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Effectiveness of Allium cepa L. (Shallot) in Lowering Body Temperature in Toddlers with ISPA in the Working Area of the Sukadana Health Center, Ciamis Regency

ABSTRACT

Background: Acute Respiratory Infection (ARI) is one of the most common diseases in toddlers and is often accompanied by fever. Fever that is not handled properly can cause discomfort and complications in the child. One of the complementary therapies that has long been used by the community is onion compresses (*Allium cepa L.*).**Objective:** This study aimed to analyze the effectiveness of *Allium cepa L compresses.* in lowering body temperature in toddlers with ISPA in the work area of the Cibeureum Health Center, Tasikmalaya City. **Methods:** This study used a quasi-experimental design with a pretest-posttest with control group design approach. The research sample consisted of 48 toddlers consisting of 24 intervention groups and 24 control groups selected using purposive sampling techniques. Body temperature measurements are carried out using a digital thermometer. Data analysis used the Wilcoxon test and the Mann–Whitney test. **Results:** The average body temperature before the intervention in the intervention group was 38.2°C and decreased to 36.6°C after the intervention. The results of the Wilcoxon test showed a p-value of < 0.05 which showed a significant influence of *applying Allium cepa L compress.* to a decrease in body temperature. The results of the Mann–Whitney test also showed a significant difference between the intervention group and the control group. **Conclusion:** Allium cepa L *compress.* has been shown to be effective in lowering body temperature in toddlers with ISPA and can be used as a nonpharmacological intervention in pediatric nursing practice.

Keywords: Allium cepa, fever, ISPA, toddlers, complementary therapy

Implications for Practice:

The results of this study show that *the compress Allium cepa L.* effective in lowering body temperature in toddlers with Acute Respiratory Tract Infection (ARI). These findings have important implications for pediatric nursing practice, particularly in the management of fever in toddlers in primary health services.

The use of shallot compresses can be used as one of the non-pharmacological interventions that can be recommended by health workers, especially community nurses, as an initial effort to help reduce mild to moderate fever in toddlers. This intervention is relatively easy to do, uses materials that are easy to obtain in the community, and has a low cost so that it can be widely applied at the family level and primary health services.

In addition, the results of this study also support the integration of complementary therapy based on local wisdom into evidence-based nursing practices. Health workers can use these findings as part of health education for parents in conducting initial care for children who experience fever due to ISPA at home.

Nevertheless, the use of *Allium cepa L compresses.* It is still necessary to consider the child's clinical condition and not replace medical therapy if the child has a high fever or other danger signs. Therefore, health workers still need to educate parents about the danger signs in children who need immediate medical treatment.

Background

Acute Respiratory Tract Infection (ARI) is one of the leading causes of morbidity in children under five worldwide. In Indonesia, ISPA is among the top ten most diseases and is still the cause of high child health visits at primary care facilities, such as health centers and posyandu (Ministry of Health of the Republic of Indonesia, 2023). In toddlers, one of the clinical manifestations that often appears in ISPA is fever or an increase in body temperature in response to infection, which if left untreated can cause discomfort, risk of febrile seizures, and other complications (NICE, 2021).

The management of fever in children is generally carried out pharmacologically through antipyretics such as paracetamol or ibuprofen. However, many parents in tropical communities also use nonpharmacological therapies based on local wisdom to help lower their child's body temperature, one of which is a shallot (*Allium cepa* L.) compress. as a traditional therapy that is relatively inexpensive and accessible. Shallot compresses have been used for generations in the management of childhood fever, especially in toddlers with ISPA or post-immunization fever. A number of community studies in Indonesia show that the administration of onion compresses can significantly lower children's body temperature after intervention, thus indicating that this therapy has the potential to be an effective nonpharmacological alternative to reduce children's fever in primary care or at home (Ainy & Riyanti, 2023; Global Health Science Group Article, 2024).

Pharmacologically, shallots are rich in bioactive compounds such as flavonoids (specifically *quercetin*), *phenolics*, and other organic sulfur compounds that have antioxidant, anti-inflammatory, and immunomodulatory properties (Marefati et al., 2021; Ullah et al., 2022). This compound has been studied in various pharmacological studies for its biological effects, including the ability to regulate inflammatory responses and modulate the immune system which plays an important role in the body's process of dealing with infections. *Quercetin*, for example, has been shown to be able to influence proinflammatory cytokine pathways as well as exhibit antiinflammatory activity in various laboratory experimental models, which makes it an attractive bioactive candidate in the reduction of generalized inflammation including those that occur in fever (Marefati et al., 2021; Ullah et al., 2022).

Quantitative research in the community showed that the use of onion compresses significantly lowered the body temperature of feverish children from an average of more than 38°C to the normal range after the intervention. This effect is partly explained by the vasodilation process triggered by the bioactive components of onions, thus helping to increase heat evaporation through the skin and lower body temperature (Global Health Science Group article, 2024).

Community and quasi-experimental research in health centers and primary health facilities shows evidence of the positive effect of onion compresses in lowering body temperature in feverish toddlers (Lilik Handayani & Maulina, 2025).

At the primary health service level, such as the Sukadana Health Center in Ciamis Regency, the incidence rate of ISPA in toddlers is still relatively high. Effective and safe handling of fever is an integral part of efforts to reduce morbidity. As part of evidence-based practice-based nursing, scientific examination of complementary therapies based on local wisdom such as onion compresses is essential to strengthen recommendations for pediatric nursing care in the community.

Based on clinical urgency and complementary practices that are widely used by the community, this study was conducted to analyze the effectiveness of *Allium cepa L.* (shallots) in lowering body temperature in toddlers with ISPA in the work area of the Sukadana Health Center, Ciamis Regency**.** The results of the study are expected to strengthen the scientific basis

for the use of onion compresses as a nonpharmacological therapy that is safe, practical, and relevant to evidence-based nursing practices in primary care settings.

Research Methods

1. Study Design

This study uses a quasi-experimental design with a pretest–posttest with control group design approach. This design was chosen to compare changes in body temperature before and after *the intervention of Allium cepa L compress.* in the intervention group and compared it with the control group that received standard management.

This approach allows researchers to evaluate the effectiveness of the intervention more robustly than the pre-experimental design, as there are comparison groups to control for the influence of external factors.

The research was carried out in the working area of the Sukadana Health Center, Ciamis Regency.

2. Population and Sample

a. Population

According to Handayani and Ririn (2020), population is a whole of elements that have certain characteristics and are the object of research. The population in this study is all children under five years old who experience Acute Respiratory Infection (ARI) and are recorded as patients in the working area of the Sukadana Health Center, Ciamis Regency**.**

Based on the data of the Sukadana Health Center visit register, in the last 3 months there have been 127 cases of ISPA in toddlers**.** This number is the target population in this study.

b. Sample

Samples are part of the number and characteristics possessed by the population used in the study (Sugiyono, 2018). The sample in this study is toddlers with ISPA who meet the inclusion and exclusion criteria that have been set. The sample size calculation uses the proportional estimation formula as follows:

$$n_1 = n_2 = \frac{(Z_\alpha)^2 \times P \times Q}{d^2}$$

Description:

- n1=n2 : Sample size of each group
- Zα : Z value at 95% significance degree (1.96)
- P : Proportion of cases in the population (assumed 50% = 0.5)
- Q : 1 – P (0.5)
- d : Desired degree of deviation (20% = 0.2)

Calculation:

$$n_1 = n_2 = \frac{(1,96)^2 \times 0,5 \times 0,5}{(0,2)^2}$$

$$n_1 = n_2 = \frac{3,8416 \times 0,25}{0,04}$$

$$n_1 = n_2 = \frac{0,9604}{0,04}$$

$$n_1 = n_2 = 24,01$$

Based on the results of the calculation, the minimum number of samples needed is 24 respondents per group. Because the study used a quasi-experimental design with the intervention group and the control group, the total sample used was 48 toddlers.

Sampling technique is a method used to determine a sample from the research population (Riyanto, 2017). The sampling technique used in this study is non-probability sampling with the purposive sampling method.

Purposive sampling is a sampling technique based on certain considerations in accordance with the criteria set by the researcher (Sugiyono, 2018). This technique was chosen because not all toddlers with ISPA meet the criteria to be given a shallot compress intervention (*Allium cepa L.*).

Inclusion criteria

- Children under five years old (0–5 years old).
- Children diagnosed with Acute Respiratory Tract Infections (ARI).
- Children with a body temperature ≥ 37.5°C at the initial examination.
- Parents or guardians give informed consent.
- The child has no history of allergy to shallots (*Allium cepa L.* var. aggregatum).
- The child has no injuries or irritations in the area of the body that will be intervened.
- The child is not taking antipyretic drugs or other drugs that can affect body temperature in the last 4 hours.

Exclusion Criteria

- Children who are undergoing treatment at hospitals or other health facilities.
- Children who have sensitive skin conditions or a history of allergies to shallots.
- Children with a body temperature of > 39°C who require immediate medical treatment.

Research Instruments

The instruments used include:

1. Digital thermometers are calibrated to measure body temperature (axilla).
2. Body temperature observation sheet, which records:
    - Pre-intervention temperature (pretest)
    - Temperature 30 minutes after the intervention (posttest)
3. Respondent characteristics sheet, including age and gender

Temperature measurements were carried out with the same standard operating procedures (SOPs) in both groups to maintain data consistency.

Intervention

a. Intervention Groups

Toddlers in the intervention group were given a shallot compress (*Allium cepa L.*) with the following procedure:

SOP (Standard Operating Procedure) for Giving Allium Cepa L. Var Aggregatum Compress

Yes		**Apply *Allium Cepa L.Var Aggregateum Compress)***
1.	Tools and Materials	1. *Allium Cepa L. Var Aggregatum* (Onion) 3 grams 2. Knife 3. Digital Scales 4. Coconut oil 5. *Digital thermometer* 6. Small plates 7. Gloves
2.	Procedure	1. Say hello and introduce yourself 2. Identify and inquire about patient complaints 3. Ask the patient's family if the patient has an allergy to *allium cepa* (onion) 4. Explain the objectives, steps, procedures and time contracts 5. Prepare the necessary tools and materials a. Gloves, *if necessary* b. *Allium Cepa* (Shallot) c. Knife d. Digital Scales e. Coconut oil f. *Digital thermometer* g. Small plates 6. Give the patient's family the opportunity to ask questions before taking action 7. Do 6-step hand hygiene 8. Check the child's body temperature through the axillary 9. Record the results of body temperature checks 10. Slice the onion 3 grams, then place the sliced shallots on a small plate 11. Mix coconut oil 5 drops 12. Apply gently to *the child'* s fontanel 13. Wait 30 minutes 14. Remeasure your child's body temperature and record the results of the measurement 15. Tidy up the patient and the tools used 16. Do 6-step hand hygiene
3.	Documentation	1. Record the results of the action in the nursing record

b. Control Group
The control group received standard management (observation without onion compress) according to the procedures of the health center.

Data Collection
Data collection is carried out through the following stages:
1. Identify toddlers who meet the inclusion criteria.
2. Explanation of the research to parents and filling in informed consent.
3. Initial body temperature measurement (pretest).
4. Provision of interventions according to groups.
5. Body temperature measurement 30 minutes after the intervention (posttest).
6. Recording of results in observation sheets.

The entire process is carried out by researchers and research assistants who have been trained to ensure uniformity of procedures.

Data Analysis
Data analysis is carried out using statistical software.

a. Univariate Analysis
It is used to describe the characteristics of the respondents (age, gender, initial temperature) in the form of mean, standard deviation, frequency, and percentage.

b. Bivariate Analysis
- The **Paired t-test** was used to determine the temperature difference before and after the intervention in each group.
- The **Independent t-test** was used to compare the difference in temperature drop between the intervention and control groups.

If the data are not normally distributed, nonparametric tests (Wilcoxon and Mann–Whitney) are used. The significance level was set at $p < 0.05$ with a 95% confidence interval.

Research Ethics
This research has received approval from the Health Research Ethics Committee (letter number .....). The ethical principles applied include:
1. **Respect for persons** : Parents are provided with complete information about the objectives, procedures, benefits, and risks of the research before signing the informed consent.
2. **Beneficence** : The interventions provided are noninvasive and relatively safe. Researchers make sure there are no skin irritations or side effects.
3. **Non-maleficence** : If the body temperature increases or the child's condition worsens, the study is stopped and the child is referred for medical treatment.
4. **Confidentiality** : The identity of the respondent is kept confidential and is only used for research purposes.

Research Results
1. Univariate Analysis
Respondent Characteristics

The number of respondents in this study was 48 toddlers consisting of 24 respondents in the intervention group and 24 respondents in the control group.

Table 1. Characteristics of Respondents by Gender

Gender	Intervention (n=24)	Control (n=24)	Total (n=48)
Male	13 (54,2%)	12 (50,0%)	25 (52,1%)
Women	11 (45,8%)	12 (50,0%)	23 (47,9%)

Based on Table 1, most of the respondents were male, namely 25 respondents (52.1%), while female respondents were 23 respondents (47.9%). The sex distribution between the intervention group and the control group was relatively balanced.

Table 2. Characteristics of Respondents by Age

Age	Intervention (n=24)	Control (n=24)
Infant (0–12 months)	5 (20,8%)	6 (25,0%)
Toddler (1–3 years)	10 (41,7%)	9 (37,5%)
Pre-school (3–5 years)	9 (37,5%)	9 (37,5%)

Based on Table 2, the majority of respondents were in the toddler age group (1–3 years), namely 10 respondents (41.7%) in the intervention group and 9 respondents (37.5%) in the control group.

Distribution of Respondents' Body Temperature

Table 3. Body Temperature Distribution Before and After Intervention

Groups	Variable	N	Red	SD	Min	Max
Intervention	Pretest	24	38,2	0,494	37,8	39,0
	Posttest	24	36,6	0,177	36,3	37,0
Controls	Pretest	24	38,1	0,365	37,7	38,9
	Posttest	24	37,8	0,310	37,3	38,5

Based on Table 3, the average body temperature in the intervention group before being given *Allium cepa L compress.* was 38.2°C, then decreased to 36.6°C after the intervention. Meanwhile, in the control group, the average body temperature before observation was 38.1°C and decreased to 37.8°C after observation.
The average decrease in body temperature in the intervention group was 1.6°C, while in the control group it was only 0.3°C**.**

Bivariate Analysis
Data Normality Test

Table 4. Normality Test Results (Shapiro–Wilk)

Variable	Groups	p-value
Pretest	Intervention	0,006
Posttest	Intervention	0,013
Pretest	Controls	0,021
Posttest	Controls	0,018

Based on Table 4, the results of the normality test using Shapiro–Wilk show that the entire p-value < 0.05, so the data is not normally distributed. Therefore, the analysis was continued using a non-parametric test.

Wilcoxon Test

Table 5. Wilcoxon Test Results of Body Temperature Change

Groups	Z	p-value	Mean Decline
Intervention	-4,297	0,000	1.63°C
Controls	-2,112	0,035	0.28°C

Based on Table 5, the results of the Wilcoxon test showed that there was a significant decrease in body temperature in both the intervention group and the control group ($p < 0.05$). However, the magnitude of the decrease in body temperature in the intervention group was much higher than in the control group.

Comparison Between Groups

Table 6. Results of the Mann–Whitney Test on the Difference in Temperature Decrease

Variable	Mean Rank Intervention	Mean Rank Control	p-value
Temperature Drop	36,75	12,25	0,000

Based on Table 6, the results of the Mann–Whitney test showed that there was a significant difference between the intervention group and the control group ($p < 0.001$). This shows that the administration of *Allium cepa L. compress.* It had a greater effect on lowering body temperature compared to the group that did not receive the intervention.

Effect Size

Effect size is calculated using the formula:

$$r = \frac{4,297}{\sqrt{24}} = 0,87$$

The calculation results showed a value of r = 0.87, which is included in the category of very large effect size (large effect). These findings suggest that *the Allium cepa L.* not only does it have a statistically significant influence, but it also has a great power of effect in lowering body temperature in toddlers with ISPA.

Clinically, a decrease in body temperature of more than 1°C in the intervention group showed that *the compress Allium cepa L.* can be an effective complementary therapy in helping the management of mild to moderate fever in toddlers with arid.

Discussion

1. Characteristics of Respondents

The results showed that most of the respondents were male as many as 13 people (54.2%), while women were 11 people (45.8%). These findings show that the incidence of ISPA in toddlers in this study is more common in boys than girls. Epidemiologically, several studies have stated that boys have a higher tendency to develop respiratory tract infections than girls. These differences are thought to be related to biological factors, such as differences in immune system development and inflammatory responses to infections in boys and girls (Evans et al., 2021).

In addition, based on age distribution, most of the respondents were in the toddler age group (1-3 years), which was 10 people (41.7%). This age group is a period that is susceptible to various infectious diseases, including ISPA. According to global child health reports, toddlers are the most vulnerable age group to respiratory tract infections due to an underdeveloped immune system and high exposure to the environment (World Health Organization, 2023).

According to the theory of child immunological development, the immune system under five years of age is still in the maturation stage so the body's response to pathogens is not as strong as it is at an older age (Chiappini et al., 2024). This makes children more susceptible to infections, especially respiratory infections.

In the opinion of the researcher, the high proportion of children in the toddler age group in this study can also be influenced by children's behavioral factors at that age, such as high exploration activities and the habit of putting hands or objects in the mouth. This condition increases the risk of exposure to infection-causing microorganisms.

2. Changes in Body Temperature of Toddlers with ISPA After Giving *Allium cepa L Compress.*

The results of the study showed that the average body temperature before being given *the Allium cepa L* compress intervention. was 38.208°C and decreased to 36.575°C after the intervention. The decrease in body temperature by 1.63°C shows a clinically significant change. The results of the Wilcoxon test showed a p-value of 0.000 ($p < 0.05$), which means that there is a significant difference between body temperature before and after the administration of *Allium cepa L compress.*

These findings show that onion compresses are effective in helping to lower body temperature in toddlers who have fever due to ISPA. Fever itself is the body's physiological response to infection that occurs due to an increase in body temperature set points in the hypothalamus triggered by inflammatory mediators such as interleukin-1, interleukin-6, and tumor necrosis factor (Evans et al., 2021).

Pharmacologically, shallots (*Allium cepa L.*) is known to contain various bioactive compounds such as flavonoids, quercetin, and organic sulfur compounds that have anti-inflammatory and antioxidant activity (Marefati et al., 2021). Quercetin compounds are known to inhibit inflammatory pathways and reduce the production of pro-inflammatory cytokines that play a role in the process of fever (Ullah et al., 2022).

In addition to anti-inflammatory mechanisms, onion compresses are also thought to work through physical mechanisms. Applying shallots to the skin can stimulate peripheral vasodilation which increases blood flow to the surface of the skin thereby accelerating the process of releasing body heat through conduction and evaporation mechanisms (NICE, 2021).

In the researchers' opinion, the combination of the pharmacological effects of the active compounds of shallots and the physiological effects of the compressive process is likely to be the factor that caused a considerable decrease in body temperature in toddlers in this study.

3. Comparison of Body Temperature Reduction between the Intervention Group and the Control Group

The results showed that the average decrease in body temperature in the intervention group was 1.63°C, while in the control group it was only 0.28°C. The results of the Mann–Whitney test showed a p-value of 0.000 ($p < 0.05$), which suggests that there was a significant difference between the two groups.

The decrease in body temperature that occurred in the control group was likely due to the body's natural mechanism of lowering fever after the peak phase of fever occurred. Physiologically, the body will carry out thermoregulatory processes through peripheral vasodilation and increased heat excretion through sweat to lower body temperature (Chiappini et al., 2024).

Nevertheless, a much greater temperature drop in the intervention group suggests that *the compress Allium cepa L.* provides an additional effect in accelerating the process of lowering body temperature. These findings are in line with several previous studies that showed that onion compress therapy can help lower the body temperature of children who have a fever (Ainy & Riyanti, 2023).

According to the researchers, the results of this study strengthen the evidence that the use of complementary therapies based on natural ingredients can provide benefits in children's nursing practices, especially in primary health services. Interventions such as onion compresses can be used as supportive therapy in the management of mild to moderate fever in toddlers with ISPA.

4. Research Implications in Nursing Practice

The results of this study provide important implications for pediatric nursing practice, especially in the management of fever in toddlers with ISPA in primary health services. Allium *cepa L Compress.* It can be considered as one of the non-pharmacological interventions that can be recommended to parents as an initial effort in helping to lower the child's body temperature.

The use of complementary therapies based on natural ingredients such as shallots is also in line with **the evidence-based nursing approach**, which is the integration of scientific evidence, clinical experience of health workers, and patient or family preferences in the clinical decision-making process (Bennett et al., 2022).

In the opinion of the researcher, the use of shallot compresses has the potential to be developed as an educational intervention in health promotion programs in the community. However, this

intervention still needs to be used by paying attention to the child's clinical condition and does not replace medical treatment if fever is accompanied by danger signs.

Conclusion

This study shows that the administration of *Allium cepa L.* significantly lowers body temperature in toddlers who experience Acute Respiratory Tract Infection (ARI). The average body temperature before the intervention of 38.208°C decreased to 36.575°C after the intervention, with an average temperature decrease of 1.63°C. The results of the statistical test using the Wilcoxon test showed a p-value of < 0.05 which indicates a significant influence between body temperature before and after the intervention.

In addition, the results of the comparative analysis with the control group showed that the body temperature decreased in the group that received *the Allium cepa L compress.* significantly greater than the group that did not receive the intervention. This shows that shallot compresses not only provide a statistically weight-lowering effect, but also have clinical significance in helping to overcome fever in toddlers with ISPA.

Thus, *compress Allium cepa L.* can be considered as one of the effective nonpharmacological interventions based on local wisdom in helping to lower body temperature in toddlers with ISPA in primary health services.

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CrediT Authorship Contributions Statement
Dini Nurbaeti Zen: Conceptualization, Methodology, Formal Analysis, Supervision, Writing – Original Draft, Writing – Review & Editing.
Daniel Akbar Wibowo : Investigation, Data Curation, Validation, Resources, Writing – Review & Editing, Project Administration.

Conflicts of Interest
The author states that there is no conflict of interest in this study. This research is conducted independently without any influence from any party that can affect the research design, data collection, data analysis, or article writing.

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ABSTRACT

Background: Acute Respiratory Infection (ARI) is one of the most common diseases in toddlers and is often accompanied by fever. Fever that is not handled properly can cause discomfort and complications in the child. One of the complementary therapies that has long been used by the community is onion compresses (*Allium cepa L.*).**Objective:** This study aimed to analyze the effectiveness of *Allium cepa L compresses.* in lowering body temperature in toddlers with ISPA in the work area of the Cibeureum Health Center, Tasikmalaya City. **Methods:** This study used a quasi-experimental design with a pretest-posttest with control group design approach. The research sample consisted of 48 toddlers consisting of 24 intervention groups and 24 control groups selected using purposive sampling techniques. Body temperature measurements are carried out using a digital thermometer. Data analysis used the Wilcoxon test and the Mann–Whitney test. **Results:** The average body temperature before the intervention in the intervention group was 38.2°C and decreased to 36.6°C after the intervention. The results of the Wilcoxon test showed a p-value of < 0.05 which showed a significant influence of *applying Allium cepa L compress.* to a decrease in body temperature. The results of the Mann–Whitney test also showed a significant difference between the intervention group and the control group. **Conclusion:** Allium cepa L *compress.* has been shown to be effective in lowering body temperature in toddlers with ISPA and can be used as a nonpharmacological intervention in pediatric nursing practice.

Keywords: Allium cepa, fever, ISPA, toddlers, complementary therapy

Implications for Practice:

The results of this study show that *the compress Allium cepa L.* effective in lowering body temperature in toddlers with Acute Respiratory Tract Infection (ARI). These findings have important implications for pediatric nursing practice, particularly in the management of fever in toddlers in primary health services.

The use of shallot compresses can be used as one of the non-pharmacological interventions that can be recommended by health workers, especially community nurses, as an initial effort to help reduce mild to moderate fever in toddlers. This intervention is relatively easy to do, uses materials that are easy to obtain in the community, and has a low cost so that it can be widely applied at the family level and primary health services.

In addition, the results of this study also support the integration of complementary therapy based on local wisdom into evidence-based nursing practices. Health workers can use these findings as part of health education for parents in conducting initial care for children who experience fever due to ISPA at home.

Nevertheless, the use of *Allium cepa L compresses.* It is still necessary to consider the child's clinical condition and not replace medical therapy if the child has a high fever or other danger signs. Therefore, health workers still need to educate parents about the danger signs in children who need immediate medical treatment.

Background

Acute Respiratory Tract Infection (ARI) is one of the leading causes of morbidity in children under five worldwide. In Indonesia, ISPA is among the top ten most diseases and is still the cause of high child health visits at primary care facilities, such as health centers and posyandu (Ministry of Health of the Republic of Indonesia, 2023). In toddlers, one of the clinical manifestations that often appears in ISPA is fever or an increase in body temperature in response to infection, which if left untreated can cause discomfort, risk of febrile seizures, and other complications (NICE, 2021).

The management of fever in children is generally carried out pharmacologically through antipyretics such as paracetamol or ibuprofen. However, many parents in tropical communities also use nonpharmacological therapies based on local wisdom to help lower their child's body temperature, one of which is a shallot (*Allium cepa* L.) compress. as a traditional therapy that is relatively inexpensive and accessible. Shallot compresses have been used for generations in the management of childhood fever, especially in toddlers with ISPA or post-immunization fever. A number of community studies in Indonesia show that the administration of onion compresses can significantly lower children's body temperature after intervention, thus indicating that this therapy has the potential to be an effective nonpharmacological alternative to reduce children's fever in primary care or at home (Ainy & Riyanti, 2023; Global Health Science Group Article, 2024).

Pharmacologically, shallots are rich in bioactive compounds such as flavonoids (specifically *quercetin*), *phenolics*, and other organic sulfur compounds that have antioxidant, anti-inflammatory, and immunomodulatory properties (Marefati et al., 2021; Ullah et al., 2022). This compound has been studied in various pharmacological studies for its biological effects, including the ability to regulate inflammatory responses and modulate the immune system which plays an important role in the body's process of dealing with infections. *Quercetin*, for example, has been shown to be able to influence proinflammatory cytokine pathways as well as exhibit antiinflammatory activity in various laboratory experimental models, which makes it an attractive bioactive candidate in the reduction of generalized inflammation including those that occur in fever (Marefati et al., 2021; Ullah et al., 2022).

Quantitative research in the community showed that the use of onion compresses significantly lowered the body temperature of feverish children from an average of more than 38°C to the normal range after the intervention. This effect is partly explained by the vasodilation process triggered by the bioactive components of onions, thus helping to increase heat evaporation through the skin and lower body temperature (Global Health Science Group article, 2024).

Community and quasi-experimental research in health centers and primary health facilities shows evidence of the positive effect of onion compresses in lowering body temperature in feverish toddlers (Lilik Handayani & Maulina, 2025).

At the primary health service level, such as the Sukadana Health Center in Ciamis Regency, the incidence rate of ISPA in toddlers is still relatively high. Effective and safe handling of fever is an integral part of efforts to reduce morbidity. As part of evidence-based practice-based nursing, scientific examination of complementary therapies based on local wisdom such as onion compresses is essential to strengthen recommendations for pediatric nursing care in the community.

Based on clinical urgency and complementary practices that are widely used by the community, this study was conducted to analyze the effectiveness of *Allium cepa L.* (shallots) in lowering body temperature in toddlers with ISPA in the work area of the Sukadana Health Center, Ciamis Regency**.** The results of the study are expected to strengthen the scientific basis

for the use of onion compresses as a nonpharmacological therapy that is safe, practical, and relevant to evidence-based nursing practices in primary care settings.

Research Methods

1. Study Design

This study uses a quasi-experimental design with a pretest–posttest with control group design approach. This design was chosen to compare changes in body temperature before and after *the intervention of Allium cepa L compress.* in the intervention group and compared it with the control group that received standard management.

This approach allows researchers to evaluate the effectiveness of the intervention more robustly than the pre-experimental design, as there are comparison groups to control for the influence of external factors.

The research was carried out in the working area of the Sukadana Health Center, Ciamis Regency.

2. Population and Sample

a. Population

According to Handayani and Ririn (2020), population is a whole of elements that have certain characteristics and are the object of research. The population in this study is all children under five years old who experience Acute Respiratory Infection (ARI) and are recorded as patients in the working area of the Sukadana Health Center, Ciamis Regency**.**

Based on the data of the Sukadana Health Center visit register, in the last 3 months there have been 127 cases of ISPA in toddlers**.** This number is the target population in this study.

b. Sample

Samples are part of the number and characteristics possessed by the population used in the study (Sugiyono, 2018). The sample in this study is toddlers with ISPA who meet the inclusion and exclusion criteria that have been set. The sample size calculation uses the proportional estimation formula as follows:

$$n_1 = n_2 = \frac{(Z_\alpha)^2 \times P \times Q}{d^2}$$

Description:

- n1=n2 : Sample size of each group
- Zα : Z value at 95% significance degree (1.96)
- P : Proportion of cases in the population (assumed 50% = 0.5)
- Q : 1 – P (0.5)
- d : Desired degree of deviation (20% = 0.2)

Calculation:

$$n_1 = n_2 = \frac{(1,96)^2 \times 0,5 \times 0,5}{(0,2)^2}$$

$$n_1 = n_2 = \frac{3,8416 \times 0,25}{0,04}$$

$$n_1 = n_2 = \frac{0,9604}{0,04}$$

$$n_1 = n_2 = 24,01$$

Based on the results of the calculation, the minimum number of samples needed is 24 respondents per group. Because the study used a quasi-experimental design with the intervention group and the control group, the total sample used was 48 toddlers.

Sampling technique is a method used to determine a sample from the research population (Riyanto, 2017). The sampling technique used in this study is non-probability sampling with the purposive sampling method.

Purposive sampling is a sampling technique based on certain considerations in accordance with the criteria set by the researcher (Sugiyono, 2018). This technique was chosen because not all toddlers with ISPA meet the criteria to be given a shallot compress intervention (*Allium cepa L.*).

Inclusion criteria

- Children under five years old (0–5 years old).
- Children diagnosed with Acute Respiratory Tract Infections (ARI).
- Children with a body temperature ≥ 37.5°C at the initial examination.
- Parents or guardians give informed consent.
- The child has no history of allergy to shallots (*Allium cepa L.* var. aggregatum).
- The child has no injuries or irritations in the area of the body that will be intervened.
- The child is not taking antipyretic drugs or other drugs that can affect body temperature in the last 4 hours.

Exclusion Criteria

- Children who are undergoing treatment at hospitals or other health facilities.
- Children who have sensitive skin conditions or a history of allergies to shallots.
- Children with a body temperature of > 39°C who require immediate medical treatment.

Research Instruments

The instruments used include:

1. Digital thermometers are calibrated to measure body temperature (axilla).
2. Body temperature observation sheet, which records:
    - Pre-intervention temperature (pretest)
    - Temperature 30 minutes after the intervention (posttest)
3. Respondent characteristics sheet, including age and gender

Temperature measurements were carried out with the same standard operating procedures (SOPs) in both groups to maintain data consistency.

Intervention

a. Intervention Groups

Toddlers in the intervention group were given a shallot compress (*Allium cepa L.*) with the following procedure:

SOP (Standard Operating Procedure) for Giving Allium Cepa L. Var Aggregatum Compress

Yes		Apply *Allium Cepa L.Var Aggregateum Compress)*
1.	Tools and Materials	1. *Allium Cepa L. Var Aggregatum* (Onion) 3 grams 2. Knife 3. Digital Scales 4. Coconut oil 5. *Digital thermometer* 6. Small plates 7. Gloves
2.	Procedure	1. Say hello and introduce yourself 2. Identify and inquire about patient complaints 3. Ask the patient's family if the patient has an allergy to *allium cepa* (onion) 4. Explain the objectives, steps, procedures and time contracts 5. Prepare the necessary tools and materials a. Gloves, *if necessary* b. *Allium Cepa* (Shallot) c. Knife d. Digital Scales e. Coconut oil f. *Digital thermometer* g. Small plates 6. Give the patient's family the opportunity to ask questions before taking action 7. Do 6-step hand hygiene 8. Check the child's body temperature through the axillary 9. Record the results of body temperature checks 10. Slice the onion 3 grams, then place the sliced shallots on a small plate 11. Mix coconut oil 5 drops 12. Apply gently to *the child'* s fontanel 13. Wait 30 minutes 14. Remeasure your child's body temperature and record the results of the measurement 15. Tidy up the patient and the tools used 16. Do 6-step hand hygiene
3.	Documentation	1. Record the results of the action in the nursing record

b. Control Group
The control group received standard management (observation without onion compress) according to the procedures of the health center.

Data Collection
Data collection is carried out through the following stages:
1. Identify toddlers who meet the inclusion criteria.
2. Explanation of the research to parents and filling in informed consent.
3. Initial body temperature measurement (pretest).
4. Provision of interventions according to groups.
5. Body temperature measurement 30 minutes after the intervention (posttest).
6. Recording of results in observation sheets.

The entire process is carried out by researchers and research assistants who have been trained to ensure uniformity of procedures.

Data Analysis
Data analysis is carried out using statistical software.

a. Univariate Analysis
It is used to describe the characteristics of the respondents (age, gender, initial temperature) in the form of mean, standard deviation, frequency, and percentage.

b. Bivariate Analysis
- The **Paired t-test** was used to determine the temperature difference before and after the intervention in each group.
- The **Independent t-test** was used to compare the difference in temperature drop between the intervention and control groups.

If the data are not normally distributed, nonparametric tests (Wilcoxon and Mann–Whitney) are used. The significance level was set at $p < 0.05$ with a 95% confidence interval.

Research Ethics
This research has received approval from the Health Research Ethics Committee (letter number .....). The ethical principles applied include:
1. **Respect for persons** : Parents are provided with complete information about the objectives, procedures, benefits, and risks of the research before signing the informed consent.
2. **Beneficence** : The interventions provided are noninvasive and relatively safe. Researchers make sure there are no skin irritations or side effects.
3. **Non-maleficence** : If the body temperature increases or the child's condition worsens, the study is stopped and the child is referred for medical treatment.
4. **Confidentiality** : The identity of the respondent is kept confidential and is only used for research purposes.

Research Results
1. Univariate Analysis
Respondent Characteristics

The number of respondents in this study was 48 toddlers consisting of 24 respondents in the intervention group and 24 respondents in the control group.

Table 1. Characteristics of Respondents by Gender

Gender	Intervention (n=24)	Control (n=24)	Total (n=48)
Male	13 (54,2%)	12 (50,0%)	25 (52,1%)
Women	11 (45,8%)	12 (50,0%)	23 (47,9%)

Based on Table 1, most of the respondents were male, namely 25 respondents (52.1%), while female respondents were 23 respondents (47.9%). The sex distribution between the intervention group and the control group was relatively balanced.

Table 2. Characteristics of Respondents by Age

Age	Intervention (n=24)	Control (n=24)
Infant (0–12 months)	5 (20,8%)	6 (25,0%)
Toddler (1–3 years)	10 (41,7%)	9 (37,5%)
Pre-school (3–5 years)	9 (37,5%)	9 (37,5%)

Based on Table 2, the majority of respondents were in the toddler age group (1–3 years), namely 10 respondents (41.7%) in the intervention group and 9 respondents (37.5%) in the control group.

Distribution of Respondents' Body Temperature

Table 3. Body Temperature Distribution Before and After Intervention

Groups	Variable	N	Red	SD	Min	Max
Intervention	Pretest	24	38,2	0,494	37,8	39,0
	Posttest	24	36,6	0,177	36,3	37,0
Controls	Pretest	24	38,1	0,365	37,7	38,9
	Posttest	24	37,8	0,310	37,3	38,5

Based on Table 3, the average body temperature in the intervention group before being given *Allium cepa L compress.* was 38.2°C, then decreased to 36.6°C after the intervention. Meanwhile, in the control group, the average body temperature before observation was 38.1°C and decreased to 37.8°C after observation.
The average decrease in body temperature in the intervention group was 1.6°C, while in the control group it was only 0.3°C.

Bivariate Analysis
Data Normality Test

Table 4. Normality Test Results (Shapiro–Wilk)

Variable	Groups	p-value
Pretest	Intervention	0,006
Posttest	Intervention	0,013
Pretest	Controls	0,021
Posttest	Controls	0,018

Based on Table 4, the results of the normality test using Shapiro–Wilk show that the entire p-value < 0.05, so the data is not normally distributed. Therefore, the analysis was continued using a non-parametric test.

Wilcoxon Test

Table 5. Wilcoxon Test Results of Body Temperature Change

Groups	Z	p-value	Mean Decline
Intervention	-4,297	0,000	1.63°C
Controls	-2,112	0,035	0.28°C

Based on Table 5, the results of the Wilcoxon test showed that there was a significant decrease in body temperature in both the intervention group and the control group ($p < 0.05$). However, the magnitude of the decrease in body temperature in the intervention group was much higher than in the control group.

Comparison Between Groups

Table 6. Results of the Mann–Whitney Test on the Difference in Temperature Decrease

Variable	Mean Rank Intervention	Mean Rank Control	p-value
Temperature Drop	36,75	12,25	0,000

Based on Table 6, the results of the Mann–Whitney test showed that there was a significant difference between the intervention group and the control group ($p < 0.001$). This shows that the administration of *Allium cepa L. compress*. It had a greater effect on lowering body temperature compared to the group that did not receive the intervention.

Effect Size

Effect size is calculated using the formula:

$$r = \frac{4,297}{\sqrt{24}} = 0,87$$

The calculation results showed a value of r = 0.87, which is included in the category of very large effect size (large effect). These findings suggest that *the Allium cepa L.* not only does it have a statistically significant influence, but it also has a great power of effect in lowering body temperature in toddlers with ISPA.

Clinically, a decrease in body temperature of more than 1°C in the intervention group showed that *the compress Allium cepa L.* can be an effective complementary therapy in helping the management of mild to moderate fever in toddlers with arid.

Discussion

1. Characteristics of Respondents

The results showed that most of the respondents were male as many as 13 people (54.2%), while women were 11 people (45.8%). These findings show that the incidence of ISPA in toddlers in this study is more common in boys than girls. Epidemiologically, several studies have stated that boys have a higher tendency to develop respiratory tract infections than girls. These differences are thought to be related to biological factors, such as differences in immune system development and inflammatory responses to infections in boys and girls (Evans et al., 2021).

In addition, based on age distribution, most of the respondents were in the toddler age group (1-3 years), which was 10 people (41.7%). This age group is a period that is susceptible to various infectious diseases, including ISPA. According to global child health reports, toddlers are the most vulnerable age group to respiratory tract infections due to an underdeveloped immune system and high exposure to the environment (World Health Organization, 2023).

According to the theory of child immunological development, the immune system under five years of age is still in the maturation stage so the body's response to pathogens is not as strong as it is at an older age (Chiappini et al., 2024). This makes children more susceptible to infections, especially respiratory infections.

In the opinion of the researcher, the high proportion of children in the toddler age group in this study can also be influenced by children's behavioral factors at that age, such as high exploration activities and the habit of putting hands or objects in the mouth. This condition increases the risk of exposure to infection-causing microorganisms.

2. Changes in Body Temperature of Toddlers with ISPA After Giving *Allium cepa L Compress.*

The results of the study showed that the average body temperature before being given *the Allium cepa L* compress intervention. was 38.208°C and decreased to 36.575°C after the intervention. The decrease in body temperature by 1.63°C shows a clinically significant change. The results of the Wilcoxon test showed a p-value of 0.000 ($p < 0.05$), which means that there is a significant difference between body temperature before and after the administration of *Allium cepa L compress*.

These findings show that onion compresses are effective in helping to lower body temperature in toddlers who have fever due to ISPA. Fever itself is the body's physiological response to infection that occurs due to an increase in body temperature set points in the hypothalamus triggered by inflammatory mediators such as interleukin-1, interleukin-6, and tumor necrosis factor (Evans et al., 2021).

Pharmacologically, shallots (*Allium cepa L.*) is known to contain various bioactive compounds such as flavonoids, quercetin, and organic sulfur compounds that have anti-inflammatory and antioxidant activity (Marefati et al., 2021). Quercetin compounds are known to inhibit inflammatory pathways and reduce the production of pro-inflammatory cytokines that play a role in the process of fever (Ullah et al., 2022).

In addition to anti-inflammatory mechanisms, onion compresses are also thought to work through physical mechanisms. Applying shallots to the skin can stimulate peripheral vasodilation which increases blood flow to the surface of the skin thereby accelerating the process of releasing body heat through conduction and evaporation mechanisms (NICE, 2021).

In the researchers' opinion, the combination of the pharmacological effects of the active compounds of shallots and the physiological effects of the compressive process is likely to be the factor that caused a considerable decrease in body temperature in toddlers in this study.

3. Comparison of Body Temperature Reduction between the Intervention Group and the Control Group

The results showed that the average decrease in body temperature in the intervention group was 1.63°C, while in the control group it was only 0.28°C. The results of the Mann–Whitney test showed a p-value of 0.000 ($p < 0.05$), which suggests that there was a significant difference between the two groups.

The decrease in body temperature that occurred in the control group was likely due to the body's natural mechanism of lowering fever after the peak phase of fever occurred. Physiologically, the body will carry out thermoregulatory processes through peripheral vasodilation and increased heat excretion through sweat to lower body temperature (Chiappini et al., 2024).

Nevertheless, a much greater temperature drop in the intervention group suggests that *the compress Allium cepa L.* provides an additional effect in accelerating the process of lowering body temperature. These findings are in line with several previous studies that showed that onion compress therapy can help lower the body temperature of children who have a fever (Ainy & Riyanti, 2023).

According to the researchers, the results of this study strengthen the evidence that the use of complementary therapies based on natural ingredients can provide benefits in children's nursing practices, especially in primary health services. Interventions such as onion compresses can be used as supportive therapy in the management of mild to moderate fever in toddlers with ISPA.

4. Research Implications in Nursing Practice

The results of this study provide important implications for pediatric nursing practice, especially in the management of fever in toddlers with ISPA in primary health services. Allium *cepa L Compress.* It can be considered as one of the non-pharmacological interventions that can be recommended to parents as an initial effort in helping to lower the child's body temperature.

The use of complementary therapies based on natural ingredients such as shallots is also in line with **the evidence-based nursing approach**, which is the integration of scientific evidence, clinical experience of health workers, and patient or family preferences in the clinical decision-making process (Bennett et al., 2022).

In the opinion of the researcher, the use of shallot compresses has the potential to be developed as an educational intervention in health promotion programs in the community. However, this

intervention still needs to be used by paying attention to the child's clinical condition and does not replace medical treatment if fever is accompanied by danger signs.

Conclusion

This study shows that the administration of *Allium cepa L.* significantly lowers body temperature in toddlers who experience Acute Respiratory Tract Infection (ARI). The average body temperature before the intervention of 38.208°C decreased to 36.575°C after the intervention, with an average temperature decrease of 1.63°C. The results of the statistical test using the Wilcoxon test showed a p-value of < 0.05 which indicates a significant influence between body temperature before and after the intervention.

In addition, the results of the comparative analysis with the control group showed that the body temperature decreased in the group that received *the Allium cepa L compress.* significantly greater than the group that did not receive the intervention. This shows that shallot compresses not only provide a statistically weight-lowering effect, but also have clinical significance in helping to overcome fever in toddlers with ISPA.

Thus, *compress Allium cepa L.* can be considered as one of the effective nonpharmacological interventions based on local wisdom in helping to lower body temperature in toddlers with ISPA in primary health services.

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CrediT Authorship Contributions Statement

Dini Nurbaeti Zen: Conceptualization, Methodology, Formal Analysis, Supervision, Writing – Original Draft, Writing – Review & Editing.
Daniel Akbar Wibowo : Investigation, Data Curation, Validation, Resources, Writing – Review & Editing, Project Administration.

Conflicts of Interest

The author states that there is no conflict of interest in this study. This research is conducted independently without any influence from any party that can affect the research design, data collection, data analysis, or article writing.

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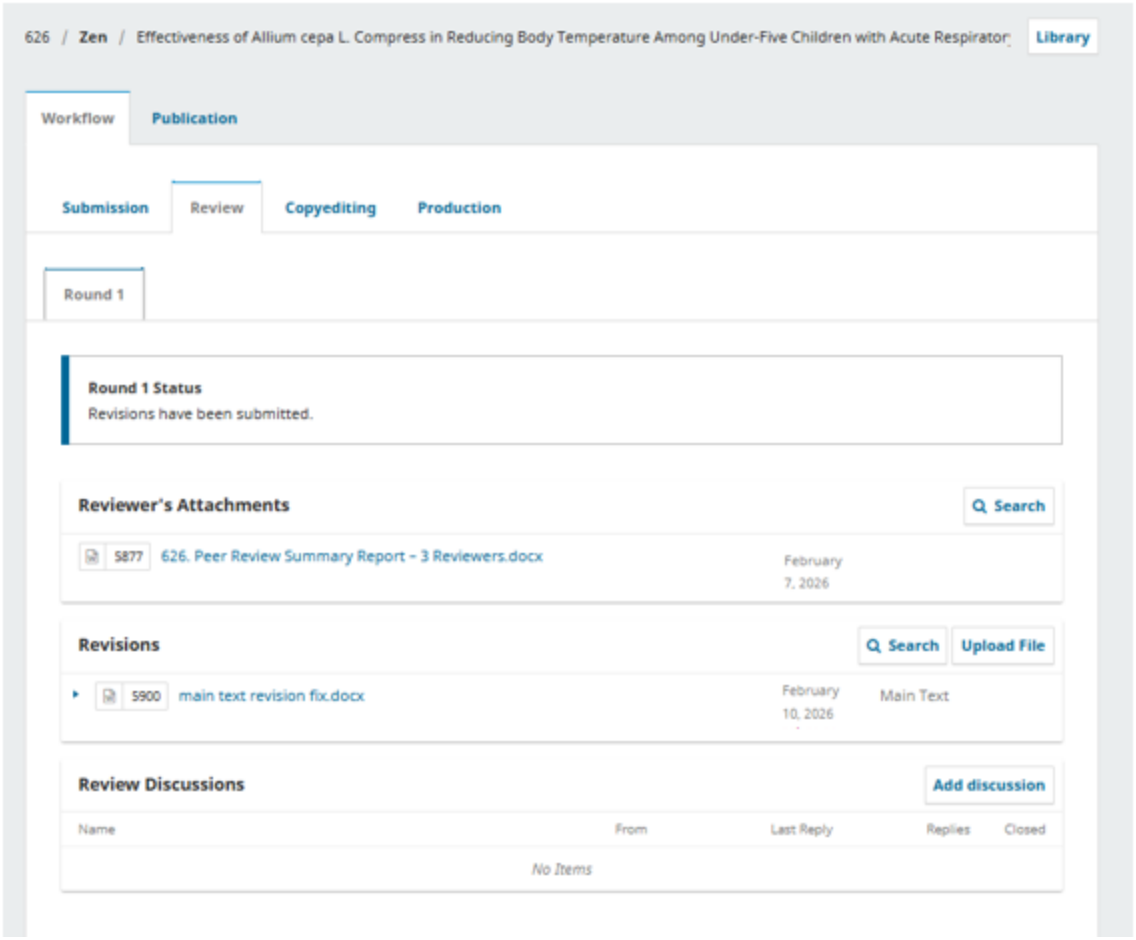
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- Revise the table to comply with the standard **table format** (Download example table)
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Comments from Reviewer 1

A. Title

Recommended title (15–20 words):

“ Effectiveness of Allium cepa L. Compress in Reducing Body Temperature Among Under-Five Children with Acute Respiratory Infections: A Quasi-Experimental Study

B. Abstract

Background

The abstract does not clearly present a **research gap**. There is no explicit contrast using phrases such as “however” to indicate what is lacking in previous studies. The research objective is also not strongly formulated.

Methods

Several critical methodological elements are missing. The abstract does not mention:

-
- Explicit **independent and dependent variables**
- Instrument validity or reliability
- Confidence intervals

Results

- Distribution of respondent characteristics

Conclusion

The conclusion is still descriptive and does not include **practical recommendations**.

Keywords

Comments from Reviewer 1

Recommended keywords:
Allium cepa; fever; acute respiratory infections; toddlers; complementary therapies

Implications for Practice
The section is not structured into **three concise key points** and does not fully address:

- Clinical protocol updates
- Policy implications
- Adaptation in Low- and Middle-Income Countries (LMICs)

C. Introduction
Several critical components are insufficient or missing:

- The **research gap is not explicitly emphasized**
- No clear **theoretical or conceptual framework**
- No explanation of **relationships between variables**
- Lack of comparison with studies from developed countries

D. Methods
1. Study Design
The study design is mentioned but does not refer to the **TREND reporting guideline**, which is essential for quasi-experimental studies.

2. Participants

- Country (Indonesia) is not explicitly stated
- No reporting of **dropout or attrition**
- No detailed recruitment process

3. Instruments

- Detailed explanation of measurement procedures
- Mode of administration
- Scoring system

4. Intervention

- Explicit **theoretical rationale**
- **Fidelity monitoring**
- Qualifications of intervention providers
- Safety monitoring
- Standardization of materials

5. Data Collection

- Quality control procedures
- Handling of missing data
- Enumerator training details

I

Comments from Reviewer 1

6. Data Analysis
- Statistical software used
- Confidence intervals
- Assumption testing

7. Ethical Approval
-

E. Results
- Decimal formatting uses commas instead of dots
- Tables are not consistently referenced in text
- No confidence intervals reported

F. Discussion
- Comparison with international studies
- Explanation of inconsistencies
- Global comparison
- Cultural and healthcare system context
- Explanation of differing findings

Implications and Limitation
- Theoretical contribution
- Study limitations (e.g., small sample, non-randomized design)
- Written in one balanced paragraph

H. Relevance for Practice
It should include:
- Direct application in clinical or community practice
- Practical recommendations for healthcare providers

I. Conclusion
- Summarize findings concisely
- Provide a clear take-home message
- Avoid repetition of results

J. References
- Total references are fewer than 20 (approximately 7 missing)
- Some references are not international (e.g., Sugiyono, 2018)
- Not all include DOI
- APA 7th edition formatting is inconsistent
-

Comments from Reviewer 2

The methods in the abstract are inconsistent with the Methods section, so align the statistical tests used in both sections. The abstract results do not include the effect size, so add the reported effect size (r = 0.87). Non-standard phrasing such as “compress Allium cepa L.” should be corrected to “Allium cepa L. compress.”

Comments from Reviewer 3

The background does not clearly state a research gap, so add a sentence highlighting the lack of rigorous quasi-experimental evidence.

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We are pleased to inform you that your manuscript has been **ACCEPTED** for publication in the *Journal of Applied Nursing and Health (JANH)* after successfully completing the peer-review process.

We congratulate you on this achievement and thank you for contributing to the *Journal of Applied Nursing and Health (JANH)*. Should you require any further information or support, please do not hesitate to contact us.

Best Regards,
Friday, March 20, 2026
Editor in Chief
Journal of Applied Nursing and Health (JANH)

Original Article

Effectiveness of Allium cepa L. Compress in Reducing Body Temperature Among Under-Five Children with Acute Respiratory Infections: A Quasi-Experimental Study

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ABSTRACT

Background: Acute Respiratory Infections (ARI) are among the most common illnesses affecting children under five and are often accompanied by fever. Inadequately managed fever may lead to discomfort and potential complications. One complementary therapy widely used in communities is the application of shallot (Allium cepa L.) compresses. This study aimed to analyze the effectiveness of Allium cepa L. compresses in reducing body temperature among toddlers with ARI.

Methods: A quasi-experimental design with a pretest–posttest control group approach was employed. The study involved 48 toddlers, divided into 24 intervention and 24 control groups, selected using purposive sampling. Body temperature was measured using a digital thermometer. Data were analyzed using Wilcoxon and Mann–Whitney tests.

Results: The mean body temperature in the intervention group decreased from 38.2°C before intervention to 36.6°C after intervention, with an average reduction of 1.63°C. Statistical analysis showed a significant effect ($p < 0.05$). The control group experienced a smaller decrease (0.28°C). There was a significant difference between the intervention and control groups, with a large effect size ($r = 0.87$).

Conclusion: Allium cepa L. compresses are effective in reducing body temperature among toddlers with ARI and can be considered a non-pharmacological intervention in pediatric nursing practice, particularly in primary healthcare settings.

Keywords: Allium cepa L.; Fever; Acute Respiratory Infection; Toddlers; Complementary Therapy.

Implications for Practice:

- In clinical practice, Allium cepa L. compress may be considered as a safe and feasible non-pharmacological adjunct to support fever management in under-five children with acute respiratory infections, particularly in primary care and community settings.
- From a health policy perspective, the integration of evidence-based complementary therapies such as Allium cepa L. into pediatric care guidelines may enhance culturally sensitive, cost-effective, and accessible approaches to fever management.
- In midwifery education, incorporating training on the use of locally available complementary interventions such as Allium cepa L. is relevant for preparing practitioners to deliver context-appropriate care in Low- and Middle-Income Countries and other resource-limited settings.

Introduction

Acute respiratory infections (ARIs) remain a leading cause of morbidity and mortality among children under five years of age worldwide, particularly in low- and middle-income countries. According to the World Health Organization, ARIs account for a substantial proportion of pediatric healthcare visits and hospitalizations, reflecting a persistent global health burden. In Indonesia, ARIs are consistently reported among the most prevalent childhood illnesses and represent a major contributor to primary healthcare utilization, especially in community health centers.

Fever is one of the most common clinical manifestations associated with ARIs in young children. It represents a physiological response to infection mediated by endogenous pyrogens, including pro-inflammatory cytokines such as interleukin-1, interleukin-6, and tumor necrosis factor (Evans et al., 2021). Although fever plays a role in host defense, inadequate management may lead to discomfort, dehydration, febrile seizures, and increased parental anxiety. Therefore, effective and safe fever management remains an essential component of pediatric care.

Pharmacological interventions, such as paracetamol and ibuprofen, are widely recommended as first-line treatments for fever in children. However, growing concerns regarding inappropriate use, dosing errors, and potential side effects have prompted increased interest in non-pharmacological and complementary approaches to fever management. Clinical guidelines from the National Institute for Health and Care Excellence emphasize that non-pharmacological strategies can be used to improve comfort in febrile children, provided they are safe and evidence-based.

In many tropical and resource-constrained settings, traditional remedies based on local knowledge continue to play an important role in child healthcare. One such practice is the use of Allium cepa L. (shallot) compress, which has been widely utilized in Indonesian communities as a home-based intervention to reduce fever in children. This practice is valued for its affordability, accessibility, and cultural acceptability. Several community-based studies have reported that the application of shallot compress is associated with a significant reduction in body temperature among febrile children (Ainy & Riyanti, 2023).

From a pharmacological perspective, Allium cepa L. contains various bioactive compounds, including flavonoids (notably quercetin), phenolic compounds, and organosulfur constituents, which exhibit antioxidant and anti-inflammatory properties (Marefati et al., 2021; Ullah et al., 2022). Quercetin, in particular, has been shown to modulate inflammatory pathways and suppress the production of pro-inflammatory cytokines, thereby potentially contributing to the regulation of febrile responses. In addition to these biochemical mechanisms, topical application of shallot is also hypothesized to promote peripheral vasodilation, facilitating heat dissipation through the skin via conduction and evaporation.

Despite its widespread use and promising biological plausibility, the scientific evidence supporting the effectiveness of Allium cepa L. as a complementary therapy for fever management remains limited, particularly in controlled clinical settings. Most existing studies are observational or community-based, with limited methodological rigor. Consequently, there is a need for more robust empirical evidence to validate its clinical effectiveness and support its integration into evidence-based nursing practice.

Given the high burden of ARIs among children under five and the widespread use

of traditional remedies in primary care settings, this study aims to evaluate the effectiveness of Allium cepa L. compress in reducing body temperature among under-five children with ARIs using a quasi-experimental design. The findings are expected to contribute to the growing body of evidence on complementary therapies and support the development of culturally appropriate, accessible, and evidence-based interventions in pediatric nursing practice.

Methods

Study Design

This study employed a quasi-experimental design using a pretest–posttest with control group approach. This design was selected to evaluate changes in body temperature before and after the administration of Allium cepa L. compress in the intervention group and to compare the outcomes with a control group receiving standard care. The inclusion of a control group allowed for better control of potential external influences and strengthened the internal validity of the study compared to pre-experimental designs. The study was conducted in the working area of Sukadana Community Health Center, Ciamis Regency, Indonesia.

Participants

The target population consisted of all children under five years of age (0–5 years) diagnosed with acute respiratory infections (ARIs) and registered at the Sukadana Community Health Center. Based on health service records, there were 127 ARI cases among under-five children in the three months preceding the study.

The sample size was calculated using a proportion estimation formula with a 95% confidence level (Z = 1.96), an assumed population proportion of 0.5, and a margin of error of 0.2. The calculation resulted in a minimum sample size of 24 participants per group. Accordingly, a total of 48 children were included, consisting of 24 participants in the intervention group and 24 in the control group.

A non-probability sampling technique with purposive sampling was applied to select participants who met the predetermined inclusion and exclusion criteria. Inclusion criteria were as follows: children aged 0–5 years diagnosed with ARIs, body temperature ≥ 37.5°C at baseline, parental or guardian consent provided, no history of allergy to Allium cepa L., no skin irritation or wounds at the application site, and no use of antipyretic or other temperature-affecting medications within the previous four hours. Exclusion criteria included children receiving treatment in hospitals or other healthcare facilities, those with sensitive skin or known allergies to shallots, and children with body temperature exceeding 39°C requiring immediate medical intervention.

Instruments

Data collection was conducted using a calibrated digital thermometer to measure axillary body temperature. An observation sheet was used to record body temperature before the intervention (pretest) and 30 minutes after the intervention (posttest). In addition, a respondent characteristics form was used to collect demographic data, including age and sex.

All measurements were conducted following standardized operating procedures (SOPs) to ensure consistency across both intervention and control groups. The intervention group received Allium cepa L. compress prepared by slicing 3 grams of shallot and mixing it with five drops of coconut oil, which was then gently applied to the child's fontanel area for 30 minutes. Meanwhile, the control group received standard management without the shallot compress intervention. Data collection procedures were carried out by trained researchers and assistants to

maintain uniformity and reliability of the measurements.

Intervention

Participants in the intervention group received a topical Allium cepa L. (shallot) compress administered according to a standardized operating procedure. The intervention was initiated after baseline (pretest) body temperature measurement. Prior to the procedure, the researcher introduced themselves, verified the child's condition, assessed for any history of allergy to Allium cepa L., and explained the purpose and steps of the intervention to the parents or guardians. Informed consent had been obtained before participation.

The materials used in the intervention included 3 grams of Allium cepa L., a knife, a digital scale, coconut oil, a small plate, disposable gloves, and a calibrated digital thermometer. Hand hygiene was performed following standard protocols before and after the procedure. The shallot was sliced and placed on a clean plate, then mixed with approximately five drops of coconut oil. The mixture was gently applied to the child's fontanel area using a careful and non-invasive technique.

The compress was left in place for 30 minutes. During this period, the child's condition was monitored to ensure comfort and to detect any potential adverse reactions, such as skin irritation. After 30 minutes, body temperature was re-measured using the same digital thermometer at the axillary site, and the results were recorded in the observation sheet. All procedures were documented in the nursing records.

Participants in the control group received standard care consisting of observation without the application of Allium cepa L. compress, in accordance with routine practice at the community health center.

Data Collection

Data collection was conducted through a structured and sequential process. Initially, eligible under-five children with acute respiratory infections (ARIs) were identified based on the predefined inclusion and exclusion criteria. Parents or guardians were then provided with a detailed explanation of the study objectives, procedures, potential benefits, and risks, followed by the signing of informed consent.

Baseline body temperature (pretest) was measured using a calibrated digital thermometer at the axillary site. Subsequently, participants received the assigned intervention according to their respective groups. The intervention group received the Allium cepa L. compress, while the control group received standard care without the compress. After 30 minutes, body temperature was measured again (posttest) using the same instrument and procedure to ensure consistency. All measurements and participant information were recorded in standardized observation sheets. Data collection was carried out by trained researchers and assistants to ensure uniformity and reliability of the procedures.

Data Analysis

Data analysis was performed using statistical software. Univariate analysis was used to describe participant characteristics, including age, sex, and baseline body temperature, which were presented as means, standard deviations, frequencies, and percentages.

Bivariate analysis was conducted to examine differences in body temperature before and after the intervention within each group, as well as to compare the magnitude of temperature reduction between the intervention and control groups. Normality of the data distribution was assessed using the Shapiro–Wilk test. As the data were not normally distributed

($p < 0.05$), non-parametric tests were applied.

The Wilcoxon signed-rank test was used to evaluate within-group differences between pretest and posttest measurements, while the Mann–Whitney U test was used to compare differences between the intervention and control groups. Statistical significance was set at $p < 0.05$ with a 95% confidence interval. In addition, effect size was calculated to determine the magnitude of the intervention effect.

Ethical Considerations

This study received ethical approval from the Health Research Ethics Committee Ethical principles applied in this study included respect for persons, beneficence, non-maleficence, and confidentiality.

Respect for persons was ensured by providing complete information to parents or guardians regarding the study and obtaining informed consent prior to participation. Beneficence was maintained by ensuring that the intervention was non-invasive and posed minimal risk to participants. Non-maleficence was upheld by monitoring participants throughout the procedure and discontinuing the intervention if any adverse effects or worsening conditions were observed, with referral for appropriate medical care when necessary. Confidentiality was strictly maintained by anonymizing participant data and using it solely for research purposes.

Results

Table 1. Participant Characteristics

Variable	Intervention (n=24)	Control (n=24)	Total (n=48)
Sex, n (%)			
Male	13 (54.2)	12 (50.0)	25 (52.1)
Female	11 (45.8)	12 (50.0)	23 (47.9)
Age Group, n (%)			
Infant (0–12 months)	5 (20.8)	6 (25.0)	11 (22.9)
Toddler (1–3 years)	10 (41.7)	9 (37.5)	19 (39.6)
Preschool (3–5 years)	9 (37.5)	9 (37.5)	18 (37.5)

Table 1 illustrates the distribution of participant characteristics across the intervention and control groups. The results show that the proportion of male participants (52.1%) was slightly higher than that of females (47.9%). In terms of age, most participants were classified as toddlers (1–3 years), representing 39.6% of the total sample. The distribution of sex and age was relatively balanced between the two groups, indicating that the baseline demographic characteristics were comparable.

Table 2. Body Temperature Before and After Intervention

Group	Measurement	Mean (°C)	SD	Min	Max
Intervention	Pretest	38.2	0.49	37.8	39
	Posttest	36.6	0.18	36.3	37
Control	Pretest	38.1	0.37	37.7	38.9
	Posttest	37.8	0.31	37.3	38.5

Table 2 illustrates the mean body temperature of participants before and after the intervention. At baseline, the mean temperature was similar between the intervention group (38.2°C) and the control group (38.1°C). After the intervention, a substantial reduction was observed in the intervention group, with the mean temperature decreasing to 36.6°C. In contrast, the control group showed a smaller decrease to 37.8°C. The magnitude of temperature reduction was considerably greater in the intervention group compared to the control group, suggesting a potential therapeutic effect of Allium cepa L. compress.

Table 3. Within-Group Comparison of Temperature Changes (Wilcoxon Test)

Group	Mean Reduction (°C)	Z-value	p-value
Intervention	1.63	-4.297	<0.001
Control	0.28	-2.112	0.035

Table 3 illustrates the within-group comparison of body temperature changes based on the Wilcoxon signed-rank test. The results indicate a statistically significant reduction in body temperature in both groups. The intervention group showed a greater mean reduction of 1.63°C ($Z = -4.297$, $p < 0.001$), while the control group demonstrated a smaller reduction of 0.28°C ($Z = -2.112$, $p = 0.035$). These findings suggest that although a natural decline in temperature may occur, the reduction was substantially more pronounced in the intervention group.

Table 4. Between-Group Comparison of Temperature Reduction (Mann–Whitney U Test)

Variable	Intervention Mean Rank	Control Mean Rank	p-value
Temperature Reduction	36.75	12.25	<0.001

Table 4 illustrates the comparison of temperature reduction between the intervention and control groups using the Mann–Whitney U test. The analysis revealed a statistically significant difference between the two groups ($p < 0.001$). The intervention group demonstrated a markedly higher mean rank (36.75) compared to the control group (12.25), indicating that the reduction in body temperature was significantly greater among participants receiving the Allium cepa L. compress.

Discussion

This study provides evidence that the application of Allium cepa L. compress contributes to the reduction of body temperature among under-five children with acute respiratory infections (ARIs). These findings reinforce the potential role of complementary therapies in pediatric fever management, particularly within primary healthcare and community-based settings.

Fever is a common physiological response to infection, mediated by endogenous pyrogens and inflammatory cytokines such as interleukin-1, interleukin-6, and tumor necrosis factor, which act on the hypothalamic thermoregulatory center (Evans et al., 2021). While fever plays a protective role in enhancing immune response, its persistence may lead to discomfort and complications in young children. Conventional management typically involves pharmacological agents; however, concerns related to inappropriate use and potential side effects have encouraged the exploration of safer, non-pharmacological alternatives (National Institute for Health and Care Excellence, 2021).

The findings of this study are consistent with previous community-based research indicating that Allium cepa L. compress is associated with a reduction in body temperature among febrile children (Ainy & Riyanti, 2023; Handayani & Maulina, 2025). However, unlike earlier studies that were largely descriptive or observational in nature, the present study employed a quasi-experimental design with a control group, thereby providing stronger evidence regarding the effectiveness of this intervention. This methodological approach represents an important contribution to the existing literature, where controlled studies on traditional therapies remain limited.

From a biological perspective, the therapeutic effect of Allium cepa L. may be

explained by its rich composition of bioactive compounds, including flavonoids, phenolic substances, and organosulfur compounds. Among these, quercetin has been extensively studied for its anti-inflammatory and antioxidant properties, including its ability to modulate inflammatory pathways and suppress the production of pro-inflammatory cytokines (Marefati et al., 2021; Ullah et al., 2022). These mechanisms are particularly relevant in the context of fever, where inflammatory mediators play a central role in elevating body temperature.

In addition to its biochemical effects, the topical application of shallot compress may facilitate peripheral vasodilation, thereby enhancing heat dissipation through the skin via conduction and evaporation. This dual mechanism—combining pharmacological and physiological effects—may explain the observed clinical benefits of the intervention. Such findings support the integration of traditional knowledge with biomedical understanding, which is increasingly recognized as a valuable approach in evidence-based practice (Bennett et al., 2022).

Despite its promising findings, the use of Allium cepa L. as a complementary therapy in clinical settings remains underexplored in the global literature. Most existing studies are conducted in localized contexts, with limited generalizability and methodological rigor. This highlights a critical research gap in the evaluation of culturally rooted, low-cost interventions using robust study designs. The present study addresses this gap by providing empirical evidence from a controlled quasi-experimental framework, thereby strengthening the scientific basis for the use of Allium cepa L. in pediatric care.

The findings of this study are supported by a growing body of evidence demonstrating the anti-inflammatory and immunomodulatory properties of Allium cepa, particularly through its major bioactive compound, quercetin. Previous studies have shown that Allium cepa exerts its therapeutic effects by inhibiting pro-inflammatory mediators such as cytokines, prostaglandins, and signaling pathways including NF-κB and JAK–STAT, which are central to the inflammatory response associated with fever (Marefati et al., 2021; Lee et al., 2023; Pagliaro et al., 2022) . In addition, quercetin has been reported to reduce oxidative stress and modulate immune responses, thereby contributing to the regulation of body temperature and inflammatory processes (Kianian et al., 2021; Cho et al., 2024) . These biological mechanisms provide a plausible explanation for the observed reduction in body temperature following the application of Allium cepa compress in children, supporting its role as a complementary non-pharmacological intervention in fever management.

Furthermore, empirical and clinical evidence indicates that Allium cepa is not only biologically active but also clinically relevant in pediatric care. A randomized controlled trial demonstrated that onion-based interventions significantly reduce fever and accelerate symptom recovery in children without adverse effects (Anjeli et al., 2024) , while literature reviews have consistently highlighted its traditional use as a safe and accessible fever-reducing method (Sari et al., 2021) . Additional studies confirm that onion extracts possess strong antioxidant and anti-inflammatory activities due to high concentrations of phenolic compounds and quercetin (Al-Ansari et al., 2023; Ayanniyi et al., 2022) . Despite this evidence, there remains a notable gap in well-designed clinical studies focusing specifically on topical applications of Allium cepa in pediatric populations. Therefore, this study contributes novel evidence by evaluating a culturally rooted, topical intervention within a structured

clinical framework, thereby strengthening the scientific basis for integrating traditional therapies into evidence-based pediatric nursing practice.

Furthermore, this study contributes to the growing body of literature on culturally appropriate and resource-sensitive healthcare interventions. In many low-resource settings, access to pharmacological treatments may be limited, and reliance on traditional practices remains high. Therefore, validating such practices through scientific research is essential to ensure their safety, effectiveness, and appropriate integration into healthcare systems. The novelty of this study lies in its ability to bridge traditional practice and modern clinical research by systematically evaluating a widely used local remedy within a controlled design. It not only confirms the clinical relevance of Allium cepa L. compress but also provides a foundation for its inclusion in evidence-based nursing interventions, particularly in primary care and community health contexts. Overall, these findings suggest that Allium cepa L. compress may serve as a feasible and effective complementary approach to fever management in children with ARIs. However, further research with larger sample sizes, randomized controlled designs, and diverse populations is warranted to enhance the generalizability of the findings and to establish standardized protocols for clinical application.

Implications and limitations

This study contributes to the growing body of knowledge on complementary and culturally embedded therapies by providing empirical support for the potential integration of Allium cepa L. into evidence-based pediatric care frameworks. Conceptually, it advances the understanding of how traditional remedies can be systematically evaluated within a quasi-experimental design, thereby bridging the gap between local health practices and scientific validation. The findings also support the theoretical integration of non-pharmacological interventions into holistic fever management models, particularly in the context of pediatric nursing and community health. However, several limitations should be acknowledged. The use of a quasi-experimental design without randomization may limit causal inference and introduce potential selection bias. The relatively small sample size and single-site setting may also restrict the generalizability of the findings to broader populations. Additionally, the short duration of observation limits the ability to assess long-term effects or potential variability in response. Future studies employing randomized controlled trials with larger and more diverse samples are needed to strengthen the evidence base and confirm the reproducibility of these findings.

Relevance to Practice

The findings of this study demonstrate that Allium cepa L. compress can be directly applied as a practical, low-cost, and non-invasive complementary intervention for managing fever in under-five children with acute respiratory infections, particularly in primary care and community settings. For nursing practice, this intervention may be incorporated into routine fever management protocols as an adjunct to standard care, especially for mild to moderate fever cases, while ensuring appropriate clinical assessment and monitoring. Healthcare providers, including community nurses and midwives, can utilize this approach as part of health education for parents, emphasizing correct preparation, safe application, and recognition of warning signs requiring medical attention. At the institutional and policy levels, the integration of evidence-based traditional therapies such as Allium

cepa L. into clinical guidelines and community health programs may enhance accessibility and cultural acceptability of care. This is particularly relevant in Low- and Middle-Income Countries, where limited access to medications and healthcare resources necessitates the use of safe, affordable, and locally available interventions to support child health management.

Conclusion

This study demonstrates that the application of Allium cepa L. compress is effective as a complementary, non-pharmacological intervention in reducing body temperature among children under five with acute respiratory infections. The findings support its potential integration into pediatric care due to its anti-inflammatory properties, accessibility, and cultural acceptability. As a simple and low-cost intervention, it offers a promising alternative for fever management, particularly in resource-limited settings. Further rigorous studies are recommended to confirm its effectiveness and expand its applicability in broader clinical contexts.

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CrediT Authorship Contributions Statement

Dini Nurbaeti Zen: Conceptualization, Methodology, Formal Analysis, Supervision, Writing – Original Draft, Writing – Review & Editing.

Daniel Akbar Wibowo: Investigation, Data Curation, Validation, Resources, Project Administration, Writing – Review & Editing.

Conflicts of Interest

There is no conflict of interest.

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