

## The Effects of Topically-Applied Skin Moisturizer on Striae Gravidarum in East Indian Women

Dipanshu Sur\* and Ratnabali Chakravorty

Department of Obstetrics and gynecology, ILS Hospital., Saltlake City, Kolkata, West Bengal, India

\*Corresponding Author: Sur D, Department of Obstetrics and gynecology, ILS Hospital., Saltlake City, Kolkata, West Bengal, India, Tel : +919874275456; E-mail: dipanshu.sur@gmail.com

Received date: September 21, 2015; Accepted date: October 20, 2015; Published date: October 28, 2015

Copyright: © 2015 Sur D, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

**Background:** Striae result from rapid expansion of the underlying tissue, e.g., during puberty, pregnancy or rapid weight gain. Prior data indicate that the incidence of stretch marks in Indian women is 77%. The hormonal and genetic factors are associated with their appearance. Recently that has been found skin extensibility, elasticity and rupture were strongly influenced by the water content of dermis and epidermis cells.

**Objective:** The objectives were to assess the effects of topical treatments applied during pregnancy on the later development of stretch marks.

**Materials and methods:** An open, prospective, randomized study was done on 120 pregnant women in whom skin elasticity and hydration as well as striae presence or apparition were measured at baseline and periodically until delivery. Patients were randomly assigned to application in wet skin cream, or in dry skin conditions.

**Results:** The average basal hydration was  $42 \pm 13$  IU and the final was  $46 \pm 6$  IU ( $p=0.0325$ ; 95% CI: -7.66 to -0.34), which difference was statistically significant. By measuring the moisture in the control region (forearm) a basal reading of  $40 \pm 9$  IU and end of study of  $38 \pm 6$ ; ( $p=0.1547$ ; 95% CI: -0.77 to 4.77) and this difference was considered to be not statistically significant. It was observed that at the end of the study, 55% women without ridges; mild ridges 5%; 36% moderate and 4% severe ridges. The proportion of women without grooves was 54% when the cream was applied studied wet skin and 45% when the cream was applied on dry skin.

**Conclusion:** It was shown that cream under study increased hydration and elasticity of abdominal skin consequently in all subjects. This effect is more significant (54%) when the cream is applied to damp skin.

**Keywords:** Striae gravidarum; Skin moisturizer; Skin hydration; Skin elasticity

### Background

Stretch marks are caused by destroying of the dermis. Stretch marks are referred to as striae distensae, striae gravidarum (SG) and by many other terms. Striae appear as elliptical erythematous or blanched areas on the skin. Striae may merge to form an interwoven pattern on the affected area. Pregnant women are at particular risk of developing SG due to combination of rapid changes in hormonal environment (e.g., effects of adrenocortical steroids, estrogen, and relaxin on the skin's elastic fibers) and stretching of the skin of the abdomen, which appear more frequently in the anterolateral abdomen (35%), hips (25%), thighs (14%), in the breast (13%) and buttocks (13%). Although the etiology of SG is unclear, it is generally accepted that the combined effects of endocrine factors and skin stretch play a key role. It is estimated that 50% to 90% of women develop some stretch marks during pregnancy but this figure is considered from the early and isolated defects to changes skin. The prevalence is higher in women who are already obese prior to pregnancy [1]. Stretch marks usually occur in about  $27 \pm 5$  week's gestation [2]. In pregnant women with seborrheic skin, acne and stretch marks ichthyosis intensifies, which is probably a result of the loss of additional elasticity. It is considered that

factors involved in its genesis as lower maternal age, higher weight gain and genetic characteristics individuals [3]. Numerous creams, emollients, and oils (e.g., vitamin E cream, cocoa butter, aloe vera lotion and olive oil) are used to prevent striae; however, there is no evidence that these treatments are effective. Limited evidence suggests that two topical treatments may help prevent striae [4]. One contains Centella asiatica extract plus  $\alpha$ -tocopherol and collagen-elastin hydro lysates which study found that only 34% of the group that used a daily application of a cream containing Centella asiatica extract, vitamin E and collagen-elastin hydro lysates developed striae, as opposed to 56% in the control group. In women with a history of striae during puberty, the active cream induced a significant absolute prevention in 89% of the cases, whereas all the women in the placebo group developed striae [5]. The other treatment contains tocopherol, essential fatty acids, panthenol, hyaluronic acid, elastin, and menthol, was associated with fewer women with stretch marks (OR: 0.26; 95% CI 0.08 to 0.84) [6]. However, neither of these products is widely available, and the safety of using Centella asiatica during pregnancy and the components responsible for their effectiveness are unclear [7]. Recent research has shown that keratinocytes locally express "aquaglyceroporins"; viz., AQP3 in the epidermis where they increase the hydration and transport glycerine throughout the epidermis [8]. As the physical properties of glycerol provide occlusive physical properties (wetting care and maintenance), this makes possible that a topical formulation

with glycerol increase skin hydration, improved elasticity thereof and lessen stretch marks. For this purpose a semi moisturizer was developed for use during pregnancy.

Prior data indicate that the incidence of stretch marks in Indian women is 77%. Further studies are needed before treatments and commonly used creams and emollients can be recommended for widespread use. Any topical treatment which could prevent the development of striae would be welcomed by many women.

## Materials and Methods

### Types of study

Open, randomized, prospective, comparative trial.

### Type of participants

Healthy, primiparous women [n=120] (at outpatient department of Obstetrics and Gynecology, ILS Hospital, Kolkata), who are in 18 to 20 weeks' gestation with single foetus and low risk of pregnancy.

### Inclusion criteria

- Aged 20-50 years
- In good health
- Willing to sign informed consent and attend all appointments
- Having appropriate bilateral striae

### Exclusion criteria

- Currently taking or applying antihistamines, anti-inflammatories, corticosteroids or other medication that may affect skin reactions
- Body mass index > 30kg/m<sup>2</sup>
- Suffering from diabetes, circulatory problems, malnutrition or other conditions that may adversely affect healing processes

### Type of interventions

Active moisturizer (consists mainly by a base in water emulsion oil, containing 19% fat, 2% lactic acid, 3% glycerin, it has a pH of 4.5-5.5 and lacking perfume and allergens).

### Types of outcome measures

The hydration and elasticity of the abdominal skin at inclusion and decrease the ridging during pregnancy and soon after childbirth.

The study was conducted with adherence to ethical guidelines issued by the Helsinki Declaration of 1975. This study was reviewed and approved by the institutional ethics committee (ILS Hospital Ethics Committee). Once included in the study, patients were explained the proper application of the cream: apply the cream once a day after bathing using a sufficient amount of cream to cover the abdomen, from the ribs to the top of the pubis and inguinal folds. The control zone measurement was the inner forearm and subjects were warned that during treatment do not apply cream or other substances in said zone. Subjects were formed randomly two groups: 1) wet skin (n=60), where the excess water is removed only with hands immediately applying the cream, and 2) dry skin (n=60), wherein excess water was removed with towel before applying cream; in both cases the cream should cover the abdomen and integrated into the skin by gently

massaging of at least two minutes. The data was collected via questionnaire and physical examination. The objectives were to assess the effects of topical treatments applied during pregnancy on the later development of stretch marks.

## Measurements

Measurements before treatment (baseline) and at subsequent visits scheduled for performed in a under controlled temperature and humidity conditions (21 ± 1°C, 45 ± 5%) in the absence of heat and forced convection, to reduce the perspiration and reduce the possibility of methodological bias. Before humidification and elasticity measurements subjects were kept 10 minutes rest. Being patient supine proceeded to uncover the abdomen and exposure to ambient conditions for 20 to 30 seconds.

### Determination of hydration

CM 825 (CK Electronic FRD) was used corneometer. The measuring principle is based on detecting the capacitance of a dielectric medium. Any change in dielectric constant caused by a variation of skin hydration alters the capacitance of capacitor accuracy. The measurement can detect even the lightest of hydration changes. In each quadrant of the abdomen moisture was measured in instrumental units (IU) and readings were recorded in the data sheet. In the anterior forearm as a control region, the same procedure was performed.

Score (A)	
Stretch Marks (Number)	Score/Rating
0-3	0
4-9	1
10-15	2
>15	3
Score (B)	
Erythema/Color of stretch mark	Score/Rating
Absent	0
Pink/light red	1
Dark red	2
Purple	3
Final Score (C=A+B)	
0	None/No striae
1-2	Minor
3-4	Moderate
5-6	Severe

Table 1: Results of determination of elasticity.

### Determination of elasticity

A Reviscometre RV 600 (CK electronic FRD) was used to measure the elasticity, measured by determining the consistency of directional fibers of the skin by the resonance speed of an ultrasound wave. The

higher the running time, detected as a shorter route in tissue elasticity. To do this, with clean skin and in regions designated for the specific transducer applicator, which identified four readings (at 0, 45, 90 and 180°) expressed in milliseconds (msec) was placed. The results of the measurements are captured in the data sheet for analyzing later. Finally, the abdomen is visually explored for recording absence, existence and intensity of dermal ridges; thus grading the results according to the parameters specified in Table 1.

### Statistical analysis

The sample size was calculated with the formula proportions; it was assumed that after treatment the differential ratio could be 50% (25%-75%); confidence: 95%, and statistical power: 0.5%; expected also get a rejection rate or abandonment of 10%. Quantitative parameters expressed in percentages and metric parameters are described by the arithmetic mean and standard deviation standard. Before and after treatment comparisons were based on the mean change from baseline to the end of the observation, and examined with Fisher exact test using an analysis of variance (ANOVA) was performed. A p-value <0.05 was considered statistically significant.

### Results and Discussion

The data of the 120 women who completed the study were analyzed. The demographic characteristics were mention in Table 2. The Initial weight was 55.6 ± 8.8 kg and weight again 10.66 ± 3.8 kg. The mean of baseline values and after treatment until the end of pregnancy (end of study) was calculated. The average basal hydration was 42 ± 13 IU and the final was 46 ± 6 IU (p=0.0325; 95% CI: -7.66 to -0.34), which difference was statistically significant. But the basal average elasticity was 185 ± 49 msec and the final was 176 ± 47 msec (p=0.3066; 95% CI: -26.36 to 8.36), which was not statistically significant.

Age (years)	25 ± 5
Initial weight (kg)	55.6 ± 8.8
Weight gain (kg)	10.66 ± 3.8

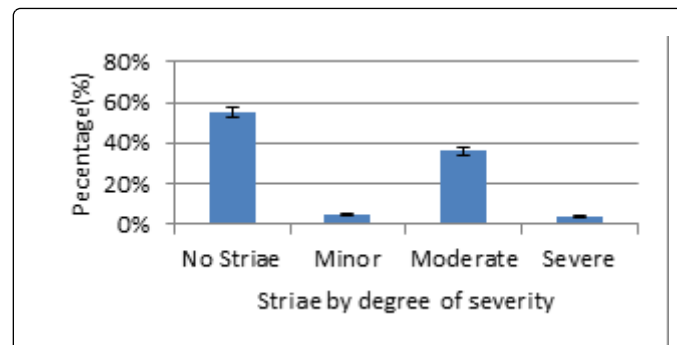
**Table 2:** Demographic characteristics of the study population.

By measuring the moisture in the control region (forearm) a basal reading of 40 ± 9 IU and end of study of 38 ± 6; (p=0.1547; 95% CI: -0.77 to 4.77) and this difference was considered to be not statistically significant. It was observed that at the end of the study, 55% women without ridges; mild ridges 5%; 36% moderate; and 4% severe ridges (Figure 1).

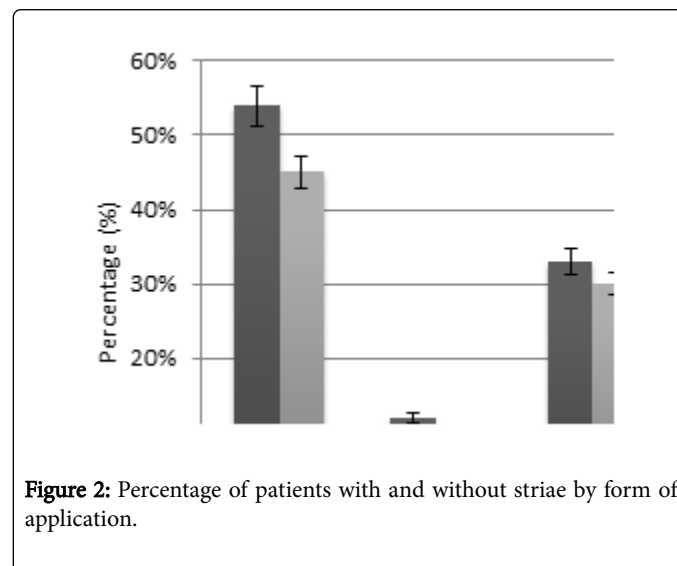
When comparing the groups (wet skin vs. dry skin), the proportion of women without grooves was 54% when the cream was applied studied wet skin and 45% when the cream was applied on dry skin. In addition, there were 1% of severe striations in the group of application in wet skin (Figure 2).

Prevent formation of stretch marks is the main part of the treatment, but existing striae are very rare to healing. The hormone responsible for stretch marks changes. Changes are inherent to pregnancy and cannot therefore remove. Effect of a moisturizer to prevent stretch marks decreases the stiffness of the abdominal wall. Passive therapy should aim to strengthen the resilient layer to be tougher and distensible. In this study, half of them (54%) had virtually no stretch marks during pregnancy. Thus, which may be more

significant cream when applied to wet skin, is due to the effect occlusive cream, which reduces losses water insensitive. In our population sample was no association between risk factors (race, weight gain, age or parity) and stretch marks.



**Figure 1:** Percentage of patients with and without striae by degree of severity.



**Figure 2:** Percentage of patients with and without striae by form of application.

### Conclusion

Objectively found that study cream increased wetting and skin elasticity all participants. Half of them had no stretch marks during pregnancy. This effect is more significant (54%) when the cream is applied to damp skin. This study has shown that it is possible to improve the appearance of striae with the topical application.

### References

1. Atwal GS, Manku LK, Griffiths CE, Polson DW (2006) Striae gravidarum in primiparae. Br J Dermatol 155: 965-969.
2. Ghasemi A, Gorouhi F, Rashighi-Firoozabadi M, Jafarian S, Firooz A (2007) Striae gravidarum: Associated factors. J Eur Acad Dermatol Venereol 21: 743-746.
3. Osman H, Rubeiz N, Tamin H, Nassar AH (2007) Risk factors for the development of striae gravidarum. Am J Obstet Gynecol 196: 62e1-62e5.
4. Young GL, Jewell D (1996) Creams for preventing stretch marks in pregnancy. Cochrane Database Syst Rev Art. No.: CD000066.

- 
5. Mallol J, Belda MA, Costa D, Noval A, Sola M (1991) Prophylaxis of striae gravidarum with a topical formulation. A double blind trial. *International Journal of Cosmetic Science* 13: 51-57.
  6. Young GL, Jewell D (1996) Creams for preventing stretch marks in pregnancy. *Cochrane Database Syst Rev* 2000: CD000066.
  7. Ernst E (2002) Herbal medicinal products during pregnancy: are they safe? *BJOG* 109: 227-235.
  8. Sougrat R, Morand M, Gondran C, Barré P, et al. (2002) Functional expression of AQP3 in human skin epidermis and reconstructed epidermis. *J Invest Dermatol* 118: 678-685.