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The Effectiveness of *Allium cepa* L Compress on Body Temperature of Fever Infants after DPT Immunization (Diphtheria Pertussis Tetanus) at Posyandu Kenanga Kertajaya Village, Purwakarta Regency, Indonesia

Nova Rati Lova[1*], Rica Rianjani[1]

[1]Bachelor of Applied Midwifery Study Program, Politeknik Bhakti Asih, Purwakarta, Indonesia

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***Corresponding author:**
Nova Rati Lova

E-mail address:
novaratilova@gmail.com

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A B S T R A C T

Fever in infants after DPT immunization can cause concern for parents and health care providers. One alternative that is widely used in relieving fever in infants is by applying compresses using natural ingredients. One of the natural ingredients used in compresses is *Allium cepa* L, or better known as shallots. This study aimed to evaluate the effectiveness of compressed *Allium cepa* L on the body temperature of infants with fever after DPT immunization at Posyandu Kenanga Kertajaya Village, Purwakarta Regency, Indonesia. This study was an experimental study, where as many as 30 research subjects participated in this study. The research subjects were grouped into the intervention group and the control group. Data analysis was carried out using SPSS univariate and bivariate. Giving compresses *Allium cepa* L statistically effective in reducing the temperature of research subjects by 0.6°C and statistically significant, p<0.05. Compress *Allium cepa* L effective in reducing body temperature in infants with fever after DPT immunization at Posyandu Kenanga Kertajaya Village, Purwakarta Regency, Indonesia.

1. Introduction

Health is an important aspect of a country's development, especially in terms of the growth and development of children. Infants and children require special attention to their health, given that their immune systems are still in the developing stage. One important step in maintaining children's health is through the immunization program, which aims to provide protection against dangerous infectious diseases. DPT (diphtheria pertussis tetanus) immunization is an important type of immunization given to infants as part of a routine immunization program. Even though this immunization has great benefits in preventing dangerous diseases, it is not uncommon for babies to experience side effects such as fever after undergoing immunization. Fever in infants after DPT immunization can cause concern for parents and health care providers. One alternative that is widely used in relieving fever in infants is by applying compresses using natural ingredients. One of the natural ingredients used in compresses is *Allium cepa* L, or better known as shallots.[1,2]

Shallots have anti-inflammatory and antipyretic properties that have been known in traditional medicine for a long time. Shallots (*Allium cepa* L) do have anti-inflammatory and antipyretic properties which have been known and used in traditional medicine since centuries ago. Quercetin is a flavonoid

compound that is found in shallots. This compound has anti-inflammatory properties by inhibiting the release of histamine and other inflammatory mediators. These compounds can help relieve inflammation in the body. Allicin is a compound found in shallots after they are chopped or crushed. Allicin has antipyretic properties, which means it can help reduce fever by regulating the body's temperature regulation center in the brain. The use of *Allium cepa* L compresses is expected to help reduce fever in infants after DPT immunization.[3,4] This study aimed to evaluate the effectiveness of *Allium cepa* L compresses on the body temperature of infants with fever after DPT immunization at Posyandu Kenanga Kertajaya Village, Purwakarta Regency, Indonesia.

2. Methods

This study was an experimental study with a pre-posttest design approach and used primary data obtained from research subjects. A total of 30 research subjects participated in this study, where the research subjects were grouped into two groups, namely the group that received compress intervention *Allium cepa L* and the control group that received a fever-reducing drug, paracetamol. The research subjects were toddlers aged 2-4 months who received the DPT vaccine at Posyandu Kenanga, Kertajaya Village, Purwakarta Regency, Indonesia.

Allium cepa compress is made by preparing one shallot clove. Then it is sliced into small pieces and pounded. Take a piece of clean, soft cloth, such as a cotton cloth or gauze that is large enough to cover the baby's forehead or forehead area. Place chopped or crushed shallots in the middle of the cloth. Fold the cloth so that the shallots are wrapped neatly in the cloth, or you can also tie the cloth to form a small bag filled with the shallots. Before using a compress, make sure the cloth containing the shallots is warm. You can soak the cloth in warm water or keep it in a warm place for some time. This will help release active compounds from the shallot that can help reduce fever. Data analysis was carried out using SPSS version 25 software to assess the body temperature of the research subjects before and after the intervention between groups. Univariate analysis was performed to present the frequency distribution of the test variable data, and bivariate analysis was performed to evaluate the effectiveness of the intervention on the test variable, with $p<0.05$.

3. Results and Discussion

Table 1 presents the effectiveness of the compress *Allium cepa L* compared to the control for fever. Giving compressed *Allium cepa L* was statistically effective in reducing the temperature of research subjects by 0.6°C and was statistically significant, $p<0.05$. In the control group given paracetamol, the effectiveness of the control in reducing the temperature of the study subjects was 0.7°C and statistically significant, $p < 0.05$. Compress ability *Allium cepa L* lowering the temperature of the study subjects differed only 0.1°C compared to the control drug paracetamol, $p<0.05$.

Table 1. Effectiveness of *Allium cepa* L compresses compared to control against fever.

Test variable	***Allium cepa L* group, Mean±SD**			**Control group, Mean±SD**			**P-value****
	Pre	**Post**	**P-value***	**Pre**	**Post**	**P-value***	
Body temperature (°C)	38,0±0,67	37,4±0,82	0,000	38,0±0,72	37,3±0,77	0,000	0,000

*Dependent t-test; pre VS post test; p<0,05.
**Independent t-test; group posts *Allium cepa* L VS post control group; p<0.05.

Quercetin, as an anti-inflammatory compound, can reduce the production of prostaglandins and leukotrienes by inhibiting the activity of COX and LOX enzymes. By reducing the production of these mediators, quercetin helps control the inflammatory response, reduces symptoms associated with inflammation, and promotes balance in the immune system. COX and LOX enzymes are involved in the biosynthetic pathway of prostaglandins and leukotrienes, which are inflammatory mediators in the body. Prostaglandins and leukotrienes are chemicals known as inflammatory mediators, which can cause swelling, pain, redness, and other inflammatory responses. Prostaglandins are a group of chemical compounds produced by various types of body cells, including cells involved in inflammatory responses. Prostaglandins have various roles in the body, including in response to injury, inflammation, and various other physiological processes. Leukotrienes are a type of molecule that is also produced by many types of cells, especially cells involved in inflammatory responses, such as mast cells and immune cells. Leukotrienes are involved in the regulation of the inflammatory response, including increased vascular permeability and migration of white blood cells to areas of inflammation. When there is injury or inflammation in the body, prostaglandins and leukotrienes are produced as part of the immune response. Although they have an important role in protecting the body from injury and infection, sometimes these responses can go overboard and cause uncomfortable symptoms of inflammation.[5-7]

Quercetin is known to have the ability to inhibit the release of histamine and other inflammatory mediators. Histamine is a chemical in the body that is involved in allergic reactions and inflammation. By inhibiting the release of histamine, quercetin can help reduce excessive inflammatory responses in the body. Histamine is a chemical that is produced and stored in various cells in the body, especially mast cells and basophils. Histamine plays a role in many body functions, including in allergic and inflammatory responses. When the body is exposed to an allergen or injury, mast cells, and basophils release histamine into the bloodstream. This histamine release triggers a variety of responses, such as vasodilation (widening of blood vessels), which causes redness and swelling, and increased vascular permeability, which allows white blood cells to enter infected or injured areas. And smooth muscle contraction, which can cause symptoms such as narrowing of the airways.[8]

Allicin is a compound found in shallots (*Allium cepa*) and garlic (*Allium sativum*). This compound is the result of an enzymatic reaction that occurs when onions or garlic are chopped, crushed, or chopped. Allicin provides the characteristic aroma and taste associated with onions. In addition, allicin also has potential antimicrobial, anti-inflammatory, and antipyretic properties. The body temperature regulation center, located in the hypothalamus in the brain, functions to maintain a normal body temperature around the set point, which is usually around 37°C. When the body is exposed to infection or inflammation, these centers can increase normal body temperature in response to help fight disease-causing agents. This process results in a fever, in which the body temperature rises above the set point. Allicin has the ability to influence the body's temperature regulation center in the hypothalamus. By affecting receptors and mechanisms in the brain, allicin can help return body temperature to normal levels. This can help reduce fever and relieve symptoms associated with fever, such as fatigue, body aches, and discomfort.[9,10]

4. Conclusion

Allium cepa L compress is effective in lowering body temperature in feverish infants after DPT immunization at Posyandu Kenanga Kertajaya Village, Purwakarta Regency, Indonesia.

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