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EVALUATION OF ANTIBIOTIC USE FOR DIARRHEA THERAPY IN TODDLERS AT PUSKESMAS BEJI DEPOK CITY

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ABSTRACT

Acute diarrhea is diarrhea more than fourteen days and is generally caused by microbial infection. The principles management of acute diarrhea are rehydration, symptomatic therapy, and selective and rational antibiotic therapy. Previous study shown antibiotic prescriptions for diarrhea therapy are still quite high, a study at the Bangsal Puskesmas in Mojokerto Regency showed that 27% was inappropriate for the indication. The aim this study was to evaluate the rationality of using antibiotics for diarrhea in toddlers. This study is a descriptive study with retrospective data collection from the medical records of toddler diarrhea patients at the Puskesmas Beji in Depok City in 2021 who met the inclusion and exclusion criteria. The results of the study showed the use of antibiotics such as metronidazole, amoxicillin, and cotrimoxazole was the right choice because it was in accordance with the choice of antibiotic therapy for acute diarrhea with specific indications, however the results of the evaluation of antibiotic prescriptions were not appropriate indications there was still a high number 62,5% of antibiotic prescriptions for patients with non-specific acute diarrhea. Antibiotic prescriptions must be based on the bacteria causing the infection so it is very necessary to be supported by data from laboratory tests.

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

INTRODUCTION

Diarrhea is a condition in which an individual experiences a frequency of defecation as much as three times per day with the consistency of more liquid or flaccid stool (1). The normal value of water content in the stool is about 10 mL/kg/day in infants and young children or 200 g/day in adolescents and adults. Diarrhea occurs in the presence of an increase in the water content in the stool due to an imbalance in the normal functioning of the physiological processes of the small and large intestine that are responsible for the absorption of various ions, other substrates and water and are caused not only by infections, but also by various **chemical substances that affect the functioning of the gastrointestinal tract**. Enterotoxin-like bacterial infections ***Vibrio cholerae*** **dan** ***Escherichia coli*** which produces enterotoxins stimulates the secretion of ions and fluids to the intestinal lumen without any noticeable mucosal damage (2). In addition to microbial toxins**, substances that are not absorbed in the lumen of the intestine,** such as carbohydrates in lactose intolerance conditions, can cause osmotic diarrhea by increasing the osmotic pressure of the lumen so as to draw water into the intestine. Diarrhea in children is the result **of a multifactorial interaction between infectious agents, environmental chemicals, and unabsorbed dietary components** that affect the secretion and absorption of ions and intestinal fluids as well as the body's biological response. A thorough understanding of these chemical mechanisms is important as a basis for **prevention strategies, proper diagnosis, and management of diarrhea** in children (3).

Diarrhea based on the length of course of the disease is classified into acute diarrhea and chronic diarrhea. Acute diarrhea is diarrhea as an acute onset of the occurrence of diarrhea with a frequency of three or more times a day with the consistency of diluted or watery stools that last for 14 days or less. Chronic or persistent diarrhea is when the occurrence of diarrhea lasts more than 14 days. Acute diarrhea is usually caused by an infection. The etiology of diarrhea due to non-infection is becoming more common causing chronic diarrhea. The determination of this classification of diarrhea is important to know at the early stages of treatment to determine the administration of therapy based on the duration and specific etiology (4).

The prevalence of diarrhea according to the results of Basic Health Research in 2018 shows that it is 8% of all age groups, 12.3% in toddlers, and 10.6% in infants. In 2021, diarrhea is still the largest cause of infant mortality in the post-neonatal period, which is 14%. Data on the number of diarrhea cases under five served in West Java in 2021 showed the highest cases at 18% or around 666,244 cases and followed by the second most cases, namely in East Java at 12.7% or 470,968 cases of the total number of diarrhea cases in Indonesia (5). According to data from the Depok City Health Office in 2021, diarrhea and gastroenteritis are included in the top 10 most diseases in hospital inpatients and the top 15 diseases in the Depok City Health Center with the percentage of diarrhea cases found and treated in toddlers, which is 7.3%. The coverage of diarrhea cases from reports from health centers and hospitals in the Depok City area over the past four years has continued to decline, as much as 46.35% or 29,160 cases in 2018, by 40.23% or 26,142 cases in 2019, then decreased by 18.75% or 12,576 cases in 2020, and then decreased again to 15.13% in 2021 so that it has shown

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

positive improvements in efforts to prevent and handle diarrhea in children but effective efforts still need to be made to continue Reduce the incidence of diarrhea in children (6).

Diarrhea is categorized into acute diarrhea and chronic diarrhea based on the length of the illness, and based on the cause is classified into infectious diarrhea and noninfectious diarrhea. Acute diarrhea is diarrhea that lasts for 14 days or less, generally caused by viral, bacterial, and/or parasitic infections. Diarrhea due to viral infection is usually caused by Rotavirus and enterovirus, diarrhea due to bacterial infection is usually caused by *Escherichia Coli*, and diarrhea due to parasite infection is caused by parasites *Entamoeba histolytica* (2). Chronic diarrhea is diarrhea with a duration of more than 14 days and tends to be non-contagious, generally caused by malabsorption in the digestion, inflammatory bowel disease, and side effects of medication. The clinical manifestation of diarrhea is that the patient will experience dehydration due to the loss of a large amount of body fluids and electrolytes through bowel movements. Dehydration will be more severe if it is accompanied by vomiting and fever. It is very dangerous if not treated immediately and escalates to severe dehydration leading to decreased consciousness, metabolic acidosis and hypokalemia (7). The principles of acute diarrhea management are rehydration of body fluids, symptomatic therapy, and antibiotic therapy (8). (4) (4)(1) . Most cases of mild acute diarrhea can heal on their own by the body's immune system and do not require antibiotic treatment. The management of antibiotic use for diarrhea based on WHO is only for cases of acute bloody diarrhea accompanied by blood and cases of cholera (9). Antibiotic administration must be selective and rational so that it can prevent antibiotic resistance, and optimize treatment (10). When antibiotics must be prescribed, the fluoroquinolones group is the first-line medication that can be considered for patients with more severe symptoms. Probiotic supplementation has been shown to reduce the severity and duration of symptoms and should be recommended in patients with acute diarrhea (11). Based on several studies conducted, it is known that the prescription of antibiotics for diarrhea therapy in toddlers in Indonesia is still quite high (5). The research conducted at the Kaladawa Health Center, Tegal Regency, of 200 diarrhea patients who were given antibiotic therapy, as many as 93% had the right dose and 7% had not the right dose(12) . Then research at the Ward Health Center in Mojokerto Regency showed that 73% of the use of antibiotics was correct in the indications but still as many as 27% were not correctly indicatedi(13). Research has also been conducted at the Jiwan Health Center, Madiun City, showing that among 75 diarrhea patients who received antibiotics, 10% were not in the right dose(14).

Based on the description above, the use of antibiotics for diarrhea patients in toddlers needs to be evaluated. Therefore, researchers conducted a study on the evaluation of the rationality of the use of antibiotics for diarrhea therapy in toddlers at the Beji Health Center, Depok City in 2021.

RESEARCH METHODS

This research is a descriptive research with retrospective data collection. Data was taken through the medical records of diarrhea patients under five. The subjects used for this study were all outpatients with diarrhea under five years at the Beji Health Center in Depok City in 2021 with inclusion criteria, namely all diarrhea patients under five at the Beji Health Center in Depok City in 2021, all diarrhea patients under five who received antibiotic therapy, and

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

all diarrhea patients under five who were not experiencing other infectious diseases. The exclusion criteria include diarrheal patients with incomplete medical record data and acute diarrhea patients under five with medical record data that cannot be read clearly. The data collected are data obtained from medical records, including patient demographics (gender and age), clinical symptoms, and disease diagnosis, as well as patient treatment management records. The data were then analyzed descriptively to describe the profile and prescription of antibiotics in pediatric diarrhea patients at the Beji Health Center, Depok City in 2021.

RESULTS AND DISCUSSION

Patient Characteristics

The research was carried out by taking medical record data of diarrhea patients under five in the Beji Health Center area for the 2021 period. Of the 157 cases of diarrhea patients under five that were found, there were 34 patients who met the inclusion criteria, consisting of 21 male patients and 13 female patients.

Gender

From these data, it shows that the incidence of diarrhea patients in boys is higher than in girls, although in general diarrhea cases are not affected by gender, however, the risk of diarrhea in boys may be caused by several factors, one of which is the characteristics of boys who tend to be more active than girls so that they are more at risk of being exposed to bacteria and microorganisms that cause diarrhea(15).

Category Usia

(15) (15)

Table 1. Patient Characteristics

No	Features	Number of Patients	Percentage
1	**Gender**	**34**	
	Male	21	61,76%
	Women	13	38,23%
2	**Age**	**34**	
	< 1 Year	10	29,41%
	1 Year	14	41,18%
	2 years	6	17,65%
	3 Year	3	8,82%
	4 years	0	0%
	5 Year	1	2,94%

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

Table 2. Symptoms on the Patient's Medical Record

No	Gejala		Number of Patients
1	**Diarrhea**	Diarrhea < 3 days	24
		Diarrhea > 3 days	6
		Diarrhea < 3 bloody and slimy days	2
2	**Fever**	Fever < 3 days	11
		Fever > 3 days	4
3	**Muntah**	Muntah	11
4	**Nausea**	Nausea	1
5	**Cough and Cold**	Cough < 3 hari	7
		Cough > 3 hari	3
6	**With Laboratory Results**	Leukosit 14.100	2
		Trombosit 271	1
		Infectious bacteria	1
7	**No Complaints**	No Complaints	1

Table 3. Antibiotic Prescribing Patterns

No	Antibiotics	Types of Antibiotics	Quantity	Percentage
1	Fenikol	Kloramfenikol	1	2,94%
2	Sulfonamide & Diaminopyrimidine	Kotrimoksazol	3	8,82%
3	Nitroimidazole	Metronidazol	17	50%
4	Penisillin	Amoksisilin	13	38,24%

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

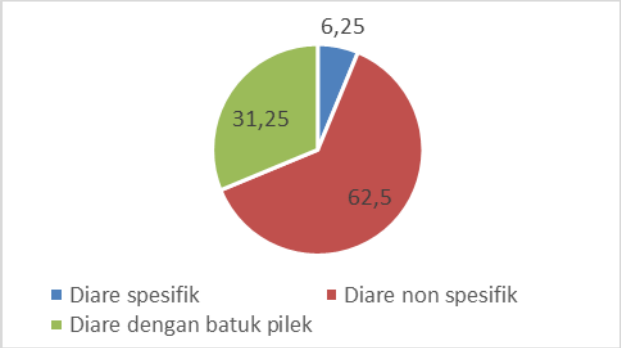

Figure 1. Percentage of Antibiotic Prescriptions

Types of Antibiotics Used

From the medical record data obtained, it was found that the pattern of antibiotic prescription received by diarrhea patients under five at the Beji Health Center was 4 groups of antibiotics as stated in the table. The most prescribed antibiotic group for diarrhea patients under five is the nitroimidazole group of metronidazole at 50%, then the second most is the pensilin antibiotic type amoxicillin at 38.24%. The choice of antibiotics for acute diarrhea that is prescribed, namely metronidazole, amoxicillin, and cotrimoxazole, is appropriate because it is included in the choice of acute diarrheal antibiotic therapy that is used when there are specific indications such as dysentery, namely diarrhea accompanied by blood and cholera disease(16). The use of antibiotics must be specific according to the cause of the infection, so it is very necessary to support the data from laboratory examinations, if it is found to be caused by a bacterial infection, therapy with antibiotics needs to be carried out immediately with the choice of first-line antibiotics, namely the nitroimidazole, penicillin, or sulfonamide group.

The nitroimidazole group, metronidazole 5-10 mg/kg three times a day for 5 days, is used for the treatment of acute diarrhea caused by *amobiasis* or *giardiasis* infection. The penicillin group, amoxicillin, is a broad-spectrum antibiotic that can be used for the treatment of *Escherichia coli, Staphylococcus aureus, S. pneumoniae, N. gonorrhoeae, H. influenza, Enterococcus, Streptococcus, and P. mirabilis* infections. The sulfonamide group is a combination of trimethoprim 80 mg and sulfamethoxazole 400 mg with a ratio of 1:5 has a broad-spectrum bactericidal synergistic effect on gram-positive and gram-negative bacteria infection of *Vibrio cholera, Streptococcus, Staphylococcus, Pneumococcus, Neisseria, Bordetella. Klebsiella, Shigella* and *E.coli*.

Patient Symptoms

From the medical records data of diarrhea patients under five at the Beji Health Center, there are several symptoms that patients also experience, including:

Diarrhea

Data obtained from 32 patients with diarrhea symptoms in the form of diarrhea with a duration of less than 3 days as many as 24 patients and a duration of more than 3 days as many as 6 patients and 2 patients accompanied by blood and mucus. Diarrhea is an indicator

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

of the body's response to something that occurs in the body, especially the gastrointestinal tract such as microorganism infections, intestinal function disorders, intestinal tract diseases, intolerance and sensitivity to certain foods, or due to drug reactions taken (3). Acute diarrhea is a condition of the consistency of softer or more liquid bowel movements with a frequency of more than three to four times a day and if diarrhea is also accompanied by blood, it is a symptom of dysentery (17). Diarrhea that occurs for more than 3 days can be a sign of more serious health problems in the body.

Fever

The data obtained showed that out of 34 patients with acute diarrhea under five, 15 patients experienced fever symptoms. Fever is a common sign experienced by the body in response to something happening in the body, including pathogenic infections, inflammatory responses, and disturbances in the balance of body fluids and metabolites. In the case of diarrhea, fever can occur due to a pathogenic infection that causes diarrhea and/or there is a disturbance in the balance of body fluids due to dehydration because during diarrhea the body loses a lot of fluid that comes out with the stool so that dehydration occurs. If the body is dehydrated, the hypothalamus as the body's thermo regulatory center will send a signal by raising the body temperature to high so that fever occurs and if the condition continues without any fluid supply entering the body, the higher body temperature can cause tissue damage (7).

Nausea and/or vomiting

Nausea and vomiting are a reaction of the body's mechanisms to protect against harmful foreign substances entering the digestive tract which is a sign of a disorder in the digestive system. In the case of diarrhea caused by a gastrointestinal infection, it can generally also cause symptoms of nausea and vomiting (18). Symptoms of nausea and vomiting can occur due to the influence of excessive intestinal peristaltic activity during diarrhea so that there is an increase in stomach acid production.

Cough and/or Cold

Cough and cold in children are one of the symptoms of acute respiratory infection (ARI) in the non-specific category (18). From the data obtained, there were 10 pediatric diarrhea patients also accompanied by cough and cold. The occurrence of coughs and colds in children can be caused by bacterial or viral infections due to a weakened immune system where during diarrhea conditions if not treated immediately the body will lose a lot of nutrients so that the body's immune system decreases. Therefore, in the treatment of coughs and colds in children, it is enough to get enough rest and eat nutritious foods so that the immune system can increase to fight the cause of the disease and does not require treatment with antibiotics.

With Laboratory Examination

Management of acute diarrhea with antibiotics should be based on the results of laboratory tests on the specific cause of pathogenic infection. Acute diarrhea accompanied by blood is usually caused by infection with pathogens namely *Shigella, Salmonella, Campylobacter jejuni,* and *Entamoeba histolitica* (1). From the data obtained from 34

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Jurnal Katalisator Vol 10 No. 2 (2025) 84-93

diarrhea patients under five, no data was found on patients conducting specific laboratory examinations of pathogens that cause diarrhea. Laboratory examinations were found in 3 patients, namely the results of the examination of the patient's hematological status showed signs of infection in the form of an increase in leukocyte values, which was more than 12,000 from normal values in toddlers.

Exact Indications

Data obtained at the Beji Health Center found that the use of antibiotics prescribed in 32 pediatric diarrhea patients was 62.5% without any indication of specific causes of diarrhea and 6.25% were in accordance with the indications of specific causes of diarrhea. From this data, it can be seen that there is still a high inaccuracy of indications for the use of antibiotics in pediatric diarrhea patients. The prescription of antibiotics must be based on the bacteria that cause the infection, so it is very necessary to support the data from laboratory tests. Some of the factors that may be taken into account for the prescription of antibiotics for non-specific diarrhea are the presence of comorbidities other than the diarrhea experienced by the patient such as cough and cold, and the duration of diarrhea that has lasted more than 3 days. Coughs and colds can be caused by bacterial infections, so one of the options for therapy is antibiotics. Then another consideration is the duration of diarrhea in patients who have been more than 3 days or even have lasted for 1 week which should need further treatment so that the condition does not get worse. These factors are the basis for consideration in prescribing antibiotics in the treatment of acute diarrhea in patients

CONCLUSION

Acute diarrhea is diarrhea that lasts for 14 days or less, generally caused by viral, bacterial, and/or parasitic infections. The principles of acute diarrhea management are rehydration of body fluids, symptomatic therapy, and antibiotic therapy, the administration of antibiotics must be selective and rational so that it can prevent antibiotic resistance and optimize treatment. The results of the evaluation of the rationality of the use of antibiotics for the treatment of acute diarrhea in toddlers at the Beji Health Center are that the choice of drugs is appropriate because it is included in the choice of acute diarrheal antibiotic therapy that is used when there are specific indications such as dysentery, namely diarrhea accompanied by blood and cholera. Then the results of the evaluation of the rationality of the use of antibiotics for acute diarrhea therapy in toddlers at the Beji Health Center are not yet indicated, where treatment data shows that there is still a high incidence of antibiotic prescription in non-specific acute diarrhea patients that have not been accompanied by supporting data such as laboratory examination results to ascertain the specific cause of diarrhea. The prescription of antibiotics must be based on the bacteria that cause the infection so it is very necessary to support the data from laboratory tests.

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