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Evaluasi *Gyssens* Penggunaan Antibiotik pada Pasien Infeksi Saluran Kemih Rawat Inap RSUD X di Jakarta Pusat, Periode Januari 2017 – Juni 2019,

Gyssens Evaluation On Antibiotics Usage On Inpatients With Urinary Tract Infection In Hospital X, Central Jakarta, on January 2017 – June 2019

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Abstrak
Infeksi saluran kemih merupakan infeksi pada kandung kemih sampai parenkim ginjal, dan dapat menyerang semua usia. Terapi empiris dapat menurunkan angka morbiditas, namun akibat penggunaan antibiotik yang kurang bijak akan berdampak pada resistensi yang akan menyebabkan peningkatan morbiditas, mortalitas, dan biaya kesehatan. Pada kawasan Asia Tenggara, ditemukan pemakaian antibiotik yang cukup tinggi hampir lebih dari 80% pada berbagai provinsi di Indonesia. Penelitian ini memiliki tujuan untuk menilai tepatnya pemakaian antibiotik pada pasien rawat inap dengan ISK di RSUD X periode Januari 2017 – Juni 2019 menggunakan alur *gyssens.* Penelitian ini merupakan studi *retrospektif.* Data dikumpulkan dan dinilai dengan alur *gyssens*, kemudian diolah menggunakan *microsoft excel*. Hasil evaluasi antibiotik didapatkan 15 kasus (46,88%) tepat penggunaan (kategori 0), 3 kasus (9,37%) tidak tepat interval (kategori IIB), 1 kasus (3,33%) tidak tepat dosis (kategori IIA), 10 kasus (31,25%) pemberian terlalu singkat (kategori IIIB), 3 kasus (9,37%) pemberian terlalu lama (kategori IIIA). Terapi empirik pada pasien infeksi saluran kemih rawat inap di RSUD X ditemukan 46,8% penggunaan antibiotik yang tepat.

Kata kunci: : Infeksi saluran kemih, antibiotik, alur gyssens

Abstract
Urinary tract infections are infections from the bladder to the renal parenchyma and can affect all ages. Empirical therapy can reduce morbidity, but it will impact the resistance that will cause increased morbidity, mortality, and health costs due to antibiotics that are not appropriate. In the Southeast Asian region, high antibiotics were found to be almost 80% in various provinces in Indonesia. This study aims to assess antibiotics' appropriateness in hospitalized patients with UTIs in District Hospital X in January 2017 - June 2019 using gyssens criteria with a retrospective study approach. Research data sourced from medical records. Data was collected and assessed with Gyssens flow, then processed using Microsoft Excel. The results found 15 cases (46.88%) with the appropriate use (category 0), 3 cases (9.37%) incorrect interval (category IIB), 1 case (3.33%) incorrect dosage (category IIA), 10 cases (31.25%) too short given (category IIIB), 3 cases (9.37%) too long given (category IIIA). For empirical therapy in patients with diagnosis urinary tract infections at district Hospital X, 46.8% of antibiotics were used appropriately.

Keywords: *Urinary tract infections, antibiotics, gyssens criteria*

Introduction

Urinary tract infection (UTI) is defined as a combination of clinical symptoms and significant presence of bacteria in the urine, which is ≥ 100.000 CFU/ml during urine culture[1]. UTI is an infection commonly found in the bladder to the renal parenchyma. Urinary tract infection can affect anyone, from neonates to adults. UTI is more likely to be found in females than males, as it has several causes, such as the shorter structure of the female urethral anatomy[2,3]. UTI is commonly found in pediatric patients both in hospitals and in communities. An estimated 150 million cases occur annually throughout the world [4]. UTI is the second most common infection found in children after respiratory infections[5].

UTIs can cause symptoms, or it can be asymptomatic. Common symptoms of UTI are dysuria, pollakiuria, urgency, suprapubic pain, and possible hematuria. In UTI complications, such as pyelonephritis, UTI symptoms will persist for more than a week with systemic symptoms of persistent

fever, chills, costovertebral pain, nausea, and vomiting[6,7]. The most common pathogenic bacterium that causes UTI is *Escherichia coli*, which can reach up to 80% of UTI cases, followed by *Klebsiella spp*, *Proteus spp*., and other Gram-negative rod bacteria. In contrast, the most common Gram-negative bacteria are *Staphylococcus saprophyticus*, *Staphylococcus aureus*, and coagulase-negative *Staphylococcus* (CoNS0[1,8]. Early empirical treatment of UTI cases can reduce morbidity. The appropriate empirical therapy is essential to identify the main bacteria involved in the urinary tract infection and their respective antimicrobial resistance patterns. At the moment, urinary pathogenic bacteria show relatively high resistance towards various antibiotics due to excessive or inappropriate antibiotic usage. Although this has become a global issue, resistance is more common in developing countries, and the conditions are quite alarming. Bacterial pattern data in Indonesia is very limited to significant hospitals. It is important to update information on UTI cases regarding prevalence and resistance patterns as the basis for selecting appropriate empirical antibiotics[2,8,9].

Inappropriate antibiotics prescriptions can have an impact on the emergence of resistance. The effects of antibiotic resistance include increased mortality, morbidity, and health costs. In Southeast Asia, frequent antibiotic use has been found, reaching more than 80% in various provinces in Indonesia[10]. Therefore, it is crucial to evaluate antibiotic usage regularly, both qualitatively and quantitatively.

Several criteria or references can be used to assess antibiotic usage accuracy, one of which is the Gyssens method, which is used to evaluate antibiotic usage qualitatively. The Gyssens method comprises of categories from 0-VI[10]:

1. Category 0: Appropriate antibiotics usage
2. Category I: Inappropriate timing of antibiotics usage
3. Category IIA: Inappropriate antibiotics dosage
4. Category IIB: Inappropriate interval of antibiotics usage
5. Category IIC: Inappropriate antibiotics administration route
6. Category IIIA: Antibiotics is administered for too long
7. Category IIIB: Antibiotics is administered for too short
8. Category IVA: There is a more practical option
9. Category IVB: There is a less toxic option
10. Category IVC: There is a cheaper option
11. Category IVD: There is a narrower antibiotics spectrum
12. Category V: No indication of antibiotics
13. Category VI: Incomplete data

This research aims to identify the accuracy and appropriateness of antibiotics usage on inpatients with UTIs in District Hospital X from January 2017 – June 2019 using the Gyssens method.

Methodology

This research uses a retrospective study. Data is compiled by obtaining secondary data from medical records at District Hospital X in Jakarta. The data was then compared with the following guidelines: Guidelines for the management of urinary tract infections and male genitalia in 2015[2], *Guidelines on Urological Infections European Association of Urology* 2018[11], and *Urinary Tract Infection in Children: EAU/ESPU guidelines.*[12]

The data was then processed using Microsoft Excel 2013 and is presented in table form to showcase variables that have been categorized according to the Gyssens criteria. Samples were taken from inpatient inpatients diagnosed with UTI from January 2017 – June 2019 in District Hospital X. The determined inclusion criteria include inpatients diagnosed with UTI without any other infections

and have received empirical antibiotic therapy. Antibiotics usage is evaluated using the Gyssens method (Figure 1).

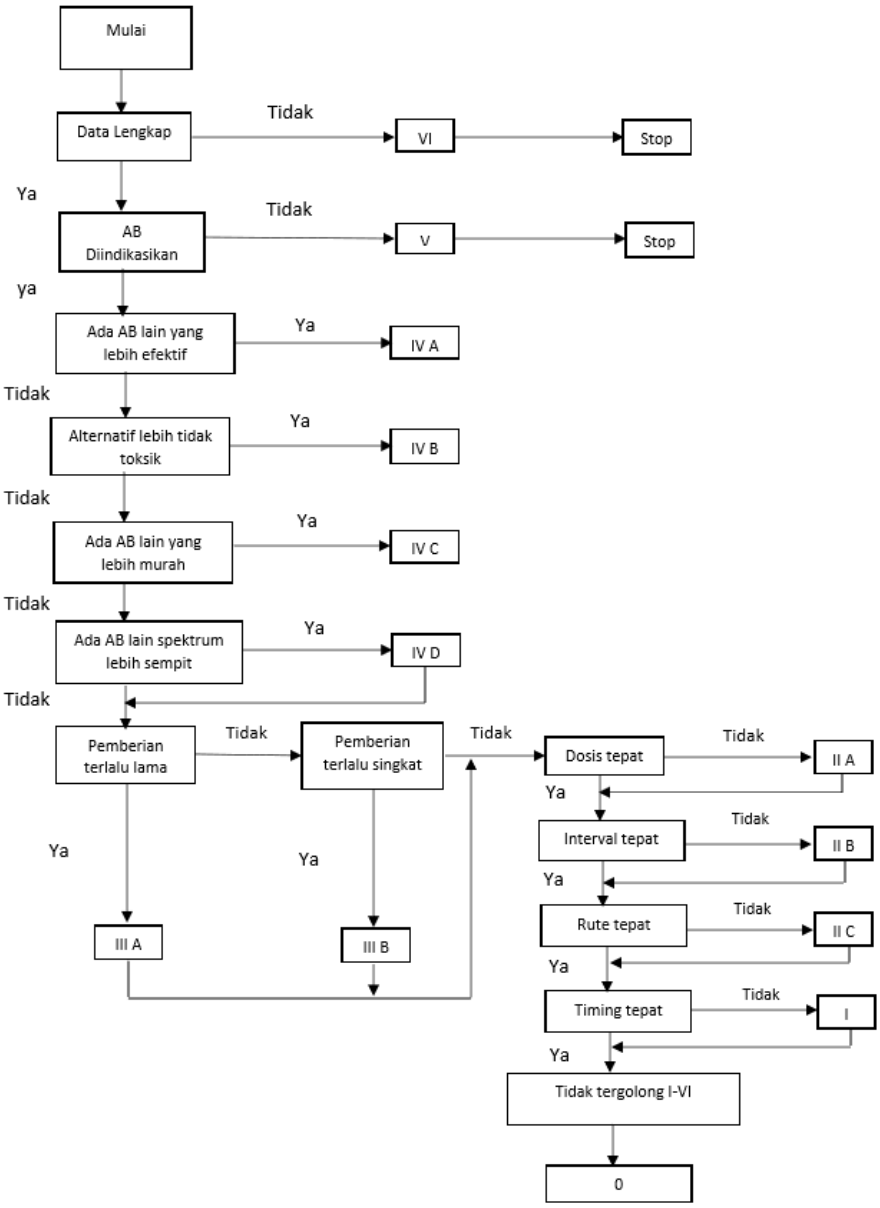

Figure 1. Gyssens Flowchart (adaptation from Kemenkes RI. Pedoman Umum Penggunaan Antibiotik)[10]

Results and Discussion

As many as 30 medical records matched the medical record data's inclusion criteria from a total of 68 medical records. There are more women inpatients with urinary tract infection profile from the obtained data on inpatients than men, with 25 cases (83%). The higher percentage among women can be caused by the female urethra's anatomical structure, which is shorter than the male urethra, making it easier for bacteria to penetrate and cause infection[13,14].

Table 1. Distribution of UTI Patients Based on Gender in District Hospital X Central Jakarta from January 2017 – June 2019.

No.	Gender	Total
1	Male	5
2	Female	25
	Total	30

The highest incidence occurred at the age of 0 - 5 years; as many as 7 cases could be due to undeveloped immunity and hygiene factors facilitating the infection on urinary tracts[4,15]. Previous research by Ganesh et al., where 73% of the incidence occurred at 0 – 5 years[15], is similar to the current study.

Table 2. Distribution of UTI Patients Based on Age in District Hospital X Central Jakarta from January 2017 – June 2019.

No.	Age classification	Total
1	0-5 years	7
2	5 - 11 years	2
3	12 - 16 years	5
4	17 - 25 years	2
5	26- 35 years	2
6	36- 45 years	4
7	46- 55 years	3
8	56 - 65 years	3
9	>65 years	2
	Total	30

The antibiotic class that is most widely used for empirical therapy is the cephalosporin class, which is a broad-spectrum antibiotic with 26 cases of a single administration (81,25%), with ceftriaxone as the most used cephalosporin class, which was used in 20 cases (62,35%). Similar results were also found in the study by Wang et al., where ceftriaxone antibiotics are the most widely used and most effective for patients with urinary tract infection[16]. Another study from Umul Fadlilah et al. found that ceftriaxone was the most widely used antibiotics for empirical therapy[17]. The ceftriaxone antibiotics included in the BPJS (public health insurance) coverage and because ceftriaxone belongs to a class of antibiotics that is relatively safe to use[17,18].

Table 3. Distribution of Antibiotics Usage on Patients with UTI in Hospital X Central Jakarta from January 2017 – June 2019.

No	Antibiotics class and type	Total usage	Percentage
1	**Cephalosporin**		
	Ceftriaxone	20	62,5%
	Cefixime	4	12,5%
	Cefoperazone	1	3,125%
	Cefuroxime	1	3,125%
2	**Fluoroquinolone**		
	Levofloxacin	4	12,5%
4	**Aminoglikosida**		
	Gentamicin	1	3,125%
5	**Penicillin**		
	Ampicillin-sulbactam	1	3,125%
	Total	32	100%

Results from the qualitative evaluation of antibiotics using the Gyssems method show 15 cases (46,98) with appropriate usage and classified as category 0; 3 cases (9,37%) with inappropriate administration interval (category IIB); 1 case (3,33%) with inappropriate dosage (category IIA); 10 cases (31,25%) with an administration that is too short (category IIIB); and 4 cases (9,37%) with an administration that is too long (category IIIA). A previous study showed that category 0 was found as much as 62%[17]. A similar study conducted at Koja District Hospital by Fransiska Sitompul et al. found that antibiotics usage classified as category 0 was dominant, although it was assessed in 2 different periods[18]. Based on these results, it can be assessed that the majority of antibiotic usage in Indonesia is in line with the indicators. The difference between this study and the studies conducted by Umul Fadlilah et al. and Fransiska Sitompul et al. is that, in their studies, the second-highest percentage of antibiotics usage after category 0 is category IV or regarding the issue of antibiotics type selection. In contrast, this study shows that the second-highest percentage of antibiotics usage is category IIIB, or regarding antibiotics administration duration. [17,18]

Table 4. Categories of Gyssens Method Evaluation on Patients with UTI in District Hospital X Central Jakarta from January 2017 – June 2019.

Category	Total	Percentage
Category 0	15	46,88%
Category I	-	-
Category IIA	1	3,13%
Category IIB	3	9,37%
Category IIC	-	-
Category IIIA	3	9,37%
Category IIIB	10	31,25%
Category IVA	-	-
Category IVB	-	-

Category IVC	-	-
Category IVD	-	-
Category V	-	-
Category VI	-	-
Total	32	100%

Conclusion

Empirical therapy on inpatients with UTI in District Hospital X shows 53,12% inappropriate antibiotic usage and 46,88% of appropriate antibiotic usage. Therefore, it is essential for each hospital to regularly evaluate antibiotics usage to improve its usage, impacting the decreasing number of bacteria resistant to antibiotics due to their inappropriate usage.

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