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Gel Formulation Test of Gotu Kola Leaf Extract (*Centella Asiatica*) 15% For Handling Striae Gravidarum

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Abstract

Hormonal changes during pregnancy will impact the skin so that the skin of pregnant women will be vulnerable and at significant risk for striae gravidarum in several areas of the body, including the abdomen, breasts, calves, and thighs. This will impact the quality of life, the incidence of pelvic organ prolapses, and rupture of the perineum due to a lack of collagen in the body. Techniques for treating striae gravidarum have been developed in several methods, including micro-needling and fractional CO₂ laser, vitamin C, the use of 0.1% tretinoin cream to the use of frequency radio microneedle (FMR). This treatment aims to help increase, maintain and stabilize collagen in the skin. Gotu kola leaf (*Centella Asiatica*) is one of the plants that can stimulate the production of collagen I and moisturize the skin because it contains compounds such as saponins, asiaticoside, Asiatic acid, madecassoside, and triterpenes. This plant is also anti-infectious, anti-leprosy, anti-syphilis, and skin cell revitalization. This study aimed to test the effectiveness of a gel based on Gotu kola leaf with a concentration of 15% for treating striae gravidarum. This research method is quasi-experimental with a one-group pre-test post-test design. The population and research sample consisted of 3 respondents; each respondent was assessed in 4 areas: the breast, abdomen, thigh, and calf. The results show that because the significance level is more significant than α ($0.130 > 0.05$), there is not enough reason to accept H₀, and we also get the difference between the average value before and after being given a 15% concentration, which is 1.5, which means the average decreases. Conclusion Gel preparations of Gotu kola leaf extract (*Centella Asiatica*) with a concentration of 15% are effective in treating striae gravidarum degrees 1,2, and 3.

Keywords: Skin of pregnant women, medicinal plants, Cosmetic disorders.

INTRODUCTION

During the pregnancy, there will be physiological changes in the skin, so there is a significant risk for striae gravidarum in several areas of the body, including the abdomen, breasts, and thighs. Initially, a purplish pink color will appear, becoming hypopigmented or white, which is a sign of atrophy. Striae gravidarum will directly affect the quality of life of women related to self-confidence and the integration of social life (Ogrom and Dogru 2019).

In addition, striae gravidarum is also considered a cosmetic disorder during pregnancy (Liu et al., 2018).

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A study by J Eric Jelovsek in 2007, cited in Lipping Liu in 2018, reported that women who experience striae during pregnancy are at high risk for pelvic organ prolapse, so this should receive more severe attention (Liu et al. 2018). On the other hand, striae gravidarum is closely related to perineal lacerations during labor due to decreased skin elasticity. This is evidenced by a cross-sectional design study conducted on 188 respondents, showing that women with moderate-to-severe striae gravidarum can cause mild lacerations (Sinta Khrisnamurti, 2016 cited in (Isir and Abdullah, 2021).

The prevalence of striae gravidarum is estimated to range from 50% to 90% in the general population, making it one of the most common skin problems during pregnancy. Some studies attribute its occurrence to the relaxin of the estrogen and adrenocortical hormones. Family history, weight gain, maternal age, impaired glucose tolerance, hair color, nutrition, and sex of the neonate are some of the factors that support the occurrence of striae gravidarum (Liu et al., 2018)

Several studies have developed techniques and methods for treating striae gravidarum, including using micro-needling and fractional CO2 lasers and vitamin C (Abdelsamiea et al. n.d.). 0.1% tretinoin cream therapy (Ud-Din, McGeorge, and Bayat 2016) to the use of radio frequency microneedle (FMR), all of these methods and techniques aim to help increase, maintain and stabilize collagen in the skin. Gotu kola leaf (*Centella Asiatica*) is one of the plants that can stimulate the production of collagen I because it contains compounds such as saponins, asiaticoside, and Asiatic acid, madecassoside, and triterpenes. This plant is also anti-infectious, anti-leprosy, anti-syphilis, and skin cell revitalization (Galomat et al., 2021). The content of these triterpenes can also increase the metabolism of lysine, proline, and amino acids and directly increase the synthesis of tropocollagen and mucopolysaccharides to help restore skin elasticity and firmness (Kristiani Ani, 2017).

For this reason, the Gotu kola leaf can be developed as a complementary treatment method because it has minimal complications and is much cheaper. Gotu kola leaf extract has been widely developed to treat striae gravidarum in the form of lotion, oral nanoencapsulation, and in combination with oil and gel preparations with a concentration of 10%. For this reason, through this study, researchers will explore the formulation of 15% Gotu kola leaf extract gel to treat striae gravidarum in pregnant women so that it becomes the latest evidence-based that is cheap, safe, and effective.

Method

This type of research is a quasi-experimental study using a one-group pre-post test design; this design involves one group being given the intervention of Gotu kola leaf extract gel (*Centella Asiatica*) with a concentration of 15%. In this study, there were 2 variables: the independent variable: Gotu

kola leaf extract gel formulation 15%, and the dependent variable: striae gravidarum. The population in this study was the researcher using 3 mothers who experienced striae gravidarum degrees 1, 2, and 3. The instrument used to assess the degree of striae gravidarum used the observation instrument "Atwal method, 2006" (GSS Atwal, LK Manku, CEM Griffiths, no. dates). The research was carried out from June to August 2021 for 2 months. The research location is in the Mariya Health Center Work Area, Sorong Regency, West Papua, Indonesia. Data processing techniques through the stages of Editing, Coding, Cleaning, and Processing. Univariate analysis was used to describe factors that could influence the occurrence of striae gravidarum, including maternal age, BMI, parity, and gestational age, and assessment of striae gravidarum before and after the intervention. Meanwhile, bivariate analysis to assess changes in striae gravidarum between before and after the intervention was given using a paired T-test. This research has obtained permission from the ethics committee of the Health Polytechnic of the Ministry of Health, Sorong No. DM.03.05/6/040/2021. The process of making gotu kola leaf gel extract started from the stage of taking samples of gotu kola (*Centella Asiatica*) leaves obtained from the Mariyat District, Mariyai Village, after that the sample was processed by maceration using 96% ethanol for 1 week. After that, it is done using filter paper and placed in a measuring container that aims to separate the leaf dregs. The leaf extract was cooked using an electric stove with a temperature of 600 degrees until it thickened and made a gel with a formula of 15% in a 50 gr preparation.

Results and Discussion

A. Univariate Analysis

The univariate analysis aims to describe the characteristics of respondents related to factors that directly and indirectly influence the incidence of striae gravidarum, including maternal age, BMI, parity, and gestational age. More details can be seen in Table 1 below:

Table 1 Respondent Characteristics

Respondent Characteristics	n	%
Age		
<20 years old	0	0
20-35 years old	1	33,33
>35 years old	2	66,66
Body Mass Index		
≥ 30 (Obesity)	2	66,66
25–29,9 (Excess Weight)	0	0
18,5–24,9 (Normal Weight)	1	33,33
<18,5 (Weight below average)	0	0
Parity		
1 (Primigravida)	0	0
2-5 (Multigravida)	3	100

>5 (Grandemultipara)	0	0
Gestational Age (Week)		
0-13	2	66,66
14-26	0	0
27-40	1	33,33

Based on the description in table 1 above, the characteristics of most respondents in the age group > 35 years were 2 (66.66%). Characteristics of respondents according to BMI based on classification According to WHO, most have a BMI ≥ 30, which is included in the obesity category as many as 2 (66.66%) respondents. Characteristics of respondents based on parity are classified according to Manuaba 2009,

showing that the most in the parity range of 2-5 children or multigravida as many as 2 (66.66%) respondents. The characteristics of respondents based on gestational age were mainly in the gestational age range of 0-13 weeks or the first trimester as many as 2 respondents (66.66%).

B. Bivariate Analysis

To analyze the differences in the effectiveness of the gel preparation of Gotu kola leaf extract (Centella Asiatica) formula 15% against the treatment of striae gravidarum degrees 1, 2, and 3 before and after the intervention. For details, see Table 2 below.

Table 2 Before and after intervention

FACTOR	N	MEAN	STD.	STD. ERROR
			DEVIATION	MEAN
Gel 15 %	Before	12	3.42	2.503
	After	12	1.92	1.832

Independent Samples Test

Levene's Test for Equality of Variances				t-test for Equality of Means							
	F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
					One-Sided p	Two-Sided p			Lower	Upper	
15% concentration	Equal variances assumed	2.473	.130	1.67	22	.054	.108	1.500	.895	- .357	3.357
	Equal variances not assumed			1.67	20.157	.055	.109	1.500	.895	- .367	3.367

The conclusion is that because the significance level is more significant than α ($0.130 > 0.05$), there is not enough reason to accept H_0 , and we also get the difference between the average value before and after being given a 15% concentration, which is 1.5, which means the average decreases. Then it is concluded that there is an increase or a significant difference between the treatment given to the respondents before and after the intervention.

Discussion

The asiaticoside content contained in Gotu kola leaves significantly functions to regenerate dead skin cells and repair skin cells, and strengthen skin cells. In addition, this content can provide a natural antibiotic effect. The Gotu kola

leaf extract gel is thought to trigger collagen production because it contains saponins. After all, saponins stimulate collagen production and regenerate skin cells (Sutardi 2017). This collagen content is thought to be able to help moisturize the skin, even out skin tone, tighten the skin and help heal irritation of the skin and make the skin elastic so that it will look more youthful (Brincat et al. 1983).

This is in line with the study's results, which showed that the 15% formulation was significantly effective in the treatment of striae gravidarum, with a significant value greater than α ($0.149 > 0.05$). Three bioactive groups make Gotu kola leaf a "magic herb" that has been used for more than 2000 years because it can act as an antioxidant (Prakash, Jaiswal, and Srivastava 2017). Blood circulation plays a vital role in helping skin metabolism to help remove spots or scratches on

the skin; this process will be significantly helped by the triterpenoid content (Sutardi 2017).

In addition, the triterpenoid content will help remove black spots because it stimulates protein and converts alanine and proline into collagen (Sutardi 2017). Spots due to striae gravidarum, although they do not cause pain, are very disturbing to women's appearance because they are related to the beauty of the body and aesthetic disorders (Goldman et al., 2008) (Abd-alaama 2020). To maintain the skin's beauty, the moisture and elasticity must be maintained so that the skin is not dry and wrinkled. The saponins in Gotu kola leaves can help retain moisture for longer in the skin, thereby preventing evaporation of water from the epidermal layer so that the skin is not dry and helps overcome dermal scarring and epidermal atrophy. (Titis Nurmalita Dianti 2021).

In pregnant women, the incidence of striae gravidarum is about 90%. Enlargement of the uterus causes the skin to stretch, dry skin, and lack of collagen will crack and cause white streaks (Abdelghani 2017). Cushing's syndrome and changes in body shape cause mechanical skin stretching (Boozalis E. et al., 2018) (Leung and Barankin, 2017). In addition to helping remove spots, this gel can relieve itching on the skin and heal painful wounds around the striae gravidarum. This is due to the effect of the antibiotics contained. Ordinarily, pregnant women will experience weight gain suddenly due to the enlargement of the fetus and placenta. A high body mass index (BMI) or obesity is significantly one of the triggering factors for the emergence of striae gravidarum (Al-Hamdani, 2017 in (Kadir, Badrin, and Hoong 2021).

Based on the study's results (Elson, 1990 quoted in (Abd-alaama 2020)). It shows that Gotu kola leaf is safe to use in pregnant women to overcome the striae gravidarum because it does not cause side effects, so the results of this study can be a new finding in the field of obstetrics.

Conclusion

The preparation of Gotu kola (*Centella Asiatica*) Leaf Extract Gel with a concentration of 15% was influential in treating striae gravidarum grades 1,2, and 3. This was proven with a significance level greater than α (0.130 > 0.05) before and after the intervention.

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