Journal of Hospital Management and Services
p-ISSN: 2829-842X (print); e-ISSN: 2830-1056 (online) Vol. 3 No. 2 November 2021 Page. 74-81

Effect Of Giving Ricinus Comunis Leaves (Balacay) To Decrease In Body Temperature In Hypertermid Toddlers At Matanga Health Center, Banggai Laut

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ABSTRACT
Antipyretic administration is the main therapy in reducing hyperthermia, but excessive use of antipyretics can cause side effects. Balacay leaves have chemical content that can lower body temperature so that it has the potential as a non-pharmacological therapy for hyperthermia. The purpose of this study was to determine the effect of administering Ricinus comunis (Balacay) leaves on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency.
The design of this study was Pre Experiment with a one-group pre-post test approach. The sample studied was 61 hyperthermic toddlers determined through accidental sampling techniques. The independent variable was the administration of balacay leaves with the dependent variable being body temperature. Data collection used questionnaires and observations, the results were analyzed using the Willcoxon test at α = 0.05.
The results of the study showed that all respondents had a body temperature before being given Balacay leaves in the high category, namely 61 respondents (100.0%) and after being given Balacay leaves, most respondents had a normal body temperature category, namely 38 respondents (62.3%) while the remaining 23 respondents (37.7%) had a high body temperature category. The results of the analysis obtained a p-value (0.000) <□ (0.05) so H0 was rejected, which means that there is an effect of giving Ricinus comunis leaves (Balacay) on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency. The content of the Quercetin compound (3,4-dihydroxyflavonol) in Ricinus comunis leaves inhibits the production and release of histamine and inflammatory mediators that can trigger fever so that body temperature can slowly decrease.

Keywords : **Toddlers, Ricinus Communis (Balacai) Leaves, Body Temperature.**

INTRODUCTION
Hyperthermia or more commonly called fever is a condition where the body temperature is higher than usual, and is a symptom of a disease (Maryunani, 2010). Hyperthermia is a condition where the body temperature exceeds the set point of more than 37oC, which is usually caused by body or external conditions that create more heat than the body can release (Wong, 2013). Fever in children is generally caused by a viral infection (Setiawati, 2015). Fever has a positive impact in triggering an increase in leukocytes and increasing the function of interferon which fights foreign microorganisms. However, excessive and untreated fever can have negative impacts that can endanger children, including dehydration, lack of oxygen, neurological damage, and febrile seizures (febrile compulsion) (Arisandi, 2012). The World Health Organization (WHO) estimates that the number of fever cases worldwide reaches 16-33 million with 500-600 thousand deaths each year (WHO, 2017). Data from the Central Sulawesi Provincial Health Office in 2017 stated that fever in children aged 1-14 years reached 4,074 children with a classification of 1,837 children aged 1-4 years, 1,192 children aged 5-9 years and 1,045 children aged 10-14 years.

The most common diseases with initial symptoms of fever in 2017 were caused by bronchopneumonia, typhoid fever and DHF (Central Sulawesi Health Office, 2017). The results of a preliminary study conducted on February 12, 2018 on 10 parents of toddlers at the Matanga Health Center obtained information that all parents said their toddlers had experienced high fever caused by diseases such as coughs and influenza. The actions taken by parents to reduce fever at home were 7 people doing cold water compresses, 2 people giving fever compress plasters and 1 person giving a combination of cold water compresses and Balacay leaf compresses. There are many things that can cause hyperthermia, protein breakdown and several other substances such as liposaccharide toxins released from bacterial membrane cells. The changes that occur are an increase in the set-point. Everything that causes this set-point increase is then known as pyrogen. When the set-point becomes higher than normal, the body will release a mechanism to increase body temperature, including heat conservation and heat production. In a matter of hours, body temperature will approach the setpoint. The initial release of pyrogen is when bacteria breakdown occurs in the tissue or in the blood through the mechanism of phagocytosis by leukocytes, macrophages, and large gramdar killer lymphocytes (Guyton, 2011). Fever in children requires different treatment and handling compared to adults. This is because, if the action in dealing with fever is not right and slow, it will disrupt the child's growth and development. Fever can endanger the safety of children if not treated quickly and properly will cause other complications such as hyperthermia, seizures and decreased consciousness (Maharani, 2011). According to Ridha (2014), improper treatment of fever such as giving inappropriate compresses, lack of drinking can cause serious health problems. These health problems include seizures to decreased consciousness, dehydration to death.

Reducing or controlling fever in children can be done in various ways, including by administering antipyretics (pharmacological). Antipyretics work centrally by reducing the temperature control center in the hypothalamus, which is followed by physiological responses including decreased heat production, increased blood flow to the skin, and increased heat release through the skin by radiation, convection, and evaporation. However, the use of antipyretics has side effects, namely causing bronchial spasms, gastrointestinal circulation, decreased kidney function and can inhibit suppression of serum antibody responses (Sumarmo, 2010). In addition to the use of antipyretic drugs, reducing body temperature can be done physically (non-pharmacologically) for example using compresses (Potter and Perry, 2010). According to Hariyono (2016) as first aid for fever, generally given chemical-based fever-reducing drugs such as paracetamol, silicic acid, ibuprofen, and others. It is rare for parents to immediately give traditional medicines. In fact, traditional medicines derived from medicinal plants are no less effective as lowering body temperature. In fact, traditional medicines have advantages, namely their toxicity is relatively lower than chemical drugs. So it is relatively safer, there are even no side effects if used correctly, the drug content is complex and organic. One of the plants that is often used by people in rural areas to reduce high fever in children is the Castor Leaf / Balacay (Ricinus comunis). Castor leaves have chemical content, namely saponins, flavonoid compounds including kaempferol, nicotiflorin, quercetin, astragalin, ricinin and vitamin C (Taur, 2012). The effect of castor leaves on lowering temperature is believed to occur because castor leaves contain one of which is Quercetin. Quercetin (3,4-dihydroxyflavonol) is an active compound including the flavonoid group which is widely found in plants or herbs and vegetables, fruits and grains. Quercetin has many benefits that are believed to be anti-inflammatory, antioxidant, anti-cancer, anti-diabetic, lower cholesterol and can be an antipyretic (Jena, 2012).

The mechanism of action of quercetin in lowering body temperature or reducing fever is by inhibiting the production and release of histamine, as well as inflammatory mediators that can

trigger fever, namely prostaglandins, leukotrienes, cytokines, macrophages, interleukin-L interieukin-6, tumor necrosis factor, and interferon. Inhibition of fever-triggering mediators occurs by blocking the cyclooxygenase (COX-2) and phospholipase A2 pathways. Inhibition of the release of arachidonic acid causes a reduction in the amount of arachidonic acid substrate through the cyclooxygenase pathway so that the release of endoperoxides (PGG2, PGH2) namely prostaglandins, thromboxane and prostacyclin and hydroperoxides namely leukotrienes is also inhibited. So that the release of prostaglandins and leukotrienes (which play a role in the inflammatory process) that is inhibited will cause the fever reaction to also be inhibited so that if used when a fever occurs, it can have an effect as a fever reducer (Taur, 2011). Handling of fever can be done with pharmacological actions, non-pharmacological actions or a combination of both. Pharmacological actions include giving antipyretic drugs. As an effort to reduce the negative impact of using antipyretics, parents should start switching to using non-pharmacological treatments to reduce fever at a mild level, but if the fever continues or gets higher, parents can give antipyretics as a follow-up (Kania, 2015) The method of administering Balacay Leaves is a non-pharmacological management of fever that provides many benefits including lowering body temperature, providing comfort and calm to children, and reducing the use of fever-reducing drugs. However, if the child experiences a fever that continues even though a compress has been given, parents must immediately collaborate with a doctor (Djuwariah, 2014).

METHODS

Research Design

The design in this study is Pre Experiment, namely research by providing treatment but there are external variables that also influence the formation of dependent variables, using the one-group pre-post test approach, namely the subject group is observed before the intervention, then observed again after the intervention (Notoatmodjo, 2010).

Population, Sample and Sampling

The population in this study were all parents of adolescents who use alcohol in Tanjung Tuwis Village, South Luwuk District. Using the accidental sampling technique, a sample of 61 respondents was obtained.

Research Variables

The Independent Variable in this study is the Provision of Ricinus comunis leaves (Balacay), while the dependent variable in this study is body temperature in hyperthermic toddlers. The instrument used in this study is an observation sheet which is a type of primary data.

Data Analysis

The statistical test used in this study is the Wilcoxon signed rank test at a deviation level of 5% ($\alpha = 0.05$)..

RESULT

Body temperature in toddlers with hyperthermia at the Matanga Health Center, Banggai Laut Regency before being given Ricinus comunis leaves (Balacay)

Body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency before being given Ricinus comunis leaves (Balacay) is as follows:

Table 1 Body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency before being given Ricinus comunis leaves (Balacay) Date 14 - 29 September 2018

No	Sebelum diberikan daun *Ricinus comunis* (Balacay)	Frekuensi	%
1	Rendah	0	0,0
2	Normal	0	0,0
3	Tinggi	61	100
Jumlah		61	100

Based on table 1, it is known that all respondents had a body temperature before being given Ricinus comunis leaves (Balacay) in the high category, namely 61 respondents (100.0%).

Body temperature in toddlers with hyperthermia at the Matanga Health Center, Banggai Laut Regency after being given Ricinus comunis leaves (Balacay)

Body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency after being given Ricinus comunis leaves (Balacay) is as follows:

Table 2 Body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency after being given Ricinus comunis leaves (Balacay) Date 14 - 29 September 2018

No	Sesudah diberikan daun *Ricinus comunis* (Balacay)	Frekuensi	%
1	Rendah	0	0,0
2	Normal	38	62,3
3	Tinggi	23	37,7
Jumlah		61	100,0

Based on table 2, it is known that the majority of respondents had body temperatures in the normal category after being given Ricinus comunis leaves (Balacay), namely 38 respondents (62.3%)..

ANALISIS DATA

Table 3 Results of the analysis of the effect of administering Ricinus comunis leaves (Balacay) on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency, 14-29 September 2018.

No	**Kategori**	**Suhu tubuh sebelum**		**Suhu tubuh sesudah**	
		F	**%**	**F**	**%**
1	Rendah	0	0,0	0	0,0
2	Normal	0	0,0	38	62,3
3	Tinggi	61	100	23	37,7
Jumlah		61	100	61	100

p-value=0,000 < α=0,05

Based on table 3, it is known that all respondents had Body Temperature before being given Ricinus comunis (Balacay) leaves in the high category, namely 61 respondents (100.0%) while most respondents had Body Temperature after being given Ricinus comunis (Balacay) leaves in the normal category, namely 38 respondents (62.3%). Based on the results of the analysis using the Willcoxon test, p-value = 0.000 < □ = 0.05 was obtained, so H0 was rejected and H1 was accepted, which means that there is an effect of giving Ricinus comunis (Balacay) leaves on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency.

DISCUSSION

Body temperature in toddlers with hyperthermia at the Matanga Health Center, Banggai Laut Regency before being given Ricinus comunis leaves (Balacay)

Body Temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency before being given Ricinus comunis leaves (Balacay) was known that all respondents had Body Temperature before being given Ricinus comunis leaves (Balacay) in the high category, namely 61 respondents (100.0%). The cross-tabulation results showed that respondents diagnosed with influenza had body temperatures before being given Ricinus comunis leaves (Balacay) in the high category, namely 18 respondents (29.5%). Body temperature is regulated almost entirely by feedback neural mechanisms, and almost all of these mechanisms occur through the temperature regulation center located in the hypothalamus. In order for this feedback mechanism to take place, a temperature detector must also be available to determine when body temperature becomes very hot or very cold (Guyton, 2014). Body temperature in infants can rise when they are dressed too thickly, are in hot areas too much, or as a reaction to vaccinations. Feverish babies are usually indicated by symptoms of warmth when touched on the forehead, back, and stomach. The baby's cheeks will appear reddish and sometimes the baby feels sweaty (Potter, 2012). One of the diseases that toddlers often suffer from is influenza, this is because the influenza virus is very infectious while the immune system of toddlers is still weak. The influenza virus spreads through the air in the form of tiny droplets from the respiratory tract of an infected person, coughing, sneezing or through direct contact with hands contaminated by respiratory secretions. Symptoms that often arise are fever, coughing, nasal congestion, headache, sometimes accompanied by diarrhea, vomiting and loss of appetite (Ngastiyah, 2015). Based on the study, all respondents experienced high body temperature, this occurs because the heat that has been channeled to the skin is then channeled back into the environment. Fever can occur when someone experiences health problems. An increase in temperature above normal temperature is caused by an infection reaction by viruses, bacteria, fungi or parasites that attack the body, for example coughing, colds, sore throats and pneumonia. Most fevers are associated with infections that can be local or systemic infections. Most often fever is caused by infectious diseases such as upper respiratory tract infections, lower respiratory tract infections, gastrointestinal, tuberculosis. While in this study it was found that most respondents had fever because of influenza disease that was being suffered. Influenza disease is one of the diseases that is often suffered by toddlers. This disease is caused by a respiratory virus, the infection can spread quickly because it is transmitted from human to human. When someone who has the flu coughs or sneezes, the influenza virus is mixed into the air content, and people nearby, including toddlers can inhale it. This virus can also spread when your child touches the surface of an object that contains the virus and then puts his hand to his nose or mouth. Influenza in toddlers usually heals in about one to two weeks without other problems. However, sometimes complications can also occur if the child appears to complain

of ear pain or feels pressure on the face and head or if the cough and fever last more than two weeks. Important actions that parents must pay attention to in caring for toddlers when they have a fever are to pay attention to the increase in body temperature and prevent febrile seizures due to high body temperature which can be fatal for toddlers. To prevent this, there are various methods, including compresses and ensuring the temperature of the environment around the child is comfortable.

Body temperature in toddlers with hyperthermia at the Matanga Health Center, Banggai Laut Regency after being given Ricinus comunis leaves (Balacay)

Body Temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency after being given Ricinus comunis leaves (Balacay) is known that most respondents have Body Temperature after being given Ricinus comunis leaves (Balacay) in the normal category, namely 38 respondents (62.3%). Fever has a positive impact in triggering an increase in leukocytes and increasing the function of interferon which fights foreign microorganisms. However, excessive and untreated fever can have negative impacts that can endanger children, including dehydration, lack of oxygen, neurological damage, and febrile seizures (febrile compulsion) (Arisandi, 2012). The temperature regulation center is located in the hypothalamus of the brain. When body temperature increases above normal, the hypothalamus will send a message to the sweat glands to increase sweat secretion. At the same time, the hypothalamus sends a message to the muscles of the blood vessel walls in the skin, which causes the blood vessels to widen, resulting in more blood circulating in the skin carrying heat to the surface of the body. The skin acts as a heat radiator, allowing heat to radiate from the body's surface to the environment (Ganong, 2009).

Based on the results of the study, it was found that the body temperature after administration of Ricinus comunis leaves (Balacay) was in the normal category. Balacay leaves are a non-pharmacological management of fever that provides many benefits including lowering body temperature, providing comfort and calm to children and reducing the use of fever-reducing drugs. This happens because balacay leaves have chemical content, namely saponins, flavonoid compounds including kaempferol, nicotinic acid, quercetin, astragalin, ricinin and vitamin C. The effect of castor leaves on reducing temperature is believed to occur because castor leaves contain one of them, Quercetin. Quercetin (3,4-dihydroxyflavonol) is an active compound including the flavonoid group which is widely found in plants or plants and vegetables, fruits and grains. Quercetin has many benefits which are believed to be anti-inflammatory, antioxidant, anti-cancer, antidiabetic, lower cholesterol and can be an antipyretic.

Applying Balacay leaf compresses to the axillary area that has been soaked in warm water beforehand causes the chemical content in the leaves to come out more easily. The quercetin content which is believed to be a natural antipyretic from balacay leaves will be absorbed from the leaves into the body through the pores of the skin. The effect of soaking the leaves in warm water is also useful in helping to open the skin pores wider so that the quercetin compound can enter the body more easily, in addition, warm conditions will also make the blood vessels wider so that blood and oxygen flow becomes smoother which is useful in accelerating the release of heat from the body. The mechanism of warm compresses is supported by the results of Ayu's research (2015) which found that applying warm water compresses to the axillary area is more effective in lowering body temperature than on the forehead (t count = 5.879 p = 0.000). This is because in the axillary area there are large veins that have very good vasodilation capabilities in lowering body temperature, besides being

very close to the brain which is where the body's temperature regulator is located, namely the hypothalamus.

The effect of administering Ricinus communis (Balacai) leaves on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency

The results of the study showed that all respondents had Body Temperature before being given Ricinus comunis leaves (Balacay) in the high category, namely 61 respondents (100.0%) while after the intervention it was known that most respondents had Body Temperature after being given Ricinus comunis leaves (Balacay) in the normal category, namely 38 respondents (62.3%). Based on the results of the analysis using the Willcoxon test, the p-value = 0.000 <□ = 0.05 was obtained, so H0 was rejected and H1 was accepted, which means that there was an effect of giving Ricinus comunis leaves (Balacay) on reducing body temperature in hyperthermic toddlers at the Matanga Health Center, Banggai Laut Regency. There are many things that can cause hyperthermia. The breakdown of proteins and several other substances such as liposaccharide toxins released from bacterial membrane cells. The changes that occur are an increase in the set-point. Everything that causes this increase in the set-point is then known as pyrogen. When the set-point becomes higher than normal, the body will release a mechanism to increase body temperature, including heat conservation and heat production. In a matter of hours, body temperature will approach the setpoint (Guyton 2014). The fever process is a disruption of the body's adaptation process, from the adaptation process if supported by the right intervention can produce an adaptive response, but conversely if not then a maladaptive response can occur (Arifianto, 2013). Based on the results of the study, giving balacay leaves is very effective if toddlers experience high body temperature. Body temperature is regulated by the balance between heat production and loss. The body's temperature regulator is in the hypothalamus, in a fever the balance is disturbed but can be returned to normal by drugs including through the provision of interventions such as antipyretics and compresses. In the utilization of Balacay leaves, the mechanism of lowering body temperature is triggered by the mechanism of quercetin in lowering body temperature or reducing fever, namely by inhibiting the production and release of histamine, as well as inflammatory mediators that can trigger fever, namely prostaglandins, leukotrienes, cytokines, macrophages, interleukin-L interieukin-6, tumor necrosis factor, and interferon. Inhibition of fever-triggering mediators occurs by blocking the cyclooxygenase (COX-2) and phospholipase A2 pathways.

The inhibition of the release of arachidonic acid causes a reduction in the amount of arachidonic acid substrate through the cyclooxygenase pathway so that the release of endoperoxides (PGG2, PGH2) namely prostaglandins, thromboxane and prostacyclin and hydroperoxides namely leukotrienes are also inhibited. So that the release of prostaglandins and leukotrienes (which play a role in the inflammatory process) which is inhibited will cause the fever reaction to also be inhibited so that if used when a fever occurs, it can have an effect as a fever reducer. The reduction in fever will be even more effective if accompanied by internal therapy by administering antipyretics so that the fever will quickly go down and toddlers will avoid excessive consumption of antipyretics. The decrease in body temperature after being given Ricinus comunis leaves is supported by the results of Kalay's (2014) study which found that ethanol extract of castor leaves with doses of 0.03 g/kgBW, 0.06 g/kgBW and 0.12 g/kgBW had an antipyretic effect on male white rats of the Wistar strain induced by the DTP HB vaccine. This is because castor leaves contain flavonoids that can inhibit the cyclooxygenase enzyme, especially cyclooxygenase-2, which plays a role in prostaglandin biosynthesis so that fever is inhibited. Another study by Vonisya (2017) also showed that castor leaves are effective in lowering body temperature. Quercetin content in the flavonoid

group has an effect on reducing fever, namely by blocking the cyclooxygenase pathway (which is an inhibitor of inflammatory mediators so that fever can be reduced.

The results of the study showed that there were still 23 respondents who had a high body temperature category even after being given balacay leaf therapy for 1x24 hours. This condition can be influenced by various factors, including the disease process is still in the acute phase accompanied by a weak immune system so that even though therapy has been carried out to lower body temperature, the body still responds to maintain body temperature in the high category because it feels that the disease infection process is still dangerous to the body so that the body tries to kill viruses or bacteria that attack by increasing body temperature.

The use of Balcay leaves which are effective in reducing body temperature in children is very beneficial for the community so that they do not depend on antipyretics which can cause side effects. Moreover, with the abundant availability of Balacay leaves with various benefits, innovation is needed to utilize them in a more practical way, for example to develop new herbal compress gel products with natural raw materials.

CONCLUSION

1. Most respondents have behavior in the light category, namely 41 respondents (58.6%).
2. Most respondents have an impact on the family in the moderate category, namely 51 respondents (72.9%).
3. There is a relationship between the behavior of adolescents who use alcohol and the impact experienced by the family in Tanjung Tuwis Village, South Luwuk District (p-value = 0.000 <α 0.05)

SUGGESTIONS

1. **For Parents**

   It is expected to improve guidance and supervision of children, for example by implementing a firm and democratic parenting pattern by giving children behavioral boundaries in order to prevent negative impacts on the family.
2. **For Educational Institutions**

   It is expected that health education institutions will participate in health promotion about the dangers and negative impacts of consuming alcoholic beverages through counseling activities by students during community practice.
3. **For Further Researchers**

   It is expected to be able to develop this research by examining other impacts of alcoholic beverage behavior on the health of the perpetrators, for example on the incidence of liver cirrhosis and quality of life.

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