

Literature Review : Tepid Sponge to Lower The Body Temperature of Children with Dengue Fever

Wulan Rahmadhani^{1*}, Sarwono², Ois Novita Rini², Umi Sulasih⁴, Desy Mustofa Irwanti⁵
Faculty of Health, University of Muhammadiyah Gombong

*Corresponding author ; wulan02@gmail.com

ARTICLE INFO

Article history

Received 06/04/2022

Revised 03/01/2023

Accepted 20/01/2023

Keywords

Tepid sponge

DHF

Toddler

Dengue fever

Children

Benefit of tepid sponge

ABSTRACT

Background :One of the symptoms that occur in dengue cases is the presence of fever. Fever is a state of body temperature above normal as a result of an increase in the temperature control center in the hypothalamus. Fever can endanger the safety of the child if not treated quickly and appropriately will lead to other complications such as, hyperthermy, seizures and loss of consciousness. *Water tepid sponge* is a procedure to improve the control of body heat loss through evaporation and conduction. The purpose of this literature review is to analyze the results of previous studies on the effectiveness of *tepid sponge* against decreasing body temperature of children with dengue fever. **Method:** The method used is literaturereview. The first stage begins with straightening out articles using Pubmed and Google scholar search engines .The keywords used in article search are DBD, *Tepid sponge*, child. **Results:** From the five articles analyzed, results were obtained that there was an influence of the tepid sponge method on the decrease in body temperature of children with dengue fever. **Conclusion:** *Tepid sponge* is effective against decreased body temperature of children with dengue fever.

This is an open access article under the [CC-BY-SA](#) license.



1. Introduction (**Heading 1**) (**bold, 11pt**)

Dengue Hemorrhagic Fever (DHF) is one of the diseases that often occurs in Indonesia. There are 3.9 billion people in the world in tropical and subtropical countries there are 128 countries at risk of being infected with *the dengue* virus with 96 million cases [5]. Dengue Haemorrhagic Fever (DHF) is caused by the Dengue virus transmitted through the bites of the *Aedes aegypti* and *Aedes albopictus* mosquitoes [1]. Symptoms of DHF are characterized by sudden fever, headache, nausea, and bleeding manifestations, such as nosebleeds or bleeding gums, as well as the presence of redness on the surface of the patient's body [2]. Generally, DHF sufferers have a fever for 2-7 days, the first phase: 1-3 days this patient will feel a fever that is quite high at 40.0 °C, then in the second phase the patient experiences a critical phase on days 4-5, in this phase the patient will experience a decrease in fever up to 37.0 ° C and the patient will feel able to do activities again (feel cured again) in this phase if not getting adequate treatment there can be a fatal state, there will be a drastic decrease in platelets due to the breakdown of blood vessels (bleeding) [3]. In this third phase will occur on the 6th-7th day, the patient will feel fever again, this phase is called the recovery phase, in this outside your particular field

phase platelets will slowly rise back to normal again [4]. The World Health Organization reports that in recent times dengue cases are found in almost all parts of the world with severe symptoms often found in the Asian and American regions [5]. The disease is estimated to infect around 390 million people per year and show clinical symptoms of around 96 million people per year worldwide. More than 136,000 dengue cases in Thailand reported in August 2016 were the highest number of cases in more than 20 years [6]. DHF is a major problem in Southeast Asia, because over a 40-year period there were 67,295 deaths out of a total of 68,977 deaths worldwide [5].

In Indonesia in 2018 with the number of dengue sufferers as many as 112,511 people and cases who died as many as 871 people and in 2019 there were 71,668 dengue sufferers in 34 provinces in Indonesia and 541 of them died [2]. This shows that there are an average deaths of 1682 / year due to dengue fever, the incidence of dengue cases in Indonesia from year to year tends to fluctuate. Over the last 47 years since 1968 there has been an increase of 58 cases to 126,675 cases in 2015 from 436 (85%) districts /cities in Indonesia [5]. In the decade from 1996-2005 there was an increase in cases ranging from 0.4 million cases to 1.5 million cases. In 2010 it jumped to 2.2 million cases. In 2015 the number of cases was 100,347 and there was an increase in 2018 of 129,650 cases with a death rate of 1071 and still an increase in 2019 recorded 2,014,171 patients with a mortality rate of 1598. In Central Java Province, 35 cities have been proven to have dengue fever. The incidence rate of dengue fever in Central Java Province in 2020 was 21.68 per 100,000 population [5]

One of the symptoms that occur in dengue cases is the presence of fever. Fever is a state of body temperature above normal as a result of an increase in the temperature control center in the hypothalamus [7]. Fever can endanger the safety of the child if not treated quickly and appropriately will lead to other complications such as, hyperthermy, seizures and loss of consciousness [1]. Fever that reaches a temperature of 41°C the mortality rate reaches 17%, and at a temperature of 43°C it will be comatose with 70% death, and at 45°C it will die in a few hours [8]. If the child has a fever, actions should be taken such as giving warm compresses, providing an environment as comfortable as possible, accompanying the child during the fever so that the child feels safe and comfortable, giving toys that are his favorite, giving more drinks than usual, and heavy physical activity is limited [9].

Efforts to reduce body temperature can be done physically (non-pharmacologically) namely by the use of thermal energy through conduction and evaporation [10]. The conduction method is the transfer of heat from another object by direct contact. When warm skin touches the warm one, heat transfer will occur through evaporation, so that the transfer of heat energy turns into gas [11].

An example of a conduction and evaporation method is the use of water tepid sponge bath, still found in the field. The implementation of water tepid sponge bath is rarely carried out by nurses [12]. Nurses tend to give antipyretics more often when children experience hyperthermy [13]. Water tepid sponge is a procedure to improve the control of body heat loss through evaporation and conduction performed on patients who have hyperthermy [14]. The effectiveness of water tepid sponge bath in lowering fever body temperature is already the busiest, it is known that water tepid sponge bath is more effective for reducing fever than warm compresses seen from the results of the mean rankwater tepid sponge which results in 22.82C while the results of the decrease in the warm compress group resulted in 38.18C which means that water tepid sponge is more effective for reducing fever in children than warm compresses [6]. Based on the background above, the author is interested in analyzing the results of previous *studies on tepid sponges* to reduce the body temperature of children with dengue fever.

2. Materials and Method

The method used is *literature review*. The first stage begins with straightening out articles using Pubmed and Google scholar search engines. The keyword used in article search is tepid sponge, toddler, Dengue fever, fever, DHF, children, benefits of tepid sponge. The obtained article will be reviewed to obtain an article that fits the predetermined criteria. The journals that have been found are then determined according to the inclusion criteria and exclusion criteria, namely IC1: journals published by *Google Scholar* and *Pubmed* as many as 46 articles, IC2: journals published in 2015-2021 and remaining 23 articles, IC3: qualitative and quantitative research types so that 12 articles remain, IC4: non-duplicate journals published in *Google scholar* and *Pubmed* so there are 10 left. After conforming to IC1-IC4, only 10 articles remain. Then IC5 was selected based on the compatibility of article titles and abstracts with the aim of this literature review, which had the main content that analyzed covid-19 prevention efforts in pregnant women and only 8 journals were selected for analysis. Strategies in searching for literature can be seen in the following figure:

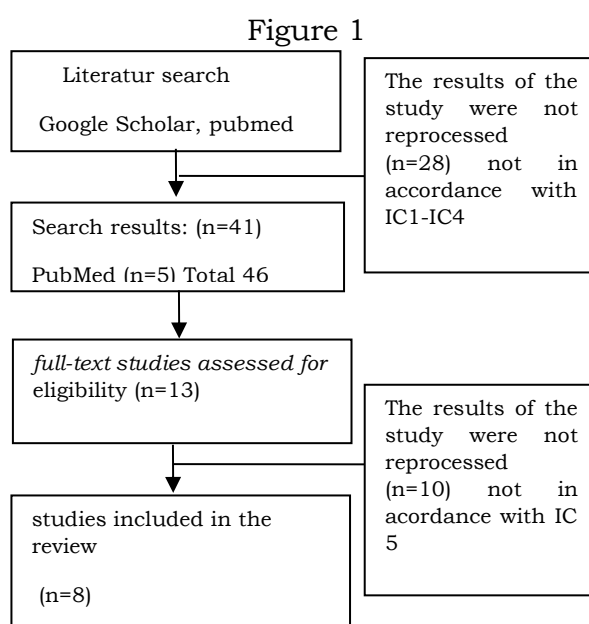


Figure 1. Flow of literature review

3. Results and Discussion

3.1. Results

The author explores the journal through the journal database based on the suitability of predetermined criteria and predetermined keywords, namely *tepid sponge*, dengue fever, child.

Table 1. Literature review results

Author's name	Heading	Method	Sampling techniques	Research results
Witri Hastuti , Novi Murdiana Sari, Indah Wulaningsih (2020)	Tepid sponge and sponge bath to change body temperature children with dengue fever	Quantitative	Purposive sampling	There is a decrease in the child's body temperature after being given the tepid water sponge method. With a p value of 0.001

Aryanti Wardiyah, Setiawati, Dwi Setiawan Ndlangamandla (2016)	Comparison of the Effectiveness of Giving Warm Compresses and Tepidsponge against Decreased Body Temperature of Children Who Experienced aNxiety at Dr. H. Abdul Moeloek Hospital, Lampung Province	Quantitative	Purposive Sampling	The results showed that there were differences the effectiveness of the administration of warm compresses and edged sponge against a decrease in body temperature children who have a fever (p value < α , 0.003 < 0.05).
Jhirin, Gina 2018	Comparison Between Warm Water CompressEs And Plaster Compresses Against Changes In Body Temperature In Children With Dhf Disease In Hospitals	Qualitative	Sample selection using non probability sampling techniques	The results showed that in the group of warm water compresses, there was a significant change in the body temperature of pediatric patients after the administration of warm water compresses in the axillary area. The average difference in body temperature degrees between the warm water compress group and the plaster compress group was 0.38oC. Based on the results of comparative analysis, the difference was obtained between the application of warm compresses and plaster compresses against changes in body temperature, meaning that warm water compresses are more effective in lowering body temperature than pleste compresses
Suci Rahayu (2022)	Fitri Application of Warm Compresses To Lower Fever In Children With Dengue Haemoragic Fever At Martapura Hospital	Qualitative	Purposive sampling	giving warm compresses can reduce body temperature in children who have a fever because warm compresses on body areas will provide stimulation to the hypothalamus through the spinal cord. when stimulated heat, the affector system then emits the body signals to expel through sweating and peripheral vasodilation. thus causing heat loss through the skin to increase so that there is a decrease in body temperature.

Emy Mulyani, Nur Ani Lestari 2020	Effectiveness of Tepid Water Sponge Against Decreased Body Temperature In Children With Hyperthermia Nursing Problems	Qualitative	Purposive sampling	There is an insignificant difference in body temperature decrease between the two clients after the action of tepid water sponge which is 0.2°C. This can be influenced by several factors of decrease in body temperature, namely the client's age factor. Which is the first case is 10 years old and the second case is 3 years old.
Ari Kusumo (2016)	Difference in Body Temperature Decrease Between Giving Warm Water Compresses And Tepid Sponge Bath In Feverish Children	The design of this study is quasy experiment with pre-test design and post test design types	The sampling technique that will be used in this study is Simple random sampling	There is a significant difference, between the temperature before the tepid sponge bath is given and the temperature after the tepid sponge bath is carried out.
Riska Hediya Putri Et Al (2020)	Differences in the Effectiveness of Warm Compresses with Water Tepid Sponge in Reducing Fever in Children: A Study Using a Quasi- Experimental Approach	This type of research is quantitative research and uses analytical research designs with a quasy experiment approach	The sampling technique that will be used in this study is Simple random sampling	The administration of tepid sponge bath is more effective in lowering the body temperature of children with fever compared to warm water compresses.
Fera Faradilla, Rusli Abdullah	The Effectiveness of the Water Tepid Sponge to Decrease the Body Temperature in Children with Febrile Seizure	This type of research is quantitative research and uses analytical research designs with a quasy experiment approach	Accidental sampling	The results of the paire t test were obtained p value of 0.000<0.05 so that the administration of the tepid sponge bath is more effective in reducing the child's body temperature

3.2 Discussion

In this *process of peripheral sponge* action, the mechanism of action on this action gives the effect of transmitting signals to the hypothalamus through sweat and peripheral vasodilation so that the heat transfer process obtained from *the action of the edged sponge* [15]. This takes place through two processes, namely conduction and evaporation where the heat transfer process through this conduction process starts from the act of compressing the child with a washcloth and the evaporation process is obtained from the presence of swabs on the body during the evaporation carried out so that the process of evaporation of heat into sweat occurs [15].

At the time of giving the tepid water sponge, the brain will expect that the temperature is outside the heat, so that the brain will immediately produce cold and there will be a

decrease in body temperature. Strong vasodilation of the skin will allow accelerating heat transfer from the skin, up to eight times more [16]

According to [9] states that if the child has a fever, actions should be taken such as giving warm compresses, providing an environment as comfortable as possible, accompanying the child during a fever so that the child feels safe and comfortable, giving toys that are his favorite, giving more drinks than usual, and heavy physical activity is limited [17]. The administration of warm compresses in the nursing intervention of DHF patients will have a positive impact on reducing body temperature due to fever, and making it easier for patients to rest and make patients more comfortable. There is a decrease in body temperature in the patient, then the patient will not experience shock because there is no seepage / leakage of plasma in the patient's body caused by the dengue virus. The dengue virus that has entered the body and disrupted thermoregulation in the hypothalamus in the patient's body is carried by mosquitoes that have been infected by the dengue virus which can be obtained from other DHF sufferers, therefore in patients with DHF there will appear symptoms of muscle and joint pain caused by the accumulation of lactic acid in aerobic metabolism so that malaise fatigue occurs which results in pain in the muscles and joints, symptoms that commonly appear in DHF sufferers are increased body temperature caused by the dengue virus which disrupts thermoregulation in the hypothalamus, if the patient's body temperature increase is not immediately lowered, it will result in shock, bleeding due to disturbances in the capillary blood vessels and in the blood clotting system caused by the dengue virus [11].

The mechanism of heat loss by means of warm compresses is by evaporation, because the heat in the body will disappear by evaporation through the skin, because warm compresses can cause skin pores to widen (vasodilation), the warm compress technique is carried out on the armpits and both thigh folds because in that place there are many blood vessels so that it can increase evaporation, after evaporation occurs, the hot body temperature will drop. The author uses a warm compress instead of a cold compress to lower body temperature, because warm water is used to compress it serves to dilate blood vessels and skin pores so that it can increase evaporation and lower body temperature, while cold compresses can reduce heat by conduction, namely body heat transfer because the skin is directly in contact with cold water but cold compresses can cause blood vessels to shrink (vasoconstriction) so that heat in the body cannot escape which results in a return of an increase in body temperature and the patient can shiver from the cold [11]. The effect of the compress warms up and gives a different physiological response. The effect of warm compresses to drain blood flow to the suffocated areas. The continuous administration of warm compresses is harmful to epithelial cells, causing redness, local weakness and can be blistering if a warm compress is given an hour or more [18].

The use of *tepid sponge* is carried out for 10-15 minutes with a water temperature of 30-32 ° C, will help reduce heat by hot out through the pores of the skin through the evaporation process. Giving warm compresses to the axillary (armpits) is more effective because in the area there are many large blood vessels and there are many apocrine sweat glands that have many vascular so that it will expand the vasodilation area which will allow accelerating heat transfer from the body to the skin up to eight times more [7] The use of warm compresses can be done in the area of the folds of the body (such as the armpit folds (axillary), thigh folds, etc.), because in the folds of the body there are usually blood vessels that are large enough to accelerate vasodilation and the process of evaporation of body heat [19]. The use of warm compresses is to coat the surface of the skin with a towel that has been moistened with warm water. Giving warm compresses to the axillary area as an area with large blood vessels is an effort to provide stimulation to the hypothalamic preoptic area in order to reduce body temperature, this is corroborated from several studies

conducted by [20]. The use of warm compresses is effective for treating fever triggering vasodilatation which can increase the production of body temperature. The use of warm compresses is recommended to help lower body temperature [8].

4. Conclusion

From the eight journals on the effectiveness of *tepid sponge* against decreasing body temperature of children with dengue fever that has been analyzed, it can be concluded that *tepid sponge* has an effect on reducing the body temperature of children with dengue fever.

Declaration

Acknowledgments: The author would express gratitude to who help and participation in this research.

Conflicts of Interest: The authors declared that there is no conflicts of interest in this research.

References

- [1] Labir, "Suhu Tubuh pada Pasien Demam dengan Menggunakan Metode Tepid Sponge," *J. Kesehat.*, vol. 12, no. 1, 2017.
- [2] Nur, Eliza, and Windi, "Faktor-Faktor Predisposisi Yang Berhubungan Dengan Pencegahan DBD Di Tanjung Basung Wilayah Kerja Puskesmas Pasar Usang," *J. Akad. Baiturrahim Jambi*, vol. 9, no. 1, 2020.
- [3] Nurlaili, "Comparative Study of Giving Warm Compress and Tepid Sponge to Decrease Temperature Children Who Gets Febrile Seizure in Rsud Dr Soedarsono Pasuruan.," *J. Keperawatan*, 2018.
- [4] Wardani, "Peningkatan Kewaspadaan Dalam Pencegahan Kejadian Demam Berdarah Dengue Dan Toksoplasmosis Pada Anggota Ranting Aisyiyah Karang Pucung Kecamatan Purwokerto Selatan," *Semin. Nas. Has. Penelit. dan Pengabd. Pada Masy. IV Tahun 2019*, pp. 39–41, 2019.
- [5] WHO, "Monitoring Health for the SDGs, Sustainable Development Goals. Geneva: World Health Organization; 2019.," 2019.
- [6] Widyawati, "Efektifitas Tepid Sponge Bath Suhu 32 O C Dan 37 O C Dalam Menurunkan Suhu Tubuh Anak Demam," *J. Ners*, vol. 3, no. 1, 2019.
- [7] Megasari, "Penerapan Paket Informasi Kesehatan terhadap Kemampuan Ibu Melakukan Kompres Tepid Sponge pada Anak Pra Sekolah yang Mengalami Demam Di Puskesmas Cimahi Selatan.," *J. Kesehat. Budi Luhur*, vol. 10, 2017.
- [8] Yuniarti, "Pengaturan Suhu Tubuh dengan Metode Tepid Water Sponge dan Kompres Hangat pada Balita Demam," *J. Kesehat.*, vol. 10, 2019.
- [9] A. Wardiyah, "Perbandingan efektifitas pemberian kompres hangat dan tepidsponge terhadap penurunan suhu tubuh anak yang mengalami demam RSUD Dr. H. Abdul moeloek provinsi lampung," *J. Ilmu Keperawatan*, vol. 4, no. 1, 2016.
- [10] Laino, "Pengelolaan Pediatric Demam Kejang," *Int. J. Penelit. Lingkung. Dan Kesehat. Masy.*, vol. 1, no. 1, 2018.
- [11] A. S. . Susilo, "Upaya Penurunan Suhu Tubuh Dengan Kompres Hangat Pada Anak DBD Di RSPA Boyolali," Universitas Muhammadiyah Surakarta, 2016.
- [12] Saputra, "Tingkat Pengetahuan Ibu Tentang Kejang Demam Pada Anak Usia 6 Bulan Sampai 5 Tahun Di Puskesmas Kampar Timur 2018," *J. Keperawatan Abdurab*, vol. 2, 2019.
- [13] Susy and Astinii, "Pengaturan Suhu Tubuh dengan Metode Tepid Water Sponge dan Kompres Hangat pada Balita Demam," *Jurnak Kesehat.*, 2019.
- [14] H. Hera, "Pengaruh Pemberian Tepid Sponge Terhadap Penurunan Suhu Tubuh pada Anak Demam Usia Toddler (1-3 tahun)," *J. Keperawatan Dan Kesehat.*, vol. 5, pp. 1–8, 2019.
- [15] Sodikin, *Prinsip perawatan demam pada anak*. Jakarta: Rufaida LQ, 2012.

- [16] Adhar, "Analisis Faktor Risiko Kejadian Kejang Demam Di Ruang Perawatan Anak RSUD Anutapura Palu," *J. Chem. Inf. Model.*, 2016.
- [17] Haryani, "Pengaruh Tepid Sponge terhadap Penurunan Suhu Tubuh pada Anak Pra Sekolah yang Mengalami Demam Di Rsud Ungaran.," *J. Keperawatan Dan Kesehat. Masy. Cendekia Utama*, 2018.
- [18] Bangun, "Pengaruh Tepid Sponge Terhadap Penurunan Demam pada Anak Usia 1-5 Tahun Di Rumah Sakit DR. Pirngadi Medan," *J. Keperawatan Flora*, 2017.
- [19] N. R. . Pratiwi, "Penerapan Kompres Hangat Pada Anak Demam Dengan Gangguan Pemenuhan Kebutuhan Nyaman Di Rsud Sleman," Karya Tulis Ilmiah. Politeknik Kesehatan Kementerian Kesehatan Yogyakarta., 2018.
- [20] Wowor, "Efektivitas Kompres Air Suhu Hangat Dengan Kompres Plester Terhadap Penurunan Suhu Anak Demam Usia Pra-Sekolah Di Ruang Anak Rs Bethesda Gmim Tomohon," *Journal Keperawatan*, vol. 5, no. 2, 2017.