HIBISCUS LEAF COMPRESS AS A NATURAL INTERVENTION FOR FEVER AFTER DPT-HB-HIB IMMUNIZATION IN INFANTS

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ABSTRAK : KOMPRES DAUN KEMBANG SEPATU SEBAGAI INTERVENSI ALAMI UNTUK DEMAM PASCA IMUNISASI DPT-HB-HIB PADA BAYI

Latar Belakang: Imunisasi pada anak balita dapat mencegah sekitar 2–3 juta kematian setiap tahunnya di seluruh dunia. Angka kematian anak secara global menurun dari 65 kematian per 1.000 kelahiran hidup pada tahun 1990 menjadi 29 per 1.000 pada tahun 2018. Meskipun bermanfaat, demam pasca imunisasi merupakan reaksi fisiologis yang umum akibat paparan antigen.Tujuan: Penelitian ini bertujuan untuk mengevaluasi efektivitas kompres daun kembang sepatu dalam menurunkan suhu tubuh pada bayi yang mengalami demam setelah imunisasi DPT-HB-HIB-Hib. Metode: Penelitian eksperimental ini menggunakan desain *pretest–posttest control group*. Populasi penelitian adalah bayi berusia 2, 3, dan 4 bulan yang belum mendapatkan imunisasi DPT-HB-HIB. Teknik *purposive sampling* digunakan untuk memilih 12 partisipan, terdiri dari enam bayi pada kelompok intervensi (kompres daun kembang sepatu) dan enam bayi pada kelompok kontrol (pemberian parasetamol). Uji normalitas data dilakukan dengan uji Shapiro–Wilk, dan analisis data menggunakan *paired t-test* serta *independent t-test*. Hasil: Rata-rata suhu tubuh pada kelompok intervensi menurun dari 37,7°C (pretest) menjadi 36,5°C (posttest), sedangkan pada kelompok kontrol menurun dari 37,7°C menjadi 37,1°C. Analisis statistik menunjukkan adanya perbedaan yang signifikan dalam penurunan suhu antara kedua kelompok (p = 0,005), dengan kelompok intervensi menunjukkan perbaikan yang lebih besar. Kesimpulan: Kompres daun kembang sepatu efektif dalam menurunkan suhu tubuh pada bayi dengan demam pasca imunisasi DPT-HB-HIB. Saran: Disarankan agar tenaga kesehatan memberikan edukasi kepada para ibu mengenai penggunaan kompres daun kembang sepatu sebagai terapi non-farmakologis yang aman dan sederhana dalam menangani demam ringan pasca imunisasi DPT-HB-Hib.

Kata kunci : Daun Kembang Sepatu, Demam, DPT-HB-HIB-Hib, Kompres, Pasca Imunisasi

ABSTRACT

Background: Immunisation in children under five prevents approximately 2–3 million deaths annually worldwide. Global child mortality has declined from 65 deaths per 1,000 live births in 1990 to 29 per 1,000 in 2018. Despite its benefits, post-immunisation fever is a common physiological reaction to antigen exposure. Purpose: This study aimed to evaluate the effectiveness of hibiscus leaf compresses in reducing body temperature in infants experiencing fever after DPT-HB-HIB immunisation. Methods: This experimental study used a pretest–posttest control group design. The population consisted of infants aged 2, 3, and 4 months who had not received DPT-HB-HIB immunisation. Purposive sampling was applied to select 12 participants: six in the intervention group (hibiscus leaf compress) and six in the control group (paracetamol administration). Data normality was tested using the Shapiro–Wilk test, and analysis was conducted using paired t-tests and independent t-tests. Results: The intervention group's mean body temperature decreased from 37.7°C (pretest) to 36.5°C (posttest), while the control group's mean temperature decreased from 37.7°C to 37.1°C. Statistical analysis revealed a significant difference in temperature reduction between groups (p = 0.005), with the intervention group showing greater improvement. Conclusion: Hibiscus leaf compresses are effective in lowering body temperature in infants with post-DPT-HB-HIB immunisation fever. Suggestion: It is recommended that healthcare providers educate mothers on the use of hibiscus leaf compresses as a safe and simple non-pharmacological therapy to manage mild fever following DPT-HB-Hib immunization.

Keywords: Compress, DPT-HB-Hib, Fever, Hibiscus leaf, Post-immunization

INTRODUCTION

Immunization is one of the most effective efforts carried out by the government together with the community to prevent various dangerous diseases (Kementerian Kesehatan Republik Indonesia, 2020). Immunization is defined as a form of prevention against infectious diseases and serves as one of the priority programs of the Ministry of Health. This reflects the strong commitment of the government to achieve the Sustainable Development Goals (SDGs), particularly in reducing child mortality (Kementerian Kesehatan Republik Indonesia, 2017)

Adverse Events Following Immunization (AEFI) or KIPI in Indonesia language are reactions that may occur after vaccination and are categorized as mild, moderate, or severe. Among infants and toddlers, the most common AEFI caused by basic immunization are pain at the injection site and fever (Ikatan Dokter Anak Indonesia, 2020). In Indonesia, data from the 2018 Basic Health Research (Riskesdas) indicated that 42.3% of children experienced AEFI, with the most common symptoms being high fever (37.5%), purulent abscess (12%), seizures (1%), and other symptoms (0.8%). In West Sumatra Province, the prevalence of AEFI reached 37.8%, with the main manifestations being high fever (27.9%), purulent abscess (19.8%), seizures (0.2%), and other symptoms (0.6%) (Badan Penelitian dan Pengembangan Kesehatan, 2018). Data from the Ministry of Health of the Republic of Indonesia reinforced these findings, stating that the DPT-HB vaccine is among the basic immunizations most frequently associated with AEFI, with fever being the predominant symptom (Kementerian Kesehatan Republik Indonesia, 2015).

Post-immunization fever occurs due to the entry of pathogens such as bacteria, viruses, or other microorganisms into the body. This condition represents a natural physiological response to infection, in which an increase in body temperature above 37.5°C indicates activation of the immune system (Proverawati & Andhini, 2010). Fever management may be carried out through both pharmacological and non-pharmacological approaches. AEFI symptoms generally appear within one to two days after immunization and may persist for several days (World Health Organization, 2018). Lack of public knowledge regarding AEFI contributes to low immunization coverage, as fear and anxiety over side effects are the primary reasons mothers delay immunization for their children (Anggini Bismarullah Putri, 2024)

Immunization in children plays an important role in reducing morbidity and mortality worldwide. According to (Nandi & Shet, 2020), immunization programs have succeeded in saving approximately 2–3 million children every year. Globally, child mortality rates decreased significantly from 65 per 1,000 live births in 1990 to 29 per 1,000 live births in 2018. However, around 20 million children still do not receive routine immunization every year, potentially increasing the risk of vaccine-preventable diseases (WHO, 2021). Body temperature reduction after immunization can be achieved through pharmacological or non-pharmacological approaches, including complementary therapy. One form of complementary therapy that can be utilized is the use of hibiscus leaves *(Hibiscus rosa-sinensis)*, which are known to possess natural antipyretic effects. The use of this medicinal plant demonstrates that fever reduction can be supported not only by chemical drugs but also through natural ingredients such as hibiscus leaf compress (Sari et al., 2024)

Research conducted by (Filawati et al., 2022) demonstrated a significant reduction in body temperature among infants after DPT-HB-Hib immunization when given hibiscus leaf compress. Bivariate analysis using the Wilcoxon test produced a p-value of 0.000 ($p < 0.05$), indicating the effectiveness of the therapy. Hibiscus leaf compress *(Hibiscus rosa-sinensis)* was proven to significantly reduce fever in infants experiencing post-immunization AEFI. These findings are consistent with (Zulherni et al., 2024), who also reported the effectiveness of hibiscus leaf compress in reducing children's body temperature. In addition (Mariani et al., 2021) found that hibiscus leaves *(Hibiscus rosa-sinensis)* had the highest Fidelity Level (FL) value (100%) in reducing fever in infants. Based on these findings and empirical evidence, this study aims to determine the effect of hibiscus leaf compress *(Hibiscus rosa-sinensis L.)* on reducing body temperature in infants after DPT-HB immunization.

RESEARCH METHODS

This study employed a quasi-experimental research design with a non-equivalent two-group pretest–posttest approach, involving two sample groups. Both groups were assessed using pretests and posttests, with the intervention administered between these measurements. The design allowed the researcher to observe changes following the intervention; however, no comparison group was included.

The study population consisted of infants aged 2, 3, and 4 months who had not yet received the DPT-HB-HIB immunization. Sampling was conducted using a non-probability technique, namely purposive sampling. The sample size was determined using the formula for hypothesis testing of the mean in two independent groups (Sudigdo Sastroasmoro, 2020):

$$n1 = n2 = \frac{(S(za + zb))^2}{bx1 - x2^2}$$

based on the sample size formula, a total of six respondents were obtained, 6 samples for intervention group and 6 samples for control group.

The inclusion criteria for this study were infants experiencing fever after DPT1/DPT2/DPT3 immunization (temperature > 37.5°C), infants receiving paracetamol (*puyer*) according to the prescribed dose and standard operating procedures (SOP), and mothers who consented for their infants to participate. Exclusion criteria included infants at risk of seizures / with temperatures > 38.5°C–39°C, infants allergic to hibiscus leaves, infants with skin disorders, infants with severe congenital diseases such as heart disease or asthma, and infants with infectious diseases such as tuberculosis, hepatitis B, and HIV. The study was conducted in April 2023 in West Sumatra.

For the intervention group, infants aged 2, 3, and 4 months who met the inclusion and exclusion criteria were selected, and their body temperature was measured after DPT-HB-HIB immunization. Infants with a body temperature above 37.5°C were given a hibiscus leaf (*Hibiscus rosa-sinensis Linn*) compress. A total of 150 grams of cleaned and finely crushed hibiscus leaves (*Hibiscus rosa-sinensis Linn*) were wrapped in gauze and applied as a compress to the axillary area once for 10 minutes. Following the intervention, the infants' body temperature was re-measured and recorded to evaluate the effectiveness of the hibiscus leaf compress in reducing post-DPT-HB-HIB immunization fever. Data normality was assessed using the Shapiro–Wilk test, and further analysis was performed with paired t-tests and independent t-tests.

RESEARCH RESULT

Pre-Intervention Infant Body Temperature in the Hibiscus Leaf Compress Group

Table 1
Mean Pre-Intervention Infant Body Temperature in the Hibiscus Leaf Compress Group

Variable	n	Mean	SD	Min–Max
Pre-test Body Temperature (°C)	6	37.7	0.1633	37.6–38.0

Among the six respondents, the mean infant body temperature prior to the hibiscus leaf compress intervention was recorded at 37.7°C.

Post-Intervention Infant Body Temperature in the Hibiscus Leaf Compress Group

Among the six respondents, the mean infant body temperature following the hibiscus leaf compress intervention was recorded at 36.5°C.

Table 2
Mean Post-Intervention Infant Body Temperature in the Hibiscus Leaf Compress Group
The Effect of Hibiscus Leaf Compress on the Intervention Group

Variable	n	Mean	SD	Min–Max
Post-test Body Temperature (°C)	6	36.5	0.3578	36.0–37.0

Average Pre-Test Infant Temperature in the Control Group

Table 3
Average Pre-Test Infant Temperature in the Control Group

Group	n	Mean (°C)	SD	Min–Max (°C)
Control (Pre-Test)	6	7.7	0.15	37.6–38.0

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Table 3 shows the pre-test infant body temperature in the control group. Among six respondents, the mean temperature was 37.7 °C with a standard deviation of 0.15, and a minimum–maximum range of 37.6–38.0 °C. These findings suggest that, before the intervention, the infants in the control group exhibited relatively similar temperature values, which were slightly above the normal physiological range.

Average Post-Test Infant Temperature in the Control Group

Table 4 presents the post-test infant body temperature in the control group. The findings indicated that among six respondents, the mean temperature was 37.1 °C with a standard deviation of 0.27, and values ranging from 36.8–37.5 °C. These results demonstrate a slight decrease in body temperature compared to the pre-test values, suggesting a return toward the normal physiological range after the observation period.

Table 4
Average Post-Test Infant Temperature in the Control Group

Group	n	Mean (°C)	SD	Min–Max (°C)
Control (Post-Test)	6	37.1	0.27	36.8–37.5

Normality testing was conducted using the Shapiro–Wilk test due to the sample size being <50. Both intervention and control groups showed normal distribution; therefore, bivariate analysis was carried out using the Paired t-test.

Following the univariate analysis to assess normality, bivariate testing was subsequently conducted, and the results are presented by following:

The Effect of Hibiscus Leaf Compress in the Intervention Group

Table 5 shows that among six respondents, the mean body temperature decreased from 37.7°C (SD = 0.1633) before the intervention to 36.5°C (SD = 0.3578) after the intervention. Paired t-test analysis yielded a p-value of 0.000 ($p < 0.05$), indicating a statistically significant effect of hibiscus leaf compresses in reducing body temperature in the intervention group.

Table 5
The Effect of Hibiscus Leaf Compress in the Intervention Group

Variable	n	Mean	SD	SE	Pvalue
Pre-test	6	37.7	0.1633	0.0667	0,000
Post-test		36.5	0.3578	0.1461	

The Effect of Paracetamol Use in the Control Group

Table 6
The Effect of Paracetamol Use in the Control Group

Variable	n	Mean	SD	SE	Pvalue
Pre-test	6	7.25	1.138	0.329	0,000
Post-test		5.33	1.073	0.310	

Table 2 demonstrates that in the control group (n = 6), mean body temperature decreased from 37.7°C (SD = 1.506) at pre-test to 37.1°C (SD = 0.2665) at post-test. Paired t-test analysis showed a significant reduction in temperature ($p = 0.000$, $p < 0.05$), confirming the effect of paracetamol administration in lowering fever among infants in the control group.

Comparison of Mean Infant Body Temperature between Intervention and Control Groups

A significant difference was observed in mean body temperature between the intervention and control groups ($p = 0.005$, $p < 0.05$). This result confirms the effectiveness of hibiscus leaf compresses in lowering post–DPT-HB-HIB immunization fever among infants.

Table 7
Comparison of Mean Infant Body Temperature between Intervention and Control Groups

Variabel	n	Mean	SD	SE	Pvalue
Intervensi	6	36.5	0.548	0.3578	0,005
Kontrol	6	37.1	0.516	0.2665	

DISCUSSION

Average Infant Temperature Before Hibiscus Leaf Compress in the Intervention Group

Post-immunization fever is a type of infection-related fever that occurs due to the entry of pathogens such as bacteria, viruses, or other microorganisms into the body. Fever is a natural physiological response, and when body temperature exceeds 37.5 °C, it indicates that the body is actively fighting an infection (Filawati et al., 2022). The findings of this study are consistent with the results of Prabowo et al. (2022), who reported that the distribution of infants' body temperature during the pre-test phase showed that most respondents (19 infants) had a body temperature between 37.6–38.0 °C, while a small proportion (3 infants) had temperatures above 39.0 °C. According to these researchers, limited knowledge regarding Adverse Events Following Immunization (AEFI) is one of the factors contributing to low immunization coverage. Concerns about AEFI also become the main reason many mothers delay immunization due to anxiety and fear of potential side effects.

Physiologically, a mild increase in body temperature up to 39 °C can stimulate the production of white blood cells, thereby strengthening the immune system. Increased body temperature also reduces iron levels in the blood, which plays a role in inhibiting bacterial growth. Although fever has protective benefits, most parents tend to feel anxious and panic when their children experience fever. This anxiety is generally associated with a lack of knowledge and inability to provide appropriate management for children with fever.

Average Infant Temperature After Hibiscus Leaf Compress in the Intervention Group

Based on Table 2, the post-test results showed that among the six respondents who were given a hibiscus leaf compress, the average body temperature of the infants was 36.5 °C. Hibiscus leaves contain various bioactive compounds, including phenols, tannins, flavonoids, flavanols, and anthocyanins. Scientifically, *Hibiscus rosa-sinensis* has been recognized to possess antibacterial properties. The mucilage content in hibiscus leaves contains bioactive compounds with antipyretic effects that help reduce fever in children and infants (Khan et al., 2014).

The antipyretic effect is mainly attributed to its flavonoid content, which makes hibiscus leaves a potential traditional remedy for reducing fever. Previous phytochemical studies reported that hibiscus leaves contain phenolic compounds equivalent to 48.4 mg catechol/g dry weight and flavonoids equivalent to 24.26 mg quercetin/g dry weight (Salem & Perez, 2014; Tiwari, 2015).

Efforts to reduce post-immunization fever can be carried out through pharmacological or non-pharmacological approaches, including complementary therapies. The use of hibiscus (*Hibiscus rosa-sinensis*) leaf compress demonstrates that a decrease in body temperature can be achieved not only with chemical drugs but also through the utilization of natural medicinal plants (Sivaraman & Saju, 2021). This finding is consistent with the study by Anis Prabowo et al. (Anis Prabowo, Nurul Istiqomah, 2022), which reported that most respondents in the post-test group had a body temperature ≤ 37.5 °C after being given a hibiscus leaf compress therapy, indicating the positive influence of this method on reducing pediatric fever.

Concern about adverse effects (e.g., fever) is an important factor contributing to vaccine hesitancy (Dyda et al., 2020). According to the researchers, fever that appears after DPT-HB-Hib immunization often causes significant anxiety among parents, especially mothers, because administering oral medication to infants is not easy. Hibiscus leaf compress can be a safe alternative, particularly for infants aged 0–6 months who are still exclusively breastfed and are not yet able to receive other medications or foods. Applying compresses on the forehead or axillary area is a simple, non-invasive, and effective complementary therapy to help reduce fever in infants after immunization.

Effect of Hibiscus Leaf Compress in the Intervention Group

Based on Table 5, it is known that among the six respondents, the average body temperature before the intervention (pre-test) was 37.7°C with a standard deviation of 0,1633, while the average body temperature after the intervention (post-test)

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was 36.5°C with a standard deviation of 0,3578. Statistical analysis using the Paired t-test showed a p-value of 0.000, which is smaller than 0.05. This indicates that there is a significant effect of the hibiscus leaf compress (*Hibiscus rosa-sinensis L.*) on reducing body temperature in the intervention group.

Hibiscus leaves are known to have medicinal properties with a Fidelity Level (FL) of 100%, indicating a high level of community trust toward its therapeutic effectiveness. According to Mariani (Mariani et al., 2021) in her study in Tanap Village, Sanggau Regency, hibiscus leaves have a use value index of 0.74 and are often used to reduce fever in infants, consistent with their high FL value.

The application of compresses to the axillary area stimulates sensory receptors, which then send impulses to the hypothalamus via the spinal medulla. When heat-sensitive receptors in the hypothalamus are activated, the effector system triggers sweat secretion and peripheral vasodilation. The vasomotor centre in the medulla oblongata, regulated by the anterior hypothalamus, plays a role in controlling this vasodilation. This process increases heat release through the skin, causes sweat production, and decreases body temperature until homeostasis is achieved (Osilla, 2023).

This mechanism aligns with the findings of Amani and Tukiran (Amani Amer Tawfeeq et al., 2024; Tukiran & Hidayati, 2014) who reported that hibiscus leaves contain flavonoids, saponins, polyphenols, essential oils, and calcium, which contribute to their antipyretic effects. The leaves can be used as a topical compress by placing them on the forehead for approximately 10 minutes. This stimulates the hypothalamus, which functions to regulate body temperature, resulting in a cooling effect and returning elevated body temperature to normal conditions. The study by Zelviani, Sri et al. (Zelviani et al., 2020) evaluated the thermophysical properties of hibiscus leaves and compared them with other types of leaves commonly used as fever compress materials. The findings supported the feasibility of hibiscus leaves as a compress medium due to their heat capacity and thermal diffusion characteristics.

Similarly, research by Filawati et al. (Filawati et al., 2022) showed a significant difference between the average body temperature of infants before and after DPT-HB-Hib immunization following the administration of hibiscus leaf compresses, with a p-value of 0.000 ($p < 0.05$). These results confirm that this intervention is effective in reducing post-immunization fever. The researchers also emphasized that pain and discomfort in infants require appropriate interventions to improve comfort, safety, and reduce discomfort due to post-immunization reactions.

Effect of Paracetamol Use in the Control Group

Based on Table 6, it is known that among the six respondents, the average body temperature in the control group before the intervention (pre-test) was 37.7°C with a standard deviation of 0,1506, while after the intervention (post-test), the average body temperature decreased to 37.1°C with a standard deviation of 0,2665. Statistical analysis using the Paired t-test showed a p-value of 0.000 ($p < 0.05$), which indicates that there was a significant effect of paracetamol administration on reducing body temperature in the control group.

Fever is defined as a physiological condition characterized by an increase in body temperature above the normal limit. Fever management can be carried out using either non-pharmacological or pharmacological methods. Pharmacological treatment is generally administered using antipyretic medication when the child's body temperature exceeds 39°C. Among the commonly used antipyretics, paracetamol and ibuprofen are considered relatively safe for both children and adults. However, persistent fever often increases parental anxiety and clinical concern among healthcare workers because it may pose risks of complications such as febrile seizures, brain haemorrhage, and even death in children (Surya et al., 2018).

Paracetamol is one of the most widely used antipyretic and analgesic medications in paediatric care. A reduction in body temperature typically occurs within 2–4 hours after administration (Surya et al., 2018). Paracetamol is considered the first-line therapy for fever below 41°C as well as for the management of mild to moderate pain. Since being introduced as an over-the-counter medication in the 1960s, paracetamol has been recognized as a safe non-opioid agent when used appropriately for short-term (De Martino & Chiarugi, 2015).

The recommended dose of 10–15 mg/kg of body weight can reduce body temperature within approximately 30 minutes, with the maximum effect achieved around 2 hours after administration. Fever may recur within 3–4 hours, allowing paracetamol to be administered every 4–6 hours as needed. The expected reduction in temperature ranges from 1.2°C to 1.4°C, indicating that paracetamol does not aim to normalize body temperature directly but rather to decrease elevated temperature to a safer range (Sofikah et al., 2021).

The results of this study are consistent with the findings of Surya et al. (Surya et al., 2018), their results showed that 42.2% of respondents administered paracetamol when the child's body temperature exceeded 37°C, with 35.3% administering the drug every four hours, and 44.1% reported a reduction in temperature within 2–4 hours. Based on these findings, it can be concluded that parents often view chemical antipyretics as the primary solution for managing fever in children, leading to paracetamol being administered as a rapid response to rising body temperature.

Differences in the Mean Infant Body Temperature Between the Intervention and Control Groups

The average decrease in body temperature among infants in the intervention group (treated with hibiscus leaf compress) was 36.5°C with a standard deviation of 0.548, while in the control group (given paracetamol), the average body temperature was 37.1°C with a standard deviation of 0.516. Statistical analysis showed a p-value of 0.005 ($p < 0.05$), which indicates a significant difference between the infants' body temperatures in both groups. Thus, it can be concluded that the hibiscus leaf compress is effective in reducing infants' body temperature after DPT-HB immunization in this study.

Body temperature reflects the balance between the amount of heat produced by the body and the amount of heat released into the external environment. The mechanism for maintaining core body temperature remains constant, although the surface temperature may vary depending on blood flow to the skin and the rate of heat release. Under normal conditions, human tissues and cells function optimally at a temperature range of 36.5°C–37.5°C (Osilla, 2023).

Fever management in children can be carried out through pharmacological or non-pharmacological (physical) methods. Antipyretic drugs work centrally by lowering the set point in the hypothalamus, resulting in physiological responses such as reduced heat production, increased blood flow to the skin, and enhanced heat dissipation through radiation, convection, and evaporation. The selection of medication type, dosage, and method of administration becomes an important aspect for both healthcare workers and parents. Therefore, comprehensive education must be provided during clinical visits to prevent medication misuse and antipyretic toxicity, as excessive use may lead to bronchospasm, gastrointestinal irritation, renal impairment, and decreased immune response (Sivaraman & Saju, 2021; Sofikah et al., 2021).

Although paracetamol is widely used, its routine administration is not recommended in newborns solely for comfort purposes. Newborns generally have immature liver function, while the primary adverse effect of paracetamol is hepatotoxicity. In healthy newborns without infection risk, elevated body temperature is often caused by environmental factors or dehydration rather than true fever. Reported adverse effects of paracetamol include vomiting, abdominal pain, allergic reactions (such as urticaria and purpura), bronchospasm, liver damage, and even delayed recovery from viral infections such as chickenpox (Sofikah et al., 2021).

As an alternative, fever can be managed through hydrotherapy, which involves the use of water to support healing or alleviate certain symptoms. There are two forms of hydrotherapy: internal therapy, such as fluid intake in the form of water, milk, or juice; and external therapy, such as warm compresses, warm sponging, hibiscus leaf compress, and tepid sponging (Sofikah et al., 2021).

The hibiscus plant (Hibiscus rosa-sinensis L.) has various therapeutic benefits and is easily accessible. Traditionally, it has been used to treat menstrual disorders, bronchitis, gonorrhoea, fever in children, stomatitis, parotitis, and headaches (Kapoor et al., 2021). Zulkurnain et al. (Zulkurnain, 2023) also reported that both fresh and dried hibiscus leaves can be effectively used as herbal medicine. In line with these findings, Mariani (Mariani et al., 2021) demonstrated that hibiscus leaves have the highest Fidelity Level (FL), which is 100%, confirming their effectiveness in reducing the surface temperature of infants through compress application. In another research, a quasi-experimental pre–post study on toddlers demonstrated that hibiscus leaf compress therapy reduced body temperature (with an average decrease of approximately 0.33 °C), and a significant difference was observed between the pre- and post-intervention measurements ($p < 0.05$) (Sari et al., 2024).

Based on the researchers' observation during the study, post-immunization fever represents a common response that reflects the body's natural immune reaction to the administered antigens, either in the form of attenuated or inactivated viruses (Filawati et al., 2022). Although antipyretic drugs such as paracetamol can help reduce fever, excessive or prolonged use may cause side effects such as nausea, abdominal discomfort, loss of appetite, liver damage, or allergic reactions such as rashes, facial swelling, breathing

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difficulties, and even anaphylactic shock (Sofikah et al., 2021).

Post-immunization fever following DPT-HB-Hib vaccination often causes concern among parents, especially mothers, who may find it difficult to administer oral medication to their infants. In this context, hibiscus leaf compresses serve as a natural alternative that is safe, easy to apply, and effective in reducing fever in infants. The compress can be placed on the forehead or axillary area, as performed in this study, and has been proven to help lower infants' body temperature after immunization.

CONCLUSION

This study demonstrated that the application of hibiscus leaf (*Hibiscus rosa-sinensis Linn*) compresses was effective in reducing fever among infants following DPT-HB-HIB immunization. The findings suggest that hibiscus leaves, containing natural compounds with soothing and cooling effects, can serve as a safe, simple, and accessible non-pharmacological intervention for managing mild post-immunization fever. This approach may complement standard infant care, particularly in community settings where the use of natural, locally available remedies is encouraged and valued.

SUGGESTION

Based on the results of this study, it is recommended that healthcare providers educate mothers on the use of hibiscus leaf compresses as a safe and simple non-pharmacological therapy to manage mild fever following immunization. The community, especially mothers, is encouraged to utilize local herbal materials such as hibiscus leaves while maintaining proper hygiene and appropriate application methods. Furthermore, future researchers are advised to conduct studies with larger sample sizes and stronger experimental designs so that the findings can serve as a scientific basis for the development of complementary therapies in the field of child health.

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