

Characteristics of Body Temperature in Children with Dengue Hemorrhagic Fever and Typhoid Fever

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Abstract

Background: Dengue and typhoid fever are endemic diseases with similar symptoms and characteristics, necessitating rapid and accurate diagnosis.

Aim: The purpose of this article is to describe cases of dengue or typhoid fever in children, and children who infected both diseases.

Method: This case reports from three children suffering from infectious diseases in one of DKI Jakarta Regional Jakarta and focuses on the patient's body temperature.

Result: The findings revealed that children with typhoid fever experienced an increase temperature from the evening until early morning on average, with the temperature gradually rising. Child with dengue fever is immediately high, usually above 39°C, and the body temperature fluctuates during the patient's hospitalization. Children who infected both diseases showed the body temperature rises sharply towards the night, above 39°C.

Conclusion: Early detection of characteristics body temperature this infectious disease in children can reduce the risk of complications and hasten the patient's recovery.

Keywords: Body Temperature, Children, Dengue Fever, Typhoid Fever.

INTRODUCTION

Indonesia, along with the Philippines and Singapore, has one of the highest dengue fever cases in the world (Ryczkowski et al., 2018) (Hervind & Widyaningsih, 2017). Dengue infection is at risk of combining with other infectious diseases, as the immune response to these infections often has similar characteristics and symptoms (Ryczkowski et al., 2018). Infection with two agents can occur in the same disease, causing symptoms that can be confusing for practitioners when making treatment decisions (Tajkia et al., 2020). As a result, the risk of misdiagnosis of infectious diseases is extremely high, particularly in the case of typhoid fever and dengue fever. Misdiagnosis increases morbidity and mortality. There were 175 cases of dengue fever in children, with 86.9% having pure dengue

fever and 13.1% having other diseases (57.4% typhoid fever, 26% hepatitis A, 8.7% hepatitis E, 4.3% urinary tract infection, and 4.3% pneumonia) (Ghosh et al., 2020).

Dengue fever and typhoid fever are endemic diseases in Indonesia. Both of these diseases need to be treated seriously because they are the cause of high mortality (Hervind & Widyaningsih, 2017). 262.225 Dengue Fever cases were reported in Jakarta (Prasetyowati et al., 2021). Typhoid fever is a global health problem in children caused by *Salmonella typhi*. According to Said et al. (2017), despite the fact that children with this condition require special attention from nurses to ensure optimal care, 90.3% of nurses have never received typhoid fever management training.

Meanwhile, a child with negative IgG and IgM and/or positive NS1 Ag results was diagnosed with primary dengue fever (Sondo et al., 2021). When a child has a fever, it is possible that the child has dengue fever or typhoid fever, or that the child has both diseases at the same time.

OBJECTIVE

Based on the phenomenon, the purpose of this study is to describe cases in children with dengue fever and typhoid fever, as well as children infected with both diseases at the same time, by focusing on the patient's body temperature.

METHODS

The research method used a case report of three cases of children suffering from infectious diseases in one of the DKI Jakarta Regional Hospitals in March 2022. The research has been explained to the three children involved, children and parents have agreed to participate in the research, and informed consent has been obtained. One child was diagnosed with dengue fever, one with typhoid fever, and one with both diseases (dengue fever and typhoid fever). In this study, cases were described with a focus on the body temperature as a signs and symptoms that appeared, as well as examinations to determine medical diagnoses and nursing care provided to children. Case reports is quantitative methods that can be used to describe clinical cases in children, including signs and symptoms and the course of the disease in patients with unique cases. Case studies that fall into the category of qualitative methods by delving into the informant's case through an interview.

According to the definition, a case report is a description of a unique clinical case that is rarely or never reported, whereas a case study is a methodology for describing a case based on interview results (Alpi & Evans, 2019). The research with a case report approach, is not required to have an ethical consideration, but must adhere to ethical principles as evidenced by informed consent. After the researcher explained the ethical principles in this study. In this study, all the children who became respondents agreed to be involved in the research, in which the informed consent form was signed by the child's parents as guardians.

RESULTS

The first case involved a 17-year-old boy weighing 57 kg. When the patient was first admitted to the hospital, he complained of dizziness, nausea for about a week, a fever that fluctuated for two weeks, and cold sweats every night. When checking blood pressure, it was 121/79 mmHg, the pulse rate was 108 beats per minute, the temperature was 38.3⁰C . The patient's tongue appears dirty and covered with a white membrane. The patient's laboratory examination results were positive, with the Widal salmonella paratyphi test + 1/320 and positive IgM. Hb 9.7 g/dl (14-16), Hematocrit 26.2 % (40-48), Erythrocytes 3.42 10⁶u/L (4.6-6.2), Leukocytes 3.36 10³u/L (5-10), Platelet 45 10³u/L (150-200). The primary nursing diagnosis is hyperthermia. Nursing implementation: Warm compresses, paracetamol 500 mg/8 hours orally, and RL 2000 cc/24 hours are all used to treat hyperthermia. After three days of treatment, namely fever on the eleventh day, the patient was diagnosed with typhoid fever and dengue fever. The patient was allowed to go home on the third day of treatment, with the child's condition being free of fever for two consecutive days and increasing platelets (more than 50,000/mm³).

The second case involves an 11-year-old girl who weighs 42 kg. The patient initially complained of nausea and vomiting for five days, with at least two vomitings per day. Fever for 7

days, body weakness, and decreased appetite. When checked, the blood pressure was 105/77 mmHg, the pulse rate was 132 beats per minute, the temperature was 39.3°C. Platelet count was 105 103u/L and the NS 1 test result was positive. The primary nursing diagnosis is hyperthermia. In the meantime, for nursing implementation: Hyperthermia treatment includes warm compresses, aspirin 1500 cc/24 hours, and paracetamol 500 mg/6 hours. After four days of treatment, the patient was diagnosed with dengue fever and discharged with no fever.

The third case involves a 9-year-old boy who weighs 30 kg. When he was first admitted to the hospital, the patient complained of a 7-day fever, body weakness, decreased appetite, and diarrhea more than 6 times per day (stool still drained). When he checked his blood pressure, it was 113/75 mmHg, his pulse rate was 97 beats per minute, his temperature was 39°C. Chloride levels were 90 mEq/L (96-108), potassium 3.15 mEq/L (3.5-5), sodium 135 mEq/L (135-147), and hemoglobin 13.6 g/dL. (12,5-14,1) Hematocrit 36.2 % (36-47), Platelets 392 103u/L (163-337), Erythrocytes 4.76 million /ul (4.2-5.6), and widal paratyphi test +1/60. Hyperthermia was diagnosed. Meanwhile, for nursing implementation: Warm compresses, Ceftriaxone 1.5 grams/12 hours, Ranitidine 50 mg/12 hours, KAEN 3B 1500 cc/24 hours for hyperthermia management. The patient was allowed to go home after four days of being diagnosed with typhoid fever.

Table 1 shows a comparison of the three cases' conditions based on body temperature and signs of symptoms, as well as supporting examinations of patients during treatment.

Table 1. Characteristics of Patient Body Temperature During Hospitalization

Patient	Day 1	Day 2	Day 3	Day 4
Case 1	The 13th day of fever. The child's temperature rose again at 06.00 p.m Indonesian time to 39.7°C, and night sweats persisted throughout the night, making sleep difficult and chills.	The child's temperature is stable, and a fever of more than 39°C occurs only once in the morning, at 09.00 a.m Indonesian time. The child's condition is improving; he is gaining weight and no longer experiences night sweats.	Children's Hb was 15 g/dL, and platelets were 157 103 u/L. The child is fever-free after 24 hours and is allowed to discharge.	-
Case 2	The child's temperature is still high on the eighth day, with temperatures above 39°C at 11.00 a.m, 05.00 p.m, 08.00 p.m, and 04.00 a.m. The child has no appetite and only eats a quarter of the portion.	The child had two fevers: 39.1°C at 09.00 p.m and 38.3°C at 04.00 a.m. After receiving ranitidine 40 mg/12 hours, the child began to develop an appetite. However, the joints and bones started to ache.	There has been no fever in the child in the last 24 hours. The child can eat a portion if the temperature is between 36.6-37.7°C. The pain begins to subside.	The child has been fever-free for two consecutive days. The child's Hb is 12 g/dL, and his platelets are 187 103 u/L, according to laboratory results. The child has no complaints and is allowed to return home.

Patient	Day 1	Day 2	Day 3	Day 4
Case 3	Fever on the seventh day, the child's temperature is always high after sunset, the child shivers every 6.30 p.m, and the temperature is 38 ⁰ C. Diarrhea still occurs more than six times per day. The tongue tastes bitter and appears filthy.	The child still has a fever at night or after sunset, before going to bed, and the temperature is 38.2 ⁰ C every 6.30 p.m. Diarrhea decreased to four times per day. The child's tongue appears to be clean, and he or she begins to crave food.	There has been no fever in the child in the last 24 hours. The diarrhea is gone, and the stool has a soft consistency. The child begins to eat, and the posri consumes one portion.	The child is in good health; he has no diarrhea or weakness, and his complete blood count is within normal ranges. When the child's appetite improves, child is discharge.

DISCUSSION

Chen et al. (2018) stated high fever occurs in children with dengue fever from day 2 to day 7. This is in contrast to the condition of fever in children 1 and 2 who have dengue fever, where fever persists after 2 weeks in case 1 and on day 8 of illness in case 2. This condition was most likely caused by another infection, specifically a salmonella typhosa infection in case 1. When the immune system is weakened as a result of infection, it is more vulnerable to other diseases such as dengue fever.

In this study, the fever curve in case 1 shows that the average temperature of children with typhoid fever appears in the evening until the morning, in contrast to the body temperature of patients with dengue fever. Fever lasts most of the day, with temperature fluctuations lasting 24 hours. Fever occurs during the patient's treatment period, which lasts 3-4 days after which they are discharged. According to research Chen et al. (2018), the median length of stay for patients with dengue fever is four days. Casman et al. (2022) stated this condition can pose another danger, if the length of stay is prolonged, it can increase the risk of rehospitalization in infectious diseases in children.

A rash affects 76.1 % of children with dengue fever, 33.2 % have headaches and body aches or myalgias, 32.7 % have nausea and vomiting, and less than 25 % have other symptoms such as cough, sore throat, joint pain, retroorbital pain, runny nose, abdominal pain, diarrhea, itching, and petechiae (Chen et al., 2018). In children infected with dengue, 78 % have anorexia, 58 % have vomiting, 58 % have abdominal pain, 24 % have diarrhea, and 77.7 % have thrombocytopenia (Mazuumder et al., 2021). This is also consistent with the findings in the first and second patients, who reported nausea, joint pain, vomiting, and a significant decrease in platelets. In contrast to dengue fever, which has thrombocytopenia, patients with typhoid fever have normal or high platelets. In addition to the typical symptoms, such as nighttime fever, night sweats, and a dirty-looking tongue. According to research, all typhoid fever children have a high fever, 58.4 % have chills, 51.66 % have a headache, 78.33 % are weak, 60 % are vomiting, 45 % have abdominal pain, 35 % cough, 53.33 % diarrhea, constipation is 18.33 %, anorexia is 75 %, and joint pain is 8.33 % (Jha et al., 2019). The symptoms of 100 children diagnosed with typhoid fever were as follows: 100% fever, 61% anorexia and headache, 34% vomiting, 32% abdominal pain, 21% cough, 15% constipation, and 14% diarrhea. Physical examination will also reveal 76 % dirty tongue, 36 % anemia, 26 % abdominal distension, 83 % limp plasticity, and 61 % splenomegaly. 50% of all normal leukocytes (Nema & Mittal, 2019). However, a laboratory examination is required to confirm a child's infection with dengue fever or typhoid fever.

A complete blood count is a type of supporting examination used to confirm a disease's diagnosis and/or to assess the patient's body's response to the disease in order to track the progress of treatment or therapy. This examination has a time limit of 2 hours. The Widal test is used in ancillary examinations to detect the presence of Salmonella typhi, whereas the HCT and PLT item analysis tests can be used to detect dengue fever (Rijal & Hidayah, 2018). Typhoid fever 88-100% positive

in Widal test (Akwa & Nguimbous, 2021) (Singh & Sundar, 2019). In addition to blood, Salmonella typhi can be detected from urine and feces (Ohanu et al., 2019).

A patient with primary dengue fever has IgG antibodies that are negative but positive for IgM and/or NS1 Ag. According to the WHO classification, severe dengue fever includes plasma leakage characterized by hemoconcentration (hematocrit > 5%), severe bleeding characterized by the need for blood transfusions, organ dysfunction ALT or AST > 1,000, encephalopathy and renal impairment (creatinine > 120 mol/L), hypovolemic shock characterized by respiratory distress, and thrombocytopenia with a platelet count of $20 \times 10^3/\mu\text{L}$ (Sondo et al., 2021). The study found that 438 children aged 4 months to 12 years were diagnosed with dengue fever over a six-month period, 70.3 % of children were positive for NS1 and 62.1 % were positive for IgM, and 80.1 % of children had thrombocytopenia (Asghar et al., 2021). Beside known as using Non-Structural Protein 1 (NS1) test, dengue fever can use Enzyme-linked Immunosorbent Assay (ELISA) test (Utama et al., 2019).

A tepid sponge compress can be used to treat hyperthermia. This compress has been shown to be effective in reducing hyperthermia in children with dengue fever and typhoid fever, with temperature drops ranging from 0.2-0.9°C in dengue fever and 0.69°C in typhoid fever (Hastuti et al., 2021) (Hastuti et al., 2020).

CONCLUSION

Based on the descriptions of the three cases in this study, it is possible to conclude that the signs and symptoms of dengue fever and typhoid fever in children are frequently indistinguishable. However, there are a few characteristics that are found to be particularly characteristic of fever in both diseases. Dengue fever causes the child's body temperature to rise immediately, usually to above 39°C, whereas typhoid fever appears gradually and rises, especially at night. In addition to fever, children with typhoid fever had a dirty tongue, night sweats, and normal platelet levels, whereas children with dengue fever had thrombocytopenia.

The difference between the two diseases can also be seen in the disease's etiology. Dengue fever is caused by a virus that is spread through mosquito bites and attacks platelets, resulting in symptoms such as petechiae, bleeding gums, and nosebleeds. Typhoid is caused by bacteria that attack the digestive system, resulting in symptoms such as pain, abdominal cramps, and diarrhea. Of course, the best way to determine the diagnosis is through supporting examination, such as the Widal test in typhoid fever and the ELISA or NS1 test in dengue fever. It has been discovered that both diseases can affect pediatric patients at the same time. In the case of children infected with these two diseases, fever usually occurs at night before the child goes to bed, with a temperature above 39°C accompanied by chills.

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