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Patterns of Antibiotic Use in Pediatric Patients in the Parkit Inpatient Unit of RSAU dr. Esnawan Antariksa

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ABSTRACT

Giving antibiotics is the main treatment in the management of infectious diseases. Antibiotics are drugs that come from all or some of certain microorganisms and are used to treat infections from bacteria, but improper use will have an impact on the emergence of resistance so that the benefits will be reduced. This study aims to determine the pattern of antibiotic use in pediatric patients at the parkit inpatient unit of RSAU dr. Esnawan Antariksa. Based on the results of research data taken in January - February 2024 with a sample size of 43 patients. The largest number of pediatric patients hospitalized in parkit rooms was diagnosed with pneumonia as many as 20 patients (46.51%), with male gender being 22 patients (51%) and the most age being 0-4 years 25 patients (58%). The antibiotic used in the third-generation cephalosporin group was ceftriaxone in 20 patients (46.51%), the dosage form most used was injection and the route of administration most used was intravenous in 22 patients (51.18%).

Keywords: Antibiotics, Pediatric Patients, Hospital

INTRODUCTION

Antibiotics are antimicrobial drugs that are commonly used to treat infections. The use of antibiotics has been commonly used by the community without understanding how to use these antibiotics, in their use these antibiotics are increasingly widespread and become important problems, including the high prevalence of infectious diseases, the increasing use of antibiotics in the community and the use of this class of drugs must be prescribed by a doctor. The use of antibiotics in developing countries such as Indonesia, as well as in developed countries such as the United States, has also increased, including the use of antibiotics without a doctor's prescription, which has the potential to cause drug resistance (Utami, 2012).

During the treatment process or in an effort to cure an infectious disease, the doctor will examine the patient and will prescribe medication according to the results of the examination. The usual considerations in prescribing antibiotics are the age factor, the type of drug used and the dose to be given to the patient. Excessive use of antibiotics has the potential to irrational use. This is one of the factors causing resistance. WHO in Antimicrobial Resistance: Global Report on Surveillance stated that the highest cases of antibiotic resistance in the world are found in Southeast Asia, especially *Staphylococcus aureus* resistant to methicillin (Ministry of Health 2015).

Incorrect use of antibiotics can lead to the occurrence of resistance. Antibiotic resistance is a phenomenon when bacteria become resistant to antibiotics so that they can no longer be killed or inhibited by antibiotics, for example the use of antibiotics with the wrong duration or dosage and the use of antibiotics indiscriminately (except in the case of bacterial infections). Bacteria that are resistant to antibiotics can be transmitted from one person to another. Bacterial immunity can be transmitted to other bacteria. That is what causes the rapid development of antibiotic resistance. The speed at which antibiotic resistance develops far exceeds the speed of discovery of new antibiotics. (Ministry of Health, 2011).

An important factor that causes the high rate of antibiotic resistance is the irrational use of drugs. Minimal public knowledge about antibiotics can affect health attitudes and behaviors, including irrational use of antibiotics. Knowledge has an important role in shaping beliefs and attitudes about certain behaviors, including behavior in the use of antibiotics, as well as the level of education which is considered to have a great influence on these behaviors (Ivoryanto, 2017).

The occurrence of infection comes from the interaction of pathogenic microorganisms with macroorganisms under certain environmental and social conditions. The concept of "Infectious disease" is a disorder caused by microorganisms such as bacteria, viruses, fungi, or parasites, examples of cases of infection that often occur including in the respiratory tract, urinary tract, digestion, skin. These microorganisms are usually harmless or even helpful, but under certain conditions, some microorganisms can cause diseases where antibiotic therapy is needed to treat the infection (Rudy, 2019).

The pattern of antibiotic use in hospitals is correlated with disease data handled by hospitals and can be used to control the number of antibiotic supplies in hospitals. The purpose of this study is to determine the pattern of

antibiotic use in pediatric patients in the parkit inpatient unit of RSAU dr. Esnawan Antariksa.

The decision to administer antibiotics must meet the following principles, namely: the right diagnosis, the right dose, the right type of antibiotic, the right route of administration, the right time interval of use.

METHOD

This study is descriptive research with retrospective data collection from secondary data of inpatient medical records. The sampling technique used is Purposive Sampling, where sampling uses predetermined inclusion and exclusion criteria. This research was carried out in March 2024 at the parkit inpatient unit of RSAU dr. Esnawan Antariksa, Jakarta. The research sample is pediatric patients who use antibiotics from January to February 2024 in the parkit inpatient unit of RSAU dr. Esnawan Antariksa.

Inclusion Criteria, namely: Parkit inpatient pediatric patients who use antibiotics in the period January - February 2024, Patients aged 1 month to <17 years, Patients are treated until they receive doctor's approval to go home, Complete and clearly legible medical records.

Exclusion Criteria, namely: Pediatric patients taking topical antibiotics, Patients who died during the study, Patients > 17 years old, Incomplete and illegible medical records.

The pattern of antibiotic use in this study is seen from the indications of antibiotic administration based on clinical diagnosis, the type of antibiotic used during treatment, the variation in prescribing based on the number of types of antibiotics received by patients during treatment, and the route of administration.

RESULTS AND DISCUSSION

Based on research conducted at RSAU dr. Esnawan Antariksa for the period January - February 2024, a research sample of 186 populations was obtained, while 43 patients were included in the inclusion criteria for antibiotic use. The results of the study are divided into:

1. Gender and Age

The results of the study based on the characteristics of the study for gender and age can be seen in table 1.

Table 1. Percentage of pediatric patients by gender and age

Characteristic	Total (n)	Percentage (%)
Gender		
Male	22	51
Female	21	49
Amount	43	100
Age (year)		
0 – 4	25	58
5 – 8	13	30
9 – 17	5	12
Amount	43	100

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Based on the data in table 1. It can be seen that the number of antibiotics uses in children aged 0-17 years who receive antibiotic treatment in the parkit inpatient unit of RSAU dr. Esnawan Antariksa for the period January - February 2024 is 43 patients, of which 22 patients are male with a percentage of 51% while female patients are 21 patients with a percentage of 49%. Based on existing conditions, it shows that gender is not the main cause or factor for a person to be infected with bacteria, but is caused by genetic factors, immunity, environment and a person's lifestyle including dietary patterns (Vascarya. et al., 2016). Meanwhile, for the age criteria for pediatric patients in the period of January - February 2024 at RSAU dr. Esnawan Antariksa who received the most antibiotic prescriptions, namely at the age of 0-4 years, there were 25 patients with a percentage of 58%, while at the age of 5-8 years there were 13 patients with a percentage of 30% and at the age of 9-17 years there were 3 patients with a percentage of 12%. Based on these conditions, the immune system in toddlers is not strong enough to deal with virus attacks or germs from outside. The child's immune system will increase as the child ages, with a good immune system in the child, the body can be protected from infectious diseases. The role of parents is needed in improving the immune system through the intake of the right nutrients, both fruits and vegetables. If necessary, children can be given additional multivitamins according to the doctor's prescription. Toddlers are also found to be sick due to immune system disorders or also called autoimmune. This disease occurs when the immune system actually attacks the body itself because it fails to recognize the threat of the virus from the outside. The environment also contributes to the many complaints of toddlers often getting sick. Children are more vulnerable to the effects of weather changes than adults. In addition, exposure to environmental pollution can cause diseases that develop with age. (Fith Dahlan, 2024)

2. Disease Diagnosis

Tabel 2. Patient Diagnosis Data

Diagnosis	Total (n)	Percentage (%)
Gastroenteritis	5	11,62
Tonsillitis	1	2,32
Sinusitis	1	2,32
Tifoid Fever	14	32,55
Pneumonia	20	46,51
ISK	2	4,67
Total	43	100,00

Based on the data in table 2. showed that the number of patients with a diagnosis of Pneumonia was more than the diagnosis of other diseases, which was as many as 20 cases or as much as 46.51%. This condition is related to the clinical condition of pneumonia patients which is defined as an inflammation of the lungs caused by microorganisms such as bacteria, viruses, fungi and parasites (Indonesian Lung Doctors Association, 2021). Pneumonia is common in children, where patients with pneumonia will find it difficult and painful to breathe because their lungs are filled with pus and fluid. Other symptoms that usually arise due to pneumonia are fever, cough and wheezing. Pneumonia is

the leading cause of death in children. The World Health Organization (WHO) reports that as many as 14% of infant deaths under five are caused by pneumonia; In 2019, 740,180 children died from pneumonia. The results of Riskesdas in 2018 show that the prevalence of pneumonia in toddlers in Indonesia is 2.1%, where the highest prevalence occurs in children aged 12 to 23 months. The causes of pneumonia vary greatly depending on the age of the child, but in general the most common bacteria are *Streptococcus pneumoniae*, *Respiratory syncytial virus*, *Adenovirus*, *Haemophilus influenzae* (both type B and non-type) and *Influenzae* A and B. Some of the risk factors for pneumonia are low immunity (undernutrition, poor nutrition, and not getting exclusive breastfeeding), living in crowded housing, low economic status, comorbidities (HIV and measles), increasing air pollution, cigarette smoke and incomplete immunization of children. (WHO, 2019)

Other symptoms of pneumonia that occur in children are coughing, shortness of breath, difficulty eating and drinking, decreased consciousness, fever, seizures, there are additional breathing sounds (wheezing), and other accompaniments such as nausea, vomiting and diarrhea. The limit of rapid breathing according to WHO is the frequency of breathing that occurs in 1 minute, which is more than or equal to 60 times in children less than two months old, more than or equal to 50 times per minute in children aged two to eleven months, and more than or equal to 40 times per minute in children aged one to five years. (WHO, 2019)

3. Antibiotic Use

Table 3. Antibiotic Use Data by Drug Name and Drug Class

Antibiotic	Antibiotic Class	Total (n)	Percentage (%)
Ceftriaxone	Sefalosporin gen III	20	46,51
Azitromycin	Makrolida	5	11,62
Cefixime	Sefalosporin gen III	15	34,88
Cefadroxil	Sefalosporin gen I	1	2,32
Cefotaxime	Sefalosporin gen III	2	4,67
Total		43	100,00

Based on the data in table 3. The most widely used antibiotic is ceftriaxone (third-generation cephalosporins) as much as 20 or 46.51%. The use of cephalosporin antibiotics is given to pneumonia based on recommendations from the Community Pneumonia Management by the Indonesian Pulmonary Doctors Association (2021) which states that the therapy of pediatric non-ICU inpatients can use beta-lactam antibiotics such as ceftriaxone combined with macrolides such as azithromycin (Farida et al., 2017). Based on the results of Sunaryani, et al., 2017 on the effectiveness of the use of third-generation safalosporin antibiotics at the Madani Regional Hospital, Central Sulawesi Province, the results were obtained that the use of third-generation cephalosporin antibiotics is more effective than other antibiotics, especially for the diagnosis of typhoid fever because there are significant differences in the average temperature drop and length of hospitalization.

3. The use of antibiotics based on the dosage form and rules of use and

route of administration can be seen in table 4.

Table 4. Antibiotic Use Data by Dosage Form, Rules of Use and Giving Route

Antibiotic	Dosage form	Giving Route	Rules of use	Total (n)	Percentage (%)
Ceftriaxone	Injeksi	IV	2x1	20	46,51
Azitromycin	Pulveres	Oral	1x1	5	11,62
Cefixime	Syrup	Oral	2x1	15	34,88
Cefadroxil	Syrup	Oral	3x1	1	2,32
Cefotaxime	Injeksi	IV	1x1	2	4,67
Total				43	100,00

Based on the data in table 4. The results were obtained that the administration of antibiotic drugs to pediatric patients in the parkit inpatient unit of RSAU dr. Esnawan Antariksa, namely Ceftriaxone, was 20 cases or 46.51% which was given in the form of injections with the rule of using 2X1 with the route of intravenous administration. Based on these conditions, it shows that most pneumonia is caused by microorganisms and a small part is caused by other things such as aspiration and radiation. In developing countries, pneumonia is mainly caused by bacteria. The bacteria that cause pneumonia are *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Haemophilus influenzae* (Said, 2008). Pneumonia can occur year-round at any age. Severe clinical manifestations can occur at a very young age, seniors and patients with critical conditions. Antibiotics are the main therapy for the treatment of pneumonia. Broad-spectrum antibiotics are given as empirical therapy for pneumonia. However, the uncontrolled use of broad-spectrum antibiotics can risk causing bacterial resistance. (Dahlan, 2007). The dose of ceftriaxone is 75-100 mg/kg, while the maximum dose is 2000 gr per day. Based on the data above, it shows that the treatment of pneumonia is carried out using ceftriaxone at a dose of 2 grams/24 hours, this is in accordance with the DDD (Defined Daily Dose) that has been determined by WHO, namely 1 DDD (WHO, 1998). The use of the antibiotic ceftriaxone is widely carried out in severe patients, especially in patients whose cause is not yet known. Ceftriaxone is a third-generation cephalosporin class that is widely used in the treatment of pneumonia because it has high antibacterial potential, has a broad spectrum and low toxicity. (Tjay and Rahardja, 2007)

CONCLUSION

From the results and discussion, it can be concluded that pediatric patients are hospitalized in the parkit inpatient unit of RSAU dr. Esnawan Antariksa with the most diagnoses, namely pneumonia as many as 20 patients (46.51%), which occurs in patients with a male gender as many as 22 patients (51%) and occurs in patients with the most age of 0-4 years as many as 25 patients (58%). The most used antibiotics were the third-generation

cephalosporin group, namely ceftriaxone as many as 20 patients (46.51%), the most used dosage form was injection and the most used route of administration was intravenous as many as 22 patients (51.18%).

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