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Warm Foot Soak Intervention for Hyperthermia in DHF (Dengue Hemorrhagic Fever) Patients: A Case Study at Bhayangkara Hospital, Lampung

Hardono Hardono, Inggit Laras Tika*, Wisnu Sadhana, Asril HS
Nursing Department, Faculty of Health, Universitas Aisyah Pringsewu, Lampung, Indonesia

Corresponding author: larastikainggit@gmail.com

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ABSTRACT

Warm water foot soak therapy presents a viable alternative for managing fever in patients who experience discomfort with conventional compress methods. This scientific paper aims to provide nursing care for patients with Dengue Hemorrhagic Fever (DHF) experiencing hyperthermia, utilizing warm water foot soak interventions in the inpatient ward of Bhayangkara Hospital, Lampung. The nursing care approach follows the nursing process framework, focusing on direct nursing interventions. The subject of care consisted of DHF patients in the inpatient unit, with the primary intervention being warm water foot soaking. Data collection tools included physical examinations and standardized nursing assessment formats (KMB), with data gathered through interviews, observation, and physical examination. During the assessment phase, the patient exhibited classic signs of DHF, including high-grade fever. A nursing diagnosis of hyperthermia was established. The primary intervention implemented was a warm water foot soak. After three days of therapy, the patient's body temperature decreased to 37.2°C, and the patient reported improved comfort and no further complications. These findings suggest that warm water foot soaking is an effective supportive intervention for managing hyperthermia in DHF patients. It is recommended that patients and their families be encouraged to understand and apply simple, non-pharmacological interventions such as warm foot soaks alongside adherence to prescribed medical treatment.

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a form of arboviral disease. The term arbovirus is derived from "arthropod-borne virus," referring to viruses transmitted through the bite of infected arthropods, particularly mosquitoes. When a mosquito bites a human during the viremic phase of dengue infection, the virus can replicate within the mosquito and, after an incubation period, be transmitted to other individuals (Rigau-Pérez et al., 1998; Teixeira & Barreto, 2009). According to the World Health Organization (WHO, 2023) reported cases of dengue fever have increased more than eightfold over the past four years, rising from 505,000 cases to 4.2 million in 2022. Similarly, the number of reported deaths increased from 960 to 4,032 between 2015 and 2022. Notably, outbreaks have expanded into new regions, including Asia and the Americas, with Asia currently facing a high risk of widespread dengue outbreaks. In 2022, the Americas alone reported 3.1 million cases. These figures underscore the growing public health concern surrounding dengue infection on a global scale.

National data from Indonesia further emphasize the critical burden of Dengue Hemorrhagic Fever (DHF) as a persistent public health issue. According to the Ministry of Health, as of July 2020, a total of 71,700 DHF cases were reported across the country, with the highest incidence recorded in West Java, highlighting the widespread distribution and endemic nature of the

disease(Kementerian Kesehatan, 2019). In Lampung Province, DHF continues to pose a significant challenge, as evidenced by routine surveillance data from community health centers and hospitals, which reported approximately 4,000 and 1,000 cases per month, respectively (Dinas Kesehatan Propinsi Lampung, 2021). The case fatality rate in the region was estimated at 0.8%, underscoring the need for effective clinical management and preventive strategies. In addition to the morbidity and mortality associated with DHF, hyperthermia remains a common clinical manifestation during the acute febrile phase of the illness. In Bandar Lampung, the prevalence of hyperthermia was reported at 1.2% among 10,966 samples recorded in 2023, according to the National Basic Health Research (Kementerian Kesehatan, 2019). These statistics reflect the substantial clinical and epidemiological impact of DHF and its complications, and they reinforce the importance of supportive nursing interventions, such as non-pharmacological approaches to managing hyperthermia, in reducing patient discomfort and improving clinical outcomes.

Dengue infection typically begins with the sudden onset of high fever, followed by symptoms characteristic of Dengue Fever (DF) (Maman Hermawan et al., 2025). If left untreated, DHF can lead to serious complications, including impaired consciousness ranging from mild confusion to coma. Severe complications include intestinal perforation, gastrointestinal bleeding, and neuropsychiatric manifestations such as coma (Singhi et al., 2007). Fever is the body's natural physiological response to infection bacterial, viral, fungal, or parasitic (Mardiana et al., 2024). Body temperature is typically measured to determine the presence of fever. A normal body temperature ranges between 36.5°C and 37.2°C. Fever is generally defined as a temperature of ≥38°C (oral), ≥37.5°C (tympanic), or ≥37.2°C (axillary). Fever caused by infectious agents is the most common, but non-infectious causes can also contribute (Mardiana et al., 2024).

Hyperthermia, which differs from fever in that it results from a failure in thermoregulatory mechanisms, poses a critical threat when not managed promptly. Complications can include prolonged fever, decreased consciousness, seizures, and death. According to WHO (2012), the mortality rate associated with hyperthermia increases significantly with body temperature: at 41°C, the mortality rate is approximately 17%; at 43°C, the likelihood of coma rises with a 70% mortality rate; and at 45°C, death may occur within hours. Most cases of hyperthermia are associated with infections, inflammatory conditions, or metabolic disorders, leading to dysfunction in the hypothalamic thermoregulation center. If not treated promptly, hyperthermia can result in serious complications such as dehydration, febrile seizures, and death (Wulandari & Nuriman, 2022).

Nurses play a vital role in managing DHF and its complications. Their responsibilities include acting as care providers, encouraging rest, maintaining personal hygiene, and administering symptom-based care. In addition, nurses function as educators and consultants, providing health education to patients and families, and offering guidance on symptom management. As collaborators, nurses also work closely with physicians in the administration of treatments, including antibiotics when necessary (Lismayanti et al., 2021).

Management of hyperthermia in DHF includes both pharmacological and non-pharmacological interventions. Pharmacological management typically involves administering antipyretic medications such as paracetamol or ibuprofen. Non-pharmacological approaches include warm compresses, increased fluid intake, avoiding heavy clothing, staying in a cool environment, and warm water foot soak therapy (Fitriyah & Murniati, 2023). Warm water foot soaking is a form of non-pharmacological therapy classified under hydrotherapy. This intervention offers multiple physiological benefits, including muscle relaxation, pain relief, vasodilation, improved blood circulation, relaxation of connective tissues, a calming effect, and enhanced body warmth. A study conducted by Fitriyah and Murniati (2023) demonstrated that soaking the feet in warm water for 15 minutes was effective in reducing body temperature in patients experiencing fever, supporting its use as a complementary intervention in hyperthermia management.

Warm water foot soak therapy can serve as an alternative solution for managing fever, particularly in patients who find forehead compresses uncomfortable. Many patients report discomfort with traditional compresses due to factors such as pillow dampness from dripping

water, eye irritation, and an overall sense of chill. In contrast, warming the feet can enhance patient comfort during fever by promoting peripheral warmth through conduction using warm water. Based on the case data and observations, the author was motivated to implement nursing care for a patient with Dengue Hemorrhagic Fever (DHF) experiencing hyperthermia by using a warm water foot soak intervention. This nursing care was conducted in the Class 2 inpatient ward of Bhayangkara Ruwa Jurai Hospital, Lampung Regional Police.

METHOD

This study employed a qualitative descriptive case study design, which is appropriate for exploring and documenting in-depth nursing interventions within a real-life clinical context. This design was chosen to comprehensively assess the implementation and impact of warm water foot soak therapy as a non-pharmacological nursing intervention in patients experiencing hyperthermia due to Dengue Hemorrhagic Fever (DHF). The setting for this study was the Class 2 inpatient ward of Bhayangkara Ruwa Jurai Hospital, located in Lampung, Indonesia, a facility that frequently manages cases of DHF. The participants were selected through purposive sampling based on specific inclusion criteria, including a confirmed diagnosis of DHF, the presence of hyperthermia (body temperature ≥ 38°C), and the patient's ability to participate in and tolerate the intervention. A total of two respondents met the criteria and were included in the study. Both respondents exhibited clinical signs consistent with DHF and had nursing diagnoses of hyperthermia as determined by standardized assessment protocols. Ethical clearance for the study was obtained from the hospital's ethics committee, and informed consent was secured from all participants prior to the initiation of data collection.

RESULTS

At the stage assessment, patient with diagnosis Medical Dengue Hemorrhagic Fever (DHF) shows typical symptoms, namely fever ongoing high more from three day. Assessment subjective show that patient complained of a burning sensation all over body, feel No comfortable, pain head, and weak. In objective, temperature body patient reaching 38.9°C, skin looks reddish, acral feel hot, and there is signs improvement temperature body others. In addition, the results laboratory support existence dengue virus infection with show decline amount platelets and increased level hematocrit.

Based on results assessment obtained, diagnosis the most appropriate and appropriate nursing care priority is associated hyperthermia with the infection process secondary due to the dengue virus. Improvement temperature body in patients caused by the release endogenous pyrogens as response body to infection, which then influence center regulator temperature in the hypothalamus. Diagnosis This enforced based on proof subjective and objective, such as temperature body temperature exceeding 38 °C, complaints of feeling hot patient, visible face redness, and the presence of sweat excessive. Hyperthermia is problem the main thing to do quick overcome, because temperature tall body can cause improvement metabolism, dehydration, even risk seizures in patients, especially If not handled with fast and precise.

In managing hyperthermia, one non-pharmacological nursing intervention that can be applied is soaking the feet in warm water. This intervention is chosen because it is simple, safe, and effective in gradually reducing body temperature through the mechanism of peripheral vasodilation. Warm water foot soaks promote the dilation of blood vessels in the lower extremities, allowing heat from the body's core to be transferred to the skin surface and released through evaporation. This technique also stimulates the parasympathetic nervous system, providing relaxation and comfort for the patient. The procedure is performed using warm water at a temperature of 37–40 °C for 15–20 minutes, repeated two to three times daily when the patient's body temperature exceeds 38 °C. This intervention has been shown to physiologically

lower body temperature without excessive reliance on chemical antipyretics. The nursing action should be implemented comprehensively and continuously throughout the care period.

The first action to be taken is periodic monitoring of the patient's body temperature every four hours to assess the effectiveness of the intervention. Subsequently, warm water foot soaks are administered whenever the patient's body temperature exceeds 38 °C. In addition, nurses monitor vital signs such as blood pressure, pulse, and respiratory rate to enable early detection of other potential complications of dengue hemorrhagic fever (DHF). Educational activities are also provided to patients and their families, particularly regarding the importance of maintaining hydration, recognizing danger signs, and performing safe foot-soaking procedures at home. This implementation reflects the active involvement of nurses in delivering comprehensive care that addresses not only the physical aspects of the patient's condition but also their educational and psychosocial needs.

After the warm water foot soak intervention was consistently applied for three consecutive days (3 × 24 hours), evaluation showed a gradual decrease in body temperature from 38.9 °C to 37.2 °C. The patient also reported feeling more comfortable and less feverish than before. Vital signs remained within normal limits, and no advanced symptoms such as seizures or dehydration were observed. The patient's family demonstrated the ability to understand and apply the instructions provided by the nurse, including proper foot-soaking techniques and home temperature monitoring. Based on these findings, it can be concluded that warm water foot soaking is effective in helping to reduce the patient's body temperature and may be used as a supportive intervention in the management of hyperthermia in patients with dengue hemorrhagic fever (DHF). This intervention also has a positive psychological impact by increasing comfort and promoting peace of mind during the recovery process.

DISCUSSION

Subjective assessment revealed that the patient reported experiencing a burning sensation throughout the body, accompanied by general discomfort, headache, and fatigue. These symptoms are commonly associated with the acute febrile phase of Dengue Hemorrhagic Fever (DHF). Objectively, the patient's body temperature reached 38.9°C, with visibly reddened skin, warm acral extremities, and additional signs indicative of an elevated body temperature. These findings align with the physiological response to viral infection, in which thermoregulation is disrupted due to the systemic inflammatory process initiated by the dengue virus.

In a comparative study conducted by (Aini et al., 2022), differences were observed between two patients diagnosed with DHF. Patient 1 exhibited clinical signs consistent with DHF Grade II, while Patient 2 showed more advanced symptoms suggestive of DHF Grade III. Physical examination of Patient 1 revealed the presence of petechial red spots on both hands, which are characteristic of capillary fragility and early hemorrhagic manifestations. In contrast, such signs were not evident in Patient 2. However, in Patient 2, examination of the extremities showed diffuse reddish discoloration around the hands, moist oral mucosa, and a pulse rate of 100 beats per minute. The appearance of red spots or petechiae is one of the hallmark clinical features of bleeding due to increased vascular permeability and platelet dysfunction, which are common pathophysiological consequences of dengue virus infection. These observations underscore the variability of clinical presentations in DHF patients and emphasize the importance of thorough subjective and objective assessments in determining the severity of illness and guiding appropriate nursing interventions.

According to Prasetia, 2024, Dengue Hemorrhagic Fever (DHF) Grade II is characterized by the clinical features of Grade I, accompanied by spontaneous bleeding, either on the skin or from other sites. In contrast, Grade III is marked by signs of circulatory failure, including a rapid and weak pulse, decreased blood pressure (≤20 mmHg), or hypotension, accompanied by cyanosis around the mouth, cold and clammy skin, and signs of restlessness or anxiety in the child.

Based on the results of the clinical assessment conducted, the most relevant and prioritized nursing diagnosis was hyperthermia related to the infection process, secondary to dengue virus infection. This diagnosis is consistent with findings from a previous study by Manalu & Nursasmita (2023), which also identified hyperthermia as a primary nursing concern in DHF patients.

Similarly, Maman Hermawan et al., (2025) emphasized that hyperthermia related to dengue virus infection was the main nursing diagnosis formulated for Client 1, based on comprehensive assessment and analysis of patient data.

Moreover, Bonara & Fajar, (2025) supported this by identifying two main nursing problems in DHF patients: hyperthermia associated with the infectious process and imbalanced nutrition: less than body requirements, related to inadequate intake secondary to symptoms such as nausea and decreased appetite. These nursing diagnoses highlight the multifaceted impact of DHF on the patient's physiological status and underscore the need for integrated nursing interventions that address both temperature regulation and nutritional support.

To address the problem of hyperthermia in patients with Dengue Hemorrhagic Fever (DHF), one of the non-pharmacological nursing interventions implemented is the application of warm water foot soaking therapy. This method, categorized under hydrotherapy, is recognized for its therapeutic effects, including promoting muscle relaxation, relieving pain, dilating blood vessels, improving peripheral circulation, relaxing connective tissues, inducing a calming effect, and increasing the sensation of warmth in the body (Aprian et al., 2024). In this case, the foot soaking intervention was carried out over a period of two consecutive days, with each session lasting approximately 15 minutes.

The implementation of this intervention demonstrates the active role of nurses in delivering holistic and comprehensive nursing care. It not only focuses on addressing the patient's physiological needs but also incorporates aspects of education and psychosocial support. According to Maman Hermawan et al., (2025), warm water foot soaking therapy is considered a simple, practical, cost-effective, and safe approach, particularly for pediatric patients. This is because the therapy assists in vasodilation in the lower extremities, thereby improving blood circulation and facilitating the release of heat from the body through perspiration, which contributes to a reduction in body temperature.

Furthermore, this finding is supported by Wulandari & Nuriman, (2022), who reported that there was a statistically significant improvement in thermoregulation among children following the administration of warm water foot soaking therapy. Therefore, the application of this intervention is proven to be effective in enhancing thermoregulation, making it a valuable complementary approach in managing hyperthermia in DHF patients. After intervention soak feet in warm water done in a way consistent for 3x24 hours, evaluation show existence decline temperature body in a way gradually from 38.9°C to 37.2°C. The patient also expressed that his body start feel comfortable and not as hot as previously. Vital signs were within normal limits, and not found existence symptom advanced like seizure or dehydration. This is in line with study according to (Fitriyah & Murniati, 2023) that There is significant difference statistically between decline temperature pretest and posttest body in children who experience fever, because moment therapy soak feet in warm water done, vessels blood in the legs tends to widen and increase flow blood, so that hot issued through sweat and supply oxygen to the brain also gets bigger smooth. Implementation This is also supported by research conducted by Nopianti et al., (2023) which states that therapy soak feet in warm water is one of action hydrotherapy and useful for the suffering child fever Because will increase circulation blood peripheral, reducing symptom shivering and giving comfort in children. Control center temperature in the hypothalamus own ability cooling. When the temperature body rises above normal temperature, then center regulator temperature try release hot with increase flow blood to skin and with sweating. sweating can help lost hot through evaporation on the skin.

CONCLUSION

During the assessment phase, patients with Dengue Hemorrhagic Fever (DHF) presented with typical clinical symptoms, including high fever, fatigue, headache, and a body temperature reaching 38.9°C. These findings indicate a disturbance in thermoregulation associated with the infection process caused by the dengue virus. The nursing diagnosis identified was hyperthermia related to the infectious process, as evidenced by elevated body temperature and discomfort.

The primary intervention implemented was warm foot soaking as a non-pharmacological approach aimed at reducing body temperature through mechanisms of peripheral vasodilation and heat evaporation from the lower extremities. The procedure was administered for 15–20 minutes using water heated to 37–40°C, initiated when the patient's body temperature exceeded 38°C. Throughout the intervention, the patient's temperature was monitored periodically, and care was adjusted as needed. Additionally, both the patient and their family received education on self-care and the importance of independent temperature management.

After three days of intervention, the patient's body temperature decreased to 37.2°C, with improved comfort and no further complications. These results suggest that warm foot soaking is an effective supportive therapy in the management of hyperthermia in patients with DHF.

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Authors' contributions and responsibilities

HH and ILT: Writing Original Draft, Conceptualization, Data Collection, Formal Analysis.
SS: Supporting Draft, Review and Editing.

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Availability of data and materials

All data and supporting materials for this study are available and can be requested directly from the corresponding author.

Competing interests

The authors declare no competing interests.

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