



## NURSING CARE OF HYPERTHERMIA IN CHILDREN FEBRILE SEIZURES: A CASE REPORT

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Case Report

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### ABSTRACT

**Introduction:** Febrile seizures occur due to increased temperature due to extracranial processes. There is a predisposition Familial and more common in boys than girls. Prolonged and repeated attacks can cause severe disturbances in the child's brain, so the child has a mental disability. This case study aims to apply hyperthermia nursing care for children with febrile seizures in the pediatric inpatient room at Lamongan Hospital. **Methods:** The research design used is to study cases with a nursing care approach. The sample in this study was one child patient with febrile seizures: data collection techniques using interviews, observation, documentation studies, and physical examination. The research instrument used the pediatric nursing care assessment format. **Results:** After implementing nursing for 3x24 hours, the nursing diagnosis of hyperthermia is resolved. The risk of injury does not occur during the treatment period because the body temperature has reached 36.5 0 C, and the patient has never had another seizure. **Conclusions:** It is necessary to collaborate with professional care providers and family participation for the success of nursing care according to nursing care standards to prevent happening seizures repeated.

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### INTRODUCTION

Childhood is the most crucial period in human life, especially in the five years of his first life. Infants and children are susceptible to various diseases due to their immature immune systems (Hidayah., 2015). Children are more susceptible to infections that often cause high fever. Frequent fever occurs at the age of five; when the increase in body temperature (fever) reaches the highest number scale, it will cause seizures in children, called febrile seizures (Ram & Newton., 2015). Conditions that can cause febrile seizures include infection about network extracranial like otitis media I, bronchitis, and tonsillitis. Generally going on brief, and there may be predisposition familial. Prolonged and repeated seizures can cause severe disturbances in the child's brain so that the child has a mental disability. Febrile seizures are more common in boys than girls (Ishmael *et al.*, 2016).

The worldwide prevalence of febrile seizures is estimated to be between 2% and 5%—children between 6 months and five years in the United States and West Europe, with a peak incidence between 12 and 18 months. Although febrile seizures are seen in all ethnic groups, it is more commonly seen in Asian populations such as India, about 5-10%. In Japan, the reported prevalence of febrile seizures in children is approx 6-9%. The incidence is as high as 14% in Guamese. By comparison, febrile seizures are more common in boys than in girls, about 1.6-1 (Leung, Hon, & Leung, 2018). In Indonesia, the number of febrile seizures was 3% - 4% of children aged six months – 5 years in 2012 – 2013. It was reported that 5 (6.5%) among 83 patients with febrile seizures become epilepsy; the handling of febrile seizures must be appropriate; approx 16% child will experience recurrence (recurrence) at 24 O'clock First, although there are times when it is not sure, if the child has a

fever the most important is business lower the temperature body (Departemen Kesehatan RI., 2017).

Febrile seizures occur due to an increase in temperature due to extracranial processes. Bacterial, viral, and parasitic infections can cause an inflammatory reaction to fever occurs and causes hyperthermia. Hyperthermia can occur at risk of repeated seizures and cause a risk of developmental delay. In the circumstances, an increased fever temperature of 1 degree Celsius will increase metabolism basal by 10-15%, and the need for oxygen will increase by 20%. Brain circulation reaches 65% of the whole body in a three-year-old child compared to adults, which is only 15%. Therefore, an increase in body temperature can change the balance of the neuron cell membrane. In a short time, potassium ions and sodium ions are diffused through the membrane due to electrical discharges. Free payload electricity is a magnitude that can be widespread to the whole cell and membrane cells surrounded with help material called neurotransmitters and seizures (Kusuma H, 2015).

Effort: This must be done the moment the body temperature increase or hyperthermia is compressing water, providing comfort in resting, providing antipyretic, improving air circulation, body temperature management, blood pressure, pulse, And RR (Nuarif & Kusuma, 2015). If seizures occur, fever moment happens attack suddenly, Which must be noticed the first time in the airway, breathing, circulation, be sure to safe, lay it down onsite client flat, head tilted, and get rid of things Which There is around the client Which Can cause harm, if the temperature is high give warm compresses, with compresses warm body will be stimulated to sweat, after the patient is conscious and wake up give a drink of warm water, do not give a thick blanket because steam fever will tricky released c. Based on the description above, the authors are interested in presenting a case study on hyperthermia nursing care in children with febrile seizures in a pediatric inpatient room.

## MATERIALS AND METHODS

The research design used in the study is to study cases with a nursing care approach. The sample in this study was one child patient with febrile seizures. This research was conducted in the pediatric inpatient room at Lamongan Hospital in 2020. Nursing care was carried out for 3x24 hours: data collection techniques using interviews, observation, documentation studies, and physical examination. The research instrument used the

pediatric nursing care assessment format, including patient identity, chief complaint, history of disease now, history of disease formerly, history of disease family, history psychologic, social, and spiritual, historical growth and development, history immunization, activity daily of life, physical examination, examination results laboratory, And therapy medical. Researchers conducted research by prioritizing the provision of informed consent, anonymity, and confidentiality.

## RESULTS

The study's results showed that a mother brought a patient boy aged one year and two months to the hospital with the main complaint of fever. The patient's mother said that the child had diarrhea for two as many days, three times a day, accompanied by mucus And blood. The patient visited the community health centres for Oral Rehydration Salts and syrup medicine. On the third day, the client suddenly had a fever, constantly accompanied by chills. However, no accompanied vomit or congested breath by family given warm compresses and fever down. On the fourth day, the client's bowel movements are no longer runny, but suddenly a high fever is accompanied by convulsions for one time for  $\pm$  5 minutes; convulsions occur all over the body, eye glared to the top. The family brought the patient to the hospital in Lamongan. The moment in the Emergency Room patient still had a fever and seizures for  $\pm$ 2 minutes, plus repeated jerking movements, and the feet moved like a bicycle pedal. At the time of assessment, the patient was still hot but had no seizures. The mother's patient says his son Has never had a fever until convulsions occurred; he has a complete immunization history, but the child has a family history of the disease, namely the patient's father Once had a seizure when he was one year old. While in the hospital, the child often cries and fusses.

The patient does not want to eat food from the hospital; he only wants to eat fine porridge, drink water  $\pm$  500ml/day, and drink before bedtime; sometimes, milk drinks also vomited back. The client's mother said that while in the hospital can change diapers 2x a day and defecate 1x a day with a soft consistency, a yellow-green colour, and urination with the colour yellow bright. The client's mother said that while in the hospital, the patient was only in a wipe with warm water and changed his dress every morning and afternoon. At the time of physical examination, compos mentis, pediatric coma scale 4-5-6, temperature 38,9 °C, frequency pulse 130 x/minute, strength pulse normal, rhythm regular, respiratory rate 25 x/minute regular

rhythm, SPO<sub>2</sub> 98%, body weight before sick 15 kg, during illness 13 kg, height before illness 112 cm, height body during sick 100 cm. The patient's face looks pale, sweaty, and flushed, with dry lip mucosa and pale, cold, wet acral. Other physical examination results were within normal limits. Laboratory investigation results of haemoglobin 12.1 g/dl, diff count 0-0-0-54-36-10, and hematocrit 36.7 %. The patient received intravenous fluid therapy D5 ½ NS 1000/24 hours, paracetamol 150 mg/8 hours / intravenous, injection queue 100 mg/8 hours / Intravenous, injection omeprazole 10 mg/8 hours / Intravenous, injection ondansetron 1 mg/12 hours/intravenous, diazepam 3,5 mg/ if convulsions/intravenous.

The nursing diagnoses that emerged in this study were 1) hyperthermia (D.0130) related to an infectious process, as evidenced by the mother saying her child had a fever, two seizures, a temperature of 38,9°C, the face looked pale, sweaty, and blushed; 2) risk of injury as evidenced by repeated seizures. The interventions given to address these nursing diagnoses are the management of hyperthermia (I.15506) and the management of seizures (I.06193) (DPP PPNI, 2018a). In dealing with hyperthermia, hyperthermia management is carried out, including identifying the causes of hyperthermia; monitoring body temperature every 8 hours; monitoring complications due to hyperthermia; providing a relaxed environment; doing external cooling (compress plain water on the forehead and neck); loosen/remove clothing; give oral fluids 1150 litres/day; a suggest bed rest; Collaboration administration of fluids and electrolytes (D5 ½ NS 1000ml/24 hours/Intravenous), Paracetamol 150 mg/ 8 hours/ intravenously, and Antrain 100 mg/8 hours/intravenously. For seizure control, seizure management (I.06193) can be carried out, namely monitoring the occurrence of recurrent seizures; monitoring vital signs every 8 hours; Loosen clothing, especially in the neck part; maintaining airway patency; noting the duration of the seizure; advise the family to avoid putting anything in the patient's mouth during the seizure period; Collaboration of drug administration during anticonvulsant seizures i: diazepam 3,5 mg/ if convulsions/intravenous. A summative evaluation carried out on the third day showed that the hyperthermia was resolved, and the risk of injury did not occur during the treatment period because the body temperature had reached 36.5 °C and the patient had never had another seizure.

## DISCUSSION

In the case of the patient, they first experienced seizures at one year and two months. Febrile seizures often occur in children aged 0-5 years, most often in children aged 17-23 months. At this age, the child's brain is vulnerable to an increased body temperature of more than 38 °C. In a state of fever, a temperature increase of 1 degree Celsius will increase basal metabolism by 10-15% and oxygen demand by 20%. Fever can indeed occur at any time and can occur after a seizure. Children with febrile seizures have a higher temperature than those with common febrile illnesses (Ishmael *et al.*, 2016).

The main complaint experienced by patients with febrile seizures is that the child has seizures at times hot on >37.5 O C. Heat or hyperthermia is a condition where individuals experience or are at risk of experiencing an increase in body temperature above normal > 37.5°C (100 O F) per oral or 38.8 °C (101 O F) per rectal which is persistent due to factors external (Nuarif & Kusuma, 2015). It happens because babies and children under five are vulnerable to various diseases. After all, their immune systems still need to develop fully. Children are more susceptible to infection. Bacterial, viral, and parasitic infections can cause an inflammatory reaction resulting in a febrile process. Fever often occurs at the age of five; when the increase in body temperature (fever) reaches the highest number scale, it will cause seizures in children, called febrile seizures. The patient had convulsions for 5 minutes and 2 minutes. Seizures fever experienced by the patient is seizures fever simple that is seizures, a fever Which goes on short of less than 15 minutes and generally will stop itself. Shaped seizures are tonic-clonic, without focal movement, occurring only once in 24 hours (Wulandari & Erawati, 2016).

On the family history of the disease, the mother patient said the patient's father had experienced a seizure when he was one year old. Febrile seizures too can occur if there is a family with a history of seizures; if any wrong one from a person's old history of seizures fever time short, likely, his child will also inherit a similar disorder. That family have febrile seizures like the patient (25% of patients with febrile seizures have a hereditary factor) (Kusuma H, 2015). A study done by Nintendo *et. al* (2015) states that as many as 142 (76.8%) suffer from seizures, fever, and own factor risk, namely predisposing factors. Dominantly lowered, but the symptoms appear incomplete age (more often at age <5 years) because brain cells in children are immature, so they are easy to change concentration when

you get a sudden stimulus; the number of events has a background behind high pre-natal and perinatal abnormalities, the number of occurrences previous minor neurologic abnormalities were also high, but severe neurologic abnormalities usually seldom happen (Ishmael *et al.*, 2016). Several factors can result in neurotransmitter damage, disability or neurological abnormalities accompanied by fever, recurrent febrile seizures, damage to the medial area lobe temporalis, And enhancement of temperature body.

The nursing diagnoses in this study were 1) hyperthermia (D.0130) related to an infectious process, as evidenced by the mother saying her child had a fever, two seizures, a temperature of 38,9 0C, the face looked pale and sweaty, and blushed; 2) risk of injury as evidenced by repeated seizures. Hyperthermia is body temperature rising above the body's normal range. At the same time, injury is the risk of experiencing danger or physical damage that causes a person to no longer be wholly healthy or in good condition (DPP PPNI, 2018a). Emerging hyperthermia in a manner fast related to infection which networks extracranial such as acute otitis media, bronchitis, and tonsillitis can cause convulsive seizures and may be a risk of injury (Kusuma H, 2015).

The first intervention patients receive is hyperthermia management (I.15506) (DPP PPNI, 2018a). One of the actions taken is plain water compresses. The average temperature of clean water is around 10 to 25 0 C. They follow Kurniawan (2018a) that cold compresses and airflow reduce body temperature in sepsis patients with hyperthermia in the ICU Room of Dr Kariadi Hospital, Semarang. The cold compress technique is done by placing a towel soaked in cold water at 15 0 C. – 27 0 C on the forehead and axillary area for 15 minutes. The compress towel is replaced after 5 minutes of use, or if the water temperature is over 27 0 C, changing the towel is carried out 2-4 times during the compressing action to prevent the temperature of the water on the towel from getting cold. Re-measurement of body temperature was carried out after ± 15 minutes of compress action. Cold compresses provide effective results in lowering the child's body temperature. The second intervention given to patients is seizure management (I.06193) (DPP PPNI, 2018a) by carrying out seizure emergencies during the seizure period. By Rifky F. (2015) and Wulandari & Erawati (2016). Some things that must be done during a seizure are to remain calm and not panic; loosen tight clothing, especially around the neck; if unconscious, position the child on his

back with his head tilted; wipe vomit or mucus in the mouth or nose; although the tongue may be bitten, do not put anything in the mouth; measure temperature, observe, record duration and form of seizures; stay with the patient during the seizure; and give rectal diazepam. Collaborative administration of drugs to reduce fever and prevent recurrent seizures in patients includes antipyretics and anticonvulsants. Antipyretics have not been proven to reduce the risk of febrile seizures, but experts in Indonesia agree that antipyretics can still be given. Paracetamol lowers body temperature by a mechanism also thought to be based on a central effect. Paracetamol is a weak prostaglandin inhibitor. The dose of paracetamol is 10-15 mg/kgBW/time was given four times a day and should not be more than five times, while the anticonvulsant diazepam oral dose of 0.3 mg/kgBW every 8 hours when fever reduces the risk of recurrence of seizures at 30-60 % of cases, also with rectal diazepam at a dose of 0.5 mg/kgBW every 8 hours at a temperature > 38.5 0 C, and intravenous diazepam 0.3 – 0.5 mg/kg BW (Rifky F, 2015).

## CONCLUSIONS

On examination, the patient complained of fever and seizures at home and in the emergency room. The nursing diagnosis raised in this case is hyperthermia and risk of injury. The nursing interventions and implementation provided were three-day hyperthermia management and seizure management. The evaluation obtained during the three days of treatment in the inpatient room was that hyperthermia was resolved. The risk of injury did not occur during the treatment period because the body temperature had reached 36.5 0 C. The patient had never had another seizure. It is necessary to collaborate with professional caregivers and family participation for the success of nursing care according to nursing care standards to prevent repeated seizures from happening.

## REFERENCES

- Arief, Rifki F. (2015). Management of febrile seizures. *Continuing Medical Education* 42(9).
- Departemen Kesehatan RI. (2017). *Profil Kesehatan Indonesia*. Jakarta: MOH RI.
- DPP PPNI. (2018a). *Standart Diagnosis Keperawatan Indonesia: Definisi dan Indikator Diagnostik* (1st ed.).
- DPP PPNI. (2018b). *Standart Intervensi Keperawatan Indonesia: Definisi dan Tindakan Keperawatan* (1st ed.).
- Lee, K. Y. (2017). Pneumonia, acute respiratory distress syndrome, and early immune-

- modulator therapy. *International Journal of Molecular Sciences*, 18(2). <https://doi.org/10.3390/ijms18020388>
- Hidayah, N. (2015). Mother's Knowledge Regarding First Management of Febrile Seizures in Children. *Contemporary Psychology: A Journal of Reviews*, 1(4), 1–6. <https://doi.org/10.1111/j.1540-4781.1969.tb04998.x>
- Ismail, HD, P., DP, W., I, M., H., & Suharso, D. (2016). *Recommendations for the Management of Febrile Seizures (3rd Edition)*. Jakarta: Publishing Agency of the Indonesian Pediatrician Association.
- Kurniawan, T. (2018). Cold compresses and airflow reduce body temperature in sepsis patients with hyperthermia in the ICU Dr Kariadi Semarang. Semarang Muhammadiyah University. Semarang Muhammadiyah University
- Kusuma H. (2015). *Nursing Care Application Based on Medical Diagnosis and Nanda Nic-Noc*. Yogyakarta: MediAction.
- Leung, AKC, Hon, KL, & Leung, TNH (2018). Febrile seizures: An overview. *Drugs in Context*, 7, 1–12. <https://doi.org/10.7573/dic.212536>
- Nindela, R., Dewi, MR, Ansori, IZ, Clinic, BP, Medicine, F., & Sriwijaya, U. (2014). Characteristics of Patients with Fever Seizures in the Inpatient Installation of the Pediatric Section of Muhammad Hossein Hospital, Palembang. *Journal of Medicine and Health*, 1 No. 1(October), 41–45. Retrieved from [ejournal.unsri.ac.id/index.php/jkk/article/download/2564/1389](http://ejournal.unsri.ac.id/index.php/jkk/article/download/2564/1389)
- Nursalam. (2016). *Nursing Science Research Methodology Practical Approach*. (Edition 3). New York: Salemba Medika.
- Nurarif, A. ., & Kusuma, H. (2015). Warm Water Compresses in the Axillary and Forehead Areas for Lowering Body Temperature in Fever Patients at PKU Muhammadiyah Kutoarjo. *Journal of Nurses and Midwifery*, 3(1), 10–14.
- Ram, D., & Newton, R. (2015). The Genetics of Febrile Seizures. *Pediatric Neurology Briefs*, 29(12), 90.
- Tarwoto and Wartonah. (2015). *Basic Human Needs and the Nursing Process*. Jakarta: salemba medica.