RESEARCH ARTICLE

CYPRUS
JOURNAL OF MEDICAL SCIENCES

DOI: 10.4274/cjms.2021.2021-209
Cyprus J Med Sci 2024;9(1):64-69

Determination of Striae Gravidarum and its Affecting Factors During Pregnancy

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Abstract

BACKGROUND/AIMS: The aim of the study was to determine the formation of striae gravidarum (SG) and its affecting factors during pregnancy.

MATERIALS AND METHODS: This study was conducted as a descriptive-cross-sectional study between April and July, 2018. The population of the study consisted of women (n=239) who gave birth at term in the Women's Health and Maternity Service of a university hospital in Cyprus and volunteered to participate in this study. The data were collected via the "Data Collection Form" consisting of 30 questions.

RESULTS: Thirty one percent of the women had intense striae. SG intensity was mostly located on the abdomen (50.4%), hips (8.5%) and breasts (8.5%). SG development time increased mostly in the third trimester of pregnancy (72.1%). It was found that 57.4% of women had striae in the same fashion as their mothers. The prevalence of striae in pregnancy was significantly higher in those women whose mothers also developed SG ($p<0.001$). It was observed that striae development was higher in women with high body mass index (BMI) in the pre-pregnancy period and after pregnancy ($p<0.001$).

CONCLUSION: Those women who had family history of SG (especially in their mothers) and whose BMI was higher both before and after pregnancy had more SG.

Keywords: Striae gravidarum, midwifery, nursing, pregnancy

INTRODUCTION

Many changes occur in women's bodies during pregnancy. Striae gravidarum (SG) is among the physiological changes which develop in the female body during pregnancy. SG may develop during pregnancy with individual differences in terms of size, shape and region.[1] SG starts out as erythematous, red or purple linear bands and then turns into mother-of-pearl patterning and then it heals, leaving an atrophic scar. Deep striae may cause itching, burning, discomfort or bleeding. Although the factors causing the formation of SG are not known precisely, some risk factors have been defined. These are; the age of the mother, the presence of striae in the family history, race, the weight of the mother during pregnancy, the weight of the new-born and the size of the head circumference, being primigravida, hormonal changes during pregnancy and increased lateral tension in the connective tissue as a result of increased regional distension.[1-5]

SG is seen in approximately 50-90% of pregnant women and is more common in the last trimester of pregnancy.[6] SG is generally seen in the breasts, abdomen, hips, thighs and axillary regions.[7] In the literature, there are many studies regarding the prevention of SG.[1-7] The most important reason for this is that SG does not disappear after it occurs and becomes an aesthetic body perception problem for women in the postpartum period.[8,9]

Due to the increased importance which women place on beauty and aesthetics, the demand to reduce or prevent SG has also increased.[10] It is seen that many herbal and cosmetic products are commonly used

To cite this article: Mammadov B, Necipoğlu D, Vural G. Determination of Striae Gravidarum and its Affecting Factors During Pregnancy. Cyprus J Med Sci 2024;9(1):64-69

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Received: 05.08.2021
Accepted: 08.12.2021

to reduce or prevent SG from occurring. A systematic review showed that the herbal and cosmetic products used to date are not sufficient in preventing SG.[10] For this reason, it is thought that more studies are needed in order to determine the factors which are effective in the development of SG and the methods used to prevent this condition. Knowing the risk factors in the formation of SG is important in terms of guiding the training and care to be given to pregnant women by midwives and nurses.

The aim of the study was to determine the frequency and severity of SG occurring during pregnancy in puerperal women and the factors affecting the formation of SG. In this context, the research questions were;

1) How common is SG in pregnant women?

2) What are the factors affecting the development of SG in pregnant women?

3) How severe is SG in pregnant women?

4) What are the methods used by pregnant women to prevent SG?

MATERIALS AND METHODS

Design of Study

The study was designed in a descriptive cross-sectional manner.

Population and Sampling of the Study

It was determined that the number of births in a year at the University Hospital was between 550-600. The sample of this study was taken as n=600 and the population of the study was calculated with a sample formula of the known universe with a 95% confidence interval and a 5% margin of error (n=234). During this study, n=239 cases were investgated. The population of this study consisted of women (n=239) who were in the inpatient ward of the Gynaecology and Obstetrics Department of a University Hospital located in the Turkish Republic of North Cyprus, who had just given birth and were willing to participate in this study.

Variables of the Study

The independent variables of this study were sociodemographic factors and the products used to prevent the striae, while the dependent variable was the presence of SG.

Inclusion Criteria

This participants of this study were women who had just given birth, who spoke Turkish, and were willing to participate.

Application of the Study

The data were collected with the "Data Collection Form" comprising 30 questions prepared by the researchers. The data collection form was prepared after taking the advice from experts (3 specialist nurses). A pilot study was conducted using the data collection form (n=30, and these participants were subsequently included in this study as there was no change in the data collection forms). The first section of the data collection form consists of 12 questions on the socio-demographic characteristics of the women (age, education, number of pregnancies, weight, height etc.); the second section consists of 18 questions related to (SG development, the number of SG, the time of the SG occurrence, family history of SG and the products they used to prevent SG and how regularly they used them etc.). The location of the SG was determined and its severity was recorded as mild, moderate or severe. The presence of 1-5 striae in a localised region was classed as mild, 6-10 striae was classed as moderate and 11 or over striae was classed as severe SG.[11,12] In addition, visuals were added to the questionnaire in order to determine the location of the striae. The body regions of puerperant women with SG were visually evaluated by the researchers.

The data were collected between the 1st of April and the 30th of July, 2018 by a face-to-face interview technique lasting 15 to 20 minutes with the women who had given birth at the hospital. When interviewing the women face-to-face, a time when they felt comfortable and did not have any pain was selected. The researchers observed the SG regions, regarding their location and severity and recorded this information in order to analyse the development of SG.

Ethical Considerations

In order for the data collection forms to be administered, institutional permission, Near East University Ethics Committee permission (approval number: YDU-2017/45-385) and informed consent were obtained from the participants and the relevant institutions.

Statistical Analysis

The Statistical Package for Social Sciences software version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) package software was used to analyse the data. Percentage, frequency and chi-squared tests (χ^2) were used to analyse the data. The data were evaluated with a 95% confidence level and level of significance of $p<0.05$.

RESULTS

A total of 83.7% of the women who developed SG during pregnancy were between the ages of 25-40 years and 74.4% (n=96) of them had postgraduate degrees. It was determined that 53.5% (n=69) of the women who developed SG were primiparous and 89.1% gave birth to babies whose birth weight was within the normal margins (2,500-4,000 gr.) (Table 1). Thirty one percent of the participants (n=40) had severe SG (11 or over) and in order of frequency, the regions in which it was observed were the abdomen (50.4%), hips (8.5%) and breasts (8.5%) (Table 2). When the women were asked when they developed SG, they stated that the increase in striae was more severe in their third trimester (72.1%). 79.9% of the women who had SG stated that before pregnancy, they had no striae on their bodies (Table 3).

When the family history of women who developed SG was considered, 84.5% of them had a first degree relative with a history of SG. The presence of SG in their family history was determined to be a statistically significant factor with regards to the development of SG (Table 1), ($p<0.001$). When the women who had SG were asked who the family member who had SG was, 57.4% of them responded by saying their mother or grandmother had SG, so it was determined this significantly affected the development of striae during their pregnancy ($p<0.001$). The development of striae both before and after pregnancy was found to be related to body mass index (BMI). It was determined that women with higher BMI had more striae (both before pregnancy; $p<0.001$, and after pregnancy $p<0.001$). It was also found that the difference between

the BMI before and after pregnancy was not related to the formation of SG (p=0.713).

When the cosmetic and herbal products which women used to prevent SG during pregnancy were considered, 70.5% of them stated that they developed striae regardless of using these products. It was determined that the use (p=0.061) of various cosmetic creams and herbal ointments (almond oil, olive oil, cocoa butter, baby oil etc.) and the different frequencies of use (sometimes, 1-3 times a day etc.) did not prevent striae development (p=0.792). Also, it was also determined that smoking (p=0.276), multiple pregnancies (p=0.366), birth method (p=0.465), the baby's gender (p=0.620), or the presence of polyhydramnios (p=0.523) did not affect the development of SG significantly (Table 1).

DISCUSSION

It is estimated that SG develops in over half of pregnancies and its aetiology is not yet known.[9] When the literature is reviewed with regard to the causes and precautions taken against SG, it can be seen that there are very few studies in this field. According to the results of our study, women who have a family history of SG (especially in their mother) are more likely to develop SG (p=0.001). Our results showed that another important factor affecting SG was a high BMI. For example, our study showed that a high BMI before and during pregnancy increased the development of striae (p=0.001). The prevalence study conducted by J-Orh et al.[11] on 180 pregnant women regarding SG showed that young women with a family history of SG and those who had a high BMI before and during pregnancy were more susceptible to SG. The results of the study conducted by Ghasemi et al.[13] showed similar results, indicating that genetic and physical factors play a significant role in the development of SG. As a result of the literature review conducted by Farahnik et al.[14] in 2016, it was determined that the most important risk factors in the development of SG were: being a young mother, the presence of a family history of SG (especially in the mother), an increased BMI before and during pregnancy and a heavy birth-weight new-born. When the results of other studies are considered, it can be seen that the factors affecting SG are genetic and physical aspects such as: being a young mother, the presence of a family history of striae, high pre-pregnancy BMI, and excessive weight gain during pregnancy.[15-19] As a result of our study, this finding, which supports the literature, revealed that genetic factors are effective in the development of striae.

Table 1. Socio-demographic characteristics of women (n=239)

Socio-demographic characteristics		Striae gravidarum, (n=129) (54%)		No striae gravidarum, (n=110) (46%)		χ^2	p
		n	%	n	%		
Age	18-24	4	3.1	2	1.8	3.248	0.189
	25-40	108	83.7	95	86.4		
	41 and above	17	13.2	13	11.8		
Education level	Primary education	7	5.4	3	2.7	3.761	0.154
	Secondary education	26	20.2	14	12.7		
	Higher education	96	74.4	39	84.5		
Number of pregnancies	Primiparous	69	53.5	71	64.5	3.010	0.084
	Multiparous	60	46.5	39	35.5		
Birth weight of babies	Below 2,500 gr	8	6.2	8	7.3	0.248	0.883
	2,500-4,000 gr	115	89.1	98	89.1		
	Over 4,000 gr	6	4.7	4	3.6		
Smoking	Yes	35	27.1	37	33.6	1.193	0.276
	No	94	72.9	73	66.4		
Multiple pregnancy	Yes	8	6.2	4	96.4	0.819	0.366
	No	121	93.8	106	3.6		
Type of delivery	Caesarean section	87	67.4	79	71.8	0.536	0.465
	Normal vaginal delivery	42	32.6	31	28.2		
Baby's gender	Female	58	45	53	48.2	0.248	0.620
	Male	71	55	57	51.8		
Presence of polyhydramnios	Yes	15	11.6	10	9.1	0.408	0.523
	No	114	88.4	100	90.9		
Family history of SG	Yes	20	15.5	68	61.8	15.894	0.001
	No	109	84.5	42	38.2		
The relationship to an individual with SG in the family	None	20	15.5	42	38.2	17.656	0.001
	Mother	74	57.4	45	40.9		
	Sister	27	20.9	14	12.7		
	Other (aunt etc.)	8	6.2	9	8.2		

χ^2: Chi-squared tests, p<0.05.

Our study also showed that there was no significant relationship (p>0.05) between the formation of SG during pregnancy and the various cosmetic and herbal ointments used (almond oil, olive oil, cocoa butter, baby oil etc.). Different results can be seen among the randomised controlled studies related to the use of various herbal and cosmetic ointments used in order to prevent SG. These studies showed that although the use of products reduces the severity of SG, they cannot remove SG or prevent it from occurring. For example, in one study conducted with 100 nulliparous women to measure the effects of olive oil in preventing SG, the women were separated into experimental and control groups. 1 mL of olive oil was topically applied twice a day to the abdomen area. The results showed that olive oil did not affect the severity or prevent the occurrence of SG.[20] Similarly, a study in which 360 nullipara women used olive oil and Saj cream showed that there were no differences between the control group and the experimental group (p>0.05).[21] The study conducted by Taavoni et al.[22] in 2011 on the effects of olive oil in preventing SG during the second trimester showed that there were no differences in SG formation between the control and experiment groups, thus demonstrating that the use of olive oil did not prevent SG. When the results of the studies examining the effects of cocoa butter and bitter almond oils had on SG were examined, it could be seen that these oils also did not prevent striae development in pregnancy.[23-25] Similar to the results in the literature, our results also showed that the cosmetic creams and herbal oils and the frequency with which women used these did not prevent the occurrence of SG.

It is thought that the reason that the cosmetic creams and herbal oils used by the women participating in our study and the frequency with

Table 2. Information on women's use of products during pregnancy (n=239)

		Striae gravidarum, (n=129) (54%)		No striae gravidarum, (n=110) (46%)		χ^2	p
Product use during pregnancy (cream, oil)	Yes	91	70.5	72	65.5	0.709	0.400
	No	38	29.5	38	34.5		
Used product during pregnancy	None	38	29.5	38	34.5	9.023	0.061
	Cosmetic product	56	43.4	56	51.0		
	Vegetable oils	35	27.1	16	14.5		
The area of the body where the product was used	None	38	29.5	38	34.5	7.396	0.119
	Abdomen	43	33.3	36	32.7		
	Abdomen + breasts	8	6.2	17	15.5		
	Abdomen + hips	20	15.5	5	4.5		
	Abdomen + hips + breasts	20	15.5	14	12.7		
Frequency of product use	Never used	38	29.5	38	34.5	1.694	0.792
	Sometimes	22	17.1	14	12.7		
	Once a day	40	31.0	36	32.7		
	2 times a day	24	18.6	17	15.5		
	3 times per day	5	3.9	5	4.5		

χ^2: Chi-squared tests, p<0.05.

Table 3. Distribution of some features of striae gravidarum (n=129)*

SG features		n	%
How many SG developed	1-5	42	32.6
	6-10	47	36.4
	11 or above	40	31.0
Area where SG developed	Abdomen	65	50.4
	Hips	11	8.5
	Abdomen + breasts	18	14.0
	Breasts	11	8.5
	Abdomen + hips	12	9.3
	Abdomen + hips + breasts	6	4.7
	Hips + breasts	6	4.7
SG development trimester	First trimester	10	7.8
	Second trimester	26	20.2
	Third trimester	93	72.1
Presence of striae before pregnancy	Yes	48	20.1
	No	191	79.9

*Only those women who developed striae gravidarum were included.

which they used them did not work was their genetic tendencies to develop SG. Our results showed that increased BMI can affect striae and that this is due to the fatty tissue under the skin becoming thicker and stretching the skin, thus causing SG. Although no significant relationship was found between the age of the women and the development of SG in our study (p=0.189), the literature states that SG is more common in younger women. This is due to the structure of the fibrils in younger women being more breakable, which allows stretch marks to occur more easily.[11] The ages of the women participating in our study were similar and so it is thought that if this study is repeated with participants from different age groups, this might affect the results.

The study conducted by Canpolat et al.[12] in 2010 showed that polyhydramnios is related to SG and that SG is seen in all polyhydramnios cases. This situation, which they assumed to be due to the abdomen region being wider thus increasing the tension in the skin, did not appear as a factor which increased striae in our study (p=0.523). It was also seen that smoking during pregnancy did not affect SG and it is assumed that this is due to the number of pregnant women who smoke being low and that there were not enough sample numbers to test the validity of this proposition. Also, although smoking has many harmful effects, it did not directly affect SG (p=0.276).

Study Limitations

Our research is limited to those women who applied to a university hospital in North Cyprus to give birth between April and July, 2018 and who also agreed to participate in this research. Increasing the sample size would increase the power of this study.

CONCLUSION

It was found that approximately half of the women participating in our study developed SG and SG intensity increased mostly in the third trimester. It was found that the development of striae before and after pregnancy was higher in those women with a family history of SG and a high BMI. Many factors (maternal age, genetic predisposition, skin type, etc.) which cause SG during pregnancy are beyond the control of midwives and nurses. With good prenatal care and education, other factors affecting the development of SG can be controlled by midwives and nurses. Therefore, during pregnancy, it is necessary to monitor and control the mother's weight, to direct her to appropriate exercises, to maintain body hydration, to provide adequate fluid intake and to be followed up regarding edema.

In addition, in order to determine the formation of SG and its related factors during pregnancy, we recommend carrying out analytical and randomized controlled scientific studies on women with different genetic structures, from different cultures, living in different climates, and experimental studies using different products which are intended to prevent the formation of SG.

MAIN POINTS

- Approximately half of the women had striae gravidarum.
- Striae gravidarum severity increased mostly in the third trimester.
- The prevalence of striae in pregnancy was higher in those women whose mothers developed striae gravidarum.
- The development of striae gravidarum before and after pregnancy was higher in women with high BMI.
- Using various vegetable oils and cosmetic creams did not effectively prevent striae formation in pregnancy.

Acknowledgments: The authors would like to thank all participants who voluntarily participated in this study.

ETHICS

Ethics Committee Approval: This study was approved by the Near East University Ethics Committee (approval number: YDU-2017/45-385).

Informed Consent: Informed consent were obtained from the participants and the relevant institutions.

Authorship Contributions

Concept: B.M., D.N., G.V., Design: B.M., D.N., G.V., Supervision: G.V., Fundings: B.M., G.V., Materials: B.M., D.N., G.V., Data Collection and/or Processing: B.M., D.N., Analysis and/or Interpretation: D.N., Literature Search: B.M., D.N., G.V., Writing: B.M., D.N., Critical Review: B.M., G.V.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study had received no financial support.

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