

INFORMASI ARTIKEL

Received: October, 19, 2025

Revised: November, 18, 2025

Available online: November, 19 2025

at: <https://e-jurnal.iphorr.com/index.php/mchc>

Implementation of warm water sponge intervention for the diagnosis of hyperthermia in children with phase I dengue hemorrhagic fever

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Abstract

Background: The incidence of dengue hemorrhagic fever (DHF) in Indonesia continues to increase annually. Fever is a common problem experienced by DHF patients. Various interventions can be implemented to address this issue, one of which is water warm.

Purpose: To determine the effectiveness of applying warmwater sponge to dengue hemorrhagic fever patients with hyperthermia.

Method: The method used in this case study is descriptive with a nursing care process approach. The subject in this case study was one respondent with inclusion criteria of having hyperthermia or a body temperature $> 37^{\circ}\text{C}$ and being of school age.

Results: The results obtained according to the development of the graph in 3 days were that there was a decrease in temperature in the patient after the warmwater sponge technique was applied.

Conclusion: SeeThe more attractive the health education media, the more respondents will be interested in knowing the information provided in health education, so that health education becomes more effective.

Keywords: Children; Degue Hemorrhagic Fever; Hyperthermia; Warm Water Sponge.

INTRODUCTION

Children are individuals who are still in the growth and development stage, both physically, mentally, and emotionally. Children are unique individuals and have needs according to their developmental stage. As unique individuals, children have various needs that differ from one another according to their growth and development. Physiological needs such as nutrition and fluids, activity, elimination, sleep, and others, while psychological, social, and spiritual needs will be seen according to their growth and development. The child's development period begins with the infant phase, toddler phase, preschool phase, school phase, early adolescence phase, and late adolescence phase (Cholih, Nasrullah, & Mundakir, 2020).

Early adolescence (around 10-14 years of age) marks the beginning of a number of interrelated

biological, social, and psychological transitions. In terms of biological changes, puberty and brain development contribute to important changes in physical, behavioral, and social development (Shanahan, Steinhoff, Ribeaud, & Eisner, 2024). In early adolescence (10-14 years), secondary sex characteristics begin to appear, such as breast enlargement in girls, testicular enlargement in boys, and the growth of underarm hair or pubic hair. In the early stages, adolescents seek new values and energy and compare normality with peers of the same sex. In later adolescence, they are able to view problems comprehensively, and their intellectual identity has already formed (Nasution, Reswari, Sarah, Aspah, Anggraeni, Simbolon, & Fatimah, 2024).

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When a person reaches the age of 10-14 years, they are in an immunological transition phase, where the body's immunity or resistance to fight diseases caused by viruses or bacteria is not yet as strong as when a person reaches adulthood (Khomaeny, Ulfah, & Hamzah, 2020). Children entering school are more susceptible to diseases caused by viruses, one of which is DHF. Dengue Hemorrhagic Fever (DHF) is an acute viral infection caused by the dengue virus, which is classified as an Arthropod-Borne virus, genus *Flavivirus*, family *Flaviviridae*. DHF is transmitted through the bite of the *Aedes aegypti* and *Aedes albopictus* mosquitoes, which are the main factors of DHF disease, so it occurs throughout the year and can attack all age groups, from children to adults (Setyadevi & Rokhaidah, 2020).

This disease is related to environmental conditions and community behavior. The main cause of many children contracting Dengue Hemorrhagic Fever (DHF) is several factors. First, their immune systems are still developing, making them more susceptible to dengue virus infection carried by the *Aedes aegypti* mosquito. Environmental factors such as the presence of stagnant water and damp places around children's homes also contribute to the high risk of transmission, as mosquitoes that transmit the virus often breed in these areas. Furthermore, children in the school-age phase are more often active outside the home and interact in a wider environment, including at school. Schools and playgrounds can become breeding grounds for the *Aedes aegypti* mosquito, the vector for the dengue virus (Nuryanti, Kistimbar, Sutarmi, & Aprilia, 2022).

Dengue Hemorrhagic Fever (DHF) cases continue to rise globally, from 505,430 in 2000 to over 5.2 million in 2019, with the largest spike in 2023 affecting over 80 countries. This disease can affect all age groups, but children are more at risk due to their immature immune systems. In Indonesia, DHF remains a serious problem with 88,593 cases and 621 deaths in 2024, with the majority of victims being children aged 5–14. In fact, from January to March 2024 alone, 53,131 cases and 404 deaths were recorded, mostly in children. A similar situation was also seen in Malang City, where dengue fever cases increased from 261 in 2021 to 569 in 2022, with 225 cases, or approximately 39.5%, affecting children aged 1-14 (Winarti, Nugroho, & Lubis, 2025).

In the febrile phase, body temperature rises suddenly to $\pm 40^{\circ}\text{C}$ and lasts for 2–7 days. Approximately 6% of cases show a saddle/biphasic fever pattern, especially in severe dengue fever, with fever lasting at least 24 hours, then dropping briefly and rising again for at least 1 day (Schaefer, Panda, & Wolford, 2024). The fever phase is the initial symptom with a sudden increase in body temperature to $39\text{--}41^{\circ}\text{C}$ for 2-7 days (Assegaf, Puspitasari, & Ginting, 2021). In DHF patients with hyperthermia, the primary therapy is the antipyretic paracetamol at a dose of 10-15 mg/kg body weight per dose every 4-6 hours, up to a maximum of 5 times in 24 hours. Paracetamol works by inhibiting the COX enzyme in the central nervous system to reduce prostaglandin production, thus effectively reducing fever. The use of ibuprofen is not recommended due to the increased risk of bleeding, so paracetamol remains the safest and most effective choice (Nuryanti et al. 2022).

Management of hyperthermia in children with Dengue Hemorrhagic Fever (DHF) is not only limited to pharmacological interventions, but also involves safe and effective non-pharmacological interventions, one of which is warm water sponge (lukewarm compress). Warm water sponge is a physical method of reducing body temperature by rubbing a cloth soaked in warmwater (around $29\text{--}32^{\circ}\text{C}$) on certain areas of the body such as the forehead, neck, armpits, and groin. The goal is to gradually increase evaporation of the skin surface, thereby helping to reduce body temperature through conduction and evaporation mechanisms (Kristina 2020).

This method is used as a supportive intervention in pediatric patients with hyperthermia, especially when the body temperature exceeds 38.5°C and there is no indication, or antipyretics have not been administered. Based on clinical studies, warm water sponging has been shown to significantly lower body temperature within 30–60 minutes of the procedure and can improve patient comfort without causing systemic side effects. Implementation is carried out for 10–15 minutes, accompanied by close monitoring of the child's respiratory rate, pulse, body temperature, and comfort level. This intervention also has a positive psychological effect because it involves touching and providing direct care to the patient, which can increase the child's sense of security and calm. It is important to ensure that the water used is

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DOI: 10.56922/mchc.v4i8.1642

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not too cold, as this can cause peripheral vasoconstriction, which actually conserves body heat. Thus, warm water sponging is a non-pharmacological intervention that has been proven safe, easy to perform, and effective as part of the management of hyperthermia in children with DHF (Aprian, Sarwendah, & Zulva, 2024).

RESEARCH METHOD

The case study design used in this research is a descriptive case study method. The research process was carried out systematically through the stages of nursing care, which consist of: assessment, formulation of nursing diagnoses, development of interventions, implementation of nursing care, and evaluation. In this case study, the author conducted research to identify and analyze nursing problems in pediatric patients with *Dengue Hemorrhagic Fever*

(DHF) who were treated at a community health center in Malang Regency.

The research process began with determining the case subjects, submitting a research proposal, and explaining the purpose and procedures of the research to the parents or families, followed by obtaining informed consent. Data collection was carried out through the stages of nursing care, from assessment to evaluation. The intervention provided was a warm water sponge compress, with the involvement of parents or family members in its implementation. Next, the researchers observed the patients' responses before and after the intervention and systematically recorded changes in their condition. The data were analyzed descriptively and compared with nursing theory and practice standards to assess the effectiveness of the intervention.

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RESEARCH RESULTS

Table 1 Overview of Nursing Care Results for Patients with Hyperthermia Problem

Data	Day 1	Day 2	Day 3
Shivering	2	3	4
Red Skin	2	3	4
Pale	2	3	4
Tachypnea	5	5	5
Body Temperature	2	3	4

Table 1. Shows that after the warm water sponge intervention was carried out, the patient's condition improved every day.

Table 2. Patient Body Temperature Graph

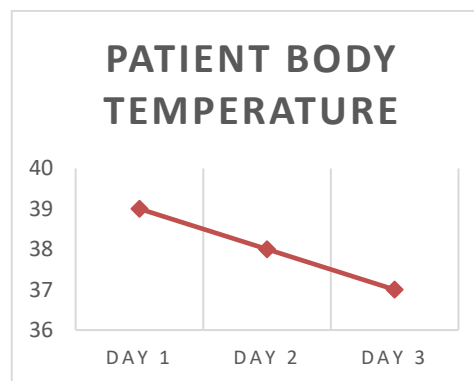


Table 2. Shows that after the warm water sponge intervention, the body temperature on the first day was 39 C. It can be seen from the graph above that

This research is a case study conducted at one of the health centers in Malang Regency in June 2025. The case study was conducted using a nursing process approach on patient An. N with dengue hemorrhagic fever who experienced hyperthermia nursing problems. The results of the categorization of the temperature period after the implementation of the warm sponge technique found that the level of temperature reduction was very specific. The outcome criteria to be achieved in the implementation of warm water sponge on An. N are explained in table 1. Based on the results of nursing care for patient An. N for 3 days are depicted in table 2. Table 2 explains that there was a decrease in body temperature

there was a decrease in the patient's body temperature of 1 C every day and on the third day it became 37°C.

experienced by dengue hemorrhagic fever patients after the implementation of warm water sponge actions. On the first day, the body temperature was 39°C, on the second day 38°C, and the patient's body temperature on the third day was 37°C.

DISCUSSION

Symptoms of dengue fever include sudden fever accompanied by shivering and compos mentis. The fever subsides between the third and seventh day, and the patient becomes increasingly weak. It is sometimes accompanied by nausea, vomiting, anorexia, sore eyes, and the presence of bleeding in

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the skin, melena, or hematesis (Syahdan, Arif, & Megawati, 2021).

The research results, in accordance with An. N's assessment, showed red spots on the client's feet and hands, but these had begun to diminish. They also presented with nausea, vomiting, and weakness. This was due to the virus entering the client's body through the bite of the *Aedes aegypti* mosquito. Viremia occurred, causing the patient to experience fever, headache, nausea, muscle pain, or aches throughout the body. In addition, rash or red spots appeared on the skin, hyperemia of the throat, or possibly enlarged lymph nodes and liver (hepatomegaly) (Haerani & Nurhayati, 2020).

Clinical manifestations such as skin redness, rashes or spots, and throat hyperemia that persist in dengue hemorrhagic fever patients, even after entering the febrile phase on day 8, can be explained as a result of the ongoing systemic inflammatory response and increased capillary permeability. This inflammatory process is triggered by dengue virus replication and the release of inflammatory mediators. Therefore, although the febrile phase generally lasts 2-7 days, in some cases, clinical symptoms can persist longer as the vascular endothelium recovers.

Hyperthermia is the body's normal response to infection, characterized by a temperature above 37°C. Infection is the entry of microorganisms such as viruses, bacteria, fungi, or parasites. Hyperthermia in children is generally caused by viruses, exposure to excessive heat, dehydration, allergies, or immune system disorders. Hyperthermia is characterized by redness of the skin, increased body temperature, tachycardia, and warm skin. In DHF grade I, fever with typical clinical symptoms, a positive tourniquet test, thrombocytopenia, and hemoconcentration are present. This problem is caused by inflammation caused by the dengue virus, which affects the hypothalamus, increasing body temperature. Therefore, hyperthermia is prioritized as the primary problem (Zakiah & Rahayu, 2022). This problem arises in a case marked by Subjective data: according to the client's family's statement, the client had a fever since 8 days on June 4, 2025, the fever went up and down and the body felt shivery. Objective data: the extremities felt hot, Temperature:

39°C. A rumpled test examination showed petechiae on the client's arm.

The interventions carried out are assessing the client's vital signs (pulse, temperature, respiration) with the rationale of knowing that there is an increase in body temperature, giving a warmwater compress if the body temperature is >38°C with the rationale of reducing heat by heat transfer by conduction, advising the mother to wear thin clothing that can absorb sweat with the rationale of providing comfort and thin clothing does not stimulate an increase in body temperature, and carrying out collaborative actions to administer intravenous fluids with the rationale that administering fluids is very important for clients with high body temperature (Qurohman, 2020).

Nursing interventions that can be performed independently to address hyperthermia include administering warm water sponging. Warm water sponging is a warmcompress technique that combines a compression block on the superficial blood vessels with a wiping technique (Jiwantoro, Kridawati, & Pratiwi, 2020).

In the warm water sponge action process, the working mechanism of the action provides the effect of channeling signals to the hypothalamus through sweat and peripheral vasodilation so that the heat transfer process is obtained from the warm water sponge action. This takes place through two processes, namely conduction and evaporation where the heat transfer process through the conduction process begins with the action of compressing the child with a washcloth and the evaporation process is obtained from the wiping of the body during the wiping so that the process of heat evaporation occurs into sweat (Firmansyah, Setiawan, & Ariyanto, 2021).

Research into non-pharmacological techniques that can be used to reduce elevated body temperature in hyperthermia patients includes warmwater sponge immersion. However, in addition to warm water sponge immersion, pharmacological therapy, including antipyretic therapy, can be used to reduce fever in children with DHF (Hastuti, Sari, & Wulaningsih, 2020).

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Physical (non-pharmacological) actions involve the use of heat energy through conduction and evaporation. Conduction is the transfer of heat from one object to another through direct contact. When warm skin touches something warm, heat is transferred through evaporation, transforming the heat energy into gas. An example of this method is the use of a water-tamped sponge bath (Firmansyah et al., 2021). From the implementation above, providing warm water sponge compresses to patients with dengue fever has been proven as a technique that aims to overcome increased body temperature, especially in dengue fever sufferers.

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CONCLUSION

The patient's body temperature was measured using a thermometer and the result was 39.8°C. The primary nursing diagnosis in this case was hyperthermia related to the inflammatory process caused by dengue virus infection. The independent nursing intervention provided to address hyperthermia was water warm sponge. This procedure was carried out for two days, and on the second day, the patient's body temperature decreased to 37.2°C. Thus, water warm sponging therapy has been proven effective in reducing body temperature in patients with hyperthermia.

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