UTI is a potentially fatal condition. Asymptomatic bacteriuria is prevalent in the elderly, with prevalence rates ranging from 5% to 20% and even higher in long-term care patients, according to several

studies. Antibiotic-associated diarrhea and *Clostridium difficile* infection are a couple of side effects that might result from improper antibiotic prescription⁴.

Enterococcus, *Proteus*, *Klebsiella*, and *Pseudomonas aeruginosa* are further frequent daughter species. Children are rarely affected by viruses or fungus, which are often limited to the lower urinary tract. The risk of UTI in children is raised by a variety of variables. These include female sex, CAKUT, urolithiasis, neurogenic bladder (NB), bladder and bowel dysfunction (BBD), diabetes mellitus (DM), and immunodeficiency⁵.

An infectious disease that frequently affects the community is UTI. Depending on the location of the infection and whether they are straightforward or complicated depending on the underlying condition and anatomical or functional abnormalities of the urinary tract, they are categorized as upper UTI (pyelonephritis) and lower UTI (cystitis, prostatitis). To avoid significant consequences, antibiotic overuse, and the expression of resistant bacteria, it is crucial to have a thorough awareness of these symptoms and to use the right antibiotics⁶.

A urinary tract infection (UTI) is an infection of the urinary system, which includes the urethra, bladder, ureters, and kidneys. UTIs are the infection type related with healthcare that receives the most reports to the National Health Safety Network. About 75% of UTIs that occur in hospitals are related to urinary catheters, which are tubes that are inserted into the bladder through the urethra to drain urine. 15–25% of hospital inpatients receive a urinary catheter throughout their stay. The primary risk factor for developing a catheter-associated UTI (CAUTI) is long-term urinary catheter use. As a result, catheters should only be used when absolutely essential and should be removed as soon as possible⁷.

The increasing risk of UTI among diabetes patients and the increasing prevalence of DM worldwide in recent years may place a significant financial burden on health services. Existing data shows that the most common bacterial infection in diabetes patients is UTI. The prevalence of UTI was 39.3%. More than half (60.6%) of the participants in this study suffered from UTI 1-2 times every year. A study conducted in Saudi Arabia found that the overall prevalence of UTI in diabetes patients was 25.3%. The prevalence of diabetic UTI was reported to be 13.8% in Ethiopia, 17.5% in India, and 9.71% in the United States⁸.

UTIs due to catheter insertion are proven to be common and provide disadvantages in the form of increased UTI incidence, increased length of hospitalization and increased costs of treatment, but research on this problem is still limited. The purpose of this study was to analyze the prevalence and risk factors for urinary tract infection (UTI) in PKU Muhammadiyah Gamping Hospital,

Yogyakarta. By knowing the influential factors and the size of the OR, it is hoped that this will further increase motivation to make various efforts to emerge UTI.

MATERIAL AND METHOD

The research design is an analytic observational study using a cross sectional design. The sample in this study were patients who were diagnosed with UTI at the hospital from January 2019 to December 2022 and met the inclusion and exclusion criteria. The inclusion criteria were inpatients at the hospital from January 2021 to December 31, 2022 and patients diagnosed with sepsis according to hospital protocol. Exclusion criteria were patients diagnosed with bacteremia but incomplete data. Method of sample selection Sampling was conducted by Consecutive sampling. Retrieval of data from patient data stored in medical records. Ethical permit from PKU Muhammadiyah Gamping Hospital with number: 053/KEP-PKU/III/2023.

RESULTS AND DISCUSSION

Below will be shown the characteristics of the respondents and the results of statistical tests regarding the length of stay, age and gender on the incidence of Urinary Tract Infection.

1. Respondent characteristics

Table 1. Respondent characteristics

Variable	n	Percentage
Length of Treatment		
> 3 days	53	81,5%
<= 3 days	12	18,5%
Age		
> 60 years	49	75,4%
<= 60 years	16	24,6%
Gender		
Female	49	75,4%
Male	16	24,6%

Source : primary data

2. Test results for the Effect of Length of Treatment, Age and Gender on the incidence of Urinary Tract Infections

Table 2. Test results for the Effect of Length of Treatment, Age and Gender on the incidence of Urinary Tract Infections

Variabel	R	B	p	OR	95% C,I,for EXP (B)	
					Lower	Upper
Length of Treatment		0,942	0,019	2,565	1,170	5,623
	0,314					14,846
Age		1,962	0,001	7,113	3,408	
Gender		1,420	0,001	4,136	1,939	8,821

Source : primary data

From table 2 it can be explained as follows :

- a. The effect of length of stay, age and gender on the incidence of UTI was 31.4%.
- b. Length of stay has an effect on the incidence of UTI with a p-value of 0.019. OR value of 2.565 (95% CI 1.170 – 5.623) means that the length of stay for more than 3 days has a risk of suffering from a UTI 2.5 times greater than the length of stay for less than 3 days.
- c. Age has an effect on the incidence of UTI with a p value of 0.001. OR value of 7.113 (95% CI 3.408 – 14.846) means that patients over 60 years of age are at risk of suffering from a UTI 7 times greater than patients aged \leq 60 years.
- d. Gender has an effect on the incidence of UTI with a value of P = 0.001. OR value of 4.136 (95% CI 1.939 – 8.821) means that female sex is at risk of suffering from UTI 4 times greater than male patients.

3. Efforts to control urinary tract infections

Among the efforts to prevent and minimize the occurrence of infections in patients, staff, visitors and the community around health service facilities is to carry out infection prevention and control, hereinafter abbreviated as PPI. PPI as implemented through the implementation of: a. standard and transmission-based precautionary principles; b. judicious use of antimicrobials; and c. bundles. Bundles are a collection of valid evidence-based practices that result in improved health service process outcomes when carried out collectively and consistently⁹.

4. Discuss

In this study, the prevalence of UTI during 2 years of data collection was 65, with 16 male and 49 female. There is a correlation between length of stay and the incidence of UTI with $p = 0.019$ and $OR = 2.56$, there is a correlation between age and UTI with $p = 0.001$ and $OR = 7.113$ and there is a correlation between gender and UTI with $p = 0.001$ and OR value = 4.136. The effect of length of care, age and gender on the incidence of UTI was 31.4%. These results need to be compared with other countries.

Depending on the population under consideration and the kind of UTI, behavioral, anatomical, or genetic risk factors for urinary tract infections (UTI) may be present. Pregnancy, for example, can increase the risk of significant infection-related problems or predispose one to a UTI. The evolvable nature of patient requirements and medical interventions means that the risk of UTI changes with time in situations that are permanent, such as neurogenic bladder dysfunction brought on by spinal cord damage. Better habits (such as better cleanliness or avoiding catheters) can manage modifiable risk factors, however preventative medication is required in the case of nonmodifiable risk factors¹⁰.

Based on bivariate analysis, it was found that female gender, previous history of UTI, sexual activity, history of catheter insertion, uncircumcised men, women using contraception, dysuria, frequency, urgency, hematuria, pelvic pain, and urinary incontinence showed a relationship with symptoms of infection. urinary tract and proceed to multivariate analysis. Therefore, in the multivariate analysis, it was found that female gender ($AOR = 7.42$, 95% CI: 1.25–43.96, $p = 0.027$), previous history of UTI ($OR = 5.75$, 95%, CI: 1.70–19.4, $p = 0.005$), sexual activity ($OR = 2.16$, 95% CI: 1.149–3.69, $p = 0.012$) and history of catheterization ($OR = 18.2$, 95% CI: 4.45–74.77, $p \leq 0.001$) were significant factors associated with urinary tract infections. Among the currently observed UTI symptoms is pelvic pain ($OR = 3.776$, 95% CI: 1.55–9.18, $p = 0.003$) significantly associated with urinary tract infections¹¹. Age, gender, the habit of holding in urine, cleanliness of the genitals, and the habit of not drinking enough water are risk factors for urinary tract infections both independently and simultaneously¹².

Additionally connected to behavioral risk factors are UTIs in women. A sedentary lifestyle of more than six hours per day, delayed urination, and poor personal hygiene are associated with an increased risk of recurrent UTI in postmenopausal women. We have investigated assessing additional potential risk factors for UTI in women, such as behavioral and attitudinal traits. We

hypothesized that a woman's chance of developing a urinary tract infection (UTI) would be significantly increased if she persistently retained her urine. By employing statistical analysis, we conducted a study to identify the many factors that contribute to urine retention and to test these factors scientifically¹³.

Gestational age is another risk factor that is significantly associated with UTI in pregnant women. UTIs are more common in the second trimester of pregnancy (57.1%) and are four times more likely to contract a UTI than women in the first trimester of pregnancy. Sexual activity is also significantly associated with UTI in pregnant women. This study shows that pregnant women who have had at least one sexual intercourse in the last two weeks are three times more likely to be at risk of developing a UTI than women who have not had sexual intercourse during that time period. Sexual activity increases the possibility of contamination of the urethra during intercourse and increases the risk of bacteria entering the urethra¹⁴.

In patients over 65 years of age, the genitourinary system is the most common site for sepsis and urinary tract infections. In this study, patients in the old and very old groups had different clinical manifestations in male gender, multiple comorbidities, febrile status during hospitalization, more worsened renal function, and increased Klebsiella species, Enterococcus species, and Pseudomonas species which isolates and degrades E. coli. coli isolation compared with the younger age group. Increasing age is a risk factor for sudden worsening of sepsis to severe sepsis and septic shock. The results of our study show that very old UTI patients are more susceptible to uroseptic shock than young patients with UTI. Bacteremia is independently associated with uroseptic shock in very old UTI patients¹⁵.

The three most prevalent benign disorders in urology are benign prostatic hyperplasia (BPH), urinary tract infections (UTI), and urolithiasis. In contrast to cancer, which shortens life expectancy, this urological benign condition significantly reduces people's quality of life. Around 10.50 million outpatient visits and 2-3 million trips to the emergency room were made for UTIs in the US in 2007, and \$3.50 billion was spent on the condition in 2015. According to a comprehensive review and meta-analysis of 31 research, the prevalence of lifetime BPH is 26.20%. The prevalence of urolithiasis varies by area; in Australia in 2000, it was 7.0%; in Spain in 2007, it was 5.06%; in the United States it was 8.80%; and in China it was 6.50%. The prevalence of urolithiasis varies by area; in Australia in 2000, it was 7.0%; in Spain in 2007, it was 5.06%; in the United States it was 8.80%; and in China it was 6.50%. Over the past 50 years, urolithiasis has had a significant impact on society; in 2014, it was predicted to cost \$5.30 billion annually. Aging populations, socioeconomic advancements, and improvements in illness

prevention and control have all contributed to changes in the disease spectrum during the past few decades. However, thorough and recent epidemiological data on UTI, urolithiasis, and BPH are still lacking¹⁶.

UTIs can result in more serious infections like sepsis and are among the third most frequent bacterial infections among older patients that require hospitalization for infection-related reasons. According to a 2016 study from the Centers for Disease Control and Prevention's Emerging Infections Program, 42% of sepsis cases originated in the community, and 25% of individuals hospitalized with sepsis also experienced UTI. 61.8% of patients between 2012 and 2014 had sepsis that was acquired in the community¹⁷.

Urinary tract infections caused by catheters are a frequent nosocomial infection. The Centers for Medicare and Medicaid Services started charging institutions with CAUTI rates that are greater than expected financial penalties in 2015. Although it is not a clinical diagnosis, the monitoring definition for CAUTI may refer to asymptomatic bacteriuria¹⁸.

A typical infectious disease in society is urinary tract infection (UTI). Depending on the location of the infection and whether they are straightforward or complicated depending on the underlying condition and anatomical or functional abnormalities of the urinary tract, they are categorized as upper UTI (pyelonephritis) and lower UTI (cystitis, prostatitis). Clinical signs and symptoms of UTI range from asymptomatic bacteriuria to septic shock. To avoid significant problems and antibiotic abuse as well as to stop the development of resistant bacteria, it is crucial to have a thorough understanding of these symptoms and to use the proper antibiotics¹⁹.

Guidelines for treating lower urinary tract infections are straightforward in light of rising antibiotic resistance because, as of 2010, nitrofurantoin and fosfomycin were suggested as first-line treatments. Since then, its use has multiplied dramatically. Nitrofurantoin has been shown to be less effective than newer medications like fluoroquinolones in a meta-analysis of randomized clinical studies, while this has not been seen for fosfomycin. Fosfomycin had a 70% efficacy rate in clinical trials conducted in the 1990s compared to 96% and 94% for ciprofloxacin and trimethoprim/sulfamethoxazole, respectively²⁰.

There are 9 tips for reducing UTIs, namely: when cleaning the genitals, wipe the genitals from front to back, drink lots of fluids, avoid holding in urine, urinate before and after sex, avoid various perfumed products (will increase bacterial growth), consume probiotics, use antibiotics, consume cranberries. Apart from that, avoid using contraceptives that have an impact on the growth of

dangerous bacteria, including diaphragms, condoms that are not lubricated, spermicides and spermicidal condoms²¹.

Among the efforts to prevent urinary tract infections is the management of recurrent urinary tract infections which involves optimizing personal hygiene, using vitamin C as a urine acidifier, taking extra precautions after sexual contact, and using prophylactic antibiotics or antiseptics such as nitrofurantoin and methenamine. From the research results, there is evidence of its efficacy. The duration of prophylactic treatment is generally 6 to 12 months. The use of estrogen vaginal cream applied twice a week can help postmenopausal women with atrophic vaginitis²².

CONCLUSION

The incidence of UTI is 65 cases. Factors that influence the incidence of UTI are length of stay, age and gender with a p value of 31.4%. The OR was 2.565 for length of stay, 7.113 for age and 4.136 for sex. By knowing the influential factors and the size of the OR, it is hoped that this will further increase motivation to make various efforts to emerge UTI.

AUTHORS' CONTRIBUTIONS

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