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Overview of Microorganisms Causing Urinary Tract Infections at Cut Meutia General Hospital, North Aceh, Indonesia

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A B S T R A C T

Introduction: Urinary tract infection (UTI) is a general term that refers to the presence of microorganisms in the urine. Bacteria and fungi are the causative agents of urinary tract infections, which can be found in the urine of someone who is indicated to be suffering from a urinary tract infection. This study aimed to provide an overview of microorganisms that cause urinary tract infections in Cut Meutia General Hospital, North Aceh, Indonesia. **Methods:** This study is a descriptive observational study. A total of 100 research subjects participated in this study. Data analysis on the distribution of microorganisms that cause UTIs was carried out in a univariate. **Results:** The majority of microorganisms that cause urinary tract infections are *Escherichia coli.* In addition, other microorganisms as the cause of urinary tract infections are *Klebsiella pneumoniae, Acinetobacter baumannii, Proteus mirabilis, Klebsiella oxytoca,* and *Pseudomonas aeruginosa.* **Conclusion:** *Escherichia coli* is the most common microorganism that causes urinary tract infections at Cut Meutia General Hospital, North Aceh, Indonesia.

1. Introduction

Urinary tract infection (UTI) is a general term that refers to the presence of microorganisms in the urine. UTI is a collective term that describes any infection involving the urinary tract from the kidneys, ureters, and bladder to the urethra. Patients who have urinary tract disorders and there are significant amounts of bacteria in the urine can be categorized as having symptomatic urinary tract infections. Female gender and old age are risk factors. In Indonesia, it is recorded that 5-15% of the population has experienced urinary tract infections, with an average number of sufferers of 90-100 cases per 100,000 population per year.[1-5]

Bacteria and fungi are the causative agents of urinary tract infections, which can be found in the urine of someone who is indicated to be suffering from a urinary tract infection. The bacteria that usually cause urinary tract infections are *E. coli, klebsiella sp, proteus sp, Providencia, citrobacter, P. aeruginosa, acinetobacter, enterococcus faecalis,* and *Staphylococcus saprophyticus;* however, about 90% of urinary tract infections are caused by bacteria *E. coli.* Symptoms that can be caused if someone has a urinary tract infection are feeling pressure and pain in the lower back, dysuria, polyuria, nocturia, hematuria, and unable to hold urine.[6-8]

The mechanism of urinary tract infection is divided into 2 names ascending infection and hematogenous infection. The bacteria that infect the urinary tract of them is uropathogenic *Escherichia coli,* abbreviated UPEC. UPEC attaches to the surface of epithelial cells (facets) in type 1 pilus. The host defense mechanism to combat the pathogenic nature of these bacteria is to activate lysosomal enzymes found in bladder epithelial

cells. The hematogenous pathway is more difficult to find in cases of urinary tract infection. Usually caused by prolonged bacteraemia or preceded by infectious endocarditis.[9-11] This study aimed to provide an overview of microorganisms that cause urinary tract infections at Cut Meutia General Hospital, North Aceh, Indonesia.

2. Methods

This study was a descriptive observational study. and used primary data from a direct examination of research subjects at the internal medicine polyclinic, Cut Meutia General Hospital, North Aceh, Indonesia. A total of 100 research subjects participated in this study, and the research subjects met the inclusion criteria. The inclusion criteria were patients who went to the Internal Medicine Polyclinic at Cut Meutia General Hospital, North Aceh, Indonesia, with a diagnosis of urinary tract infection, aged over 18 years, and willing to participate in this study by signing an informed consent form. This study was approved by the medical and health research ethics committee at Cut Meutia General Hospital, North Aceh, Indonesia.

This study observed the sociodemographic data of the research subjects and the microbiological data of the research subjects. Taking specimen microbiology was carried out by taking midstream urine and catheter urine from the research subjects, then examining the microorganism culture at the central laboratory of Cut Meutia General Hospital, North Aceh, Indonesia. Data analysis was carried out using SPSS software version 21. Univariate analysis was performed to present the univariate data distribution in the form of frequency distribution and percentage of each variable.

3. Results and Discussion

Table 1 presents the sociodemographic description of the research subjects. The majority of research subjects are between 26-35 years old. The majority of research subjects work as civil servants, and most research subjects have undergraduate education.

Table 1. Sociodemographic description of research subjects.

No.	Variable	Frequency	Percentage
1.	Age		
	18-25 years	25	25
	26-35 years	39	39
	36-45 years	22	22
	46-60 years	14	14
2.	Occupation		
	Not working	27	27
	Civil servant	38	38
	Private	35	35
3.	Education		
	Senior high school	23	23
	Diploma	27	27
	Bachelor degree	50	50

Table 2 presents an overview of microorganisms that cause urinary tract infections. The majority of microorganisms that cause urinary tract infections are *Escherichia coli*. In addition, other microorganisms that cause urinary tract infections are *Klebsiella pneumoniae, Acinetobacter baumannii, Proteus mirabilis, Klebsiella oxytoca,* and *Pseudomonas aeruginosa*. This study also showed the discovery of a fungal microorganism, namely *Candida albicans,* as one of the causes of urinary tract infections.

Table 2. Overview of microorganisms that cause urinary tract infections.

No.	Microorganisms	Frequency	Percentage
1.	*Escherichia coli*	54	54
2.	*Klebsiella pneumoniae ssp. Pneumoniae*	16	16
3.	*Acinetobacter baumannii*	12	12
4.	*Proteus is wonderful*	10	10
5.	*Klebsiella oxytoca*	3	3
6.	*Candida albicans*	4	4
7.	*Pseudomonas aeruginosa*	1	1

Urinary tract infection is a bacterial infection**.** It is most common in women of all ages, but its incidence increases with age. Age-related changes in immune function, exposure to nosocomial pathogens, and an increase in the number of comorbidities put the elderly at a higher risk of infection. In another study, it was stated that the prevalence of women over the age of 65 years was 20%, having a greater risk of developing urinary tract infections.[12-15] Another study mentioned between patients older than 65 years with uncomplicated cystitis, *E. coli* remains the main pathogen, causing almost two-thirds of cases, followed by *Klebsiella oxytoca* (15% of cases).[16] Overall, gram-negative bacteria are present in more than 90% of cases of cystitis in older adults. The microbiology of catheter-associated UTI (CAUTI) is more diverse. *E. coli is* still the most common pathogen but only reached 23.9% of cases, while the rates of *Candida spp* (17.8%), *Enterococcus spp (*13.8%), and *Pseudomonas aeruginosa* (10.3%) were significantly higher than those reported in patients without a catheter.[17,18] Another study showed that the yield of microorganisms in urine culture was *E. coli* (75,7%). Other studies show that *E. Coli* is the most common microorganism that causes urinary tract infections, as much as 51% of the total sample used. In line with the results of this study, other studies have also shown that microorganisms *E. coli* are the microorganisms most frequently found in patients with urinary tract infections.[19,20]

4. Conclusion

Escherichia coli is the most common microorganism that causes urinary tract infections at Cut Meutia General Hospital, North Aceh, Indonesia.

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