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The Effectiveness of Tepid Sponge Therapy in Managing Hyperthermia among Patients with Typhoid Fever in the Emergency Department

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Abstract: Typhoid fever is an acute infectious disease caused by *Salmonella enterica* serovar *Typhi* (*S. typhi*), which primarily affects the human digestive system. It is transmitted through the consumption of food or water contaminated with the feces or urine of infected individuals, and can also spread through direct contact with bacterial carriers. One effective solution to reduce body temperature in patients with typhoid fever is the application of tepid sponge therapy**,** a non-pharmacological nursing intervention used to alleviate hyperthermia. This study aims to describe the application of water tepid sponge therapy in lowering body temperature among patients with typhoid fever. The results showed that after the implementation of tepid sponge therapy, the patient's body temperature decreased from 39°C to 37.8°C, indicating the effectiveness of this therapy in reducing fever. In conclusion, tepid sponge therapy has a significant effect on lowering body temperature in patients with typhoid fever. It is expected that this finding can serve as a useful reference for improving nursing care, particularly for patients suffering from typhoid fever.

Keywords: Typhoid fever, tepid sponge therapy, body temperature reduction.

INTRODUCTION

Typhoid fever is a life-threatening systemic infection caused by the bacterium *Salmonella enterica* serovar *Typhi* (*Salmonella Typhi*) (1). A study conducted in urban slum areas of Jakarta estimated the incidence of typhoid fever at 148.7 per 100,000 population per year among children aged 2–4 years, 180.3 among those aged 5–15 years, and 51.2 among adults aged over 16 years (2). However, specific data on the prevalence of typhoid fever in South Sulawesi were not available in the 2023 SKI report. In 2015, the South Sulawesi Provincial Health Office reported 16,743 cases of typhoid fever, with the highest number recorded in Makassar City (2).

Typhoid fever poses a significant public health challenge, particularly in countries with inadequate sanitation systems. The disease can lead to serious and potentially fatal complications, contributing to a substantial socioeconomic and health burden (3). Global studies have shown that approximately 26% of patients experience complications, with case fatality rates ranging from 0.9% in Asia to 5.4% in Africa. In cases of intestinal perforation, the mortality rate can reach as high as 15.5% (4).An effective non-pharmacological intervention to reduce body temperature in patients with typhoid fever is tepid sponge therapy (5). This technique combines warm compresses and body sponging to induce peripheral vasodilation, increase blood circulation, and accelerate the evaporation of heat from the skin surface. These physiological effects facilitate a safe and effective reduction of body temperature (6).Several studies have demonstrated the clinical benefits of tepid sponge therapy in managing hyperthermia among typhoid fever patients. For instance, a case study at Pariaman General Hospital reported that after three days of tepid

sponge therapy, the patient's body temperature decreased from 39.2°C to 36.8°C (7). However, recent studies indicate that tepid sponge therapy may not be more effective than paracetamol in reducing fever among children (8). A systematic review involving two randomized controlled trials found that tepid sponge therapy was only effective during the first 30 minutes of treatment, with no significant difference observed after two hours compared to paracetamol (RR = 0.25; 95% CI: 0.08–0.79) (9,10).The general objective of this study is to describe the effectiveness of water tepid sponge therapy in managing hyperthermia among patients with typhoid fever in the Emergency Department of Makassar City General Hospital**.**

CASES

On March 22, 2025, at 10:25 Central Indonesia Time (WITA), a 7-year-old boy, initials "N", was brought by his family to the Emergency Department (ED) of Makassar City General Hospital. The patient presented with a complaint of intermittent fever for the past three days, accompanied by nausea, vomiting, and loss of appetite. Upon arrival, the patient was categorized as yellow triage**.**In the primary assessment, the airway was patent with no abnormalities observed. In the breathing assessment, the respiratory rate was 26 breaths per minute, oxygen saturation (SpO_2) was 98%, and the patient was breathing spontaneously without assistance. In the circulatory assessment, the pulse was rapid at 115 beats per minute, capillary refill time (CRT) was less than two seconds, with no cyanosis. The skin appeared pale, and the extremities were warm to the touch with a body temperature of 39.1°C. The disability assessment revealed that the patient was fully conscious, compos mentis, with a Glasgow Coma Scale (GCS) score of 15 (E4V5M6). In the exposure assessment, the extremities were warm with a temperature of 39.1°C, and no closed or open wounds were found on the limbs (11).During the secondary assessment**,** the patient's mother reported noticeable weight loss during illness—from 20 kg before the onset of fever to 17.7 kg at presentation. The calculated Body Mass Index (BMI) was 11.3, indicating underweight status, considering that the normal BMI for a 7-year-old is approximately 13.7. The patient had no history of drug or food allergies. Physical examination findings included:

- Eyes: Pale conjunctiva, non-icteric sclera, isochoric pupils, and normal ocular movement in all directions.
- Oral cavity: Pale lips, moist mucous membranes.
- Chest (lungs and heart): Symmetrical shape on both sides, respiratory rate of 28 breaths per minute, irregular breathing pattern, and synchronized chest expansion with breathing rhythm.
- Extremities: Intravenous line in the left hand, infusing Asering solution at 20 drops per minute (12).

Diagnostic examination revealed a positive result for *Salmonella Typhi* infection with a Tubex TF score of 4, confirming active typhoid fever infection. Pharmacological therapy administered included intravenous Asering solution (20 drops per minute) and intravenous Paracetamol 1 gram**.** In addition to medication, water tepid sponge therapy was implemented as part of nursing intervention.Upon evaluation in the Emergency Department of Makassar City General Hospital, the patient was managed under the yellow triage category for typhoid fever. After nursing implementation of tepid sponge therapy**,** the patient's body temperature decreased significantly from 39.1°C before intervention to 37.8°C after intervention indicating a positive therapeutic response (13).

METHODS

This study employed a descriptive approach using a descriptive case study design aimed at providing an overview of the effectiveness of water tepid sponge therapy in managing hyperthermia

among patients with fever (14). The subject of this study was a 7-year-old male patient. The research was conducted in the Emergency Department (ED) of Makassar City General Hospital on March 22, 2025**.**The patient presented with complaints of fluctuating fever for three days prior to admission. Body temperature was measured using a digital thermometer**,** ranging from 38°C to 39°C**.** Prior to the intervention, the patient and family were informed about the therapeutic procedure, which consisted of applying tepid sponge therapy for approximately 10–15 minutes**.** The patient's body temperature was reassessed two hours after the intervention to evaluate the treatment effect.

The patient and family received information regarding the purpose, procedure, and potential benefits of the intervention. Verbal consent was obtained before implementing the nursing procedure, in accordance with the principles of informed consent. Patient identity and confidentiality were maintained throughout the study in compliance with the nursing ethical principle of confidentiality (14).

RESULT AND DISCUSSION

Result

The assessment results at Makassar City General Hospital showed that the management of patients with fever upon arrival at the Emergency Department (ED) began with an elevated body temperature. The initial step taken was to place the patient who was brought in by family members in the ED, followed by assessing vital signs and administering Water Tepid Sponge therapy.

Table 1. Data Pre and Post with Water Tepid Sponge Therapy

Time	Pra	Implementation	Time	Post
10.30 WITA	Patient's body temperature 39,1^{0}C	To monitor the patient's body temperature	12.00 WITA	Patient's body temperature 37,8^{0}C

Discussion

In this assessment, the author focuses on reducing the patient's body temperature using the Water Tepid Sponge therapy. According to reference 14, the positive impacts of Water Tepid Sponge therapy include lowering body temperature without causing adverse side effects. Moreover, this therapy can enhance parents' skills in the therapeutic process, thereby improving the effectiveness of fever reduction in children (15).

Administering Water Tepid Sponge therapy lowers the patient's body temperature primarily through the mechanisms of evaporation and vasodilation. Applying warm water compresses at approximately 32–37 °C increases blood flow to the skin's surface, accelerating the release of body heat into the surrounding environment. This helps reduce body temperature without causing harmful side effects that may occur when using cold water (16, 17). The application of Water Tepid Sponge therapy to patient N with a diagnosis of Typhoid Fever was performed prior to the administration of 1 gram of intravenous paracetamol. During the initial assessment, the patient's temperature was 39.1 °C. After 10–15 minutes of Water Tepid Sponge therapy and two hours of observation, the patient's temperature decreased to 37.8 °C. This finding aligns with a study indicating that the application of Water Tepid Sponge therapy can reduce body temperature in children with typhoid fever, with recorded decreases to 37.1 °C and 37.0 °C in subjects I and II, respectively, after therapy (18).The effectiveness of Water Tepid Sponge therapy in reducing body temperature has been supported by numerous practitioners, researchers, and health organizations. Based on the assessment findings, the patient appeared febrile; thus, the author identified

a nursing diagnosis of *hyperthermia related to disease process* (19). The corresponding nursing intervention was hyperthermia management, which was combined with Water Tepid Sponge therapy. The results demonstrated improvement in symptoms such as reduced shivering, improved body temperature, and normalized skin temperature. Regular monitoring during therapy allows for prompt and appropriate nursing interventions as needed. Furthermore, this therapy provides valuable information regarding the patient's overall condition and health status (20).

Following the intervention and temperature measurement, the patient's body temperature decreased from 39.1 °C to 37.8 °C. Based on the intervention outcomes, the implementation of Water Tepid Sponge therapy effectively influenced temperature regulation in patients with typhoid fever. This finding is consistent with research (17) showing that a 60-minute Water Tepid Sponge therapy successfully reduced the body temperature of children with Dengue Hemorrhagic Fever (DHF) by 1.2 °C (21, 22). Similarly, study (23) found that before therapy, the mean body temperature of patients was 39.8 °C, which decreased to 39.0 °C after treatment. Statistical testing revealed $p = 0.000$, indicating that this therapy effectively lowers body temperature in children.

These findings are further supported by reference (24), which highlights that Water Tepid Sponge therapy is a non-pharmacological method proven to be both effective and safe for reducing body temperature in patients with fever or hyperthermia. This therapy can serve as a valuable alternative in nursing practice. According to reference (14), the positive effects of Water Tepid Sponge therapy include lowering body temperature, producing no adverse side effects, and improving parents' skills in carrying out the procedure to enhance the efficacy of fever reduction in children (15, 24).

CONCLUSION

Based on the discussion of the nursing implementation results carried out for patient N with hyperthermia management, it can be concluded that the administration of Water Tepid Sponge therapy had a significant effect. During the assessment at 10:20 a.m., the patient's body temperature before receiving the Water Tepid Sponge therapy was 39.1 °C, while after the therapy, the temperature decreased to 37.0 °C. The purpose of providing Water Tepid Sponge therapy is to lower the patient's body temperature

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