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ORIGINAL RESEARCH

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ALOE VERA BARBADENSIS MILLER AS AN ALTERNATIVE TREATMENT FOR CHILDREN WITH FEVER

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ABSTRACT

Background: Applying a cooling treatment from outside the body is one way to lower fever in children. Midwives commonly perform a warm water compress in their care, but it is considered less effective. Thus, compress with Aloe Vera Barbadensis Miller is proposed in this study as an alternative treatment.

Objective: To examine the effect of Aloe Vera Barbadensis Miller compress in reducing body temperature in children with fever.

Methods: This was a quasi-experimental study with pretest and posttest with control group design. Forty children were recruited, with twenty of them assigned in each group. Purposive sampling was performed to select the sample. A digital rectal thermometer was used to measure the temperature. Independent t- test and paired test were used for data analysis.

Results: Findings showed that the Aloe Vera compress group showed a higher decrease of body temperature compared to the warm water compress group. The difference of body temperature after 20 minutes in the experiment group was 1.435 while in the control group was only 1.085. There were statistically significant differences in body temperature between the experiment and control group ($p=0.013$).

Conclusion: Aloe Vera Barbadensis Miller compress is an effective alternative therapy in reducing body temperature in children with fever. It is recommended for midwives to apply this intervention to reduce body temperature significantly.

Keywords: fever, toddler, Aloe Vera Barbadensis; compress, warm water

INTRODUCTION

Change of condition from health to sick causes the body reaction to increase the temperature called fever (hyperthermia).^{1,2} Fever is a state that the body temperature is higher than usual and is a symptom of a disease. Body temperature exceeds the fixed point (set point) more than 37°C, which is usually caused by external or body conditions create more heat than released by the body.³ Studies have shown that 10-15% of mothers carrying toddlers come to health services because of fever.⁴ Fever is the body's normal response to the entry of microorganisms such as viruses, bacteria, parasites and fungus.⁵ Fever is generally caused by viral infections. Fever can also be caused by excessive heat exposure, dehydration or fluid deficiency, and allergies or due to immune system disorders.

Some research evidences suggest that the positive effects of fever trigger the increase in the number of leukocytes as well as improve interferon function that helps leukocytes fight microorganisms.⁶ Fevers are generally harmless but high fever can be harmful. The negative effects of fever include dehydration, lack of oxygen, neurological damage and febrile seizures. Fever should be handled properly in order to minimize the negative impact. Other research results show that fever often causes anxiety in the elderly person to make excessive efforts by giving antibiotics and doing a blood check.⁷

However, it requires the roles of midwife in dealing with fever to prevent excessive effort that precisely can harm. The role of midwife in handling fever in toddler must be in accordance with its authority. Based on Regulation of Minister of Health

(Permenkes) Number 1464 / Menkes / Per / X / 2010, midwives have authority in providing child health services, which their scope of services in child health services include providing newborn services, infant care, toddler services and pre-school services.⁸ In addition, midwives also have the authority to take care of infants and toddlers in accordance with established guidelines and the standard of IMCI (Integrated Management of Childhood Illness), especially for assessing and classifying fever before doing interventions.⁹

The authority of midwives in caring children with fever is by giving warm water compress. ⁹ Physical therapy by giving compress in fever management according to World Health Organization (WHO) can be done before giving drug therapy. However, not all fever can be treated with warm water compresses, it is just only for intermittent type of fever. This intermittent fever may fall to normal levels within a day and may occur on the first day. Warm water compress does not fit with children with fever accompanied by severe dehydration, consciousness loss or a history of febrile seizures.

Warm water compresses can help dilating the peripheral blood vessels in the skin and opening pores to remove heat out of the body.^{5,6} This also can reduce the dependence of patients on antipyretics.¹⁰ However, the weakness of hot water is in the media used, which is still using liquid media in the form of warm water in the wet cloth. The water in the wet cloth can be widened to other parts of the body causing discomfort. Moreover, if it is excessively given will cause redness. Warm water compress will be evaporated and should be done repeatedly for 2-3 minutes to maintain a sense of warm

water. The method of heat loss with warm water compresses will occur when the skin touches the liquid object, or when the skin touches a solid object which is actually 5 times more effective in moving heat compared to liquid.¹¹

Thus, this study used a compress with solid media in the form of Aloe Vera to increase heat exposure in children with fever. The results of Mukhamad Rajin's study¹² showed that saponin content in Aloe Vera can cause vasodilatation, thus accelerating the decrease of phlebitis level after 8 hours of giving Aloe Vera compress. This research is also supported study who found that Aloe Vera possesses phytochemical compound in the form of saponin and is used as a compress to lower body temperature in burn patients.¹³ In addition, Aloe Vera also contains lignin that can penetrate into the skin, which helps preventing the loss of body fluids from the skin surface.¹⁴ The content of saponin compounds in Aloe Vera that works dilate blood vessels can accelerate the expenditure of heat. It makes the blood circulation smooth so that the heat from the body can be more easily channeled to the peripheral blood vessels.¹³ Thus, Aloe Vera will be used to handle the fever by peeling the leaves of Aloe Vera and used as a compress. When the aloe leaves used as a medium compress, then the heat that exists on the body will evaporate so that the fever will slowly decrease because of accelerating heat.¹¹ Moreover, Aloe Vera also includes local crops that are cultivated so easy to get it and the price is affordable.

The Community Health Center is one of the health service centers providing midwifery services in maternal and child health. The standard operational procedure in taking care of fever in this

center include giving explanation to parents, rehydration, providing good air ventilation of the room, loosening the patient's clothes, and supine positioning, compressing and recording in the medical record. Data obtained from Department of Health of Blora in 26 Community Health Center located in 16 sub-districts showed that the highest prevalence of fever in under five years in 2015 was in the Doplang Health Center as many as 439 cases.¹⁵ This number indicates an increase of fever occurrence from the previous year, which amounted to 324 cases in 2014. In addition, the Doplang Health Center also applied a counseling to do compress action if there is a child with fever.

METHODS

Design

This type of research was a quasi-experiment with pretest and posttest with control group design. This research was conducted in the working area of Doplang Blora's Community Health Center from January 1, 2017 to January 27, 2017.

Population and Sample

The target population in this study was all children with fever in the working area of the Community Health Center of Doplang Blora. There were 40 samples selected based in the hypothesis formula of the mean of two independents. Purposive sampling was used and 20 samples were assigned in the experiment and control group. The inclusion criteria of the sample were: Children with intermittent fever (37.3°C - 38.5°C), first day of fever, and aged 1-5 years. The exclusion criteria were children aged less than 1 year or more than 5 years old, have been given a medicine, uncooperative fever, moderate

or heavy dehydration, and have a history of febrile seizures.

Intervention

The experiment group was given a compress of Aloe Vera. Type of Aloe Vera used was Aloe Vera Barbarensis Miller with a width of ± 6 cm and length ± 11 cm. The researchers chose a fresh and clean Aloe Vera, then peeling the Aloe Vera by removing the leaf skin and put it on the forehead, armpits (axillary), and groin folds for 15 – 20 minutes. While the control group was only given a warm water compress (37°C – 40°C) in the wet cloth and put it on the forehead, armpits (axillary), and groin folds for 15 – 20 minutes.

Instrument

A digital rectal thermometer was used to measure the temperature. It is considered a fever if the temperature is $> 37.3^{\circ}\text{C}$. The measurement was done for times (after 5 minutes, 10 minutes, 15 minutes, and 20 minutes of intervention).

Ethical consideration

Ethical clearance of the research was obtained from the Ethics Commission of

Poltekkes Kemenkes Semarang with No.057 / KEPK / Poltekkes-SMG / EC / 2017. The study permission was also obtained from the National Unity and Public Protection Body. Each participant in this study signed the informed consent prior to the data collection.

Data analysis

To examine the effect of Aloe Vera Barbarensis Miller on fever, and investigate its differences between the experiment and control group, Independent t-test and paired t-test were used for data analysis.

RESULTS

The characteristics of the respondents as shown in the table 1 showed that the majority of children in this study aged 37-38 months, female and had a good nutritional status, with p-value > 0.05 , which indicated that there were no significant differences of the characteristics of the respondents between the experiment and control group.

Table 1 Characteristic of the respondents and its homogeneity

Characteristics of the respondents	Warm water compress group	Aloe Vera compress group	P-value
Age (month)			0.802
Mean	37.55	38.2	
Median	34.5	37	
Min	27	22	
Max	60	59	
\pm SD	7.937	9.563	
Gender			0.736
Female	14 (70%)	13 (65%)	
Male	6 (30%)	7 (35%)	
Nutritional status			0.705
Good	16 (80%)	15 (75%)	
Poor	4 (20%)	5 (25%)	

Table 2 Time to reach normal temperature

Time	Warm water compress group		Aloe Vera compress group		Total	
	N	%	N	%	n	%
5 minutes	1	5%	8	40%	9	22.5%
10 minutes	4	20%	18	90%	22	55%
15 minutes	12	60%	20	100%	32	80%
20 minutes	20	100%	20	100%	40	100%
Total	20	100%	20	100%	40	100%

Table 2 shows that most respondents in the warm water compress group reached normal temperature within 20 minutes, amounted to 20 people (100%). While most of the respondents in the Aloe Vera compress group reached the normal

temperature within 15 minutes, amounted to 20 people (100%). The respondents in the Aloe Vera compress group reached normal temperature faster than the respondents in the warm water compress group.

Table 3 Difference in body temperature before and after given intervention using paired t -test

Time of measurement	Intervention			
	Warm water compress		Aloe Vera compress	
	<i>Mean Paired Differences</i>	P-value	<i>Mean Paired Differences</i>	p-value
Before and after 5 minutes	0.26	0.001	0.55	0.0001
Before and after 10 minutes	0.44	0.001	1.065	0.0001
Before and after 15 minutes	0.71	0.001	1.415	0.0001
Before and after 20 minutes	1.085	0.001	1.435	0.0001

Table 3 shows that there was a significant decrease of body temperature in the experiment and control group in four times of measurement with p-value <0.05. However, the Aloe Vera compress group showed a higher decrease of body temperature compared to the warm water compress group

in each measurement. For instance, the difference of body temperature after 20 minutes in the experiment group was 1.435 while in the control group was only 1.085. It could be said that Aloe Vera compress was effective than warm water compress.

Table 4. Difference in body temperature before and after given intervention in the experiment and control group using Independent t-test

Time of measurement	Mean±SD; Median; Min±Max		p-value
	Aloe Vera compress	Warm water compress	
Pretest	37.9±0.37; 38.0; 37.3±38.5	37.8±0.20; 37.8; 37.4±38.2	0.141
Posttest (5 min)	37.4±0.37; 37.4; 36.9±38.0	37.5±0.23; 37.6; 36.9±37.9	0.141
Posttest (10 min)	36.9±0.34; 37.0; 36.3±38.0	37.3±0.29; 37.4; 36.6±37.9	0.001*
Posttest (15 min)	36.5±0.24; 36.5; 36.2±37.1	37.1±0.34; 37.1; 36.4±37.9	0.001*
Posttest (20 min)	36.5±0.25; 36.5; 36.2±37.1	36.7±0.23; 36.7; 36.4±37.2	0.013*
Mean difference	1.43±0.32; 1.40; 0.80±2.20	1.08±0.14; 1.10; 0.90±1.40	0.001*

The results of Independent t-test as shown in the table 4 shows that there were no significant differences in body temperature in pretest and posttest (5 minutes) with p-value >0.05. However, there were statistically significant differences in body temperature between the experiment and control group after 10 minutes (p=0.001), 15 minutes (p=0.001) and 20 minutes of intervention (0.013). There was a bit difference in body temperature between the two groups, which was only 0.2°C.

DISCUSSION

The purpose of this study was to examine the effect of Aloe Vera Barbadensis Miller in reducing body temperature in children with fever. The findings of this study revealed that there was a significant effect of Aloe Vera Barbadensis Miller compress on the decrease of body temperature compared with the warm water compress. This finding is consistent with previous study¹³ who found that Aloe Vera possesses phytochemical compound in the form of saponin and is used as a compress to lower body temperature in burn patients. In addition, Aloe Vera also contains lignin that can penetrate into the skin, which helps preventing the loss of body fluids from the skin surface. Thus, the more Aloe Vera is given, the less amount of time needed to lower the temperature. However, another study indicated that the original Aloe Vera is more effective in lowering the temperature compared with Aloe Vera extract having no influence in temperature reduction.¹⁶

The finding of this study is also in line with Mc.Vicar's¹⁷ opinion that Botany is used for cooling body temperature.

Another states that the use of Aloe Vera is a traditional base that view fever as a hot expression in response to an external pathogen.¹⁸ The principle of treatment seeks to help to completely eliminate excess heat using herbs.¹⁴

Although the principle of the two interventions was the same as making vasodilatation, but Aloe Vera has a saponin and lignin content that will give a relaxant effect thereby sending signals to the posterior hypothalamus. The function of the posterior hypothalamus is to reduce heat production. While warm compress only uses warm water as a medium to provide a sense of warmth that will make the anterior hypothalamus give a signal for vasodilation. The function of the anterior hypothalamus is to increase heat expenditure.¹²

Both interventions equally give a signal to the hypothalamus causing vasodilation and decrease in temperature. But the decrease in temperature by reducing heat production through the posterior hypothalamus gives more results than through the anterior hypothalamus to increase heat release. The results were also influenced by the researchers who used a minimal time of thermoregulation process.¹³ Provision of this compress intervention can only be used for fever with temperatures that can be immediately dropped because there is also a fever whose temperature does not immediately come down with the compress due to infection.

The significant difference in temperature reduction between the warm compress group and Aloe Vera compress group gives a significant effect on the decrease in body temperature of children. From the descriptive analysis of time to reach the

normal temperature, it can be concluded that Aloe Vera compress was faster to lower body temperature of children compared with warm water compress. This fact occurs because the Aloe Vera compress has saponins that can lower body temperature, while there is no additional other substances in warm water compress although found enough evidence to say that warm water compress as the methods to control fever.^{19,20}

CONCLUSION

There was a significant effect of Aloe Vera compress in reducing body temperature in children with fever, and significant differences in mean value of body temperature between the Aloe Vera compress group and warm water compress group. It could be concluded that Aloe Vera compress was effective than warm water compress in decreasing body temperature in children with fever. Therefore, it is suggested for midwives to apply this intervention to reduce body temperature significantly.

Declaration of Conflicting Interest

None declared.

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Authorship Contribution

All authors have equal contribution in this study.

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