

## EVALUATION OF ANTIBIOTICS UTILIZATION ON PEDIATRIC OUTPATIENTS IN UNIVERSITAS SUMATERA UTARA HOSPITAL, MEDAN

EMBUN SUCI NASUTION\*, RASMADIN MUKHTAR

Department of Pharmacology, Faculty of Pharmacy, University of Sumatera Utara, Medan, Indonesia. Email: embun@usu.ac.id

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### ABSTRACT

**Objective:** The aim of this study was to determine antibiotics prescribing profile for pediatric outpatients in Universitas Sumatera Utara Hospital, Medan, Sumatera Utara (Indonesia) in 2018.

**Methods:** This study was using a retrospective cross-sectional method study which conducted from March to April 2018 with data from January to December 2018. From Universitas Sumatera Utara Hospital, there are 211 prescriptions contained antibiotic that made as sample. The antibiotic analyzed based on the group, type, duration of administration, and dosage-drug form along with the dose.

**Results:** The antibiotic that mostly prescribed for pediatric outpatients was antituberculosis for 211 prescriptions (72.99%) which is isoniazid. There are 15 prescriptions (7.11%) with mismatch the duration of use. From 211 prescriptions with complete data to assess the dose, there are 75 prescriptions (35.55%) with mismatch dose and the most dosage form is pulveres for 121 prescriptions (57.35%).

**Conclusion:** It shows that isoniazid was the most prescribed antibiotic for pediatric outpatients in Universitas Sumatera Utara Hospital, Medan, and there is still mismatch in dose and duration of use in antibiotic prescribing for pediatric.

**Keywords:** Evaluation, Antibiotic, Utilization, Pediatric outpatient, Retrospective cross.

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### INTRODUCTION

Infectious disease remains one of the important public health issues, particularly in developing countries. One of the drug mainstays to overcome this problem is antimicrobial including antibacterial, antifungal, antiviral, and antiprotozoal [1]. Although the use of antibiotic applies to all ages, antibiotic for pediatric needs special attention [2]. The fact, antibiotic prescribed for pediatric in Indonesia still commonly found (~90%). The indiscriminate use of antibiotics in pediatric will increase the risk of infection, such as eliminating the good bacteria in the body, damaging the imperfect organs, and cause mutation that will lead to antibiotic resistance so antibiotics become less effective in treating. The use of antibiotic for pediatric adjusted to ideal weight according to age and instructions from professional guidance [3]. According to the WHO, the population of pediatric divided into several groups: Preterm newborn infant, term newborn infants (0–28 days), infants, and toddlers (29 days–23 months), children (2–11 years), and adolescents (12–18 years) [4]. Antibiotics were prescribed without investigation on empirical basis with an average of 2.11 per prescription. Cefixime was leading antibiotic prescribed followed by cefotaxime. Among the parenteral antibiotics, ceftriaxone followed by cefotaxime was prescribed in a highest number of patients. Orally administered drugs contributed the highest proportion of drugs prescribed with 78.16% of total drugs [5]. Antibiotics use was found to be reasonable and rational in most of the cases. However, still, prescribers should improve prescribing practices and make it more rational [6].

### METHODS

This study was a descriptive study that used a retrospective method. The antibiotic prescribed list obtained from Universitas Sumatera Utara Hospital in Medan by direct survey. The selection of prescribing was done with random sampling method. The study was conducted in March–April 2018.

The study assessed within 2 months (March–April) of prescribed drug utilized in the year 2018. The study included all antibiotic prescribe for pediatric (under 18 years old) in pediatric outpatients in Universitas Sumatera Utara Hospital, Medan, and then analyzed based on the antibiotic group, type, duration of use, dosage-drug form, and dose.

### RESULTS AND DISCUSSION

Antibiotic group that mostly prescribed from 211 patient data, 544 prescriptions are known to have antibiotic administration obtain is antituberculosis (72.99%), along with penicillin (8.06%), macrolide (8.06%), cephalosporin (7.11%), sulfonamide (1.42%), chloramphenicol (0.95%), fluoroquinolone (0.95%), and lincosamide (0.47%) as shown in Table 1.

#### Antibiotic types

Based on the type, antibiotic that mostly prescribed for pediatric is isoniazid (29.38%), rifampicin (26.54%), pyrazinamide (10.43%), erythromycin (9.48%), and amoxicillin (7.11%) as shown in Table 2. The list obtained from the study shown the same result with the list that published in Surakarta where 27.32% of isoniazid prescribed of antibiotic use. The list obtained from the study shown the same result with the list that published in Surakarta where 27.32% of isoniazid prescribed of antibiotic use [7].

Isoniazid also known as isonicotinylhydrazine is an antibiotic used for the treatment of tuberculosis. Isoniazid is a prodrug and must be activated by a bacterial catalase-peroxidase enzyme in *Mycobacterium tuberculosis* (KatG) [6]. Isoniazid is bacterial to rapidly dividing mycobacteria but is bacteriostatic if the mycobacteria are slow growing. It inhibits the cytochrome P450 systems and hence acts as a source of free radicals [8].

#### Duration of use

The duration of use of antibiotic prescribed for pediatric outpatients is shown in Table 3.

Table 1: Antibiotic group that mostly prescribed

No	Antibiotic group	Percentage
1	Antituberculosis	72.99
2	Penicillin	8.06
3	Macrolide	8.06
4	Cephalosporin	7.11
5	Sulfonamide	1.42
6	Chloramphenicol	0.95
7	Fluoroquinolone	0.95
8	Lincosamide	0.47

Table 2: Antibiotic type that mostly prescribed

No	Antibiotic type	Percentage
1	Isoniazid	29.38
2	Rifampicin	26.54
3	Pyrazinamide	10.43
4	Erythromycin	9.48
5	Amoxicillin	7.11
6	Cefadroxil	4.27
7	Cefixime	2.84
8	Ethambutol	2.36
9	Cotrimoxazole	1.42
10	2FDC	1.42
11	Amoxicillin Forte	1.42
12	Clarithromycin	0.95
13	Ciprofloxacin	0.95
14	Chloramphenicol	0.95
15	Clindamycin	0.47

Table 3: Duration of use of antibiotic

No	Antibiotic	Duration of use (days)	
		Appropriate (%)	Unappropriate (%)
1	Isoniazid	28.91	0.47
2	Rifampicin	26.54	0
3	Pyrazinamide	10.43	0
4	Erythromycin	9.01	0.47
5	Amoxicillin	7.11	0
6	Cefadroxil	0.47	3.79
7	Cefixime	1.89	0.94
8	Ethambutol	2.37	0
9	Cotrimoxazole	0.94	0.47
10	2FDC	1.42	0
11	Amoxicillin Forte	0.94	0.47
12	Clarithromycin	0.94	0
13	Ciprofloxacin	0.47	0.47
14	Chloramphenicol	0.94	0
15	Clindamycin	0.47	0
Total		92.89	7.11

Table 3 revealed that 92.89% onset of antibiotics was appropriate according to Mims.com and Indonesia Drug List Book [8,9]. Isoniazid was the highest antibiotic with a just duration of use. Antibiotic usually prescribed for several days also must be taken regularly and spent. The amount of antibiotics should be considered to avoid resistance [2].

#### Dosage form

An antibiotic dosage form that mostly prescribed based on the study was pulveres (57.35%), followed by tablet (27.96%), syrup (13.27%), capsule (1.42%), and drop (0.47%) as shown in Table 4.

The list obtained from this study shown the same list that published recently at Haji Hospital, Medan, where 53.1% of dosages form pulveres of antibiotic use. The oral drug use is more widely used than topical preparations because oral drug use is the most inexpensive, easy, and safest [10].

Table 4: Dosage forms of antibiotic that mostly prescribe

No	Dosage form	Percentage
1	Pulveres	57.35
2	Tablet	27.96
3	Syrup	13.27
4	Capsule	1.42
5	Drop	0.47

Table 5: Antibiotic dose

No	Antibiotic	Dose	
		Appropriate (%)	Unappropriate (%)
1	Isoniazid	13.27	16.11
2	Rifampicin	23.22	3.31
3	Pyrazinamide	8.06	2.37
4	Erythromycin	6.16	3.31
5	Amoxicillin	5.69	1.42
6	Cefadroxil	1.89	2.37
7	Cefixime	0.47	2.37
8	Ethambutol	0.94	1.42
9	Cotrimoxazole	0.94	1.42
10	2FDC	1.42	0
11	Amoxicillin Forte	0.94	0.47
12	Clarithromycin	0.47	0.47
13	Ciprofloxacin	0.94	0
14	Chloramphenicol	0	0.94
15	Clindamycin	0	0.47
Total		64.46	35.54

#### Dose

The study categorized by dose prescription as shown in Table 5.

Based on the study, 64.46% of antibiotic dose was appropriate. The correct order should be calculated based on the conversion between age and body weight of pediatric on International Organization for Standardization Medicine. The accuracy of dose is a very important factor. If the dose is administrated less than therapeutic range (underdose), there will be a therapeutically failure that will lead to antibiotic resistant, but if administrated over than the therapeutic range (overdose), there will be symptoms such as nausea, vomiting, diarrhea, and anaphylactic shock [11].

#### CONCLUSION

The antibiotic prescribed list obtained from the Universitas Sumatera Utara Hospital by direct survey in Medan City. Antibiotic group that mostly prescribed from 544 patient data, 211 prescriptions are known to have antibiotic administration obtain is antituberculosis (72.99%), the duration of antibiotic use was appropriate (64.46%) according to The Drug Doses, Mims.com and Indonesia Drug List Book, antibiotic dosage form that mostly prescribed based on the study was pulveres (57.35%), and there is still unappropriate dose in antibiotic prescribed for pediatric.

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#### CONFLICTS OF INTEREST

There are no conflicts of interest.

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