RESEARCH ARTICLE **Open Access**

Gema Lingkungan Kesehatan
Vol. 23, No. 3 (2025), pp 401-405
e-ISSN 2407-8948 p-ISSN 16933761
doi: https://doi.org/10.36568/gelinkes.v23i3.300 *Journal Homepage: https://gelinkes.poltekkesdepkes-sby.ac.id/*

The Effectiveness of Warm Compresses and Tepid Sponge Baths on Body Temprature in Toddlers Who Have a Fever on the First Day

Ni Made Ari Sukmandari*, Komang Yogi Triana, Putu Ari Sukriyanti

Department of Nursing, STIKES Bina Usada Bali, Indonesia

*Correspondence: arisukmandarimd@gmail.com

Toddlers are susceptible to fever because their immune systems are immature. Non-pharmacological managements, such as warm compresses and tepid sponge baths, are commonly used to reduce fever. This study aimed to determine the effectiveness of warm compresses and tepid sponge baths in lowering body temperature in toddlers on the first day of fever. A quasi-experimental pretest-posttest non-equivalent control group design was used, involving 30 toddlers at TK II Udayana Denpasar Hospital. Respondents were selected through purposive sampling and divided into two groups: tepid sponge (n=15) and warm compress (n=15). Subjects belonging to the intervention group were administered tepid sponge baths, and subjects in the control group were applied warm compresses. Each group was given 20 minutes of treatment using lukewarm water with a temperature no higher than 43°C. Body temperature was measured using a calibrated digital thermometer before and after the intervention. The data were analyzed using paired t-tests for within-group differences and independent t-tests for between-group comparisons. Both interventions significantly reduced body temperature in toddlers with fever on the first day (p=0.001). The average temperature decrease in the tepid sponge group was 1.14°C (p value 0,001), slightly higher than the temperature drop in the warm compress group, which is 0.99°C (p value 0,001). Statistical analysis showed a significant difference in effectiveness between the two interventions (p value 0.001), with tepid sponge being more efficacious. Tepid sponge baths are more effective than warm compresses in reducing fever in toddlers on the first day. Nurses are encouraged to apply tepid sponge therapy as an alternative to pharmacological interventions to minimize the side effects of antipyretic drugs.

Keywords : Warm Compress, Tepid Sponge, Fever, Toddler

INTRODUCTION

A child is defined as an individual under the age of eighteen who is undergoing physical and developmental growth. One critical phase of childhood is the toddler stage, which includes children under five years old (Fatkularini et al., 2014). During this period, children tend to be more physically active, which can influence their body temperature and lead to an increase in body heat. While fever may result from external heat exposure, it is more commonly a clinical sign of bacterial infection.

The World Health Organization estimates 16–33 million cases of fever globally each year, with approximately 500,000 to 600,000 resulting in death (Bochen et al., 2020). According to Indonesia's 2018 Basic Health Research (Riskesdas), 53,075 cases of fever were reported. In Bali Province, common febrile illnesses include dengue fever, respiratory infections, pulmonary diseases, typhoid fever, and paratyphoid—all among the top ten most prevalent diseases treated in health centers and general hospitals (Dinkes Bali, 2016). Based on a preliminary study at TK II Udayana Denpasar Hospital, every mont there are an average of 30 cases of children with fever who are treated at the hospital.

Fever is defined as an elevation in body temperature above the normal range of 36.5°C to 37.5°C, typically caused by stimulation of the hypothalamic thermoregulatory center (Sodikin, 2012). High fever can lead to complications such as respiratory alkalosis, metabolic acidosis, liver damage, ECG abnormalities, and reduced cerebral blood flow (Eriyani et al., 2023). If not managed appropriately, fever can cause brain damage, hyperpyrexia-induced shock, seizures, learning disabilities, or even death, particularly at temperatures above 41°C (Yunianti SC et al., 2019). Treating children with fever requires special care, which is different from that in adults (Nurlaili, 2018).

Fever management is essential to help reduce discomfort. Fever can be managed by taking antipyretic medication, increasing fluid intake, wearing light clothing, and implementing physical cooling methods such as warm compresses or tepid sponge baths (Fajarwati et al., 2023). A warm compress is a method of applying heat using a warm liquid or device to improve circulation and provide

comfort (Fatkularini et al., 2014). This method can help reduce body temperature through evaporation and is typically applied to specific areas of the body for around 10 minutes, effectively lowering temperature by approximately 0.71°C (Dewi, 2020).

Another method in managing fever is the tepid sponge, a technique that combines warm compresses on superficial blood vessels with wiping motions across the body. This method allows moist air to aid heat dissipation through convection. Because body temperature is typically higher than that of the air or water used, heat transfers directly from the skin to the surrounding environment. The tepid sponge method involves wiping the patient's entire body with warm water (Faradilla & Abdullah, 2020). Its purpose is to reduce fever in hyperthermic patients (Hidayat, 2011), and studies have shown that it can lower body temperature by an average of 1.4°C within 20 minutes (Maling, 2012).

Given the potential for serious complications, such as febrile seizures that can damage brain structure and function, this study is essential to evaluate the effectiveness of fever management in toddlers.

METHODS

This study employed a pretest-posttest non-equivalent control group design, in which the intervention group received tepid sponge treatments and the control group received warm compresses. The groups were curated and not selected at random. The research was conducted at TK II Udayana Denpasar Hospital over a four-month period. The total sample size was expected to involve at least 30 participants, with 15 children in the tepid sponge group and 15 in the warm compress group. The sampling technique used was purposive sampling, with inclusion criteria including toddlers under 5 years old who were experiencing fever on the first day, sought treatment at TK II Udayana Hospital, were conscious (compos mentis), and whose parents or guardians consented to participate. Exclusion criteria included children with a history of febrile seizures.

The intervention was conducted over four months. In the first and second months, the tepid sponge treatment was applied to the intervention group, while in the third and fourth months, the warm compress was administered to the control group. Tepid sponge treatment involved wiping the entire skin surface, including the armpits and groin folds, for 20 minutes using water with a temperature not exceeding 43°C, while the child remained clothed. Warm compresses were applied by placing a cloth or washcloth on the axilla for 20 minutes, changing washcloths if the cloth's temperature decreased, using water no hotter than 43°C.

The data collection was conducted through observation using observation sheets to record body temperature before and after the intervention. A calibrated digital thermometer was utilized to take the temperature. The thermometer used is of the OneMed brand. The body temperature results after tepid sponge treatment were measured in the armpit and groin folds, while the results from the warm compress group were only taken in the armpit. The collected data were tabulated using SPSS software. Univariate analysis was used to assess the frequency distribution of each variable. Bivariate analysis was conducted using paired t-tests to compare pretest and posttest results within each group, and independent sample t-tests to compare the effectiveness of warm compresses versus tepid sponge baths in reducing body temperature in toddlers with a first-day fever.

This study upheld ethical principles by maintaining respondent confidentiality by using only initials, obtaining informed consent from both parents and children, and ensuring no harm to participants. The study also adhered to the principle of justice by treating all participants equally. Ethical approval was granted by the ethics committee of STIKES Bina Usada Bali under approval number 069/EA/KEPK-BUB-2023.

The research team consisted of one principal investigator and two research members, with two enumerators assisting in data collection. The principal investigator was responsible for overseeing the entire study, participating in data collection, and ensuring the research was carried through to publication. Research members assisted with administrative approvals, data collection, and data analysis. Enumerators supported the data collection process.

The method describes the approach used in the research, including the research design, population and sample, data collection instruments, and analysis techniques. The description should be clear enough so that other researchers can replicate it, and if using an existing method, provide appropriate references.

RESULTS AND DISCUSSION

Table 1 shows that the majority of participants in the tepid sponge group were female, while the warm compress group included 9 male respondents. Most respondents, with a total number of 21 individuals, had a history of antipyretic use. The average age of participants was 3.36 years, with a minimum age of 1 year and a maximum of 5 years.

Table 1

The differences in respondent characteristics between the intervention group and the control group (n = 30).

Characteristics	Tepid Sponge (n=15)	Warm Compress (n=15)
Gender		
Male, n (%)	6 (40.0)	9 (60.0)
Female, n (%)	9 (60.0)	6 (40.0)
History of Antipyretic Use		
Yes	9 (60.0)	12 (80.0)
No	6 (40.0)	3 (20.0)
Age (Years)		
Mean (SD)	2.26 (1.03)	3.06 (1.43)
Median (Min-Max)	2.0 (1.0-4.0)	3.0 (1.0-5.0)

Before analyzing the effectiveness of tepid sponge and warm compress interventions, the data were first tested

for normality using the Shapiro-Wilk test, which confirmed that the data were normally distributed (p value > 0,05). Therefore, to examine the differences between pretest and posttest results in the tepid sponge group, the paired samples test was used, while the difference in effectiveness between the two groups was analyzed using the independent samples test. The results revealed a p-value of 0.001 with a t-value of 14.649 for the pretest and 14.543 for the posttest, indicating a noticeable difference in the mean values between the pretest and posttest results in both the tepid sponge and warm compress groups at TK II Udayana Denpasar Hospital.

Table 2
The results of the normality test, paired samples test, and independent samples test.

Variables		**Normality test**	**Mean ± SD**	**t-value**	***p-value Paired Samples Test***	***p-value Independent Samples Test***
Tepid Sponge	Pre-test	0.313	38.592±0.2631	14.649	0.001	0.001
Warm compress		0.213	38.513±0.2326			
Tepid Sponge	Post-test	0.224	37.447±0.1506	14.543	0.001	
Warm compress		0.780	37.527±0.1223			

Most of the respondents in the warm compress group were male, while the tepid sponge group was predominantly female. This data suggests that boys are more prone to fever than girls, possibly due to the fact that boys have slower cell maturation, which includes nerve cells (Sarayar et al., 2023). The average age of respondents was 2.26 years in the tepid sponge group and 3.06 years in the warm compress group. An infant's body temperature can respond drastically to environmental changes. In newborns, heat loss primarily occurs through the head; therefore, it is important to use head coverings to reduce heat loss (Potter & Perry, 2012). The t-value in the pretest was 14,649, and the posttest was 14,543, indicating a more significant comparison in the pretest group. Still, the average temperature reduction in the warm compress group was 0.631°C, while the tepid sponge group showed a 0.682°C temperature drop. This finding indicates that both tepid sponge and warm compress methods are effective in lowering fever in toddlers. The difference in effectiveness between the two methods on the first day of fever was 0.051°C, attesting that utilizing tepid sponge is slightly more efficacious than applying a warm compress in treating a fever.

This finding aligns with the study by Wardiyah, Setiawati, & Romayati (2016), which discovered that the average temperature reduction after using the warm compress method was 0.5°C and 0.7°C after the tepid sponge method (Wardiyah et al., 2016). In the present study, the average temperature reduction was 0,9oC for the warm compress group and 1.06oC for the tepid sponge group. The independent sample t-test showed a p-value of 0.003 at a 5% significance level, representing a prominenyt difference in effectiveness between the two interventions. Another study found a significant difference in temperature reduction between the warm compress and tepid sponge groups, with a p-value of0.000 using ANOVA (Faradilla & Abdullah, 2020).

A warm compress is applied using lukewarm water or a warm towel. It involves placing a towel soaked in warm water with a maximum temperature of 43°C directly on the skin (Sulubara, 2021). Warm compresses provide comfort and help reduce body temperature. The heat stimulates thermoreceptors in the hypothalamus via the spinal cord, triggering an effector response that induces sweating and peripheral vasodilation (Handayani et al., 2021). These changes are regulated by the vasomotor center in the medulla oblongata under anterior hypothalamic influence, leading to increased heat loss through the skin and normalization of body temperature (Nuhan et al., 2023).

Warm compresses are particularly effective when applied to the axillary area due to the presence of large blood vessels and many apocrine sweat glands, which enhance heat dissipation (Potter & Perry, 2012). Because heat from the compress can evaporate quickly, nurses must frequently replace it or use aquathermia pads to maintain a consistent temperature. Moist heat promotes vasodilation and evaporation more effectively than dry heat. Plastic covers or dry towels can help insulate and retain the heat. A warm environment can signal the body that external temperatures are high, prompting the hypothalamus to reduce internal temperature regulation. Warm compresses also help open skin pores, facilitating heat loss (Potter & Perry, 2012). Warm compresses can also inhibit shivering and its metabolic effects while inducing peripheral vasodilation, enhancing heat loss (Susanti, 2012).

According to Novikasari et al (2019), the tepid sponge method is more effective than warm compress in lowering body temperature (Novikasari et al., 2019). The wiping motion of the tepid sponge technique promotes more rapid peripheral vasodilation across the entire body, increasing heat evaporation from the skin to the environment. Additional effects include dilating blood vessels and skin pores, reducing blood viscosity, increasing metabolism, and stimulating sensory receptors that send signals to the posterior hypothalamus to decrease body temperature (Wardiyah et al., 2016).

The tepid sponge technique involves wiping the entire body with a warm, damp washcloth. The warmth

induces vasodilation, improving blood flow and allowing heat to transfer from the body to the environment. During the study, children who received tepid sponge therapy were cooperative, followed instructions obediently, and reported feeling more comfortable and cooler afterwards (Pakpahan et al., 2024). Wardiyah, Setiawati, & Romayati (2016) also observed that wiping the body with a warm washcloth for 15 minutes effectively dilates blood vessels, allowing heat from the blood to move through vessel walls to the skin's surface and dissipate (Wardaniyah et al., 2016).

The temperature reduction observed after tepid sponge application is attributed to the activation of the hypothalamus and peripheral vasodilation, which enhances heat loss through the skin (Pakpahan et al., 2024). One major advantage of the tepid sponge method is its rapid effect in lowering fever, as it directly stimulates the hypothalamus. However, a drawback is that it may be time-consuming (Pakpahan et al., 2024). Tepid sponge baths not only reduce fever but also provide comfort, relieve pain, and lower anxiety caused by the underlying illness (Maling, 2012).

CONCLUSIONS

This study examined the use of tepid sponge and warm compress techniques for children experiencing fever on the first day. Children who received tepid sponge treatment showed a faster reduction in body temperature compared to those who were treated with warm compresses. The tepid sponge method is effectively used as therapy in children with fever to minimize the use of antipyretic drugs.

REFERENCE

Bochen et al. (2020). WHO methods and data sources for country-level causes of death. *World Health Organisation*, *December*. [Publisher]

Dewi, A. K. (2020). Perbedaan Penurunan Suhu Tubuh Antara Pemberian Kompres Hangat Dengan Tepid Sponge Bath Pada Anak Demam. *Jurnal Keperawatan Muhammadiyah*, *1*(1), 63–71. [Publisher]

Dinkes Bali. (2016). *Profil Kesehatan Provinsi Bali*. [Publisher]

Eriyani, E., Widyawati, W., Rahmini, J. A., Lubis, E. S., Zulianti, Z., & Warama, J. (2023). Pengaruh Tepid Sponge Terhadap Penurunan Suhu Pada Anak Yang Mengalami Hipertermi Di Ruang Rawat Inap Anak RSUD Aceh Singkil. *Jurnal Penelitian Kesehatan" SUARA FORIKES"(Journal of Health Research" Forikes Voice"*, *14*(3), 550– 553. [Crossref] [Publisher]

Fajarwati, E., Nurvinanda, R., & Mardiana, N. (2023). Pengaruh Pemberian Terapi Tepid Sponge Water untuk Mengatasi Hipertermi pada Pasien Demam Berdarah Dengue. *Jurnal Penelitian Perawat Profesional*, *5*(2), 703–712. [Crossref] [Publisher]

Faradilla, F., & Abdullah, R. (2020). The Effectiveness of the Water Tepid Sponge to Decrease the Body Temperature in Children With Febrile Seizure. *Jurnal Kesehatan Pasak Bumi Kalimantan*, *3*(2), 1. [Crossref] [Publisher]

Fatkularini, D., Mardi, S. H., & Solechan, A. (2014). Efektifitas Kompres Air Suhu Biasa dan Kompres Plester Terhadap Penurunan Suhu Tubuh Pada Anak Demam Usia Prasekolah di RSUD Ungaran Semarang. *Jurnal Ilmu Keperawatan Dan Kebidanan (JIKK)*, *3*, 1–10. [Publisher]

Handayani, T. W., Astuti, D. D., & Astuti, D. P. (2021). *51-Article Text-420-1-10-20210728*. *2*(1), 21–30.

Hidayat, A. A. (2011). *Pengantar Ilmu Kesehatan Anak*.

Maling, E. a. (2012). Pengaruh Kompres Tepid Sponge Hangat terhadap Penurunan Suhu Tubuh Pada Anak Umur 1-10 tahun dengan Hipertermia. *Ecos*, *22*(3–4), 94–98. [Publisher]

Novikasari, L., Siahaan, E. R., & Maryustiana. (2019). Efektifitas_Penurunan_Suhu_Tubuh_Menggunakan_Kompr. *Holistic Jurnal Kesehatan*, *13*(2), 143–151. [Publisher]

Nuhan, H. G., Turochman, H., & Sari, E. (2023). Pengaruh Kompres Tepid Sponge Terhadap Penurunan Suhu Tubuh dan Kenyamanan Pada Demam Anak Pra Sekolah di RS Bhayangkara TK I Pusdokkes Polri. *Jurnal Ilmiah Kesehatan*, *15*(1), 154–168. [Crossref] [Publisher]

Nurlaili, E. a. (2018). *Studi Komparatif Pemberian Kompres Hangat dan Tepidsponge Tergadap penurunan Suhu Tubuh Pada Anak dengan Kejang Demam di RSUD dr. Soedarsono Pasuruan*. *1*(6), 11–21. [Publisher]

Pakpahan, R., Pasaribu, E. R., & Purba, Y. T. (2024). c

Potter, P. ., & Perry, A. . (2012). *Fundamental of Nursing*. EGC.

Sarayar, C., Pongantung, H., Palendeng, F. O., Tinggi, S., Kesehatan, I., & Tomohon, G. M. (2023). Health Education: Menurunkan Demam Anak dengan Tepid Water Sponge. *Jurnal Pengabdian Kepada Masyarakat MAPALUS Sekolah Tinggi Ilmu Kesehatan Gunung Maria Tomohon*, *1*(2), 2023. [Publisher]

Sodikin. (2012). *Prinsip Perawatan Demam Pada Anak*. Pustaka Pelajar. [Publisher]

Sulubara, S. (2021). Efektivitas Tindakan Kompres Air Hangat Dan Tepid Sponge Bath Terhadap Penurunan Demam Pada Anak. *Journal of Midwifery Science and Women's Health*, *2*(1), 15–19. [Crossref] [Publisher]

Susanti, N. (2012). Efektifitas Kompres Dingin Dan Hangat Pada Penataleksanaan Demam. In *Sainstis* (Issue December). [Crossref] [Publisher]

Wardaniyah, A., Setiawati, & Dwi, S. (2016). Perbangdingan Efektifitas Peberian Kompres Hangat Dan Tepid Sponge Terhadap Penurunan Suhu Tubuh Anak Yang Mengalami Demam. *Jurnal Ilmu Keperawatan*, *4*(1), 44–56.

Wardiyah, A., Setiawati, & Romayati, U. (2016). Perbandingan Efektifitas Pemberian Kompres Hangat dan Tepid Sponge terhadap Penurunan Suhu Tubuh Anak yang Mengalami Demam di Ruang Alamanda

RSUD dr. H. Abdul Moeloek Provinsi Lampung tahun 2015. *Jurnal Kesehatan Holistik*, *10*(1), 36–44. [Publisher]

Yunianti SC, N., Astini, P. S. N., & Sugiani, N. M. D. (2019). Pengaturan Suhu Tubuh dengan Metode Tepid Water Sponge dan Kompres Hangat pada Balita Demam. *Jurnal Kesehatan*, *10*(1), 10–16. [Crossref] [Publisher]