

Section: Paediatric Nursing

Water tepid sponge to reduce hyperthermia in children with dengue fever

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Abstract

Dengue Haemorrhagic Fever (DHF) is an infectious disease caused by the Dengue virus and transmitted through mosquito vectors of the *Aedes aegypti* or *Aedes albopictus* species. The role of vectors in the spread of the disease causes many cases to be found during the rainy season when there are many puddles of water that become breeding places for mosquitoes. Fever is a condition when the body temperature rises above normal body temperature. One of the non-pharmacological techniques applied to reduce high body temperature/fever is the water tepid sponge technique. This case study aims to describe the application of the water tepid sponge technique in children with high fever. The research subject is a 10-year-old girl with a fever for 5 days with a body temperature of 39.5°C and complaints of dizziness, nausea and vomiting, red and pale skin. The nursing process was carried out for 3 days including assessment, establishing a nursing diagnosis, planning, implementation of the water tepid sponge technique and evaluation. The water tepid sponge technique was carried out for 15 minutes in one session in several areas with large blood vessels such as the armpits (axilla), in the groin (femoral) and on the forehead (frontal) plus wiping several areas of the chest and abdomen. The results obtained showed a decrease in body temperature from 39.5° C to 37.5° C. The water tepid sponge technique has been proven to provide benefits in reducing body temperature in paediatric patients significantly. In conclusion, the water tepid sponge technique can be a safe and effective alternative in reducing body temperature in children by maximizing the provision of pharmacological and non-pharmacological therapy.

Keywords: Hyperthermia, non-pharmacological treatment, nursing care, paediatric care, water tepid sponge

Introduction

Dengue haemorrhagic fever (DHF) remains a significant public health concern where the disease has been endemic for the past two centuries (Kularatne & Dalugama, 2022). In recent years, dengue infection has shown increasingly severe clinical manifestations, such as dengue fever, and the frequency of outbreaks has increased (Tantawichien, 2012). The epidemiological pattern of dengue infection changes annually, with a 10-year cycle peak in cases. In 2019, Indonesia reported 138,127 cases of dengue fever, a significant increase from 65,602 cases in 2018 (Silaen et al., 2025). The World Health Organization (WHO) estimates that global fever cases range from 16-33 million. Children are most susceptible to fever, with the highest incidence among those aged 5-19 in almost all endemic areas. According to the 2018 Indonesian Health Profile, 109,021 cases of fever caused by infection occurred, resulting in 871 deaths. The WHO estimates that there are 16-33 million fever cases worldwide, resulting in 500-600 thousand deaths annually. Water tepid sponging is a technique that combines block compression and wiping, targeting areas with large blood vessels (Akyirem & Bossman, 2021). This technique is more complex than others, as it involves applying block compression in multiple locations and wiping several body areas. This facilitates signal transmission to the hypothalamus, promoting peripheral blood vessel dilation and heat transfer from the body to the environment, thereby reducing body temperature. When applied, water tepid sponging triggers the brain to produce a cooling response, decreasing body temperature (Elvira, 2019). Warm compresses in areas with high vascularity cause vasodilation, accelerating heat transfer from the body to the skin (Aluka et al., 2013). The water tepid sponge technique involves applying the sponge to areas with large blood vessels, such as the armpits, femoral folds, and frontal region, while wiping the chest and abdomen, for 15 minutes, twice daily (Maktalia & Adimayanti, 2025).

The study on using water tepid sponging to reduce hyperthermia in children with dengue fever is crucial due to the significant burden of dengue fever globally, particularly among paediatric populations. Dengue fever is a mosquito-borne viral infection that can cause severe flu-like symptoms, and in severe cases, it can lead to haemorrhagic fever or shock syndrome (Bhatt et al., 2021). One of the common symptoms of dengue fever is high fever, which can be distressing and potentially life-threatening if not managed properly. Hyperthermia in children can lead to complications such as seizures, dehydration, and even organ failure (Walter & Carraretto, 2016). Therefore, effective and safe methods for reducing fever are essential in the management of dengue fever in children. The use of water

tepid sponging as a physical method for fever reduction is particularly important in resource-limited settings where access to pharmacological interventions might be restricted or when parents and caregivers are looking for non-pharmacological approaches to manage their child's fever. Tepid sponging is a simple, inexpensive, and easily accessible method that can be performed at home or in healthcare settings (Widiyanto et al., 2023; Alves et al., 2008). With investigating the effectiveness of water tepid sponging in reducing hyperthermia in children with dengue fever, this study aims to provide evidence-based guidance for healthcare providers and parents on the best practices for managing fever in dengue fever patients. The findings of this study can contribute to improving outcomes for children with dengue fever by reducing the risk of complications associated with hyperthermia and enhancing the quality of care provided to these patients.

Case Description

The patient is a 10-year-old female elementary school student with no history of health problems. She is active, playing with friends, and has no known allergies to drugs or food. The initial assessment revealed a temperature of 39.5°C, blood pressure of 110/70 mmHg, pulse of 88x/minute, and respiration of 20x/minute. The patient has a poor appetite, eating only 3-4 spoons of food 3 times a day, resulting in weight loss. Her elimination pattern is relatively normal, with 3 urinations and 1 bowel movement per day. The patient appears uncomfortable, feeling hot, dizzy, and nauseous, with occasional urges to urinate. She has difficulty sleeping due to the high fever, and her skin is red and pale. Based on these findings, two nursing diagnoses were established: (1) Hyperthermia related to the disease process, characterized by warm skin, pale appearance, and reddened skin, and (2) Risk of nutritional deficit related to psychological factors (reluctance to eat), characterized by weakness, pale mucous membranes, and weight loss.

The primary intervention priority was to lower the patient's body temperature. Nursing intervention planning focused on thermoregulation through a non-pharmacological approach, specifically the water tepid sponge technique. This intervention was carried out for 3 consecutive days, targeting areas with large blood vessels such as the armpits, groin, and forehead, as well as the chest and abdomen. On the first day, the patient and family were educated and taught the water tepid sponge technique, which was performed by the researcher with family assistance. On the second day, the family performed the technique with researcher guidance, yielding positive results: body temperature decreased to 38°C, and the patient became more hydrated. By the third day, the family had mastered the technique, and the patient's body temperature had decreased to 37.9°C, with improved fever symptoms and reduced skin redness. Evaluation results indicate that consistent water tepid sponge administration significantly reduces body temperature. Family involvement is crucial to the technique's success, particularly in assisting with administration.

Discussion

The author collected subjective data through interviews with the client and family, and objective data through direct observations and measurements. The patient's family reported a 5-day history of fever, with a body temperature of 39.5°C. Objective data revealed: blood pressure 110/70 mmHg, temperature 39.5°C, weakness, and poor appetite (3-4 spoons per meal). These complaints align with the theoretical concept of dengue fever signs and symptoms. Factors influencing body temperature include age, as children's temperature-regulating mechanisms are immature, making them susceptible to fluctuations. Hormonal influences, such as oestrogen and progesterone, also impact body temperature (Greenfield et al., 2021; Charkoudian & Stachenfeld, 2016). Additionally, physical activity and environmental exposure to heat can cause temperature increases. Hyperthermia is defined as a body temperature that rises above the normal range. The etiologies of hyperthermia include exposure to a hot environment, disease processes (inflammation), and increased metabolic rate. Major objective signs include a body temperature above normal, and minor objective signs include red skin, seizures, tachycardia, tachypnea, and warm skin.

Hyperthermia occurs when the dengue virus causes viremia, triggering a reaction in the hypothalamus's temperature-regulating centre and increasing body temperature through the release of bradykinin, serotonin, thrombin, and histamine (Damtew et al., 2023; Madhusankha et al., 2021; Wang et al., 2010). Nursing intervention involves determining priorities, formulating problems, and action plans to address hyperthermia. The nursing plan and outcome criteria serve as the basis for the nursing process. For hyperthermia diagnosis, goals include thermoregulation with outcome criteria: decreased shivering, reduced skin redness, decreased pallor, and improved body temperature. The intervention is hyperthermia management, aiming to address the patient's elevated body temperature and associated symptoms. For the diagnosis of hyperthermia related to the disease process, the author implemented the nursing plan as follows: conducted a vital signs examination, observed the temperature before the compression action, obtained informed consent from the client and family, and administered the water tepid sponge according to the Standard Operating Procedure for 15 minutes. The author also provided education on reducing fever with water tepid sponge, encouraged the client to drink plenty of water, and administered 500 mg of paracetamol intravenously before the water tepid sponge. On the second and third day, the author repeated the water tepid sponge action, obtained consent, and observed the temperature before and after the action.

The water tepid sponge causes peripheral blood vessels to widen and experience vasodilation, opening pores and facilitating heat release, thereby lowering body temperature. Evaluation was conducted to assess the development and effectiveness of nursing actions. For hyperthermia diagnosis, the problem was not resolved on day 1

due to the child's difficulty with water tepid sponge and drinking. On day 2, the problem was partially resolved as the patient started to cooperate and drink more. By day 3, the problem was resolved, indicated by the patient's cooperation, reduced fussiness, increased water intake, decreased skin redness, and improved body temperature. The evaluation results confirm that water tepid sponges can effectively lower body temperature in children.

The family's role at home is crucial in supporting the child's recovery. They can continue the water tepid sponge technique, monitor the child's temperature, and encourage plenty of fluid intake. Family members can also assist with administering medication, provide emotional support, and maintain a comfortable environment to help manage the child's symptoms and promote recovery. With being actively involved in the child's care, the family can help ensure the effectiveness of the treatment and support the child's health. Community nurses play a vital role in managing fever cases, particularly in educating families and communities about prevention and control measures. They can conduct home visits to assess patients, provide guidance on hydration, nutrition, and fever management, and promote the use of water tepid sponge therapy. Through empowering families with knowledge and skills, community nurses can help reduce the incidence of DHF and improve patient outcomes.

Conclusion

Water tepid sponge therapy is effective in reducing fever in children with dengue fever. This intervention is safe, easy to perform, and has no side effects. A nursing assessment of a patient with hyperthermia due to dengue fever revealed a nursing problem. Data analysis established the main priority nursing diagnosis as hyperthermia, with subjective data indicating the patient had a fever for 5 days with a temperature of 39.5°C, and objective data showing warm skin, pale and flushed appearance. The water tepid sponge was applied for three days, 15-20 minutes after paracetamol administration, and was administered once every 15 minutes. Evaluation after three days of nursing interventions revealed that the water tepid sponge technique effectively lowered body temperature in children with hyperthermia. Future studies should investigate the long-term effects of water tepid sponge therapy on patients with hyperthermia and explore its potential applications in other clinical settings. Additionally, research could examine the efficacy of combining water tepid sponge therapy with other nursing interventions to enhance fever management outcomes. Further studies are also needed to validate the effectiveness of this therapy in diverse populations and age groups.

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