



## Overview of the Factors Affecting the Length of Treatment for Patients with Typhoid Fever in Children at Dr. Tadjuddin Chalid Hospital Makassar in 2018

Rini Suherti<sup>1\*</sup>, Andi Sitti Rahma<sup>2</sup>, Trisnawaty<sup>3</sup>

<sup>1</sup> Undergraduate Student of Medical Education, Faculty of Medicine and Health Science, Universitas Islam Negeri Alauddin, Makassar, Indonesia

<sup>2</sup> Department of Anatomy, Faculty of Medicine and Health Science, Universitas Islam Negeri Alauddin, Makassar, Indonesia

<sup>3</sup> Department of Psychology, Faculty of Medicine and Health Science, Universitas Islam Negeri Alauddin, Makassar, Indonesia

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#### Corresponding author:

Rini Suherti

E-mail address:

[rinisuhartia22@gmail.com](mailto:rinisuhartia22@gmail.com)

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### ABSTRACT

Typhoid fever is one of the endemic diseases in Indonesia caused by *Salmonella typhi* bacteria. Typhoid fever transmission occurs due to personal hygiene behavior and poor environmental hygiene. Several factors can affect the length of treatment for typhoid fever patients in children. This study was conducted to determine the description of the length of treatment for typhoid fever patients in children at the Dr. Tadjuddin Chalid Hospital Makassar in 2018 based on age, nutritional status, and types of antibiotics. This research is a descriptive study using quantitative methods. The study sample was 75 patients with typhoid fever in children aged 1-18 years. The data was used in the form of secondary data in the form of medical records. The results of the study from 75 patients showed that short length of treatment based on age was found in the 11-14 year age group as many as 22 people (37.3%), the short length of treatment based on nutritional status was mostly found in normal nutritional status as many as 56 people (94.9%), the short length of treatment based on the type of antibiotic was found in the use of the antibiotic ceftriaxone as many as 39 people (66.1%). Most of the length of treatment for typhoid fever patients in children had a short duration of treatment as many as 59 people (78.7%).

### 1. Introduction

Typhoid fever is a disease caused by the bacterium *Salmonella typhi* and is associated with personal hygiene and poor environmental sanitation. The World Health Organization (WHO) estimates that the number of typhoid fever cases has reached 17 million cases. According to WHO, the incidence of typhoid fever is around 12.5 million cases per year worldwide. In developing countries, the incidence of typhoid fever is around 500 cases per 100,000 population or about 0.5%, varying from 10-540/100,000 population with mortality rate.<sup>1</sup>

According to data from the Indonesian Health

Profile in 2014, out of 10 types of typhoid fever, one of the 10 most common diseases in hospitals with hospitalization is ranked 3rd after diarrheal disease. Typhoid fever cases increased at the age of 3-19 years in 2014 reaching 91% of 21 million cases and 200,000 of them died.<sup>2</sup> Reports from the P2P of the Makassar City Health Office in 2019 the incidence of typhoid fever was recorded in 2016 to 2018 as many as 17,920 which experienced an increase in incidence every year. The incidence of typhoid fever increased in those aged 5-14 years.<sup>3</sup>

Typhoid fever is a systemic infection with



characteristic symptoms, namely an increase in the fever that increases very high in the afternoon and evening. The occurrence of *Salmonella typhi* is due to personal hygiene behavior and poor environmental sanitation. bacteria *Samonella typhi* enter the human body through water and food that have been previously contaminated by these bacteria. The prevalence of typhoid fever most often occurs at school age where the level of cleanliness is still lacking and tends to still pay less attention to personal hygiene.<sup>4</sup> This study was conducted to determine the description of the length of treatment for typhoid fever patients in children at the Dr. Tadjuddin Chalid Hospital Makassar in 2018 based on age, nutritional status, and types of antibiotics.

## 2. Methods

This research is a descriptive observational study. The research location is Dr. Tadjuddin Chalid Hospital, Makassar city. The research was conducted in January-February 2020. This research has received ethical approval from the Health Research Ethics Committee, Faculty of Medicine and Health Sciences UIN Alauddin Makassar (No. E.019/KEPK/FKIK/I/2020). Sampling was done by

the total sampling method. The data used is secondary data, namely medical records of pediatric typhoid fever patients. The sample inclusion criteria were patients with a diagnosis of typhoid fever, aged 1-18 years, and had complete medical records. Age, type of antibiotic, and nutritional status are independent variables where this variable will affect the dependent variable, namely the length of treatment for typhoid fever patients. Data analysis was performed using SPSS 25.0 software.

## 3. Results and Discussion

This study was conducted on 75 patients with typhoid fever in Dr. Tadjuddin Chalid Hospital Makassar in 2018. Table 1 shows the baseline characteristics in children with typhoid fever. Most of the patients (78.7%) required a short duration of treatment for typhoid fever (Table 2). The length of time patients are treated today can be used as a measure of the performance of a hospital's health services. The average length of time a patient is treated can assess the efficiency of a health service. Where the average length of stay which is considered efficient according to medical service standards is 3-5 days.<sup>5</sup>

Table 1. Baseline characteristics of pediatric typhoid fever patients at Dr. Tadjuddin Chalid Hospital Makassar

Characteristics	Frequency (%)
Age	
1-4 years	14 (18.7)
5-10 years	20 (26.7)
11-14 years	24 (32.0)
15-18 years	17 (32.7)
Gender	
Male	44 (58.7)
Female	31 (41.3)
Leukocyte count	
Leukopenia	21 (28)
Normal	41 (54.7)
Leukocytosis	13 (17.3)
Nutritional status	
Normal nutrition	63 (84)
Undernutrition	12 (16)
Parental education	
No school	2 (2.7)
Elementary	8 (10.7)
Junior	18 (24)
high school	24 (32)
College	10 (13.3)
Not recorded	13 (17.3)
Occupation of parents	
PNS/TNI-POLRI	13 (17.3)
Private employees	12 (16)
Self-employed	19 (25.3)
Housewives	16 (21.3)
Not recorded	15 (20)



Table 2. Frequency distribution of length of patient treatment

Length of treatment	Frequency (%)
Short	59 (78.7)
Ideal	15 (20)
Length	1 (1.3)
Total	75 (100)

Table 3. Length of treatment for typhoid fever patients by age

Age group	Length of treatment					
	Short		Ideal		Length	
	N	%	N	%	N	%
1 – 4 years	13	22	1	6.7	0	0
5 – 10 years	14	23.7	6	40	0	0
11 – 14 years	22	37, 3	1	6.7	1	100
15 – 18 years	10	16.9	7	46.7	0	0
TOTAL	59	100	15	100	1	100

Based on table 3, of the 59 typhoid fever patients with short treatment, most were in the age range 11 – 14 years, namely as many as 22 people (37.3%) and at least are in the age range 15-18 years, namely as many as 10 people (16.9%). From 1 patient with typhoid fever with long treatment, most are in the age range of 11-14 years, namely 1 person (100%). Previous studies stated that the age of patients with typhoid fever was more common at the age of 7-18 years than at the age of fewer than 7 years.<sup>6</sup>

Immunity in certain age groups is certainly different. In the age group, less than 10 years a person's immunity is not optimal. Research by Owais et al. stated that children and young adults are more susceptible to infection with typhoid fever than the older population.<sup>7</sup> This is presumably because the immune system is not yet fully developed, causing this age group to be susceptible to *Salmonella typhi* bacteria.<sup>8</sup>

Table 4. Length of treatment for typhoid fever patients based on nutritional status

Nutritional status	Length of treatment					
	Short		Ideal		Length	
	N	%	N	%	N	%
Normal nutrition	56	94.9	7	46.7	0	0
Undernourished	3	5.1	8	53.3	1	100
TOTAL	59	100	15	100	1	100

Based on table 4 of 59 typhoid fever patients with short treatment, the most were in normal nutritional status, 56 people (94.9%), and the least were in poor nutritional status, namely 3 people (5,1%). Of the 15 typhoid fever patients with ideal treatment, the most were in poor nutritional status, as many as 8 people (46.7%), and the least were in normal nutritional

status, as many as 7 people. Decreased nutritional status in patients with typhoid fever is caused by decreased appetite, decreased absorption of nutrients due to injuries to the digestive tract, and the patient's habit of reducing food when sick. Increased lack of fluids or nutrients in patients with typhoid fever due to diarrhea, nausea or vomiting, and continuous



bleeding caused by a lack of platelets in the blood so that wound clotting decreases. In addition, it

increases the need for both the increased need due to illness and *S. Typhi* in the body.<sup>9</sup>

Table 5. Frequency of length of treatment for typhoid fever patients by type of antibiotic

Type of Antibiotic	Length of treatment					
	Short		Ideal		Length	
	N	%	N	%	N	%
Ceftriaxone	39	66.1	11	73.3	0	0
Cefoperazone	17	28.8	0	0	0	0
Cotrimoxazole	1	1.7	1	6.7	0	0
Cefixime	1	1.7	3	20	0	0
Cefotaxime	1	1.7	0	0	1	100
TOTAL	59	100	15	100	1	100

Based on table 5, out of 59 typhoid fever patients with short treatment, the most used types ceftriaxone antibiotics, as many as 39 people (66.1%) and at least used the antibiotics cotrimoxazole, cefixime and cefotaxime, namely 1 person (1.7%). Of the 15 typhoid fever patients with ideal treatment, the most used was the type of antibiotic ceftriaxone, which was 11 people (73.3%) and the least type of antibiotic was cotrimoxazole, which was 1 person (6.7%). typhoid fever with long treatment, the most using the type of antibiotic cefotaxime, namely 1 person (100%).

Long treatment was found in 1 person using cefotaxime. Research by Veeraraghavan et al., stated that the use of ceftriaxone antibiotics had better effectiveness than cefotaxime because the length of days of treatment or length of stay with ceftriaxone was shorter than the use of cefotaxime.<sup>10</sup> In addition ceftriaxone is an antibiotic that has high effectiveness against gram-negative bacteria, so its ability to inhibit the synthesis of the cell wall of *Salmonella typhi* bacteria will be stronger than cefotaxime and the resistance rate of ceftriaxone is lower than cefotaxime. Ceftriaxone has a longer half-life in the body, which is about 8 hours while cefotaxime is only about 1 hour, so its antimicrobial activity is longer than cefotaxime.<sup>11</sup>

The advantage of ceftriaxone over other cephalosporins is that the active substance of the

drug is excreted in the gallbladder which is higher than cefotaxime or other generation cephalosporin drugs that it can be related to this case of typhoid fever because the organ that is invaded by *Salmonella typhi* is the intestine, which is where the place of bile ducts.

Chloramphenicol and ampicillin were the main antibiotics of choice in the treatment of typhoid fever for decades until finally, a resistance called multidrug-resistant *Salmonella typhi* (MDRST) emerged. MDRST is resistant to antibiotics of choice in the treatment of typhoid fever caused by irrational use of antibiotics and changes in intrinsic factors in microbes. Ceftriaxone and ciprofloxacin are the antibiotics of choice for MDRST. Treatment with antibiotics (chloramphenicol, ampicillin, and cotrimoxazole) can lead to the presence of *Salmonella typhi*. This can result in not being able to overcome cases of severe fever so that it can be fatal in children. In addition, the use of chloramphenicol also has side effects on bone marrow suppression and can cause aplastic anemia.<sup>11</sup>

Ceftriaxone in the treatment of typhoid fever is more recommended than chloramphenicol because ceftriaxone is not easy to cause resistance, has minimal side effects, and has been clinically proven to be effective. Ceftriaxone shows a faster heat-free time so that the duration of therapy is shorter, side



effects are lighter and the recurrence rate is lower than chloramphenicol.

The success of the treatment of typhoid fever depends on the accuracy of the indications in the use of antibiotic drugs that are adjusted to the results of the diagnosis by looking at the symptoms, the patient is right in giving antibiotics to the patient, there are no contraindications to the patient's condition, and the right dose is given according to the method of administration, frequency, and rules of drug dosage, namely the dose is not below the therapeutic dose. and not above the therapeutic dose, the dose of a drug is also adjusted according to the clinical condition of the patient because every patient may not necessarily receive the same dose.

#### 4. Conclusion

Based on the results of the study, it can be concluded that the most age group of pediatric typhoid fever patients is 11-14 years old (32%), the short length of stay in the 11-14 year age group (37.3%), and normal nutritional status (84%). The type of antibiotic that was widely used was ceftriaxone (66.7%) and the shortest treatments were in patients receiving ceftriaxone (66.1%).

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