

# Monitoring Use of Antibiotic with ATC/DDD and DU 90% on Pediatric Patients at One of the Government Hospitals in East Borneo

*by* Risna Agustina

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## Monitoring Use of Antibiotic with ATC/DDD and DU 90% on Pediatric Patients at One of the Government Hospitals in East Borneo

Risna Agustina\*, Wisnu Cahyo Prabowo

Fakultas Farmasi Universitas Mulawarman, Samarinda, Indonesia

\*E-mail: [aaisyahrisna@yahoo.com](mailto:aaisyahrisna@yahoo.com)

### Abstract

Pediatric patients are among the recipients of most antibiotic treatment in hospitals so as to induce irrational use of antibiotics. This study aims to monitor the use of antibiotics in pediatric using ATC/DDD methods and DU 90%. This study is a descriptive study with a retrospective study by taking data from medical records to assess the use of antibiotics in pediatric patients with various diseases in the hospital. Quantitative data analysis using ATC/DDD methods showed that the widely used antibiotic was ceftriaxone 16,93% DDD. Antibiotics that include into the DU segment 90% use in the order of the largest to the smallest, respectively are ceftriaxone, metronidazole, cefotaxime, gentamycin, polymyxin B, colistin, cotrimoxazole, cefuroxime, and meropenem. The prescribing effect of short-term antibiotic use in basic medical services may increase the incidence of resistance.

**Keywords:** antibiotics, pediatric, ATT/DDD, DU 90%

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### ■ Introduction

Antibiotics are chemical compounds produced by microorganisms specifically produced by fungi or produced synthetically that can kill or inhibit the development of bacteria and other organisms. Antibiotics are the drugs most widely used in infections caused by bacteria. Various studies have found that about 40-62% of

antibiotics are used inappropriately, among other diseases that actually do not require antibiotics.

Based on its mechanism against bacteria (beta-lactam groups such as penicillin, cephalosporin, carbapenem, monobactam, and other antibiotics such as vancomycin, bacitracin, phosphomycin, and daptomycin), inhibitors of bacterial protein synthesis (aminoglycosides, macrolides, tetracycline). Inhibiting the synthesis of folate (sulfonamides and trimethoprim),

changing cell membrane permeability (polymiksin, amphotericin B, gramicidin, nystatin, colistin), interfering with DNA synthesis (metronidazole, quinolone, novobiocin) and interfering with RNA synthesis (Rifampicin).

In research, the relatively high-intensity quality raises various problems and is a global threat to health, especially bacterial resistance to antibiotics. Besides having an impact on morbidity and mortality, it also has a very high negative economic and social impact. Initially, the resistance occurred at the hospital level, but gradually it also developed in the community, especially *Streptococcus pneumoniae*, *Staphylococcus aureus*, and *Escherichia coli*.

The use of antibiotics needs to be monitored because it can increase the occurrence of resistance. Antibiotic resistance has become a concern of people in all parts of the world, and it requires a joint awareness of the relationship between the level of antibiotic resistance with antibiotic use patterns. Information about antibiotic use patterns can be used as an early detection tool for irrationality and as a source of information in controlling antibiotic resistance. A study on antibiotic use is needed to improve the rationality of antibiotic use. WHO has determined that ATC / DDD and DU 90% are standardized methods for drug use studies, and the advantage of using these studies is that they can be briefly exposed.

This study aims to evaluate the use of antibiotics in pediatric patients aged 1 - 5 years in one of the government hospitals in East Kalimantan using the ATC / DDD and DU 90% analysis methods. This research is expected to increase awareness of the use of antibiotics for health workers and local government in an effort to increase rationality in the use of antibiotics in children in the community.

## ■ Experimental

The study was conducted at a regional hospital in East Borneo using the retrospective method. Data obtained from medical records of pediatric patients aged 1-5 years who are hospitalized. Data were analyzed descriptively and processed using ATC / DDD and DU 90% methods for quantity assessment.

## ■ Results and Discussion

This research was conducted at a government hospital in East Borneo by collecting medical record data on pediatric patients aged 1-5 years. The sample used was patients who used more than one antibiotic. The use of antibiotics requires special attention to avoid problems related to the use of antibiotics in further treatment. The results showed the value of gender distribution in pediatric patients could be seen in table 1.

Table.1. Gender Distribution in Pediatric Patients

Gender	Number of patients (%)
Male	56
Female	44
Total	100

Based on data from Table 1 above result the number of male patients is more than the number of female patients are males by 56% (35 votes), and female patients by 44% (27 people) this is because boys have higher activity for the playing out of the house, so it is more susceptible to disease infection.

The results for the analysis of the types and dosages of antibiotics used can be seen in table 2.

Table.2. Distribution of Antibiotic Types and Doses

Types of Antibiotics	Number of patients (%)
Cefotaxime	23,71
Ceftriaxone	14,44
Gentamicin	12,37
Meropenem	8,25
Cortimoksazole	8,25
Ampicillin	8,25
Metronidazole	6,19
Erythromycin	5,15
Spiramycin	3,09
Cefixime	3,09
Amikacin	2,06
Kloramfenikol	1,03
Amoxicillin	1,03
Cefuroxime	1,03
Polymixin B	1,03
colistin	1,03
Total	100

Table.3. Consumption Patterns of Antibiotic Types

Code ATC	AntibioticCS	Σ Dose (g)	DDD	%	Segmen DU
J01DD04	Ceftriaxone	10,95	5,47	16,93	
G01AF01	Metronidazole	2,46	4,92	15,23	
J01DD01	Cefotaxime	19,10	4,77	14,77	
J01GB03	Gentamycin	0,69	2,87	8,88	
J01XB02	Polymyxine B	0,38	2,54	7,83	
J01XB01	Colistin	7,35 MU	2,45	7,54	
J01EE01	Cotrimoxazole	4,57	2,28	7,05	
J01DC02	Cefuroxime	1,12	2,24	6,92	
J01DH02	Meropenem	4,00	2,00	6,19	90%
J01CA01	Ampicilin	2,91	1,45	4,48	
J01BA01	Chloramphenicol	1,50	0,50	1,54	
J01DD08	Cefixime	0,11	0,27	0,83	
J01DB05	Sefadrokasil	0,50	0,25	0,77	
J01FA02	Spiramycin	0,35	0,12	0,37	
J01CR02	Amoxicilin	0,24	0,08	0,24	
J01GB06	Amikacin	0,06	0,06	0,18	
J01FA01	Erythromycin	0,04	0,04	0,15	10%
Total			32,31	100	

Based on the table 2, it can be seen that the use of cefotaxime antibiotics by 23.71% is the most widely used antibiotic in patients aged 1-5 years. Cefotaxime is a third-generation cephalosporin antibiotic that has broad-spectrum activity against gram-positive and negative bacteria. Cefotaxime is very stable against beta-lactamase hydrolysis, so cefotaxime is used as a first-line option in penicillin-resistant bacteria. Then the second highest antibiotic use is ceftriaxone, which is 14.43%, which is a broad-spectrum antibiotic. In third place is gentamicin at 12.37%.

Quantitative assessment of antibiotic use is carried out using the DDD (Defined Daily Doses) method recommended by WHO. The smaller the number of antibiotics used shows that doctors are more selective in prescribing antibiotics so that they are closer to the principle of rational use of antibiotics. The biggest antibiotic use is ceftriaxone, which is 16.93% DDD, followed by metronidazole 15.23% DDD. If seen in Table 2, it was mentioned that the number of patients using the antibiotic cefotaxime more usage when compared with ceftriaxone. This is because the WHO DDD standard value of cefotaxime (4g) is higher than ceftriaxone (2g) even though cefotaxime has a larger dose. Ceftriaxone is an antibiotic that has broad-spectrum activity, so it is often prescribed by doctors. Based on the antibiotic consumption patterns shown in table 3, it is known that antibiotics that enter the DU 90% segment use the largest to smallest antibiotic groups, namely ceftriaxone, metronidazole, cefotaxime, gentamycin, polymyxin B, colistin, cotrimoxazole,

cefuroxime, and meropenem. The DU 90% segment serves as an indicator of the quality of prescription drugs. This study aims to determine drug ranking based on the determined daily dose volume (DDD) and determine how many drugs enter the 90% DU segment. The study needs to be done about the rationality of the use of antibiotics, especially antibiotics that enter the 90% DU segment as an effort to control antibiotic resistance.

## ■ Conclusion

The results showed that the quantitative use of antibiotics ceftriaxone biggest of 16.93% DDD and antibiotics are included in the segment DU 90% that ceftriaxone, metronidazole, cefotaxime, gentamycin, polymyxin B, colistin, cotrimoxazole, cefuroxime, and meropenem.

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