



IMPROVING MANAGEMENT OF HYPERTHERMIA ON CHILDREN UNDER 5 YEARS COMPARATIVE STUDY ON HIGHEST 3 CASES IN AGRICULTURAL AREA

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ABSTRACT

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Fever is the most common problem in children. Giving antipyretics to treat fever gives a topical reaction and causes discomfort in children when they have a fever. A tepid sponge as a method of reducing temperature by administering water to the surface of the patient's skin to control body temperature based on the principles of evaporation and conduction of body temperature can cause comfort in children. The purpose of this study was to determine the effect of a tepid sponge on decreasing body temperature in pediatric patients with ARI, diarrhoea, and seizures. The research design used was quasi-experimental. This research has received ethical feasibility with number 225/UN25.1.14/KEPK/2023. Research respondents in this study will be divided into 2 groups, namely the intervention group at Dr Soebandi Jember Hospital and the control group at Dr Abdoer Rahem Situbondo Hospital. The sample size in this study was 60, with each respondent in each group namely 30 respondents. The sampling technique for taking samples used purposive sampling which was adjusted to the inclusion criteria. The results in this study were a decrease in body temperature in the intervention group after 30 minutes of giving a tepid sponge ($36.5-37.5 \pm 0.55$) and after 60 minutes of giving a tepid sponge ($36.5-37.5 \pm 0.62$). Meanwhile, in the control group, the temperature decreased after 60 minutes ($36.5-37.5 \pm 0.60$). The effectiveness of giving a tepid sponge was also found with a p-value of 0.000, which means that tepid sponge intervention was considered effective in reducing body temperature in children. The conclusions of this research are tepid sponge is effective for lowering body temperature in children. Nurses, families, and parents can safely apply the tepid sponge as a hyperthermia management solution for pediatric patients.

Keywords:

Children, Hyperthermia, Tepid Sponge

BACKGROUND

Fever is defined as an event of an increase in body temperature above the normal value, namely $> 37.5^{\circ}\text{C}$ (Green et al., 2021). Fever is also interpreted as a clinical sign that often appears in several disease conditions (Barbi et al., 2017). This increase in body temperature occurs due to a response to the stages of infection in the body. Some of them are ISPA problems, diarrhoea, and seizures. These three diseases are caused due to infection to inflammation in the body and result in an increase in body temperature as a response (Doniec et al., 2021).

WHO states that the incidence of fever worldwide reaches up to 16-33 million and often occurs in children aged 5-18 years (Anggreni, Immawati and Kusumadewi, 2022). Data from the Center of Health Research and Development (2018) states that fever in Indonesia caused by infection has reached up to 109,021 cases and there have been 871 deaths among them. The East Java Province Health Profile for 2021 stated that there were around 82 deaths of children under five due to ARI, diarrhoea and febrile seizures (Dinas Kesehatan Provinsi Jawa Timur, 2021).

The high mortality rate due to ARI, diarrhoea and febrile seizures indicates that appropriate management is needed to prevent complications from fever in children so that they do not result in death. The management of fever in children is divided into two, namely pharmacologically and non-pharmacologically (Gumilang Sudibyo et al., 2020). Pharmacological therapy is given such as antipyretics. Giving antipyretics to children certainly causes discomfort to children so it has an impact on the length of the child's recovery period (Aulia, 2019). Given this, it is necessary to combine with non-pharmacological therapy to meet the child's safe and comfortable needs.

Giving compresses, of course, needs to be understood by parents. Sometimes, many parents who do not understand the condition of fever require cold or warm compresses. In addition, conventional compression is considered less effective in reducing body temperature because it takes a long time (Karra et al., 2020). Another method that can be used to lower body temperature during fever is the tepid sponge method. The tepid sponge is a compression method by evenly distributes water to the surface of the child's body skin to reduce body temperature more quickly so that the child's comfort level will increase (Hendrawati and Elvira, 2019). Therefore, this study aims to determine the effectiveness of the tepid

sponge method by applying warm compresses to the forehead, armpits, and groin and combined with wiping the child's entire body so that children with fever will feel more comfortable because of a faster heat transfer process through this method. Given these conditions, this research must be carried out to have a significant impact on fever in children through fever management through a tepid sponge.

METHODS

The research design used was quasi-experimental. This research has received ethical feasibility from the Health Research Ethics Committee of the Faculty of Nursing, University of Jember with number 225/UN25.1.14/KEPK/2023. Research respondents in this study will be divided into 2 groups, namely the intervention group at Dr Soebandi Jember Hospital and the control group at Dr Abdoer Rahem Situbondo Hospital.

The population in this study were children aged <5 years who experienced fever caused by a child's illness in the inpatient room at Dr Soebandi Jember Hospital and Dr Abdoer Rahem Situbondo Hospital. The sample size in this study was 60, with each respondent in each group namely 30 respondents in the control group and 30 respondents in the intervention group. The sampling technique for taking samples used purposive sampling which was adjusted to the inclusion criteria such as children aged <5 years, body temperature more than 37.5°C (hyperthermia), children who were being treated for ARI, diarrhoea, or febrile seizures.

The data collection tools in this research are the researchers themselves who will carry out the tepid sponge, thermometer, and observation interventions. Next, quantitative data in the form of pre-intervention and post-intervention results will be analyzed using the Wilcoxon Test.

RESULTS

The results showed several characteristics of the respondents, namely the age of the children was dominated by the age of 0-2 years, 25 children (41.7%). Furthermore, children's weight was dominated by children weighing > 15 kg, namely 19 children (31.7%). For children's height, it was dominated by children with a height of around 50-100 cm as many as 38 children (63.3%). Respondents in this study were also dominated by female children, namely 37 children (61.7%).

Table 1. Frequency distribution of the characteristics of the respondents

Category	n (%)
Child Age	
0-2 years	25 (41,7%)
2-5 years	12 (20,0%)
5-8 years	7 (11,7%)
8-11 years	11 (18,3%)
11-14 years	5 (8,3%)
Child's Weight	
0-5 kg	7 (11,7%)
5-10 kg	18 (30,0%)
10-15 kg	16 (26,7%)
> 15 kg	19 (31,7%)
Child's Height	
0-50cm	2 (3,3%)
50-100cm	38 (63,3%)
>100cm	20 (33,3%)
Gender of Child	
Boy	23 (38,3%)
Girl	37 (61,7%)

Table 2. Distribution of body temperature frequency before the intervention

Body Temperature (°C)	n (%)
36,5-37,5	3 (5,0%)
37,5-38,5	48 (80,0%)
38,5-39,5	7 (11,7%)
39,5-40,5	2 (3,3%)

Table 3. Analysis of body temperature before and after administration of tepid sponge in intervention group

Body Temperature (°C)		
Before (X±SD)	After 30 minutes (X±SD)	After 60 minutes (X±SD)
37,5-38,5 ± 0,43	36,5-37,5 ± 0,55	36,5-37,5 ± 0,62
Z	-4,185 ^b	-4,630 ^b
p-value	0,000	0,000

Table 4. Body temperature analysis of the control group

Before (X±SD)	After 60 minutes (X±SD)	Z	p-value
37,5-38,5 ± 0,61	36,5-37,5 ± 0,60	-4,006	0,000

Table 5. Analysis of body temperature in the control group and the intervention group after 60 minutes

Before 60 menit (intervention group) (X±SD)	After 60 menit (control group) (X±SD)	Z	p-value
36,5-37,5 ± 0,62	36,5-37,5 ± 0,60	-4,200	0,000

The results on tabel 1 showed the distribution of body temperature in the control group and the intervention group before the tepid sponge intervention. The body temperature of the respondents was dominated by a temperature of 37.5-38.5°C, namely

48 children (80.0%).

The results on tabel 2 showed the analysis of body temperature before and after the tepid sponge intervention showed that there was a significant decrease in body temperature, both 30 minutes and 60

minutes after the tepid sponge intervention. Furthermore, the p-value was obtained as $0.000 < 0.005$, which means that there is a difference in the child's body temperature before and after giving the tepid sponge intervention.

The results on tabel 3 showed the study in the control group also showed a decrease in temperature which indicated that there was a difference in the child's body temperature before and after the measurement in the next 60 minutes. This is supported by the p-value obtained $0.000 < 0.005$, which means that there is a difference in body temperature.

Furthermore, the results on tabel 4 showed the study to determine whether there was a significant difference in children's body temperature in terms of the control group and the intervention group found that the p-value was obtained $0.000 < 0.005$, which means that there is a difference in the two groups.

DISCUSSION

This study demonstrated the effectiveness of reducing temperature in the intervention group. The effect of decreasing in the intervention group was identified after 30 minutes of giving the tepid sponge ($36.5-37.5 \pm 0.55$; p-value < 0.05). This is in line with the finding that giving a tepid sponge intervention to reduce body temperature is effective after 30 minutes (Kathwal, 2022). The results showed that after giving the intervention for 60 minutes there was a decrease in average body temperature ($36.5-37.5 \pm 0.62$; p-value < 0.05). While the control group found a value of $36.5-37.5 \pm 0.60$; p-value < 0.05). Other findings showed results that were in line with the provision of tepid sponge therapy with a mean value and standard deviation of body temperature in pediatric patients of 37.17 ± 0.46 (Hendrawati and Elvira, 2019). The effect of the tepid sponge intervention was also identified in the same range, namely 37.17 ± 0.213 ; p-value < 0.05 (Iskandar and Indaryani, 2022). The effect of the tepid sponge is considered to be able to help manage hyperthermia in patients who have a body temperature of up to 41°C (Aijaz et al., 2022). In patients with febrile seizures, it was reported that their body temperature decreased to 37.54°C after being given a tepid sponge intervention (Windawati and Alfianti, 2020). A decrease in body temperature of 0.2°C was identified in hyperthermic patients after the tepid sponge intervention (Mulyani and Lestari, 2020). Meanwhile, in toddler patients, a decrease in body temperature was identified to $37.4 \pm 0.41^{\circ}\text{C}$ (Heni, Wianti A, Handriana I, 2023). The tepid sponge technique will trigger nerve

fibres at 3 points and decrease in temperature for longer, up to 30 minutes after compressing (Karra et al., 2020).

Warm compresses are considered capable of triggering a physiological response in the form of vasodilation which allows heat dissipation through the bloodstream to the surface of the skin by converting heat energy into gas through evaporation (Crandall and Wilson, 2014; Cahyaningrum, 2016; Cheng and MacDonald, 2018). In addition, the evaporation process in warm compresses with a tepid sponge will increase the hypothalamic reaction in controlling body temperature (Wardiyah, Setiawati and Romayati, 2016). The tepid sponge method combined with warm water is more effective in controlling hyperthermia in children (Putri et al., 2020). The decrease in temperature in patients who were given the tepid sponge intervention was faster than the administration of antipyretics (Novikasari, Siahaan and Maryustiana, 2019). Providing intervention in the form of the tepid sponge method will also not harm patients (Burhan et al., 2020; Faradilla and Abdullah, 2020). In addition, the tepid sponge method is considered capable of lowering a child's body temperature better than plaster compresses (Karin et al., 2022). Thus, the tepid sponge can be a way to safely manage hyperthermia in pediatric patients.

CONCLUSION

Management of hyperthermia in children by administering tepid sponges can reduce body temperature significantly. In the study, it was found that the standard deviation value for the intervention group was greater than the control group, which indicates that the temperature reduction in the intervention group was more variable when compared to the control group. The final results also show the effectiveness of giving tepid sponges in reducing body temperature in children. Nurses, families and, parents can safely apply a tepid sponge as a hyperthermia management solution for pediatric patients.

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