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The Effect of Shallot Compresses on Decreasing Body Temperature in Children With Fever

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Abstract. One of the non-pharmacological treatment of fever in children is shallot compresses. This study aims to determine the effect of shallot compresses on decreasing body temperature in children with fever. This research used a quasi-experimental one group pre-posttest design and used simple random sampling as the sampling technique. A digital thermometer and observation sheet were used as the research instruments. The research took the data of children's temperature 2 times (pretest, posttest 15 minutes). The sample of this study was 20 children aged 3-6 years old. This study uses the normality test with Shapiro-Wilk and parametric statistical analysis of the Paired Test. The results showed that most child's temperature before being treated with shallot compress was 37.8ºC (25%) and most of the child's temperature after being treated with shallot compress was 37.0ºC (30%). A significant value of 0.000 (<0.05) means that there is a difference in body temperature before and after the shallot compress. Based on the results, shallot compresses can reduce children's body temperature when they have a fever. It can be used as early treatment for children with fever.

Keywords: body temperature; children with fever; shallot compress

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1. Introduction

Child health issues are one of the main problems in the health sector, which is still a significant challenge in various parts of the world, including Indonesia (Cahyaningrum & Putri, 2017). Fever is a condition with an increase in body temperature above normal. A person's temperature range is said to be hypothermic if <36.5°C. Average temperatures are 36.5°C-37.5°C and are hyperthermic if the temperature is>37.5°C (Dzulfaijah et al., 2017). Data from the World Health Organization (2012) revealed that 18 to 34 million cases afflict the world community is fever, and 500 to 600 thousand of them lead to death each year. The high prevalence of fever cases is inseparable from cases of fever which also occur in children as vulnerable individuals (WHO, 2012). On the other side, Oktiani (2018) conducted a case study showing that 12 million death of children per year in the world was caused by a disease, often has an early symptom of fever (Oktiani, 2018).

World Health Organization (WHO) estimates that fever reaches 16-33 million cases worldwide, with 500-600 thousand deaths occurring annually, and 70% of the number of cases of fever deaths occur in Asia (WHO, 2012). The incidence of fever is still a significant issue in health sector, especially in developing countries. In Indonesia, there are 800 sufferers per population yearly (Saputra et al., 2017). Fever cases in Indonesia are higher than in other developing countries, around 80-90%, especially in the tropics. That is 600,000 million cases with more than 20 thousand deaths every year (Setyowati, 2013).

According to the Indonesia Health Profile report, fever cases in children in 34 provinces in mid-December 2014 reached 2,852 children, and 641 of them resulted in death. The number of fever cases in children increased to 126,675, and 1,229 of them were reported to have died in 2015. Fever remains the 3rd of the ten most diseases in inpatient hospitals, namely 41,081 cases and as many as 276 death cases. It is estimated that 6-5% of death was caused by late treatment (Depkes RI, 2016).

Handling fever by always giving antipyretics is not justified. Humans have components in maintaining the balance of their energy and body temperature. Among them are the hypothalamus, food intake, sweat glands, skin blood vessels, and skeletal muscles. Shallots can be used to compress because onions contain organic sulfur compounds, namely Allylcysteine sulfoxide (Alliin), that destroy blood clots formation. Because of that, blood circulation will be smooth, so that heat from the body is easily channeled to the peripheral blood vessels. Alliin compounds have volatile properties, especially at temperatures from 20°C to 40°C. Crushed shallots release the alliinase enzyme, which functions as a catalyst for alliin and reacts with other compounds. The reaction happens within 10-60 seconds. To prevent this reaction happens quickly, oil is added to the crushed shallots. A unique trait of shallots is that it acts as an insulator because they have a specific heat of 0.9 kcal/kg°C.

Many measures have been widely carried out to prove the effectiveness of shallots as a type of compress. Some of them, such as the case study conducted by Cahyaningrum, Anies & Julianti (2014), showed that the average temperature before the children received shallot compress was 37.982℃. After receiving a shallot compress, the average temperature changed to 36,847℃. Using the Wilcoxon analysis method, a significance value of 0.000 was obtained ($\rho<0.05$). It can be concluded that there is a significant difference in the mean temperature before and after receiving shallot compresses in children's bodies suffering from fever. Based on the study's results, shallot compresses lower the body temperature faster than warm compresses because shallots have substances that can lower body temperature (Cahyaningrum et al., 2014). In addition, a case study by Riyady et al. (2016) showed that the group of children with fever who received shallot compress treatment decreased body temperature to 1.09℃ (Riyady et al., 2016).

After conducting the initial survey in Kute Gelime Village, the researcher obtained the data of 115 children with fever aged 3-6 years from October 2020 - March 2021. The interview with ten parents whose children aged 3-6 years were suffering from fever showed that the children only received regular compress. There has never been a study in Kute Gelime Village on the effect of shallot compresses on reducing fever in children. Based on this, the researchers are interested in researching the effect of shallot compresses on reducing fever in children in Kute Gelime Village.

2. Research Methods

This research is quantitative and uses a quasi-experimental one-group pre-post test design. The population in this study is 115 children with fever aged 3-6 years in the Kute Gelime Village Health Center working area. A simple Random Sampling technique is used. The number of samples in this study is based on the power analysis table, with a significant level (α): 0.05. The number of samples is in the estimated effect size of 0.7 and equal power of 0.8 (Polit & Beck, 2012). Thus, the number of samples is 32 people, so the number of samples taken is 20 people.

The procedures are 1) the researcher prepared the necessary tools; 2) researchers wash their hands; 3) the researcher positioned the child in a comfortable semi-Fowler's position; 4) the researcher measured the child's body temperature in the axilla (armpit) before compressing (pre-test) for 15 minutes; 5) the researchers mixed the crushed shallots with coconut oil; 6) researchers compressed a mixture of coconut oil and shallots with a cloth; 7) the compress was placed on the forehead for 15 minutes; 8) Researchers measured the child's body temperature in the axilla (armpit) after the procedure for 15 minutes.

The Shapiro-Wilk test was used as the data normality test because the number of samples was small, with only 20 respondents. The results show that the data is not normally distributed.

Therefore, non-parametric statistical analysis was used to analyze the data. The before and after child's body temperature while receiving shallot compresses were analyzed with a 95% Confidence Interval with a significance level (α) = 5% (0.05).

3. Research Results

a. Demographic Data

Table 1 Respondents' Demographic Data of Children Aged 3-6 Years Old in Kute Gelime Village in 2021 (n=20)

No	Demographic data	Frequency
1	Age	
	3 years	1
	4 years	3
	5 years	10
	6 years	6
	Total	20
2	Sex	
	Male	7
	Female	13
	Total	20
3	Education	
	Not in school yet	7
	Kindergaten	9
	Elementary School	4
	Toal	20

Table 1 shows that 13 people (65%) are female. Nine people (45%) are in kindergarten, and ten people (50%) are aged five years old.

b. Body temperature

Table 2 Frequency Distribution of Children's Body Temperature Aged 3-6 Years during Fever Before Receiving Shallot Compress in Kute Gelime Village in 2021 (n=20)

Pre-Temperature	Frequency	Percentage (%)
37.6	3	15
37.7	7	35
37.8	7	35
37.9	2	10
38.0	1	5
Total	**20**	**100**

Table 2 shows that the children's temperature before receiving shallot compress is mostly 37.8ºC (35%).

Table 3 Frequency Distribution of Children's Body Temperature Aged 3-6 Years during Fever After Receiving Shallot Compress in Kute Gelime Village in 2021 (n=20)

Post Temperature	Frequency	Percentage (%)
36.7	1	5
36.8	5	25
36.9	4	20
37.0	7	35
37.1	1	5
37.2	2	10
Total	**20**	**100**

Table 3 shows that the children's temperature after receiving shallot compress is mostly 37.0ºC (35%).

Table 4 The Distribution of Average Children's Body Temperature Aged 3-6 years during Fever After Receiving Shallot Compress in Kute Gellime Village (n=20)

Variable	Mean	Standard Deviation
Pre-Temperature	37,755	0.1050

Table 4 shows that the average body temperature of 20 children with fever aged 3-6 years old before receiving shallot compress is 37.755ºC with a standard deviation of 0.1050 and a standard error of 0.0235. After receiving a shallot compress, the average children's body temperature becomes 36.940ºC with a standard deviation of 0.1353 and a standard error of 0.303. Pre-body temperature and after the intervention is 0.9 ºC.

Table 5 Paired Sample T Test on Respondents Aged 3-6 Years Old Who Receive Shallot Compress to Reduce Fever in Kute Gelime Village in 2021 (n=20)

	Paired T *Differe Nces*				Df	Sig. *(2-tailed)*
	Mean	*sd*	*std.ErrorMean*			
The average children's body temperature during fever after receiving shallot compress	.8150	.0587	.0131	.62077	19.00	

4. Research Discussion

a. Demographic Data

Based on Table 4, there are ten children (50%) who became the respondents. This research's result is in line with Cahyaningrum research (2018), saying that in children in the preschool period (3-6 years old), their temperature regulation is not balanced enough until they reach puberty. Hence, they are vulnerable to having fever (Cahyaningrum, 2018). The statement also aligns with Riyady's research (2016), saying that there is a 60% decrease in body temperature in children aged 3-5 years (Riyady et al., 2016). Suryono, et al. (2010) said that receiving shallot compress affects the decrease of children's body temperature aged 1-5 years during fever (Suryono et al., 2010).

The result of gender analysis shows that most children are female, with 13 people (65%). Cahyaningrum research (2018) also found that most of her respondents are female, with 26 people (52%). Commonly, females have a higher fluctuation in body temperature than males. Also, they are considered to have a lower immune system than male (Cahyaningrum, 2018).

The result of the education level shows that nine children (45%) are in kindergarten. This finding aligns with Cahyaningrum research (2018), stating that in children who are in the preschool period (3-6 years old), their temperature regulation is not balanced enough until the children reach puberty, so they are vulnerable to having a fever (Cahyaningrum, 2018).

b. Children's Body Temperature Aged 3-6 Years Old During Fever Before Receiving Shallot Compress in Kute Gelime Village

The observation sheets showed that the average body temperature of 20 children aged 3-6 years before the children received shallot compress was 37.755ºC with a standard error of 0.035 and a standard deviation of 0.1050. This result aligns with Cahyaningrum research (2018), showing that the children's average body temperature before receiving shallot compress is 37.832ºC. The lowest temperature is 37.6ºC, and the highest temperature is 38.5ºC (Cahyaningrum, 2018). Respondents suffering a fever at that temperature aligns with Dzulfaijah (2017), stating that the normal temperature is 36.5 - 37.5ºC and hyperthermic >37.5ºC (Dzulfaijah et al., 2017).

Fever is a condition in which the body temperature is above normal (Wardiyah et al., 2016). A typical body temperature ranges from 36-37ºC, but during fever, it can be above 37ºC (Kurniati, 2016). Fever is caused by infection or an imbalance between heat reproduction and excretion (Salgado et al., 2016). However, fever plays a role in increasing the development of specific and non-specific immunity in helping the recovery, defense against infection, and a signal indicating the body is having health problems (Wardiyah et al., 2016). High fever can cause seizures in children aged six months to 5 years (IDAI, 2013). The treatment can use no drugs or with drugs. If

using drugs, one can administer antipyretic drugs. If there are no drugs, one can use shallot compress.

c. Children's Body Temperature Aged 3-6 Years Old During Fever After Receiving Shallot Compress in Kute Gelime Village

The observation sheets showed that the average body temperature of 20 children aged 3-6 years before the children received shallot compress was 36.940ºC with a standard error of 0.303 and a standard deviation of 0.1353. This result aligns with Etika's research (2018) entitled The Effect of Shallot Compress on Children's Body Temperature during Fever at Kembaran 1 Banyumas Public Health Center. Her research showed that children's average body temperature decreased by 0.742 ºC after receiving shallot compress. Her research aligns with Riyady's research (2016), stating that there is a decrease in body temperature with an average of 1.09 ºC after receiving a shallot compress. This proves that shallot compress could decrease body temperature (Riyady et al., 2016). Fauza (2009) also said that fundamentally reducing children's fever can do it physically, via drugs, or a combination of both (Fauza, 2009).

Harianah's research (2018), entitled the effectiveness difference of applying shallot compresses and warm compresses to decrease children's body temperature in Semboro Village, found that the difference in children's body temperature before and after receiving shallot compresses was 4.7ºC. Shallots and warm compresses signal the hypothalamus, causing vasodilation which increases heat dissipation through the skin (Harianah & Megawati, 2018). The results of this study are also supported by Suryono's research in 2012 regarding shallots' effectiveness in decreasing body temperature in children aged 1-5 years suffering from a febrile seizure. His research shows that body temperature before receiving shallot compress was 37.98ºC, and after receiving it was 37.58 ºC. P-value is 0.000. It can be concluded that there is a difference in children's body temperature during fever before and after administrating shallots.

d. The Effect of Shallot Compress on Children's Body Temperature Aged 3-6 Years Old in Kute Gelime Village

Statistical analysis with the Paired Sample T Test showed the value of $p = 0.000 < 0.05$. It can be concluded that shallot compress affects children's body temperature during fever Kute Gelime Village, Ketol District, Central Aceh. This research aligns with Cahyaningrum's research in 2017 about the difference in children's body temperature during fever before and after receiving a shallot compress. The results showed that the body temperature was 37.832ºC before receiving a shallot compress. After receiving it, the body temperature was 37.098ºC. Thus, there was a difference in children's body temperate before and after receiving shallot compress. Also, shallot compress act to dissolve blood clots which causes a smooth blood circulation.

One applied shallot compress to the skin. The skin responded by activating peripheral thermoreceptors. The peripheral informs the hypothalamus to respond to the existing stimuli and reduce skin temperature through the output of the sympathetic nervous system. Increased sympathetic activity in the skin vessels produces vasoconstriction in response to cold exposure. While, the decreased sympathetic activity causes vasodilation in skin vessels in response to heat exposure which reduces body temperature resulting in normal body temperature (Medhyana & Putri, 2020). This statement aligns with Rachmad's research (2012), stating that the greater the shallot's mass, the more effective it is to lower the temperature (Rachmad et al., 2012). This research also agrees with Utami (2013), saying that shallots contain compounds that can treat fever, including phloroglucin, cycloallin, matialiin allisin, and kaempferol to lower body temperature; and essential oil to make blood runs smoothly (Utami & Mardiana, 2013).

One of the compounds contained in shallots is flavonoids. Flavonoids work as cyclooxygenation (COX) inhibitors by inhibiting the prostaglandin formation process by utilizing flavonoid substances that act as antiseptics. Cyclooxygenation triggers the formation of prostaglandins so that there is an effect of onion on decreasing children's body temperature aged 1-5 years old (Suryono et al., 2010). In this study, Table 4.5 shows that the result of the Paired Sample T test-value = 0.000 (<0.05) indicates a shallot compress intervention's effect on reducing fever in children aged 3-6 years old in Kute Gelime Village. In line with Harianah's research (2018), her research shows that in a group of people applying shallot compress, there is an average body temperature reduction of 4.5ºC. The statistical test's P-value = 0.000 (0.05) shows that shallot compress decreases children's body temperature and reaches normal temperature faster than warm compress (Harianah & Megawati, 2018). Medhyana & Putri research (2020) also corroborated this research. The research entitled the effect of shallot compresses on reducing fever body temperature of 22 respondents in the working area of the Pagar Ayu Musi Rawas Polindes. It showed that the average body temperature before and after receiving shallot compress is 4.034 with the results of the Paired Sample T Test p-value of 0.000 (<0.05), indicating that shallot compresses affect the decreasing of body temperature (Medhyana & Putri, 2020).

5. Conclusion and Future Research

Based on the study's results, it can be concluded as follows:

1) Before the shallot compress intervention was carried out, the average body temperature of children aged 3-6 years old in Kute Gelime Village in 2021 was 37.755ºC;
2) After the shallot compress intervention, the average body temperature of children aged 3-6 years old in Kute Gelime Village in 2021 was 36.940ºC;
3) Shallot compres affects decreasing body temperature of children aged 3-6 years who have a fever in Kute Gelimedan Village. The Paired Sample T Test proves it with p-value of 0.000 (<0.05).

This study result can be used as reference material in the initial treatment of fever in children with non-pharmacological therapy. Non-pharmacological therapy with shallot compress can reduce children's body temperature during fever.

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