Combination of Red Onion Compress with Virgin Coconut Oil to Reduce Children's Fever

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Abstract: Fever is a clinical symptom that is most common in children and makes parents feel worried. This study aims to examine the effect of combination red onion compress with virgin coconut oil to reduce children's fever. The combination of red onion contains flavonoids and Allylcysteine sulfoxide (Aliin) compounds while VCO has an anti-inflammatory and antipyretic effect that can reduce body temperature. The study design uses quasi-experimental with pre and post test control group design. There were 30 participants selecting using simple random sampling, with 15 assigned in the experiment and control group. Data were analyzed using paired t test and unpaired t test. There is a decrease in body temperature after being given a red onion compress for 15 minutes by 3.11% while in warm water compresses of 1.54% There were ststistically significant differences in body temperature between the experiment and control group (p=0.000). Combination red onion with VCO can be used as an alternative intervention in lowering a child's body temperature during a fever. It is recommended for midwives to apply this intervention to reduce body temperature significantly.

1 INTRODUCTION

Fever is an acute response to a disease that most often occurs in children. WHO (World Health Organization) states that the prevalence of fever in the world reaches 16-33 million and results in 500-600 thousand deaths annually (Lunze K *et al*, 2017). One study in the United Kingdom in 2014 stated that 64.3% of parents bring their children to the doctor due to fever (Narayan K *et al*, 2017). Fever is the second biggest reason parents take their children to the hospital (Chien YL *et al*, 2017).

The use of paracetamol and ibuprofen as antipyretics is a pharmacological treatment for fever that is often done. However, there are many inconveniences caused by the use of this drug (Chiappini, *et al* 2016). According to Kanabar, 2017, paracetamol causes minor side effects of 10% while ibuprofen by 8% (Kannabar, J Dipak, 2017). Simple fever management that can be done by parents at home is by physiological interventions such as wearing baby clothes that are not thick, fluid or rest intake and use of coolant (Chang LC *et al*, 2016). Elvira, 2018 states that one time giving warm water compresses (tepidsponge) can reduce fever in children in the 6th minute until the 90th minute (Hendrawati and Elvira M, 2018). Compress aloe vera for 15 minutes effectively reduces fever by 2.86% in the 20th minute (Astuti *et al*, 2017).

In this study, researchers used a combination of red onion compresses with VCO for 15 minutes for children aged 2-3 years. Literature study at Henagan et al states that onion contains flavonoid compounds that function as antipyretics in the body by preventing arachidonic acid metabolism to form increased porstaglandin levels when fever (Henagan *et al*, 2015). The results of the Pareek S et al. 2018 study stated that onions contain flavonoids and high content of organo sulpur in the form of Aliin by 29% (Parek S *et al*, 2018). Aliin compounds make red onion easily evaporate when left at open temperatures (Rachmad, Suryani S and Gareso, 2012). To reduce the evaporation of onions, the researchers added 5 ml of virgin coconut oil to reduce the evaporation of onions. Virgin coconut has anti-inflammatory effects on the body so that it can help decrease body temperature in children. [11.12] Mass onions used by 25 mg will reduce body temperature by 88.50 seconds (Rachmad, Suryani S and Gareso, 2012). Onion compress is applied to the

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entire body through the surface of the skin because the skin is an easily accessible area in the process of drug absorption. In normal skin the onion compress penetration pathway via the topical trans epidermal route which targets treatment in the local system (Chang LC *et al*, 2016). This red onion compress and VCO will have a more effective fever-reducing effectiveness.

2 METHODS

Research location in Karang Anyer Health Center working area, Sidodadi Ramunia Village, Beringin Lubuk Pakam Subdistrict, with a quasi-experimental type of control group pretest and post test design. This study was divided into two groups: an intervention group with a combination of red onion compresses and VCO oil while the control group used warm compresses. The population in this study are all children who have a fever at the age of 2-3 years while the sample in this study is a child who has a fever at the age of 2-3 years according to inclusion criteria. The sample size calculation uses the mean different hypothesis test and the sample obtained for each group is 15 respondents so that the total sample is 30 respondents. The sampling technique uses random sampling with a simple random method. Inclusion criteria in the sample are parents or families willing if the child is a research respondent and is willing to sign an informed consent, fever no more than 1 day, body temperature 37.2°C-38.5°C, children who have not taken antipyretic drugs, not have a history of allergy to onions, a history of previous seizures and good nutritional status while the exclusion criteria are allergic, uncooperative during the research process, have infectious diseases.

The intervention group was given red onion compress (Allium Ascalonicum var Ascalonicum) as much as 3 cloves (25 mg) and 5 ml VCO while the control group was given warm water compresses using a wet cloth, temperature 37°-40 ° C for 15 minutes placed on the forehead, armpits and groin folds. Provision of therapy is carried out at the same time ie on the first day detected experiencing fever. The material used in this study was the red onion with Ascalonicum variety obtained from the market in Lubuk Pakam and samples were identified at the Botanical Laboratory of the Medistra Health Institute. The study permission was also obtained from the National Unity and public protection body . Each participant in tihis study signed the informed consent prior to the data collection.

The procedure in this research began with the permission to conduct a research location and through the village head to obtain family data. The researcher made a meeting at the village head's hall to the community who had a baby at the age of 1-2 years and explained the aims and objectives of this research. In the implementation process, the researcher has two enumerators who are tasked with helping researchers to obtain data on the community whose children are experiencing fever in accordance with the inclusion criteria. Researchers will divide the two groups based on random sampling techniques. In the intervention group was given red onion compress and VCO Red onion while the control group was given warm water compresses. Researchers do the assessment in the first 5 minutes, 10 minutes, and 15 minutes. After that, all data is collected for reprocessing (the research procedure can be seen in the block figure 1 below).

A digital thermometer was used to measure the temperature and mechanical thermometer to measure water temperature. The measurement was done for times (after 5 minutes, 10 minutes, 15 minutes of intervention)

Data analysis to examine the effect of combination red onion and virgin coconut oil on fever and investigate its differences between the experiment and control group, Independet t-test and paired t-test were used for data analysis.

3 RESULT AND DISCUSSION

Table 1 shows that the mean body temperature of respondents in the experiment group was 38 C and the control group was 37,8 months with p-value 0.74 , which indicated that there was no difference characteristics of respondents based on body temperature between two groups. The majority of respondents in both groups was female with p-value 0.43.The mean age of respondents in the experiment group was 26 and 28 months and the control group was 27 and 32 months with pvalue 0.74, which indicated that there was no diffrences characteristics of respondents based on age between two groups. In conclusion, there was no significant differences of the characteristics of the respondents in the experiment and control group.

The results in table 2 show that body temperature before being given a combination of red-bottom compresses and a VCO of at most 38.4 ° C and at least 37.6 ° C. In the first 5 minutes, the assessment of body temperature is 37.9 ° C and the lowest is 37.3 ° C, the first 10 minutes is 37.7 ° C and the

lowest is 37 ° C, and the first 15 minutes is temperature assessment the body is 37.2°C and the lowest is 36.4°C. In giving warm water compress before being given the greatest 38.4 ° C and the smallest 37.6°C. The first 5 minute body temperature assessment is 38.4°C and the lowest is 37.5 ° C, the first 10 minutes is 38.1°C and the lowest is 37.3°C, and the first 15 minutes is temperature assessment the body is at most 38 ° C and the smallest is 36.9°C.

Table 2 concludes that after 15 minutes compress red onion with VCO there were 14 respondents who had reached normal body temperature while for warm water compresses there were 5 respondents who reached normal body temperature. Both interventions provided a decrease in body temperature.

Table 3 shows that there was a significant decrease of body temperature in the experiment and control group in three times measurement with p value < 0.05. However, combination red onion and VCO showed a higher decrease of body temperature compared to the warm water compress in each measurement. For instance, the difference of body temperature after 15 minutes in the experiment group was 1.180 while in the control group was only 0.585. It could be said that red onion compress was effective than warm water compress.

Fever is the body's reaction to an illness. Fever can be both beneficial and detrimental. When a child has a fever, there will be an increase in phagocytosis in the body so that the ability to live germs decreases but the effects of the fever make the baby become fussy, anxious and have no appetite (Chiappini *et al*, 2017). Research by JR Wilyanto (2018) proves there is no significant difference in temperature between administration red bottom ethanol extract and administration of paracetamol to white rats induced by the DPT vaccine (Willyanto JR, Hamid IS and Widodo, 2018).

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This is in line with the research of Hadian et al. Which states that the use of botany can sweat and cool down the body. Herbal medicine combined with the principle of hydrotherapy can be used as a compress for handling fever (Krishna S and Thileepan T.A, 2018). Non-pharmacological treatment with the use of herbal plants has been tested to contain anti-microbial and immunomodulating pathogens (Huang *et al*, 2018).

Intervening with 25 mg of onion and 5 ml of VCO resulted in a decrease in body temperature in each study respondent. This proves that this therapy is the right combination of dosage and application time. Table 2 shows that there was a significant decrease in body temperature by giving a combination of red onion and VCO compresses and warm water compresses at 3 measurements with a value of p = 0,000. Examination of body temperature after 15 minutes given the intervention gave a significant decrease in body temperature with mean differences in the combination of red onion compresses at 1.020 while in warm water compresses at 0.585 and p = 0.000.

In table 3, the mean temperature of the child before being given the intervention 37.933 ° C, the first 5 minutes 37.633 ° C, the first 10 minutes 37.340 ° C and the first 15 minutes after the intervention 36.993 ° C. The results of the analysis showed that there were significant differences in the body temperature of children who were febrile before and after given an onion compress with an average increase of 0.94 with a value of p = 0.000.

This research states that there is a difference in body temperature before and after given an onion compress with a significance value of p = 0.000. Red onion compress given with virgin coconut oil reduces the body temperature of children who have a fever by 3.11% and warm water compresses by 1.54%. Upadhyay RK's research (2016) states that red onion content in the form of Allium will inhibit genotoxins thereby reducing the entry of pyrogens to the body (Upadhyay RK, 2016). Red onion contain flavonoid compounds, saponins, alkaloids and Alliins which prevent the increase of the cyclooxygenase enzyme to inhibit the release of the hormone prostaglandin. This hormone is a mediator that must be lost in order to decrease the temperature (Willyanto JR, Hamid IS and Widodo, 2018).

This is in line with the research of Pareek S et al (2018) that red onion have kaemferol, quersitin, floroglusin which are derivatives of flavonoids and can be used to reduce fever in children. (Cueva SM, 2015). Big red onions are more effective in lowering temperature faster. Rachmad's study (2012) states that extracted onions will reduce the benefits to reduce temperature (Rachmad, Suryani S , dan Gareso P.L, 2012). Research conducted by Riyady et al also stated that there was a difference in body temperature after being given an onion compress with a mean difference of 1.09 (PR Riyady *et al*, 2016). Cahyaningrum (2017) said an onion compress was effective in reducing fever in children by 1.94% (Cahyaningrum, Etika, 2017).

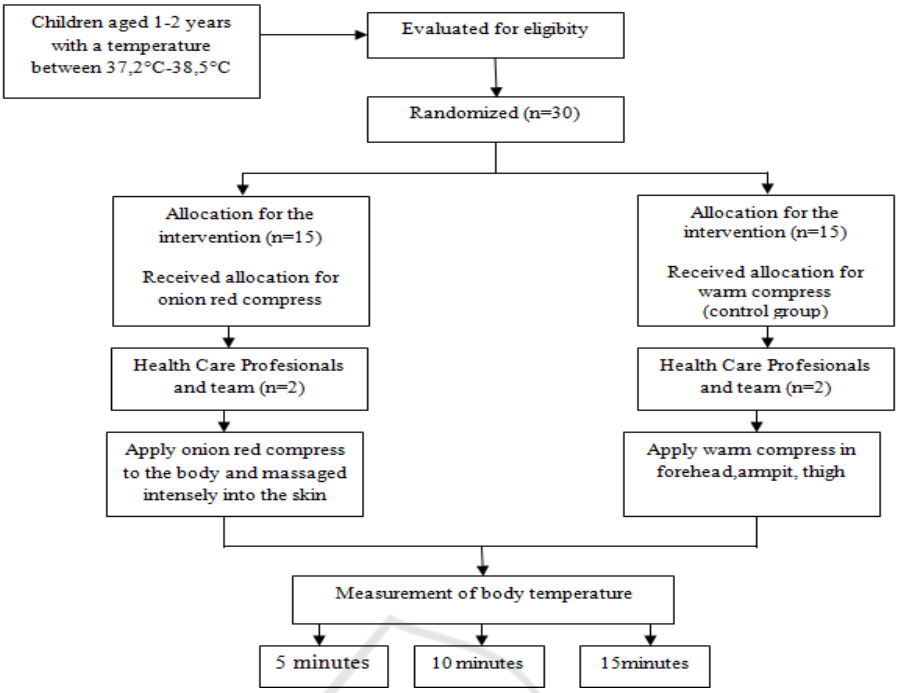

Figure1: Flowchart of progress though the trial.

Figure2: Procedure of onion compress with VCO.

Table 1: Frequency distribution of the characteristics of respondents based on age and gender (n=30).

Variable	Experiment Group		Control Group		p-value
	N	%	N	%	
Body Temperature (°C)					
37.6	2	13.3	3	20	
37.7	3	20.0	1	6.7	
37.8	1	6.7	4	26.7	
37.9	1	6.7	1	6.7	0.74
38	4	26.7	3	20	
38.1	1	6.7	1	6.7	
38.2	1	6.7	1	6.7	
38.3	1	6.7	1	6.7	
38.4	1	6.7	1	6.7	
Total	15	100	100	100	
Gender					
Female	9	60	11	73.33	
Male	6	40	4	26.66	0.43
Total	15	100	15	100	
Age (months)					
25	2	13.3	1	6.7	
26	3	20	2	13.3	
27	2	13.3	3	20	
28	3	20	3	20	
30	2	13.3	1	6.7	0.74
31	1	6.7	1	6.7	
32	1	6.7	3	20	
34	1	6.7	1	6.7	
Total	15	100	15	100	

Table 2: Differences in Body Temperature before and after given Intervention Onion Compress and Warm Compres.

Respondents	Before		Time of Measurement					
			T5		T10		T15	
	Intervensi	Control	Intervensi	Control	Intervensi	Control	Intervensi	Control
S.1	37.8	37.7	37.5	37.6	37.3	37.4	36.7	37.3
S.2	37.6	37.9	37.4	37.8	37.0	37.7	36.6	37.5
S.3	37.9	38.2	37.8	38.0	37.7	37.9	36.8	37.8
S.4	38.0	38.4	37.8	38.4	37.7	38.1	36.9	38.0
S.5	38.3	37.6	37.9	37.5	37.5	37.3	36.8	37.0
S.6	38.0	37.8	37.7	37.6	37.4	37.5	36.8	37.2
S.7	38.0	38.0	37.6	37.8	37.2	37.7	36.4	37.3
S.8	37.7	37.6	37.3	37.3	37.0	37.2	36.7	36.9
S.9	37.6	37.8	37.4	37.5	37.0	37.3	36.6	37.0
S.10	38.2	37.8	37.7	37.7	37.3	37.4	36.7	36,8
S.11	38.4	37.6	37.9	37.5	37.6	37.3	36.8	37.2
S.12	38.1	37.8	37.8	37.5	37.4	37.3	36.9	37.0
S.13	37.7	38.0	37.6	37.7	37.5	37.6	37.2	37.3
S.14	37.7	38.0	37.5	37.8	37.2	37.7	36.6	36,9
S.15	38.0	38.1	37.6	37.9	37.3	37.6	36.8	37.4

Red onion compress can reduce body temperature due to onion contains Allylcysteine sulfoxide (*Aliin*) compounds which are volatile and produce heat when crushed and produce Aliin compounds within 10-60 seconds (Pareek S *et al*, 2018). These compounds are useful for decreasing temperature. useful for removing *allin* compounds. So that the heat released by onions does not disappear too quickly, it is recommended to add oil (Henagan *et al*, 2015).

The skin is an area of the body surface that has many blood vessels, especially the hands, feet, and ears. Blood flow through the skin will reach 30% of the blood that will be pumped to the heart (Chetak KB, Gowri PS and Ravi MD, 2017). Transfer of heat through the walls of blood vessels to the surface of the skin and into the environment resulting in a decrease in body temperature. In principle, red onion compresses are more effective in lowering a child's body temperature than warm compresses because red onion compresses are given throughout the body which will accelerate the vasodilation of perifier blood vessels throughout the body so that heat evaporation from the skin to the surrounding environment will be faster than administration of warm compresses that rely on the hypothalamus (Lim *et al*, 2018). The difference *body surface* with onion compress that come in contact with peripheral blood vessels vessels from the febrile body temperature of children before and after given onion compresses with an average increase of 0.94 with a value of p = 0,000.

This research states that there is a difference in body temperature before and after this intervention with a significance value of p = 0,000. Red onion compress given with virgin coconut oil reduces the body temperature of children who have a fever by 3.11% and warm water compresses by 1.54%. Upadhyay RK's research (2016) states that the content of red onions in the form of Allium will inhibit genotoxins thereby reducing the entry of pyrogens into the body (Upadhyay, 2016). Red onion /red onion contain flavonoid compounds, saponins, alkaloids and Alliins which prevent the increase of the cyclooxygenase enzyme to inhibit the release of the hormone prostaglandin. This hormone is a mediator that must be lost in order to decrease the temperature (Willyanto JR, Hamid IS, and Widodo, 2018).

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The result of independent t-test as shown in the table 4 shows that there were no sognificant 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=0.03), 15 minutes (p=0.00) There was a difference in body temperature between the two groups.

Table 3: Differences in body temperature before and after given intervention in the experiment and control group using paired t-test.

Time of Measurement	*Mean Paired Differences*		P-value	
	Onion Compress	Warm Compress	Onion Compress	Warm Compress
Before and After 5 minutes	0.313	0.180	0.000	0.000
Before and After 10 minutes	0.600	0.353	0.000	0.000
Before and After 15 minutes	1.180	0.585	0.000	0.000

Table 4: Diffrences in body temperature before and after given intervention in the experiment and control group using unpaired t-test.

Time of Measurement	Mean,±SD		p-value
	Onion Compress	Warm Compress	
Pretest	0.24±37.93	0.23±37.88	0.6
Posttest (5 minutes)	0.18±37.62	0.26±37.7	0.3
Posttest (10 minutes)	0.23±37.33	0.25±37.53	0.03*
Posttest (15 minutes)	0.18±36.75	0.3±37.3	0.00*

The literature study of Henagen *et al* the use of red onion as a traditional treatment contains flavonoids which have antipyretic effects. At the time of fever, prostaglandin hormone levels will increase so that the inflammatory process occurs in the body resulting in an increase in body temperature. The content of onions in the form of flavonoids will inhibit the enzyme cyclooxygenase which plays a role in the formation of arachidonic acid into prostaglandins (Henagan *et al*, 2015).

Warm water compresses reduce body temperature by 1.54%. In line with the Chetak KB research (2018) that by giving compresses water effectively provides a decrease in temperature if added to the administration of antipyretics with a mean difference of 0.017 (Chetak KB, 2017). Warm water compress utilizes a high thermoregulation system. Warm water compresses will send an impulse to the hypothalamus that the surrounding environment is in a state of heat. This results in the hypothalamus responding so that it regulates body temperature to be higher by means of the production and conservation of body heat (Chetak KB, 2017). Decreased temperature on compresses of red onion due to the evaporation process of the body area by compress. The heat produced by onion will give a signal to the hypothalamus to stimulate the nerves that are sensitive to heat experience vasodilation in the size of blood vessels. This causes heat to escape through the pores of the skin resulting in a decrease in body temperature (Willyanto JR, 2018).

Salgado PO *et al* results revealed that of the 34 respondents given warm compresses there were 32 people who experienced a decrease in temperature while 2 of them did not experience a decrease. Warm compresses can reduce fever by sending signals to the anterior hypotalamus so that the blood vessels experience vasodilation (Salgado PO *et al*, 2015). Wardiyah and Romayati's 2016 research concluded that warm compresses and tepid sponges for 15 minutes were effective at reducing body temperature by 2.06% (Lim *et al*, 2018). Clinical studies comparing the effectiveness of thermal blankets using an air-cooling system with antipyretic administration were able to reduce the body temperature of adult patients experiencing fever due to infection. However, studies with this design have not been done by many other researchers (Chetak KB, 2017).

Comparative studies using pharmacological methods obtained that ibuprofen can reduce fever in 42 minutes while paracetamol 71 minutes (Narayan K *et al*, 2017). The dose of ibuprofen is 10 mg / kg every 6-8 hours. Paracetamol given intravenously can quickly cross the nervous system when the 57th minute is given. Fever will experience a rapid decline in the first hour of administration in children aged 6 months and 6 years (Cheelo M *et al*, 2015). The average reduction in fever by 71 minutes. The half-life of paracetamol elimination in neonates born at term is between 2.5 and 4 hours, postdate 1 hour longer than term (De Bont *et* al, 2015). In premature neonates, the average elimination half-life is longer; one study found 11 hours for neonates aged 28-32 weeks (for paracetamol given rectally) and 4-5 hours in neonates aged 32-36 weeks (Kannabar, 2017).

4 CONCLUSION

There were significant effect of combination of red onion with virgin coconut oil in reducing body temperature in children with fever, and significant differences in mean value of body temperature

between red onion compress with virgin coconut oil and warm water compress. It could be concluded that combination red onion and virgin coconut oil was effective than wrm water compress in decreasing body temperature in children with fever. Compress onion red is suggested for midwifes to apply this intervention to reduce body temperature significantly.

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