

p-ISSN 2301-9123 | e-ISSN 2660-5441

# GLOBAL MEDICAL AND HEALTH COMMUNICATION

Published by  
UM Faldrean Press  
Universita Islam Faldrean

**APR** 2024 VOL. 12 NO. 1



# GLOBAL MEDICAL AND HEAL

[HOME](#)
[ABOUT](#)
[LOGIN](#)
[REGISTER](#)
[CATEGORIES](#)
[SEARCH](#)
[Home](#) > [About the Journal](#) > **Editorial Team**

## USER

 Username 

 Password 
 Remember me

**Global Medical and Health Communication** Indexed by:



**Global Medical and Health Communication**

Submission Template



Journal  
Submission  
Template

## EDITORIAL TEAM

### Editor in Chief

[Santun Bhakti Rahimah](#), Department of Pharmacology, Faculty of Medicine, Universitas Islam Bandung, Indonesia

### Managing Editor

[Winni Maharani](#), Department of Microbiology, Faculty of Medicine, Universitas Islam Indonesia

### External Editorial Board

[Badrul Hisham Yahaya](#), Advanced Medical and Dental Institute, Universiti Sains Malaysia  
[Jerico Franciscus Pardosi](#), School of Public Health and Social Work, Queensland University of Technology, Queensland, Australia

[Roy Rillera Marzo](#), Asia Metropolitan University, Johor, Malaysia

### Internal Editorial Board

[Ike Rahmawaty Alie](#), Department of Physiology, Faculty of Medicine, Universitas Islam Indonesia

[Indri Budiarti](#), Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Islam Bandung, Indonesia

[Lisa Adhia Garina](#), Department of Child Health, Faculty of Medicine, Universitas Islam Indonesia

[Mirasari Putri](#), Department of Biochemistry, Nutrition, and Biomolecular, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

[Yuktiana Kharisma](#), Department of Pathology Anatomy, Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

### Proofreader

[Herry Garna](#), Department of Child Health, Faculty of Medicine, Universitas Islam Bandung

### Copyeditor

[Yudi Feriandi](#), Department of Medical Education, Bioethics, Humaniora and Islamic Studies, Universitas Islam Bandung, Bandung, Indonesia

### Layout Editor

[Agus Chalid](#), Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

### Editorial Assistants

[Agus Chalid](#), Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

[Ihsan Mulyadi Kurniawan](#), Faculty of Medicine, Universitas Islam Bandung, Bandung, Indonesia

pISSN 2301-9123 | eISSN 2460-5441

### Ethical Statement Template



### Copyright Transfer Statement



### RECOMMENDED TOOLS

EndNote

MENDELEY

turnitin

grammarly

Visitor since 19 October 2016:

0000192103



Global Medical and Health Communication is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](#).



# GLOBAL MEDICAL AND HEAL

[HOME](#)
[ABOUT](#)
[LOGIN](#)
[REGISTER](#)
[CATEGORIES](#)
[SEARCH](#)
[Home](#) > [Archives](#) > **Vol 12, No 1 (2024)**

## USER

 Username 

 Password 
 Remember me

## Global Medical and Health Communication Indexed by:



## Global Medical and Health Communication

Submission Template


 Journal  
Submission  
Template

## VOL 12, NO 1 (2024)

 DOI: <https://doi.org/10.29313/gmhc.v12i1>

## APRIL 2024

### TABLE OF CONTENTS

#### Articles

[AI-SPOT: a Novel Artificial Intelligence-enabled Sport Optimization Tracker to Enhance Performance and Prevent Injury in Elite Footballers](#)

Aaron Chen Angus, Dinesh Sirisena

[The Relationship Level of Self-medication Knowledge with Rationality of Drug Use in Adolescents](#)

Muhammad Cariefzi Zahdffa Kusuma, Meiyanti Meiyanti

[Patient Safety Incident Reporting Challenges in Indonesian Private Hospitals](#)

Ekorini Listiowati, Merita Arini, Mochamad Iqbal Nurmansyah, Emma Rachmawati Samsudin

[Vitamin D Levels and Their Correlation with Predisposing Factors and Estimated Fetal Weight in Third Trimester of Pregnancy: an Observational Study](#)

Dwiwahju Dian Indahwati, Diana Krisanti Jasaputra, Arief Budiono, Julia Windi Gusti Ronny Lesmana, Steven Zerine Putra Kusmawan

[Epidemiologic Spatial Analysis of a Tuberculosis Incidence in Bandung City in 2021](#)

Dony Septriana Rosady, Nysa Ro Aina Zulfa, Sony Bagja Pratama

[Ethnomedicinal Plants Used for Treatment of Infectious Diseases by Dayak Ethnic in Borneo, Indonesia](#)

Nawan Nawan, Septi Handayani, Agnes Immanuela Toemon

[Blood Pressure, Total Cholesterol, and Triglycerides Associated with Cardiovascular Score in Low 25-Hydroxy Vitamin D Level among Online Motorcycle Drivers, Jakarta Indonesia](#)

Joice Viladelvia Kalumpiu, Elly Herwana, Yenny Yenny, Kurniasari Kurniasari

[Correlation of NLR and D-dimer Levels with Clinical Severity of COVID-19 and Determination of Cut-off Values at a Hospital in Cirebon](#)

Fitria Ratna Sari, Rika Nilapsari

[Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Motorcycle Drivers in Jakarta, Indonesia](#)

Ida Effendi, Thomas Robertus, Jihan Samira, Arleen Devita, Widayarsi Kumala, Is

[Ruang Sehat: Innovating Portable Lactation Pods for Wellness Tourism Using Design Thinking Method in Yogyakarta](#)

Giyawati Yulilania Okinarum, Venny Vidayanti, Sri Hasta Mulyani

[Clinicopathological Characteristics of Breast Cancer at Cibabat Regional General Hospital in 2022–2023](#)

Meike Rachmawati, Nuzirwan Acang, Wida Purbaningsih, Rian Robian, Adhi Nugraha Rina Melati, Aryanti Aryanti, Aninditya Putri Anugrah, Nazmy Noor Laila

**Ethical Statement Template**



**Copyright Transfer Statement**



**Tuberculosis Treatment Using a Religious Approach**

Olih Solihin, Djuara P Lubis, Pudji Hasta Muljono, Siti Amanah

pISSN 2301-9123 | eISSN 2460-5441

**Visitor** since 19 October 2016:

**0000192099**



**RECOMMENDED TOOLS**

EndNote









MENDELEY

turnitin

grammarly

**Visitors**

See more ▶

 155.550	 4.727	 941	 591
 14.410	 1.380	 620	 562



**Global Medical and Health Communication** is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](#).

## RESEARCH ARTICLE

## Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Online Motorcycle Drivers in Jakarta, Indonesia

Ida Effendi, Thomas Robertus, Jihan Samira, Arleen Devita, Widyasari Kumala, Isa Bella

Department of Microbiology, Faculty of Medicine, Universitas Trisakti, West Jakarta, Indonesia

### Abstract

Urinary tract infection (UTI) is a bacterial infection that contributes significantly to morbidity rates. UTI is a health concern due to multidrug-resistant (MDR) organisms. Therefore, the profile of bacteria and antibiotic susceptibility patterns are very important to know in order to make the best treatment choice. Working as an online motorcycle (*ojol* driver) carries a risk of urinary tract infections. Online drivers are assumed to often hold their urination for short or long periods. The descriptive study with a cross-sectional design was conducted to obtain the prevalence of urinary tract infections, bacteria profile, and antibiotic susceptibility in urine specimens collected from Jakarta *ojol* drivers in September 2022–March 2023. Of 98 midstream urine specimens, 17 samples are considered to have UTI (17.34%). The identification of the 17 isolates shows that the microorganisms' distribution was more likely to be caused by Gram-positive than Gram-negative bacteria (70.59%). The causative bacteria were coagulase-negative *Staphylococcus* (17.65%), *Escherichia coli* (11.76%), and *Enterococcus faecalis* (11.76%). Our results showed that the prevalence of urinary tract infections in *ojol* drivers is high with the distribution of the causative organisms by coagulase-negative *Staphylococcus*, *Escherichia coli*, and *Enterococcus faecalis* and still showed good susceptibility to narrow-spectrum antibiotics such as cotrimoxazole.

**Keywords:** Antibiotic susceptibility, bacteria, *ojol* drivers, urinary tract infection prevalence

### Introduction

It has been estimated that about 150 million people worldwide develop urinary tract infections each year, with high social costs in terms of hospitalizations and medical expenses.<sup>1</sup> Urinary tract infections (UTI) are a significant cause of morbidity in infant boys, older men, and females of all ages.<sup>2</sup> Urinary tract infection is an infection that is often found in women aged 16–35 years; 10% of these women suffer from UTI annually, and more than 40–60% suffer from UTI at least once during their life. Recurrent infections are common; almost half will get a second infection within one year. Urinary tract infections occur at least four times more often in women than men. In men, UTI generally occurs at the age of over 50 years; infection under 50 years occurs with a lower prevalence.<sup>3</sup>

A definite diagnosis of urinary tract infection can be established if significant bacteriuria is found. Bacteriuria is a general term indicating the presence of bacteria in the urine on

laboratory findings.<sup>4</sup> Based on the findings of the number of bacteria in the urine, it was significant bacteriuria if the urine culture showed the growth of pure microorganisms more than  $\geq 10^5$  colony forming units/ml (CFU/ml) in two consecutive sampling.<sup>5–7</sup> Bacteriuria with a bacterial count of 1,000–100,000 CFU/ml accompanied by a clinical presentation can be managed according to urinary tract infections. Asymptomatic bacteriuria occurs when bacteria are found in urine culture with a count of  $>10^5$  CFU/ml and do not cause clinical symptoms of UTI.<sup>5–7</sup> Asymptomatic bacteriuria is not defined as a urinary tract infection.<sup>8</sup> Gram-negative, Gram-positive, and fungi can be found in bacteriuria. A single bacterial species causes most cases of UTI. Symptomatic bacteriuria (UTI) is generally caused by uropathogenic colonization of the urinary tract.<sup>9</sup> Uropathogenic *Escherichia coli* (UPEC) is the dominant infectious agent in UTI. Meanwhile, infection by the Gram-positive bacteria *Staphylococcus saprophyticus* is less common. The use of antibiotics in cases of

Copyright ©2024 by authors. This is an open access article under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-nc-sa/4.0>).

Received: 14 July 2023; Revised: 30 April 2024; Accepted: 30 April 2024; Published: 30 April 2024

**Correspondence:** dr. Ida Effendi, Sp.M.K. Department of Microbiology, Faculty of Medicine, Universitas Trisakti. Jln. Kyai Tapa No. 260, West Jakarta 11440, Special Capital Region of Jakarta, Indonesia. E-mail: [idaeffendi@trisakti.ac.id](mailto:idaeffendi@trisakti.ac.id)

infection (UTI) is very recommended, but incorrect use and overuse create new health problems. The relative frequency of uropathogens varies depending on age, sex, catheterization, hospitalization, and previous antimicrobial exposure.<sup>9</sup> Some bacteria can develop resistance to certain antimicrobials. It is essential to update the sensitivity patterns of antimicrobials periodically because they vary and change in place and at different times.<sup>10</sup> UTI is a health concern due to multidrug-resistant (MDR) organisms.<sup>11</sup>

In recent years, the profession of an online motorcycle driver (online driver/*ojol*) has been popular due to public demand, and it can provide a good income. The non-governmental organization Prakarsa surveyed 213 online drivers and obtained results showing that 30% of online drivers tended to work beyond working hours (>8 hours/day).<sup>12</sup> The profession as an online driver has a risk of urinary tract infections caused by lack of hydration and the behavior of frequently holding urine for short or long periods.<sup>7,13</sup> In most cases, holding your urine briefly is not dangerous. However, urine retained in the bladder decreases bacterial eradication and increases bacterial growth, associated with an increased risk of infection in the urinary tract.<sup>14</sup>

This study aimed to provide information regarding the bacteria and its susceptibility profile as the frequent infectious agent found in *ojol* drivers' community urinary tract infections.

## Methods

A descriptive study with a cross-sectional approach was conducted at the Faculty of Medicine Universitas Trisakti, West Jakarta city, Indonesia between September 2022–March 2023. The inclusion criteria were *ojol* drivers of all genders aged 17–60 years old. Consumption of any antibiotics in the last week was excluded. The information about gender, age, and length of work was collected by filling out the form. Data about the clinical manifestation of urinary tract infection was collected from the questionnaire. Collection of midstream urine is required to perform bacteria culture. We used a 0.01 µl sterile loop to streak the specimen to media cultivation and incubate it at 2–8°C for 18–24 hours before we did a colony count to obtain the number of colonies in CFU/ml. Species identification and antibiotic testing are performed from isolates with colony number 100,000 CFU/ml or 1,000–

10,000 CFU/ml with UTI symptoms data. Data analysis was performed descriptively using tables and narrative statements, which include the distribution of respondents' characteristics (age, sex, length of work, clinical manifestations, UTI status, bacterial profile, and antibiotic susceptibility pattern. All data were shown as numbers and percentages. Ethics Committee approval was given for this research (ethical clearance number: 167/KER/FK/VIII/2022).

## Results

This study obtained 98 urine specimens from 98 respondents (Table 1). The respondents were men-dominant (78.94%). The age group is between 17 and 40 years (67.35%). The average respondent has worked for 1–5 years as an online driver (72.63%). After the urine culture was performed, there were three samples with a colony count of >10<sup>5</sup> CFU/ml (significant bacteriuria) on agar culture and 14 samples with a colony count of 1,000–100,000 with clinical symptoms of a urinary tract infection. Of the total respondents who filled out the questionnaire, 25 respondents stated that they had at least one of the symptoms of cloudy colored urine, urinating more than one time during sleep at night, urinating in small quantities and frequently, voiding feeling incomplete, pain or burning feeling while urinating.

In this study, culture identification and

**Table 1** Distribution of Respondents

Respondents Characteristics	n=98 (%)
Gender	
Male	77 (78.57)
Female	21 (21.43)
Age (years)	
17–40	66 (67.35)
41–60	32 (32.65)
Length of work (year)	
<1	2 (2.04)
1–5	69 (70.41)
>5	27 (27.55)
UTI manifestation	
Yes	25 (25.51)
No	73 (74.49)
Confirmed UTI	
Confirmed	17 (17.34)
Not confirmed	81 (82.65)

**Table 2 Distribution of Bacteria Causing Urinary Tract Infections**

Microorganisms	n=98 (%)
Gram-negative	5 (29.41)
<i>Escherichia coli</i>	2 (11.76)
<i>Enterobacter cloacae</i> complex	1 (5.88)
<i>Pantoea</i> sp.	1 (5.88)
<i>Sphingomonas paucimobilis</i>	1 (5.88)
Gram-positive	
<i>Enterococcus faecalis</i>	2 (11.76)
<i>Staphylococcus aureus</i>	1 (5.88)
Coagulase-negative <i>Staphylococcus</i>	3 (17.65)
<i>Streptococcus agalactiae</i>	1 (5.88)
<i>Kochuria rosea</i>	1 (5.88)
<i>Corynebacterium minutissimum</i>	2 (11.76)
<i>Corynebacterium amycolatum</i>	1 (5.88)
<i>Corynebacterium</i> sp.	1 (5.88)

antibiotic sensitivity were carried out in specimens with bacteriuria  $\geq 100,000$  CFU/ml or 1,000-100,000 CFU/ml with clinical manifestation of UTI. Seventeen isolates from 17 samples were identified. Data were obtained from the identification of bacteria (Table 2).

From Table 2, the infectious agents of urinary tract infections in ojol drivers in this study were more commonly caused by Gram-positive bacteria than Gram-negative bacteria. In the Gram-negative group, *Escherichia coli* is the most common species found in UTIs. In the Gram-positive group, coagulase-negative *Staphylococcus* is the most common species, followed by *Enterococcus faecalis*.

The antibiotic sensitivity test was carried out with the identification test to obtain the sensitivity pattern of the tested bacteria. Tables 3 and Table 4 show the description and pattern of

sensitivity of Gram-negative and Gram-positive bacteria, respectively.

We use 9–17 antibiotic disks in the Gram-negative bacteria sensitivity test. All *Escherichia coli* bacteria are sensitive (100%) to the antibiotics amikacin, aztreonam, cefazolin, cefepime, ceftazidime, ceftriaxone, ertapenem, fosfomycin, meropenem, nitrofurantoin, piperacillin-tazobactam, tigecycline, trimethoprim-sulfamethoxazole. The *Escherichia coli* bacteria obtained were excluded from the extended-spectrum beta-lactamase (ESBL) group.

In Gram-positive bacteria, 6–18 antibiotic discs are used for sensitivity testing. Cefoxitin test was only carried out on *Staphylococcus* sp. bacteria (*Staphylococcus aureus*, *Staphylococcus shiurim*, *Staphylococcus xylosus*, and *Staphylococcus haemolyticus*) with negative results. All *Enterococcus faecalis* bacteria show sensitivity (100%) to the antibiotics ampicillin, benzylpenicillin, ciprofloxacin, gentamycin, levofloxacin, linezolid, nitrofurantoin, streptomycin, tigecycline, and vancomycin.

**Discussion**

Urinary tract infections (UTIs) are among the most common and severe infections in community and hospital environments. They are an important health concern because the number of multiresistant bacteria that cause them is increasing.

The prevalence of UTI in this study was 17.34%. This figure is higher than the prevalence of UTI stated by Mayangsari et al.<sup>15</sup> and Rosana et al.<sup>16</sup> This study showed that the incidence of UTI was more common in women (52.90%). Urinary tract infections occur at least four times more often in women than men in a previous study by Bono et al.<sup>3</sup> Syaikacitta et al.<sup>17</sup> also found in their

**Table 3 Bacterial Profile and Antibiotic Susceptibility Pattern of Gram-negative Bacteria**

No	Microorganisms	No of Isolate	Antibiotics																						
			AK	AMP	AMS	ATM	CZO	FEP	CAZ	CRO	CXM	CIP	DOR	ETP	FOS	GEN	IPM	LVX	MEM	NIT	TZP	TGC	SXT	ESBL	
1	<i>Escherichia coli</i>	2	100	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	Neg	
2	<i>Enterobacter cloacae</i> complex	1	100	0	0	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-
3	<i>Pantoea</i> sp.	1	100	-	100	-	-	100	-	-	100	-	100	-	100	-	-	100	0	-	-	-	0	-	
4	<i>Sphingomonas paucimobilis</i>	1	100	-	100	-	-	100	-	-	0	100	-	-	0	-	0	0	-	-	-	-	-	-	

Note: n=5, -: not tested, AK: amikacin, AMP: ampicillin, AMS: ampicillin-sulbactam, ATM: aztreonam, CZO: cefazoline (urine), FEP: cefepime, CAZ: ceftazidime, CRO: ceftriaxone, CXM: cefuroxime, CIP: ciprofloxacin, DOR: doripenem, ETP: ertapenem, fosfomycin: FOS, gentamycin: GEN, imipenem: IPM, levofloxacin: LVX, meropenem: MEM, nitrofurantoin: NIT, TZP: , TGC: piperacillin-tazobactam tigecycline, SXT: trimethoprim-sulfamethoxazole, ESBL: extended-spectrum beta-lactamase



**Table 4** Bacterial Profile and Antibiotic Susceptibility Pattern of Gram-positive Bacteria

No	Microorganisms Gram-negative	No of Isolate	Antibiotics																					
			AMP	P	FEP	C	CIP	DA	GEN	LVX	LZD	MXF	NIT	OXA	QD	RIF	STR	TE	TGC	SXT	VAN	CS	ICR	
1	<i>Enterococcus faecalis</i>	2	100	100	-	-	100	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2	<i>Staphylococcus aureus</i>	1	-	0	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	Neg	Neg	
3	Coagulase-negative <i>Staphylococcus</i>	3	-	33.3	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	Neg	Neg	
4	<i>Streptococcus agalactiae</i>	1	100	100	-	-	-	100	-	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
5	<i>Kochuria rosea</i>	1	-	-	100	100	-	-	-	-	100	-	-	-	-	-	-	0	-	100	-	-	-	
6	<i>Corynebacterium minutissimum</i>	2	-	-	0	100	-	-	-	-	100	-	-	-	-	-	-	100	-	0	-	-	-	
7	<i>Corynebacterium amycolatum</i>	1	-	-	0	0	-	-	-	-	100	-	-	-	-	-	-	100	-	0	-	-	-	
8	<i>Corynebacterium</i> sp.	1	-	-	0	100	-	-	-	-	100	-	-	-	-	-	-	100	-	0	-	-	-	

Note: n=12, -: not tested, AMP: ampicillin, P: benzylpenicillin, FEP: cefepime, C: chloramphenicol, CIP: ciprofloxacin, DA: clindamycin, E: erythromycin, GEN: gentamycin, LVX: levofloxacin, LZD: linezolid, MXF: moxifloxacin, NIT: nitrofurantoin, OXA: oxacillin, QD: quinupristin-dalfopristin, RIF: rifampicin, STR: streptomycin, TE: tetracycline, TGC: tigecycline, SXT: trimethoprim-sulfamethoxazole, VAN: vancomycin, CS: ceftioxin screen, ICR: inducible clindamycin resistance

research that the highest incidence of UTI was in females (57.58%) compared to males (12.12%). Anatomically, women have shorter urethra and the proximity of the external urethral meatus to the anus compared to men, and these are risk factors that increase urinary tract infections through the ascending route.<sup>6</sup>

Bacteria found were more Gram-positive (70.59%) than Gram-negative (29.41%). *Escherichia coli* is the most Gram-negative bacteria (40%). At the same time, the most Gram-positive is coagulase-negative *Staphylococcus* (25%), followed by *Enterococcus faecalis* (16.67%). The results of this study showed a different variety of etiological agents from previous research. Previous retrospective research showed the most common bacteria found were Gram-negative, namely *Escherichia coli* and *Klebsiella pneumoniae*.<sup>10</sup> Similar studies in Pawe General Hospital in Northwest Ethiopia showed that the most predominant bacterium isolated from urine is *Escherichia coli*, which belongs to Gram-negative.<sup>18</sup> Study results in 2019–2020 from patients with UTI at Islamic Hospital Surabaya, Indonesia, showed the proportion Gram-negative and Gram-positive was 52.0% and 48% with dominantly *Escherichia coli* and *Enterococcus* sp.<sup>17</sup>

Most of the Gram-positive bacteria found are sensitive to all antibiotics. Coagulase-negative *Staphylococcus* is 100% sensitive to the antibiotics ciprofloxacin, levofloxacin, moxifloxacin, vancomycin, linezolid, tigecycline, and cotrimoxazole. *Staphylococcus* sp. bacteria were found to be 100% sensitive to ceftioxin and not included in the methicillin-resistant *Staphylococcus* group, so they can

still be killed with beta-lactam antibiotics, for example, cephalosporins 1<sup>st</sup> and 2<sup>nd</sup> generation. Other narrow-spectrum antibiotics, such as cotrimoxazole, have susceptibility test results that are still very good (100%). *Enterococcus faecalis* bacteria were found 100% sensitive to the antibiotics penicillin, ampicillin, ciprofloxacin, levofloxacin, vancomycin, linezolid, and tigecycline, while other studies showed many *Enterococcus* spp. were resistant to vancomycin (vancomycin-resistant enterococci, VRE) and beta-lactams vary in each region due to intrinsic and acquired antibiotic resistance genes.<sup>19,20</sup>

Meanwhile, the most common Gram-negative bacteria isolate, *Escherichia coli*, is not an ESBL-producing strain. This bacterium is still sensitive to most beta-lactam antibiotics and cotrimoxazole. Other studies showed vast differences in bacteria and their susceptibility patterns. According to the sensitivity profiles, Zúniga-Moya et al.<sup>21</sup> found the most effective antibiotics were fosfomycin (68.9%), amikacin (68.4%), nitrofurantoin (62.5%), gentamicin (60.5%), and ceftriaxone (50.1%).

Antibiotic cotrimoxazole (trimethoprim-sulfamethoxazole) has been a first-line drug in urinary tract infections since 1960. It shows good effectiveness against most *Enterobacteriaceae* and *Staphylococcus* sp. in UTI.<sup>22</sup> Our study demonstrated that narrow-spectrum antibiotics such as cotrimoxazole can still be used as a choice for uncomplicated UTI therapy since it has 100% sensitivity. This result is in concordance with a study conducted by Rosana et al.<sup>16</sup> that revealed the effectiveness of cotrimoxazole for uncomplicated UTI in outpatients in Indonesia.

Decreased susceptibility was found

in quinolones antibiotics. The activity of ciprofloxacin against *Escherichia coli* and *Enterobacter cloacae* in this study was 50% and 0%. Quinolones were found to have a high percentage of resistance in a study conducted by Zuniga-Moya et al.<sup>21</sup> The study result showed that quinolones have resistance to Gram-negative and Gram-positive bacteria tested.

The limitation of this study was the number of isolates tested. In this study, 17 isolates were tested for identification and antibiotic sensitivity. Further studies with larger sample sizes are needed to make an antibiotic recommendation for UTI.

### Conclusion

The prevalence of UTI in the *ojol* driver community was found to be high, and the causative bacteria were coagulase-negative *Staphylococcus*, *Escherichia coli*, and *Enterococcus faecalis*, which is highly sensitive to narrow-spectrum antibiotics such as cotrimoxazole.

### Conflict of Interest

The authors affirm no conflict of interest in this study.

### Acknowledgment

The author would like to thank Faculty of Medicine Universitas Trisakti and all the respondents who have participated in this study.

### References

1. Terlizzi ME, Gribaudo G, Maffei ME. UroPathogenic *Escherichia coli* (UPEC) infections: virulence factors, bladder responses, antibiotic, and non-antibiotic antimicrobial strategies. *Front Microbiol.* 2017;8:1566.
2. Flores-Mireles AL, Walker JN, Caparon M, Hultgren SJ. Urinary tract infections: Epidemiology, mechanisms of infection and treatment options. *Nat Rev Microbiol.* 2015;13(5):269–84.
3. Bono MJ, Leslie SW, Reygaert WC, Doerr C. Uncomplicated urinary tract infection (nursing). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2023 April 20]. Available from: <https://europepmc.org/article/NBK/nbk568701>.
4. Ipe DS, Horton E, Ulett GC. The basics of bacteriuria: strategies of microbes for persistence in urine. *Front Cell Infect Microbiol.* 2016;6:14.
5. Cai T, Bartoletti R. Asymptomatic bacteriuria in recurrent UTI - to treat not to treat. *GMS Infect Dis.* 2017;5:Doc09.
6. Hernández-Hernández D, Padilla-Fernández B, Ortega-González MY, Castro-Díaz DM. Recurrent urinary tract infections and asymptomatic bacteriuria in adults. *Curr Bladder Dysfunct Rep.* 2022;17(1):1–12.
7. Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM; Infectious Diseases Society of America; American Society of Nephrology; American Geriatric Society. Infectious Diseases Society of America guidelines for diagnosing and treating asymptomatic bacteriuria in adults. *Clin Infect Dis.* 2005;40(5):643–54.
8. Crader MF, Kharsa A, Leslie SW. Bacteriuria. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 May 10]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482276>.
9. Khan MI, Xu S, Ali MM, Ali R, Kazmi A, Akhtar N, et al. Assessment of multidrug resistance in bacterial isolates from urinary tract-infected patients. *J Radiat Res Appl Sci.* 2020;13(1):267–75.
10. Samirah S, Darwati D, Windarwati W, Hardjoeno H. Pola dan sensitivitas kuman di penderita infeksi saluran kemih. *IJCPML.* 2006;12(3):110–3.
11. Bhargava K, Nath G, Bhargava A, Kumari R, Aseri GK, Jain N. Bacterial profile and antibiotic susceptibility pattern of uropathogens causing urinary tract infection in the eastern part of Northern India. *Front Microbiol.* 2022;13:965053.
12. Maftuchan A, Djamhari EA, Thaariq RM. Policy Brief 08 - Pengemudi ojek daring dan kerja layak [Internet]. Jakarta Selatan: Prakarsa; 2018 [cited 2023 May 15]. Available from: <https://repository.theprakarsa.org/media/publications/293911-policy-brief-08-pengemudi-ojek-daring-da-377022e1.pdf>.
13. Lean K, Nawaz RF, Jawad S, Vincent C. Reducing urinary tract infections in care homes by improving hydration. *BMJ Open Qual.* 2019;8(3):e000563.
14. Beetz R. Mild dehydration: a risk factor of

- urinary tract infection? *Eur J Clin Nutr.* 2003;57(Suppl 2):S52–8.
15. Mayangsari S, Sjakoeer NAA, Lisminingsih RD. Prevalensi infeksi saluran kemih (ISK) pada pasien di Rumah Sakit Islam (RSI) Unisma Malang tahun 2018. *E-JBST.* 2021;6(2):34–9.
  16. Rosana Y, Ocviyanti D, Akbar W. Bacterial susceptibility patterns to cotrimoxazole in urinary tract infections of outpatients and inpatients in Jakarta, Indonesia. *Med J Indones.* 2020;29(3):316–21.
  17. Syaikacitta A, Diyantoro, Sundari AS, Indriati DW. The bacterial profile and antibiotic resistance among patients with urinary tract infection in Surabaya, Indonesia. *Mal J Med Health Sci.* 2020;16(Suppl 16):14–8.
  18. Girma A, Aemiro A. The bacterial profile and antimicrobial susceptibility patterns of urinary tract infection patients at Pawe General Hospital, Northwest Ethiopia. *Scientifica (Cairo).* 2022;2022:3085950.
  19. Pfaller MA, Cormican M, Flamm RK, Mendes RE, Jones RN. Temporal and geographic variation in antimicrobial susceptibility and resistance patterns of enterococci: results from the SENTRY Antimicrobial Surveillance Program, 1997–2016. *Open Forum Infect Dis.* 2019;6(Suppl 1):S54–62.
  20. Miller WR, Munita JM, Arias CA. Mechanisms of antibiotic resistance in enterococci. *Expert Rev Anti Infect Ther.* 2014;12(10):1221–36.
  21. Zúniga-Moya JC, Bejarano-Cáceres S, Valenzuela-Cervantes H, Gough-Coto S, Castro-Mejía A, Chinchilla-López C, et al. Antibiotic sensitivity profile of bacteria in urinary tract infections. *Acta Méd Costarric.* 2016;58(4):146–53.
  22. Beauduy CE, Winston LG. Sulfonamides, trimethoprim, and quinolones. In: Katzung BG, Trevor AJ, editors. *Basic and clinical pharmacology.* 14th edition. New York: McGraw-Hill Company, Inc.; 2018. p. 868–9.

# Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Online Motorcycle Drivers in Jakarta, Indonesia

*by dr.Arleen Devita*

---

**Submission date:** 21-Aug-2024 09:05AM (UTC+0700)

**Submission ID:** 2305823617

**File name:** 4.\_Dokumen\_ISK.pdf (231.85K)

**Word count:** 3577

**Character count:** 20540

RESEARCH ARTICLE

11  
**Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Online Motorcycle Drivers in Jakarta, Indonesia**

15  
**Ida Effendi, Thomas Robertus, Jihan Samira, Arleen Devita, Widyasari Kumala, Isa Bella**

Department of Microbiology, Faculty of Medicine, Universitas Trisakti, West Jakarta, Indonesia

Abstract

9  
Urinary tract infection (UTI) is a bacterial infection that contributes significantly to morbidity rates. UTI is a health concern due to multidrug-resistant (MDR) organisms. Therefore, the profile of bacteria and antibiotic susceptibility patterns are very important to know in order to make the best treatment choice. Working as an online motorcycle (*ojol* driver) carries a risk of urinary tract infections. Online drivers are assumed to often hold their urination for short or long periods. The descriptive study with a cross-sectional design was conducted to obtain the prevalence of urinary tract infections, bacteria profile, and antibiotic susceptibility in urine specimens collected from Jakarta *ojol* drivers in September 2022–March 2023. Of 98 midstream urine specimens, 17 samples are considered to have UTI (17.34%). The identification of the 17 isolates shows that the microorganisms' distribution was more likely to be caused by Gram-positive than Gram-negative bacteria (70.59%). The causative bacteria were coagulase-negative *Staphylococcus* (17.65%), *Escherichia coli* (11.76%), and *Enterococcus faecalis* (11.76%). Our results showed that the prevalence of urinary tract infections in *ojol* drivers is high with the distribution of the causative organisms by coagulase-negative *Staphylococcus*, *Escherichia coli*, and *Enterococcus faecalis* and still showed good susceptibility to narrow-spectrum antibiotics such as cotrimoxazole.

**Keywords:** Antibiotic susceptibility, bacteria, *ojol* drivers, urinary tract infection prevalence

Introduction

7  
It has been estimated that about 150 million people worldwide develop urinary tract infections each year, with high social costs in terms of hospitalizations and medical expenses.<sup>1</sup> Urinary tract infections (UTI) are a significant cause of morbidity in infant boys, older men, and females of all ages.<sup>2</sup> Urinary tract infection is an infection that is often found in women aged 16–35 years; 10% of these women suffer from UTI annually, and more than 40–60% suffer from UTI at least once during their life. Recurrent infections are common; almost half will get a second infection within one year. Urinary tract infections occur at least four times more often in women than men. In men, UTI generally occurs at the age of over 50 years; infection under 50 years occurs with a lower prevalence.<sup>3</sup>

A definite diagnosis of urinary tract infection can be established if significant bacteriuria is found. Bacteriuria is a general term indicating the presence of bacteria in the urine on

laboratory findings.<sup>4</sup> Based on the findings of the number of bacteria in the urine, it was significant bacteriuria if the urine culture showed the growth of pure microorganisms more than  $\geq 10^5$  colony forming units/ml (CFU/ml) in two consecutive sampling.<sup>5–7</sup> Bacteriuria with a bacterial count of 1,000–100,000 CFU/ml accompanied by a clinical presentation can be managed according to urinary tract infections. Asymptomatic bacteriuria occurs when bacteria are found in urine culture with a count of  $>10^5$  CFU/ml and do not cause clinical symptoms of UTI.<sup>5,7</sup> Asymptomatic bacteriuria is not defined as a urinary tract infection.<sup>8</sup> Gram-negative, Gram-positive, and fungi can be found in bacteriuria. A single bacterial species causes most cases of UTI. Symptomatic bacteriuria (UTI) is generally caused by uropathogenic colonization of the urinary tract.<sup>9</sup> Uropathogenic *Escherichia coli* (UPEC) is the dominant infectious agent in UTI. Meanwhile, infection by the Gram-positive bacteria *Staphylococcus saprophyticus* is less common. The use of antibiotics in cases of

5  
Copyright ©2024 by authors. This is an open access article under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-nc-sa/4.0>).

26  
Received: 14 July 2023; Revised: 30 April 2024; Accepted: 30 April 2024; Published: 30 April 2024

**Correspondence:** dr. Ida Effendi, Sp.M.K. Department of Microbiology, Faculty of Medicine, Universitas Trisakti. Jln. Kyai Tapa No. 260, West Jakarta 11440, Special Capital Region of Jakarta, Indonesia. E-mail: [idaeffendi@trisakti.ac.id](mailto:idaeffendi@trisakti.ac.id)

infection (UTI) is very recommended, but incorrect use and overuse create new health problems. The relative frequency of uropathogens varies depending on age, sex, catheterization, hospitalization, and previous antimicrobial exposure.<sup>9</sup> Some bacteria can develop resistance to certain antimicrobials. It is essential to update the sensitivity patterns of antimicrobials periodically because they vary and change in place and at different times.<sup>10</sup> UTI is a health concern due to multidrug-resistant (MDR) organisms.<sup>11</sup>

In recent years, the profession of an online motorcycle driver (online driver/*ojol*) has been popular due to public demand, and it can provide a good income. The non-governmental organization Prakersa surveyed 213 online drivers and obtained results showing that 30% of online drivers tended to work beyond working hours (>8 hours/day).<sup>12</sup> The profession as an online driver has a risk of urinary tract infections caused by lack of hydration and the behavior of frequently holding urine for short or long periods.<sup>7,13</sup> In most cases, holding your urine briefly is not dangerous. However, urine retained in the bladder decreases bacterial eradication and increases bacterial growth, associated with an increased risk of infection in the urinary tract.<sup>14</sup>

This study aimed to provide information regarding the bacteria and its susceptibility profile as the frequent infectious agent found in *ojol* drivers' community urinary tract infections.

## Methods

A descriptive study with a cross-sectional approach was conducted at the Faculty of Medicine Universitas Trisakti, West Jakarta city, Indonesia between September 2022–March 2023. The inclusion criteria were *ojol* drivers of all genders aged 17–60 years old. Consumption of any antibiotics in the last week was excluded. The information about gender, age, and length of work was collected by filling out the form. Data about the clinical manifestation of urinary tract infection was collected from the questionnaire. Collection of midstream urine is required to perform bacteria culture. We used a 0.01 µl sterile loop to streak the specimen to media cultivation and incubate it at 2–8°C for 18–24 hours before we did a colony count to obtain the number of colonies in CFU/ml. Species identification and antibiotic testing are performed from isolates with colony number 100,000 CFU/ml or 1,000–

10,000 CFU/ml with UTI symptoms data. Data analysis was performed descriptively using tables and narrative statements, which include the distribution of respondents' characteristics (age, sex, length of work, clinical manifestations, UTI status, bacterial profile, and antibiotic susceptibility pattern. All data were shown as numbers and percentages. Ethics Committee approval was given for this research (ethical clearance number: 167/KER/FK/VIII/2022).

## Results

This study obtained 98 urine specimens from 98 respondents (Table 1). The respondents were men-dominant (78.94%). The age group is between 17 and 40 years (67.35%). The average respondent has worked for 1–5 years as an online driver (72.63%). After the urine culture was performed, there were three samples with a colony count of >105 CFU/ml (significant bacteriuria) on agar culture and 14 samples with a colony count of 1,000–100,000 with clinical symptoms of a urinary tract infection. Of the total respondents who filled out the questionnaire, 25 respondents stated that they had at least one of the symptoms of cloudy colored urine, urinating more than one time during sleep at night, urinating in small quantities and frequently, voiding feeling incomplete, pain or burning feeling while urinating.

In this study, culture identification and

**Table 1** Distribution of Respondents

Respondents Characteristics	n=98 (%)
Gender	
Male	77 (78.57)
Female	21 (21.43)
Age (years)	
17–40	66 (67.35)
41–60	32 (32.65)
Length of work (year)	
<1	2 (2.04)
1–5	69 (70.41)
>5	27 (27.55)
UTI manifestation	
Yes	25 (25.51)
No	73 (74.49)
Confirmed UTI	
Confirmed	17 (17.34)
Not confirmed	81 (82.65)

**Table 2 Distribution of Bacteria Causing Urinary Tract Infections**

Microorganisms	n=98 (%)
Gram-negative	5 (29.41)
<i>Escherichia coli</i>	2 (11.76)
<i>Enterobacter cloacae</i> complex	1 (5.88)
<i>Pantoea</i> sp.	1 (5.88)
<i>Sphingomonas paucimobilis</i>	1 (5.88)
Gram-positive	
<i>Enterococcus faecalis</i>	2 (11.76)
<i>Staphylococcus aureus</i>	1 (5.88)
Coagulase-negative	3 (17.65)
<i>Staphylococcus</i>	
<i>Streptococcus agalactiae</i>	1 (5.88)
<i>Kochuria rosea</i>	1 (5.88)
<i>Corynebacterium minutissimum</i>	2 (11.76)
<i>Corynebacterium amycolatum</i>	1 (5.88)
<i>Corynebacterium</i> sp.	1 (5.88)

antibiotic sensitivity were carried out in specimens with bacteriuria  $\geq 100,000$  CFU/ml or 1,000-100,000 CFU/ml with clinical manifestation of UTI. Seventeen isolates from 17 samples were identified. Data were obtained from the identification of bacteria (Table 2).

From Table 2, the infectious agents of urinary tract infections in ojol drivers in this study were more commonly caused by Gram-positive bacteria than Gram-negative bacteria. In the Gram-negative group, *Escherichia coli* is the most common species found in UTIs. In the Gram-positive group, coagulase-negative *Staphylococcus* is the most common species, followed by *Enterococcus faecalis*.

The antibiotic sensitivity test was carried out with the identification test to obtain the sensitivity pattern of the tested bacteria. Tables 3 and Table 4 show the description and pattern of

sensitivity of Gram-negative and Gram-positive bacteria, respectively.

We use 9–17 antibiotic disks in the Gram-negative bacteria sensitivity test. All *Escherichia coli* bacteria are sensitive (100%) to the antibiotics amikacin, aztreonam, cefazolin, cefepime, ceftazidime, ceftriaxone, ertapenem, fosfomycin, meropenem, nitrofurantoin, piperacillin-tazobactam, tigecycline, trimethoprim-sulfamethoxazole. The *Escherichia coli* bacteria obtained were excluded from the extended-spectrum beta-lactamase (ESBL) group.

In Gram-positive bacteria, 6–18 antibiotic discs are used for sensitivity testing. Cefoxitin test was only carried out on *Staphylococcus* sp. bacteria (*Staphylococcus aureus*, *Staphylococcus shiurim*, *Staphylococcus xylosus*, and *Staphylococcus haemolyticus*) with negative results. All *Enterococcus faecalis* bacteria show sensitivity (100%) to the antibiotics ampicillin, benzylpenicillin, ciprofloxacin, gentamycin, levofloxacin, linezolid, nitrofurantoin, streptomycin, tigecycline, and vancomycin.

**Discussion**

8  
 Urinary tract infections (UTIs) are among the most common and severe infections in community and hospital environments. They are an important health concern because the number of multiresistant bacteria that cause them is increasing.

The prevalence of UTI in this study was 17.34%. This figure is higher than the prevalence of UTI stated by Mayangsari et al.<sup>15</sup> and Rosana et al.<sup>16</sup> This study showed that the incidence of UTI was more common in women (52.90%). Urinary tract infections occur at least four times more often in women than men in a previous study by Bono et al.<sup>3</sup> Syaikacitta et al.<sup>17</sup> also found in their

20  
**Table 3 Bacterial Profile and Antibiotic Susceptibility Pattern of Gram-negative Bacteria**

No	Microorganisms	No of Isolate	Antibiotics																					
			AK	AMP	AMS	ATM	CZO	FEP	CAZ	CRO	CXM	CIP	DOR	ETP	FOS	GEN	IPM	LVX	MEM	NIT	TZP	TGC	SXT	ESBL
1	<i>Escherichia coli</i>	2	100	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	Neg
2	<i>Enterobacter cloacae</i> complex	1	100	0	0	100	0	100	100	100	100	0	0	100	100	100	0	0	100	100	100	100	100	0
3	<i>Pantoea</i> sp.	1	100	0	100	0	0	100	0	0	100	0	100	0	100	0	0	100	0	0	0	0	0	0
4	<i>Sphingomonas paucimobilis</i>	1	100	0	100	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: n=5, -: not tested, AK: amikacin, AMP: ampicillin, AMS: ampicillin-sulbactam, ATM: aztreonam, CZO: cefazoline (urine), FEP: cefepime, CAZ: ceftazidime, CRO: ceftriaxone, CXM: cefuroxime, CIP: ciprofloxacin, DOR: doripenem, ETP: ertapenem, fosfomycin: FOS, gentamycin: GEN, imipenem: IPM, levofloxacin: LVX, meropenem: MEM, nitrofurantoin: NIT, TZP: , TGC: piperacillin-tazobactam tigecycline, SXT: trimethoprim-sulfamethoxazole, ESBL: extended-spectrum beta-lactamase

**Table 4** Bacterial Profile and Antibiotic Susceptibility Pattern of Gram-positive Bacteria

No	Microorganisms Gram-negative	No of Isolate	Antibiotics																				
			AMP	P	FEP	C	CIP	DA	GEN	LVX	LZD	MFX	NIT	OXA	QD	RIF	STR	TE	TGC	SXT	VAN	CS	ICR
1	<i>Enterococcus faecalis</i>	2	100	100	-	-	100	-	100	100	100	-	100	-	0	-	100	50	100	-	100	-	-
2	<i>Staphylococcus aureus</i>	1	-	0	-	-	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	Neg	Neg
3	Coagulase-negative <i>Staphylococcus</i>	3	-	33.3	-	-	100	100	100	100	100	100	100	100	100	100	-	66.7	100	100	100	Neg	Neg
4	<i>Streptococcus agalactiae</i>	1	100	100	-	-	100	-	100	100	100	100	-	100	-	-	0	100	-	100	-	-	-
5	<i>Kochuria rosea</i>	1	-	-	100	100	-	-	-	-	100	-	-	-	-	-	0	-	100	-	-	-	-
6	<i>Corynebacterium minutissimum</i>	2	-	-	0	100	-	-	-	-	100	-	-	-	-	-	100	-	0	-	-	-	-
7	<i>Corynebacterium amycolatum</i>	1	-	-	0	0	-	-	-	-	100	-	-	-	-	-	100	-	0	-	-	-	-
8	<i>Corynebacterium</i> sp.	1	-	-	0	100	-	-	-	-	100	-	-	-	-	-	100	-	0	-	-	-	-

Note: n=12, -: not tested, AMP: ampicillin, P: benzylpenicillin, FEP: cefepime, C: chloramphenicol, CIP: ciprofloxacin, DA: clindamycin, E: erythromycin, GEN: gentamycin, LVX: levofloxacin, LZD: linezolid, MFX: moxifloxacin, NIT: nitrofurantoin, OXA: oxacillin, QD: quinupristin-dalfopristin, RIF: rifampicin, STR: streptomycin, TE: tetracycline, TGC: tigecycline, SXT: trimethoprim-sulfamethoxazole, VAN: vancomycin, CS: ceftioxin screen, ICR: inducible clindamycin resistance

research that the highest incidence of UTI was in females (57.58%) compared to males (12.12%). Anatomically, women have shorter urethra and the proximity of the external urethral meatus to the anus compared to men, and these are risk factors that increase urinary tract infections through the ascending route.<sup>6</sup>

Bacteria found were more Gram-positive (70.59%) than Gram-negative (29.41%). *Escherichia coli* is the most Gram-negative bacteria (40%). At the same time, the most Gram-positive is coagulase-negative *Staphylococcus* (25%), followed by *Enterococcus faecalis* (16.67%). The results of this study showed a different variety of etiological agents from previous research. Previous retrospective research showed the most common bacteria found were Gram-negative, namely *Escherichia coli* and *Klebsiella pneumoniae*.<sup>10</sup> Similar studies in Pawe General Hospital in Northwest Ethiopia showed that the most predominant bacterium isolated from urine is *Escherichia coli*, which belongs to Gram-negative.<sup>18</sup> Study results in 2019–2020 from patients with UTI at Islamic Hospital Surabaya, Indonesia, showed the proportion Gram-negative and Gram-positive was 52.0% and 48% with dominantly *Escherichia coli* and *Enterococcus* sp.<sup>17</sup>

Most of the Gram-positive bacteria found are sensitive to all antibiotics. Coagulase-negative *Staphylococcus* is 100% sensitive to the antibiotics ciprofloxacin, levofloxacin, moxifloxacin, vancomycin, linezolid, tigecycline, and cotrimoxazole. *Staphylococcus* sp. bacteria were found to be 100% sensitive to ceftioxin and not included in the methicillin-resistant *Staphylococcus* group, so they can

still be killed with beta-lactam antibiotics, for example, cephalosporins 1<sup>st</sup> and 2<sup>nd</sup> generation. Other narrow-spectrum antibiotics, such as cotrimoxazole, have susceptibility test results that are still very good (100%). *Enterococcus faecalis* bacteria were found 100% sensitive to the antibiotics penicillin, ampicillin, ciprofloxacin, levofloxacin, vancomycin, linezolid, and tigecycline, while other studies showed many *Enterococcus* spp. were resistant to vancomycin (vancomycin-resistant enterococci, VRE) and beta-lactams vary in each region due to intrinsic and acquired antibiotic resistance genes.<sup>19,20</sup>

Meanwhile, the most common Gram-negative bacteria isolate, *Escherichia coli*, is not an ESBL-producing strain. This bacterium is still sensitive to most beta-lactam antibiotics and cotrimoxazole. Other studies showed vast differences in bacteria and their susceptibility patterns. According to the sensitivity profiles, Zúniga-Moya et al.<sup>21</sup> found the most effective antibiotics were fosfomycin (68.9%), amikacin (68.4%), nitrofurantoin (62.5%), gentamicin (60.5%), and ceftriaxone (50.1%).

Antibiotic cotrimoxazole (trimethoprim-sulfamethoxazole) has been a first-line drug in urinary tract infections since 1960. It shows good effectiveness against most *Enterobacteriaceae* and *Staphylococcus* sp. in UTI.<sup>22</sup> Our study demonstrated that narrow-spectrum antibiotics such as cotrimoxazole can still be used as a choice for uncomplicated UTI therapy since it has 100% sensitivity. This result is in concordance with a study conducted by Rosana et al.<sup>16</sup> that revealed the effectiveness of cotrimoxazole for uncomplicated UTI in outpatients in Indonesia.

Decreased susceptibility was found



in quinolones antibiotics. The activity of ciprofloxacin against *Escherichia coli* and *Enterobacter cloacae* in this study was 50% and 0%. Quinolones were found to have a high percentage of resistance in a study conducted by Zuniga-Moya et al.<sup>21</sup> The study result showed that quinolones have resistance to Gram-negative and Gram-positive bacteria tested.

The limitation of this study was the number of isolates tested. In this study, 17 isolates were tested for identification and antibiotic sensitivity. Further studies with larger sample sizes are needed to make an antibiotic recommendation for UTI.

### Conclusion

The prevalence of UTI in the *ojol* driver community was found to be high, and the causative bacteria were coagulase-negative *Staphylococcus*, *Escherichia coli*, and *Enterococcus faecalis*, which is highly sensitive to narrow-spectrum antibiotics such as cotrimoxazole.

10

### Conflict of Interest

The authors affirm no conflict of interest in this study.

### Acknowledgment

The author would like to thank Faculty of Medicine Universitas Trisakti and all the respondents who have participated in this study.

### References

1. Terlizzi ME, Gribaudo G, Maffei ME. Uropathogenic *Escherichia coli* (UPEC) infections: virulence factors, bladder responses, antibiotic, and non-antibiotic antimicrobial strategies. *Front Microbiol.* 2017;8:1566.
2. Flores-Mireles AL, Walker JN, Caparon M, Hultgren SJ. Urinary tract infections: Epidemiology, mechanisms of infection and treatment options. *Nat Rev Microbiol.* 2015;13(5):269–84.
3. Bono MJ, Leslie SW, Reygaert WC, Doerr C. Uncomplicated urinary tract infection (nursing). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2023 April 20]. Available from: <https://europepmc.org/article/NBK/nbk568701>.
4. Ipe DS, Horton E, Ulett GC. The basics of bacteriuria: strategies of microbes for persistence in urine. *Front Cell Infect Microbiol.* 2016;6:14.
5. Cai T, Bartoletti R. Asymptomatic bacteriuria in recurrent UTI - to treat not to treat. *GMS Infect Dis.* 2017;5:Doc09.
6. Hernández-Hernández D, Padilla-Fernández B, Ortega-González MY, Castro-Díaz DM. Recurrent urinary tract infections and asymptomatic bacteriuria in adults. *Curr Bladder Dysfunct Rep.* 2022;17(1):1–12.
7. Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM; Infectious Diseases Society of America; American Society of Nephrology; American Geriatric Society. Infectious Diseases Society of America guidelines for diagnosing and treating asymptomatic bacteriuria in adults. *Clin Infect Dis.* 2005;40(5):643–54.
8. Crader MF, Kharsa A, Leslie SW. Bacteriuria. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 May 10]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482276>.
9. Khan MI, Xu S, Ali MM, Ali R, Kazmi A, Akhtar N, et al. Assessment of multidrug resistance in bacterial isolates from urinary tract-infected patients. *J Radiat Res Appl Sci.* 2020;13(1):267–75.
10. Samirah S, Darwati D, Windarwati W, Hardjoeno H. Pola dan sensitivitas kuman di penderita infeksi saluran kemih. *IJCPML.* 2006;12(3):110–3.
11. Bhargava K, Nath G, Bhargava A, Kumari R, Aseri GK, Jain N. Bacterial profile and antibiotic susceptibility pattern of uropathogens causing urinary tract infection in the eastern part of Northern India. *Front Microbiol.* 2022;13:965053.
12. Maftuchan A, Djamhari EA, Thaariq RM. Policy Brief 08 - Pengemudi ojek daring dan kerja layak [Internet]. Jakarta Selatan: Prakarsa; 2018 [cited 2023 May 15]. Available from: <https://repository.theprakarsa.org/media/publications/293911-policy-brief-08-pengemudi-ojek-daring-da-377022e1.pdf>.
13. Lean K, Nawaz RF, Jawad S, Vincent C. Reducing urinary tract infections in care homes by improving hydration. *BMJ Open Qual.* 2019;8(3):e000563.
14. Beetz R. Mild dehydration: a risk factor of

- urinary tract infection? *Eur J Clin Nutr.* 2003;57(Suppl 2):S52–8.
15. Mayangsari S, Sjakoeer NAA, Lisminingsih RD. Prevalensi infeksi saluran kemih (ISK) pada pasien di Rumah Sakit Islam (RSI) Unisma Malang tahun 2018. *E-JBST.* 2021;6(2):34–9.
  16. Rosana Y, Ocviyanti D, Akbar W. Bacterial susceptibility patterns to cotrimoxazole in urinary tract infections of outpatients and inpatients in Jakarta, Indonesia. *Med J Indones.* 2020;29(3):316–21.
  17. Syaikacitta A, Diyantoro, Sundari AS, Indriati DW. The bacterial profile and antibiotic resistance among patients with urinary tract infection in Surabaya, Indonesia. *Mal J Med Health Sci.* 2020;16(Suppl 16):14–8.
  18. Girma A, Aemiro A. The bacterial profile and antimicrobial susceptibility patterns of urinary tract infection patients at Pawe General Hospital, Northwest Ethiopia. *Scientifica (Cairo).* 2022;2022:3085950.
  19. Pfaller MA, Cormican M, Flamm RK, Mendes RE, Jones RN. Temporal and geographic variation in antimicrobial susceptibility and resistance patterns of enterococci: results from the SENTRY Antimicrobial Surveillance Program, 1997–2016. *Open Forum Infect Dis.* 2019;6(Suppl 1):S54–62.
  20. Miller WR, Munita JM, Arias CA. Mechanisms of antibiotic resistance in enterococci. *Expert Rev Anti Infect Ther.* 2014;12(10):1221–36.
  21. Zúniga-Moya JC, Bejarano-Cáceres S, Valenzuela-Cervantes H, Gough-Coto S, Castro-Mejía A, Chinchilla-López C, et al. Antibiotic sensitivity profile of bacteria in urinary tract infections. *Acta Méd Costarric.* 2016;58(4):146–53.
  22. Beauduy CE, Winston LG. Sulfonamides, trimethoprim, and quinolones. In: Katzung BG, Trevor AJ, editors. *Basic and clinical pharmacology.* 14th edition. New York: McGraw-Hill Company, Inc.; 2018. p. 868–9.

# Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Online Motorcycle Drivers in Jakarta, Indonesia

## ORIGINALITY REPORT

19%

SIMILARITY INDEX

14%

INTERNET SOURCES

13%

PUBLICATIONS

8%

STUDENT PAPERS

## PRIMARY SOURCES

1	Aakash Kapoor Pal. "Study of the prevalence and antibiotics susceptibility patterns in clinically significant isolates among urine sample in a tertiary care centre", Indian Journal of Microbiology Research, 2023 Publication	1%
2	Submitted to Universitas Jenderal Soedirman Student Paper	1%
3	<a href="http://www.scielo.sa.cr">www.scielo.sa.cr</a> Internet Source	1%
4	<a href="http://www.statpearls.com">www.statpearls.com</a> Internet Source	1%
5	<a href="http://docslib.org">docslib.org</a> Internet Source	1%
6	<a href="http://link.springer.com">link.springer.com</a> Internet Source	1%
7	<a href="http://scimatic.org">scimatic.org</a> Internet Source	1%

8	Belmont, Cheyenne Rose. "Identifying New Risk Factors for Antimicrobial Resistance in Urinary Tract Infections Through Microbial, Genotypic, and Geospatial Analyses", University of California, Berkeley, 2023	1 %
Publication		
9	Kanika Bhargava, Gopal Nath, Amit Bhargava, Ritu Kumari, G. K. Aseri, Neelam Jain. "Bacterial profile and antibiotic susceptibility pattern of uropathogens causing urinary tract infection in the eastern part of Northern India", Frontiers in Microbiology, 2022	1 %
Publication		
10	<a href="http://mji.ui.ac.id">mji.ui.ac.id</a>	1 %
Internet Source		
11	Kaina Bhonsle, Alka Vyas, Harish Vyas, Abhiraj Ramchandani, Kirti Hemwani. "Prevalence and antibiotic susceptibility pattern of uropathogens causing urinary tract infection among pregnant women in Ujjain M.P. (India)", Indian Journal of Pharmacy and Pharmacology, 2022	1 %
Publication		
12	<a href="http://myhealthlessons.blogspot.com">myhealthlessons.blogspot.com</a>	1 %
Internet Source		
13	Submitted to Fakultas Kedokteran Gigi Universitas Trisakti	1 %
Student Paper		

---

14 Lingyi Zeng, Jisheng Zhang, Kewang Hu, Jie Li, Jianmin Wang, Chengru Yang, Wan Huang, Lining Yin, Xiaoli Zhang. "Microbial Characteristics and Genomic Analysis of an ST11 Carbapenem-Resistant Strain Carrying Conjugative Drug-Resistant Plasmid", *Frontiers in Public Health*  
Internet Source 1 %

---

15 Raditya Wratsangka, Elly Herwana, Yenny Yenny, Endrico Xavieress, Aditya Krishnamurti. "High-density Lipoprotein Cholesterol as a Risk Factor of Health-Related Quality of Life in 50–70-Year-Old Community-Dwelling Women", *Open Access Macedonian Journal of Medical Sciences*, 2021  
Publication 1 %

---

16 [dspace.unza.zm](https://dspace.unza.zm)  
Internet Source 1 %

---

17 [e-journal.unair.ac.id](https://e-journal.unair.ac.id)  
Internet Source 1 %

---

18 Submitted to [fkunisba](https://fkunisba.com)  
Student Paper 1 %

---

19 [www.ijtsrd.com](https://www.ijtsrd.com)  
Internet Source 1 %

---

20 Laxmi Shrestha, Shristi Adhikari, Anjan Palikhey, Buddhi Raj Pokhrel, Amit <1 %

Shrivastava, Bishal Joshi, Chandrajeet Kumar Yadav. "Prescription pattern of antibiotics in urinary tract infection based on antimicrobial susceptibility test at a tertiary care hospital", Journal of Gandaki Medical College-Nepal, 2023

Publication

21

[en.ppt-online.org](https://en.ppt-online.org)

Internet Source

<1 %

22

Abayeneh Girma, Aleka Aemiro. "The Bacterial Profile and Antimicrobial Susceptibility Patterns of Urinary Tract Infection Patients at Pawe General Hospital, Northwest Ethiopia", Scientifica, 2022

Publication

<1 %

23

John R. Wingard, Raleigh A. Bowden. "Management of Infection in Oncology Patients", CRC Press, 2019

Publication

<1 %

24

Pillai, Deepti Kuttan. "Assessment of pet dogs as a reservoir of antibiotic resistant bacteria", Proquest, 20111109

Publication

<1 %

25

Naomi L. Siderius, Sylvia A. Sapula, Bradley J. Hart, Joshua L. Hutchings, Henrietta Venter. "Enterobacter adelaidei sp. nov. Isolation of an extensively drug resistant strain from hospital wastewater in Australia and the

<1 %

# global distribution of the species", Microbiological Research, 2024

Publication

26

[ejournal2.undip.ac.id](http://ejournal2.undip.ac.id)

Internet Source

<1 %

27

Bingshao Liang, Xiaoyun Liang, Fei Gao, Yan Long et al. "Active Surveillance, Drug Resistance, and Genotypic Profiling of *Staphylococcus aureus* Among School-Age Children in China", *Frontiers in Medicine*, 2021

Publication

<1 %

28

[api.intechopen.com](http://api.intechopen.com)

Internet Source

<1 %

29

[bmcneurol.biomedcentral.com](http://bmcneurol.biomedcentral.com)

Internet Source

<1 %

30

[floradergisi.org](http://floradergisi.org)

Internet Source

<1 %

Exclude quotes  On

Exclude matches  < 10 words

Exclude bibliography  On

# Bacteriological and Antibiotic Susceptibility Profile of Urinary Tract Infection among Online Motorcycle Drivers in Jakarta, Indonesia

---

GRADEMARK REPORT

---

FINAL GRADE

GENERAL COMMENTS

**/0**

---

PAGE 1

---

PAGE 2

---

PAGE 3

---

PAGE 4

---

PAGE 5

---

PAGE 6

---