



THE EFFECT OF NONI (*MORINDA CITRIFOLIA* L.) LEAVES EXTRACT ON BRUISES HEALING AMONG PERSAUDARAAN SETIA HATI TERATE MARTIAL ARTS ATHLETES

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ABSTRACT

Introduction: Bruises are the most common injuries for martial arts athletes during training and competitions. If bruises are not treated immediately, they can cause infection and interrupt daily activities. Noni leaves are an alternative therapy containing flavonoids which play a role in anti-inflammation. This study aims to determine the effect of Noni leaf extract on bruise healing for martial arts athletes in Kedungadem District, Bojonegoro Regency. **Methods:** This research used a one-group pre-posttest pre-experimental design. The research sample was 32 martial arts athletes with bruises selected by Accidental sampling conducted in June - July 2023. The intervention was carried out by giving Noni (*Morinda Citrifolia* L.) leaves extract ointment for 1 week twice a day. The data were collected using an observation sheet and then tested using the McNemar test ($\alpha \leq 0.05$). **Results:** The results showed bruise healing in less than 7 days after Noni leaves extract therapy was given to all respondents. There was an effect of Noni leaf extract on bruise healing in martial arts athletes ($p=0.001$). **Conclusions:** Noni leaf ointment can significantly accelerate bruise healing without pharmacological therapy.

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INTRODUCTION

Injuries in martial arts often include sprained ankles, shin injuries, muscle cramps, knee injuries, thigh injuries, calf injuries, and hamstring injuries (Damayanti, 2022). The results of a preliminary study at one of the martial arts groups in Kedungadem District, Bojonegoro Regency showed that the most frequent injuries that occurred were sprained knees, sprained ankles, abrasions, and bruises. In Indonesia, there are two types of injuries when exercising due to a lack of warm-up, i.e., acute injuries and overuse syndrome (Pratomo, C., & Gumantan, 2020). An acute injury is a severe injury that suddenly occurs (Pratomo, C., & Gumantan, 2020). These injuries usually require professional help. (Yuliandra, R., & Fahrizqi, 2019). Some examples of acute injuries are ligament tears, muscle tendons or sprains, or even bone fractures (Mahfud, I., Gumantan, A., & Fahrizqi, 2020). Overuse syndrome is often experienced by athletes. This syndrome starts with a slightly excessive strong force and causes it to take place repeatedly over a long period. It sometimes responds well to its own treatment. Therefore, it is necessary to be wiser in healing bruises to minimize side effects for the body. An alternative to healing wounds is using Noni fruit extract. Despite still being classified as traditional therapy, the use of medicinal plants is considered safer because it has relatively lower side effects compared to synthetic chemical drugs. (Damayanti, 2022).

Theoretically, bruising injury management consists of medical and non-medical treatment. Medically,

bruises are treated with ointments such as Betadine and Thromboflash Gel which have the effect of preventing clots in the blood and helping to break blood clots, while non-medically using ice packs or cold water which has the effect of stopping capillary bleeding, dislocations with immobilization to reduce pain. The first treatment for sprain, strain, and muscle cramps uses massage which has the effect of relaxing tense muscles and improving blood circulation (Nirmalasari et al., 2020).

In the current research, the researchers used Noni leaves extract to heal bruises as in the previous research by Rambe et al., (2021) who mentioned that Noni leaves contained chemical compounds of the triterpenoid/steroidal group, alkaloids, tannins, saponins, flavonoids, glycosides, phenols. Flavonoids function as anti-inflammatory and anti-bacterial (Sayuti, K., & Yenrina, 2015). Halimah et al., (2019) stated that Noni contains scopoletin which is beneficial for dilating blood vessels, anti-bacterial and antimycotic, reducing inflammation, analgesic, histamine inhibitor, sleep disorders, allergies, and headaches. It is expected that Noni (*Morinda Citrifolia* L.) leaf extract can be used as an alternative and natural ingredient as a topical antiseptic to minimize complications in humans.

Based on the results of previous research conducted by Simanungkalit et al., (2019), the phytochemical test of noni leaves (*Morinda citrifolia* L.) contains active compounds capable of inhibiting and even killing bacteria. Noni leaves are proven to contain anthraquinone



compounds which provide pharmacological effects in the form of lysozyme against bacterial and fungal cells. Anthraquinone is a mixture of several active compounds including aloin, emodin, barbaloin, saponins, tannins, and sterols which then synergize and also contribute to producing healing properties for its analgesic, anti-inflammatory, anti-fungal, and anti-bacterial properties. This research aims to analyze Noni leaves extract on bruises healing among martial arts athletes.

MATERIALS AND METHODS

This research utilized a pre-experimental one-group pre-posttest design. The sample of this study were all martial arts athletes who experienced bruises from June to July 2023, totaling 32 people selected by accidental sampling. The inclusion criteria were martial arts athletes aged 10-25 years who experienced bruises, and willing to be treated with ointment therapy and did not take other medicine during the intervention (1 week). The exclusion criteria were martial arts athletes who experienced abrasions, bleeding, strains and sprains, fractures, and dislocations. The intervention was to apply Noni leaves extract ointment to the bruised area twice a day for 1 week. The study was conducted from June 18 to July 8, 2023, in Persaudaraan Setia Hati Terate (PSHT), a martial arts group, in Kedungadem District, Bojonegoro Regency, East Java Province.

The method for making Noni Leaf Extract Ointment was formulated by the researcher himself. The process begins with drying the noni leaves by sun-drying them for approximately one week. A total of 150 grams of dried noni leaves were weighed and placed into a vessel. Then, 100ml of 96% ethanol was added, the vessel was covered, stirred, filtered, and the residue was pressed. The residue was washed with sufficient extracting liquid until 150ml was obtained. Next, the sediment was separated to obtain a thick noni leaf extract. Subsequently, 25ml of liquid paraffin and 10 grams of Vaseline album were placed into a crucible and melted, set aside as Formula 1 (F1). F1 was then placed into a mortar or glass container and ground until cool to form an ointment base. The noni leaf ethanol extract was gradually mixed in, grinding continuously until a homogeneous mixture was achieved (the researcher used 1%). Next, 0.4 grams of nipagin was added to the mortar, and ground until fine and homogeneous. Following this, 0.1 grams of Nipasol was added and similarly ground until fine and homogeneous. Lastly, 65 grams of sodium metabisulfite was added and ground until fine and homogeneous, resulting in approximately 100 grams of noni extract ointment. The final product was then placed into ointment pots and prepared for use. The ointment was distributed to each respondent to be stored at home in a dry place at room temperature.

The researcher conducted data collection with the assistance of an aide by visiting the training centers or dojos of PSHT participants and several other accessible training locations in the Bojonegoro area. During the training sessions, the researcher and the assistant were on standby at the training site to observe if any members

sustained bruises while practicing. If any PSHT members experienced bruising, the researcher offered noni leaf extract ointment therapy and explained the research procedure. If the respondents agreed, they were asked to sign an informed consent form. The research was carried out in stages according to the number of respondents encountered during the training sessions, which were held twice a week. In the first week, 8 members were found to have bruises, in the second session 4 members, in the third session 8 members, in the fourth session 8 members, and in the fifth session 4 members.

The ointment was applied twice daily for 7 days directly at each respondent's home. During these visits, the researcher observed the condition of the bruises, documented them with photographs, and recorded the wound conditions on observation sheets. Bruises were visually assessed by examining their color and the reduction in swelling. The treatment was administered twice a day, every morning at 08:00 AM and every evening at 05:00 PM. The condition of the bruises was documented with photos and written notes on observation sheets. The research was conducted with the assistance of three research assistants from the 8th semester of the Nursing Bachelor's program at Universitas Muhammadiyah Lamongan. These assistants helped with door-to-door observations, ointment application, and documentation in the form of photos and written records on observation sheets. The researcher and the assistants also ensured that respondents did not use any medications during the intervention period.

An observation sheet with a bruise healing category value of 0-2 was employed. Color 0 means the intervention was stopped or healed (color resembles skin color), value 1 means the color of the bruise is green to yellowish, and value 2 means the bruise is swollen red, blue, and dark purple. The data was then tested using the McNemar test ($\alpha \leq 0.05$). The ethical approval was obtained from Universitas Muhammadiyah Lamongan on July 28, 2023, with number 325/EC/KEPK - S1 /07/ 2023.

RESULTS

The total number of respondents who completely participated in this research process was 32 athletes. There were no respondents who dropped out during the research process.

Table 1. Characteristics Respondent based on age, and education Arts Athletes Persaudaraan Setia Hati Terate (PSHT) at Kedungadem District, Bojonegoro Regency, East Java Province 2023 (n=32)

Age (Years)	Frequency (F)	Percentage (%)
13	3	9.3
14	6	18.8
15	5	15.6
16	6	18.8
17	12	37.5
Total	32	100
Education	Frequency (F)	Percentage (%)
Junior High School	14	46.9
Senior/Vocational High School	18	53.1
Total	32	100

Based on Table 1 above, it can be perceived that 37.5% of respondents were 17 years old with the highest level of education of Senior/Vocational High School (53.1%).

Table 2. Degree of Bruises Before and After Intervention Among Martial Arts Athletes Persaudaraan Setia Hati Terate (PSHT) at Kedungadem District, Bojonegoro Regency, East Java Province 2023 (n=32)

Bruises Scale	Pre-test	Posttest
Fast (0)	0	11
Moderate (1)	0	21
Slow (2)	32	0
Total	32	32

Based on table 2, the results indicated that 11 respondents experienced rapid healing of bruises and 21 people experienced moderate healing of bruises.

Table 3. Duration of Bruises Healing After Intervention Among Martial Arts Athletes Persaudaraan Setia Hati Terate (PSHT) at Kedungadem District, Bojonegoro Regency, East Java Province 2023 (n=32)

Days	Frequency (F)	Percentage (%)
1 – 3	0	0
4	4	12.5
5	3	9.4
6	4	12.5
7	21	65.6
Total	32	32

Based on Table 3 above, the results revealed that 65.6% of respondents experienced maximum bruise healing on day 7 and 25% of respondents experienced bruise healing on days 4 and 6.

Table 4. Statistical Analysis in Martial Arts Members in Persaudaraan Setia Hati Terate (PSHT) at Kedungadem District, Bojonegoro Regency, East Java Province 2023 (n=32)

Bruises Degree	n	Min-Max	Mean ± S.D	p
Pretest	32	2 - 2	2 ± 0,000	0.001
Posttest	32	0 - 1	0,66 ± 0,483	

The data in Table 4 showed that the minimum value of the degree of bruising was 2 (pre-test) and 0 (post-test) with the mean value of the degree of bruising in the post-test smaller than the pretest, meaning that many bruises were healed. McNemar test results showed a value of $p = 0.001$ ($p \leq 0.05$), meaning that there was an effect of giving Noni leaves extract on bruise healing in martial arts athletes.

DISCUSSION

The results showed that Noni leaves extract ointment had a significant effect on bruise healing. Table 3 shows that significant bruise healing occurred on day 7 (65.6%). In their research, Asri et al., (2021) stated that the saponin and flavonoid content of Noni leaves proved to be effective in wound healing as evidenced by the increase in the number of fibroblasts after treatment for 7 days. The effectiveness in increasing the number of fibroblasts is directly proportional to the concentration level of Noni fruit extract ointment, so the number of fibroblasts is increasing because the more the concentration of flavonoid and saponin active substances contained in the ointment preparation, the more effective it is in increasing the number of fibroblasts. Flavonoids are one of the contents of Noni leaves which play a role in anti-inflammation. Supriatna et al., (2018) stated that Ambarella leaves and Noni leaves can be used as an ointment on bruises, but not in a combination form. The active substances in the Ambarella leaves that have properties to treat bruises are saponins and tannins working as anti-bacterial, on the other hand, the active substances in Noni leaves efficacious for bruises are flavonoids and triterpenoids which have powerful astringent, antimicrobial, and antioxidant effects to be responsible for the contraction of bruises.

In addition to the use of Noni leaves extract ointment, another non-pharmacological therapy that can be used as an alternative treatment for bruises is Cosmos Caudatus leaves with the treatment of 2 times/day for 2 weeks. Wurnasari et al., (2023) showed that statistically the administration of Cosmos Caudatus leaf extract was effective in healing sliced wounds and gave the same effect as betadine or having the effectiveness in healing bruises; the redness of the wound disappeared on day 4 with an average bruise healing for approximately 8 days.

In martial arts activities, it is necessary to understand how to prevent injuries, the causes of injuries, and how to handle injuries in the field (Oktavian & Roepajadi, 2021). Non-pharmacological therapy can be applied as an initial first aid therapy for bruising because it minimizes side effects. Ointment therapy has minimal side effects compared to oral therapy. In the short term, ointment therapy does not cause digestive problems. In the medium term, there is no impaired liver function. If consumed in the long-term period, it does not have the potential for impaired kidney function compared to oral therapy.

Based on the description above, it can be perceived that bruising healing is due to the administration of Noni leaves extract ointment, which is applied for 1 week twice a day. Noni leaves extract ointment can eliminate swelling and bruising color, and reduce edema due to injury. The presence of anthraquinone substances in Noni leaves is able to heal bruises because these substances act as anti-microbial and anti-fungal so that the healing of bruises can be accelerated. In addition to these substances, the

other content is Proxeronin which plays a role in cell rejuvenation, regenerating damaged cells and increasing cell work. The presence of these substances in Noni leaves can regenerate cells damaged by bruises.

During the ointment application process, some respondents still experienced mild pain because the researcher did not provide other therapies such as pain or anti-inflammatory medications because they could affect the results of the study. Future researchers can add painkillers to the ointment so that respondents can reduce the potential consumption of oral painkillers. In addition, Noni leaves ointment has an unpleasant odor because it is not mixed with any aroma. Future researchers can add certain scents that have been tested not to reduce the anti-inflammatory effect of noni leaf extract to make it more comfortable to use.

CONCLUSIONS

The administration of Noni leaves extract ointment has an effect on the healing of bruises on martial arts athletes in Kedungadem District, Bojonegoro Regency with a healing time ≤ 7 days. This study suggests that Noni leaves extract ointment can be used as one of the non-pharmacological alternative therapies for bruises. In women, the aroma is less desirable so future researchers can add a mixture of fragrant aromas to this ointment so that it can attract both women and men.

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