

Original Article

# The effectiveness of topical gel formulation extract *Centella asiatica* and *Curcuma domestica* to fading striae gravidarum

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**Background:** The incidence of striae gravidarum in Indonesia is 95%, and 79.7% are primigravida. Striae gravidarum is not a direct physical health risk but is associated with body image and decreased self-confidence. *Curcuma domestica* contains curcumin and vitamin C, which can stimulate the synthesis of type IV collagen. In contrast, the *Centella asiatica* plant contains triterpenoids and saponins, which can stimulate the synthesis of type I collagen, which helps regenerate skin cells and improve skin elasticity. However, it is necessary to see the effectiveness of the two herbs, *Centella asiatica* and *Curcuma domestica*, in fading striae gravidarum.

**Purpose:** To prove the effectiveness of topical gel formulation extract *Centella* asiatica and *Curcuma domestica* for fading of striae gravidarum.

**Methods:** This is a quasi-experimental study with a pretest-posttest control group design. The sample consisted of 32 primigravida pregnant women divided into two groups: the intervention group was given a combination of *Curcuma domestica* and *Centella asiatica* gel at a dose of 5 mg twice a day for 14 days, and the control group was given a mineral oil gel at a quantity of 5 mg twice a day for 14 days—measurement of striae gravidarum using Davey score. The statistical test used the Friedman and Wilcoxon test.

**Results:** The average fading of striae gravidarum in the intervention group was more significant than in the control group,  $11.44\pm4.131$  to  $4\pm3.033$  vs.12.19 $\pm5.788$  to  $8.56\pm4.320$  treatment on the 14th day. The analysis results showed that the topical gel formulation of *Centella asiatica* and *Curcuma domestica* was more effective in fading striae gravidarum than the placebo gel (p<0.001).

**Conclusion:** Administering topical gel containing 12% *Centella asiatica* extract and a 10% *Curcuma domestica* dose of 5 mg twice a day for 14 days affected the fading of striae gravidarum.

#### INTRODUCTION

Striae gravidarum is a reasonably serious problem because the prevalence globally reaches 50% to 90%, which makes it one of the most common skin complications in pregnancy.<sup>1</sup> The incidence of striae gravidarum in Indonesia occurs as much as 95%, and 79.7% are primigravida.<sup>2</sup> Problems that occur if the striae gravidarum is not treated in the first pregnancy, namely the striae gravidarum line, will remain permanently. It cannot be lost, and striae gravidarum will worsen in subsequent pregnancies. Striae gravidarum causes skin problems such as easy bruising and itching. If scratching, it will cause wounds, skin irritation, and rough and dry skin. The mother will feel insecure and lack confidence.<sup>3</sup>

Treatment for striae gravidarum usually uses emollients, antipruritics, and laser therapy for instant results.<sup>3</sup> Striae gravidarum can be prevented or reduced by applying herbal therapy containing hydro-droxiprolisilane C, vitamin E, olive oil,<sup>4</sup> *Curcuma domestica*,<sup>5,6</sup>and *Centella asiatica leaves*.<sup>7,8</sup> *Curcuma domestica* is a tropical spice plant widely used in herbal medicine in Asia for hundreds of years.<sup>9</sup> Previous research states that giving therapy with L-pyrrolidone Carboxylic Acid, Hydrochloric Acid, Ascorbic Acid (Vitamin C), Gluconic Acid, and Sulfuric Acid can

https://doi.org/10.30595/10.30595/medisains.v21i3.19130 ©(2023) by the Medisains Journal. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <u>Attribution-NonCommercial 4.0 International.</u> stimulate migration, cell proliferation and stimulate endogenous synthesis and elastin deposition in the network. So, it effectively promotes the regenerative potential of the extracellular matrix components of the skin to prevent the occurrence of striae in skin tissue.<sup>10</sup> Giving *Curcuma domestica* ointment can reduce striae gravidarum in postpartum women.<sup>11</sup>

Apart from *Curcuma domestica*, you can use *Centella asiatica* to prevent striae gravidarum. *Centella asiatica* or gotu kola leaves can be used to treat striae gravidarum. Previous research showed that of the several methods used, *Centella asiatica* extract cream (tropoelastin cream) was significantly much better if used two times a day (morning and evening) after bathing from 12 weeks of gestation until just before childbirth because it can increase collagen production and elasticize skin fibers.<sup>12</sup>

*Centella asiatica* leaves contain active compounds, including triterpenoid saponins, asiaticoside, centelloside, madecassoside, and asiatic acid. The content of asiaticoside is a significant compound of about 84% in aqueous extract, which has the function of inducing the synthesis of type I collagen in fibroblasts so that it can be used to heal striae. The superior ingredients of gotu kola leaf extract are expected to moisturize the skin while inducing collagen so that the skin becomes elastic and can prevent and treat striae gravidarum.<sup>13</sup>

The limitations of previous research regarding *Curcuma domestica* ointment for striae gravidarum in second-trimester pregnant women stated that giving *Curcuma domestica* ointment with a 12% formula could reduce striae gravidarum lines but could not reduce the color of striae gravidarum and 12% *Curcuma domestica* ointment was less maximum absorption into the skin in reducing striae gravidarum.<sup>6</sup> Previous research stated that *Centella asiatica* lotion helps improve striae gravidarum color pigmentation, increases skin moisture, and smoothes skin texture but does not significantly eliminate striae gravidarum lines.<sup>8</sup>

Evidence-based research examines *Centella asiatica* and *Curcuma domestica* on striae gravidarum, but the fading results could be more optimal. However, no research has combined *Centella asiatica* and *Curcuma domestica* to fade striae gravidarum. This study aims to prove the effectiveness of a topical gel formulation of *Centella asiatica* and *Curcuma domestica* to fading striae gravidarum.

#### METHOD

#### Study Design

This is a quasi-experimental study with a pretest-posttest control group design.<sup>14</sup>

#### Setting and Respondent

This research was conducted at the Lily Srikandi Medika Kudus Clinic from March to May 2023. The population in this study were primigravida pregnant women with striae gravidarum. The number of samples in the study was 32 people, who were divided into two groups, namely the intervention group and the control group. The sampling technique was carried out randomly.<sup>15</sup> Inclusion criteria are a primigravida, 18-36 weeks gestational age, and pregnant with striae gravidarum. Exclusion criteria were pregnant women who were allergic and sensitive to *Curcuma domestica* and *Centella asiatica* leaves and those who used other treatments to prevent striae gravidarum.

#### Making Topical Gel Formulation

The process of making a combination of Curcuma domestica and Centella asiatica gel begins with making 5000 grams of Curcuma domestica extract, which is maceration using 70% ethanol with a ratio of 1 kg: 2.5 L in a simple and closed reactor for three days; the macerate is separated from the filtrate by filtration using a cloth filter, the macerate is separated from the ethanol solvent using the evaporation method with a rotary evaporator with a temperature of 45-500C at a pressure of 0.08 MPa until thick and 3000 grams of Centella asiatica extract, which is maceration using 70% ethanol with a ratio of 1 kg: 3.5 L in a simple and closed reactor for three days, the macerate was separated from the filtrate by filtration using a filter cloth, the maserate was separated from the ethanol solvent using the evaporation method with a rotary evaporator with a temperature of 45-500C at a pressure of 0.08 MPa until thick and continued to make a combination of Centella asiatic and Curcuma domestica gel. Centella asiatic with 100 ml of distilled water heated to 40-500C for 3-5 minutes, stir using a magnetic stirrer, and add Na. CMC, Carbopol 5% of the total distilled water, wait until homogeneous, add glycerin and propylene glycol 5% of the total distilled water, wait until homogeneous, add 12% Curcuma domestica extract and 10% Centella asiatica, turn off the magnetic stirrer, transfer to a container.16-22

#### Experimental Procedure

The intervention group was given a combination of *Curcuma domestica* and *Centella asiatica* leaf gel with a topical gel containing 12% *Centella asiatica* extract and 10% *Curcuma domestica* at a dose of 5 mg twice a day for 14 days after bathing in the morning and evening and the control group placebo gel in the form of mineral oil at a dose of 5 mg frequency two times a day for 14 days after bathing in the morning.

#### Variables, Instruments, and Measurements

The striae gravidarum fading level is measured based on the Davey score method.<sup>24</sup> Carried out on the 7<sup>th</sup> day, and the 14<sup>th</sup> day.

#### Data Analysis

The Friedman and Wilcoxon test used to see differences in the fading of striae gravidarum between the intervention group and the control group over time.

#### Ethical Consideration

This research has passed the ethical test conducted by the Semarang Ministry of Health Poltekkes Ethics Commission with number No. 0373/EA/KEPK/2023.

#### RESULTS

Figure 1 is an example of a topical gel formulation of *Centella asiatica* and *Curcuma domestica*. This product contains 12% *Centella asiatica* extract and 10% *Curcuma domestica*. Figure 2 shows the average fading of striae gravidarum. Initially, striae gravidarum was at a score of 11.44±4.131 (intervention group) and 12.19±5.788 (control group); after being given the topical gel formulation of *Centella asiatica* and *Curcuma domestica* (intervention group) and placebo gel (control group) on day seven, a decrease striae gravidarum score was 9.13±4.113 vs. 10±4.604. On the 14<sup>th</sup> day, the striae gravidarum score was 4±3.033 vs. 8.56±4.320. The analysis results showed that the topical gel formulation of *Centella asiatica* and *Curcuma domestica* and *Curcuma domestica* and *Curcuma domestica* gel formulation of *Centella asiatica* and *Curcuma domestica* (p<0.001).



Figure 1. The Topical Gel Formulation of *Centella asi*atica and *Curcuma domestica*.

Figure 3 shows very significant changes in striae gravidarum levels. In picture 3A, the levels of striae gravidarum in the severe category are visible. This is indicated by the presence of dark brown striae gravidarum and striae gravidarum lines 5 cm to 10 cm long. After being given the topical gel formulation of *Centella asiatica* and *Curcuma domestica* on day 7, there was a change in the level of striae gravidarum to the moderate category, as seen in Figure 3B. This change can be seen from the fading of the striae gravidarum lines to less than 5 cm. Furthermore, by administering the topical gel formulation *Centella asiatica* and *Curcuma domestica* for 14 consecutive days, striae gravidarum experienced a significant change to the mild

category (see Figure 3C). This is indicated by consistent color fading from dark brown to light brown and from 5 cm to 10 cm long striae gravidarum lines until there are no striae gravidarum lines.







**Figure 3.** Photo of Fading Striae Gravidarum. A: Baseline; B: Treatment on 7<sup>th</sup> day; C: Treatment on the 14<sup>th</sup> day

# DISCUSSION

The results showed that the topical gel formulation of Centella asiatica and Curcuma domestica effectively reduced striae gravidarum in primigravida pregnant women compared to placebo gel (p<0.001). This is supported by previous research regarding Curcuma domestica ointment for striae gravidarum in second-trimester pregnant women, stating that giving 12% Curcuma domestica ointment can reduce the striae gravidarum lines but cannot reduce the color of striae gravidarum.<sup>6</sup> Previous research stated that therapy with L-Pyrrolidone Carboxylic Acid, Hydrochloric Acid, Ascorbic Acid (Vitamin C), Gluconic Acid, and Sulfuric Acid could stimulate cell migration and proliferation, as well as stimulate endogenous synthesis and elastin deposition in the tissue so that it is effective in promoting the regenerative potential of the extracellular matrix components of the skin to prevent the occurrence of striae in the skin tissue.10,11

Apart from *Curcuma domestica*, you can use *Centella asiatica* to prevent striae gravidarum. According to previous research, the extract lotion *Centella asiatica* helps improve the color pigmentation of striae gravidarum, increasing skin moisture, and smooths skin texture but does not significantly remove striae gravidarum lines.<sup>8</sup> Three classes of bioactive compounds contained in *Centella asiatica* leaves (triterpenoids, steroids, and saponins) can help induce type I collagen synthesis in fibroblasts, inhibit dermis destruction, and stimulate collagen formation and improve blood circulation so that the skin will be elastic. The gel test results of gotu kola leaf extract with a 10% formulation were significantly able to help overcome and disguise striae so that it could become a new recommendation in midwifery.<sup>12</sup>

Based on the respondents' responses, the combination of *Curcuma domestica* gel and *Centella asiatica* said that the combination of *Curcuma domestica* gel and *Centella asiatica* provides a cool sensation that makes pregnant women comfortable because the cold sensation produced by the gel can reduce itching and burning sensation in the abdomen area. The striae gravidarum area, compared to previous studies using ointments, has limitations, namely, the ointment does not absorb optimally on the skin, and the gel contact time is longer than lotion.<sup>20,24,25</sup>

The topical gel formulation of *Centella asiatica* and *Curcuma* domestica is more influential in fading striae gravidarum than previous studies; the limitations of the previous research support this, regarding *Curcuma domestica* ointment for striae gravidarum in second-trimester pregnant women, which stated that giving *Curcuma domestica* ointment with a formula 12% can reduce striae gravidarum lines, but cannot reduce the color of striae gravidarum and 12% *Curcuma domestica* ointment has less optimal absorption on the skin in reducing striae gravidarum.<sup>6</sup> *Centella asiatica* extract lotion helps improve striae gravidarum color pigmentation, increases skin moisture, and smoothes skin texture but does not significantly remove striae gravidarum lines.<sup>8</sup>

# CONCLUSIONS AND RECOMMENDATION

Administration topical gel formulation extracts *Centella asiatica*, and *Curcuma domestica* had a higher effect in reducing the fading of striae gravidarum compared to placebo gel. In midwifery, this research can be used as a reference to provide holistic pregnancy care that is effective in dealing with discomfort in pregnancy, namely striae gravidarum, thereby increasing the success of antenatal care services and the welfare of pregnant women. In future research, a skin analyzer is hoped to be used to diagnose skin changes that occur before and after treatment.

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