

RESEARCH ARTICLE

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Determination of Striae Gravidarum and its Affecting Factors During Pregnancy

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Abstract

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

MATERIALS AND METHODS: This study was conducted as a 'descriptive-cross-sectional' between April-July 2018. The population of the study consists 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 the study. The data were collected via the 'Data Collection Form' consisting of 30 questions.

RESULTS: Thirty one percent of the women had intense striae. Striae Gravidarum (SG) intensity was mostly distributed as abdomen (50.4%), hip (8.5%) and breast (8.5%), respectively. SG development time increased mostly in the third trimester of pregnancy (72.1%). It was found that 57.4% of women had striae like their mothers. The prevalence of striae in pregnancy was significantly higher in 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: The women who had family history of SG (especially in their mothers) and whose Body Mass Index was higher before and after pregnancy had more striae gravidarum.

Keywords: Striae Gravidarum, Midwifery, Nursing, Pregnancy

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 women whose mothers developed striae gravidarum.
- The development of striae gravidarum before and after pregnancy was higher in women with a high BMI.
- Using various vegetable oils and cosmetic creams cannot effectively prevent striae formation in pregnancy.

INTRODUCTION

Many changes occur in women's bodies during pregnancy. Striae gravidarum (SG) is among the physiological changes that 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 and heals, leaving an atrophic scar. Deep striae that may develop 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 young mother, the presence of striae in the family history, race, the weight of the mother during pregnancy, the weight of the newborn 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).

Striae gravidarum 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 that 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 reduce or prevent SG from occurring. A systematic review shows that the herbal and cosmetic products used today are not sufficient in preventing SG (10). For this reason, it is thought that more studies are needed to determine the factors that 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 is to determine the frequency and severity of striae gravidarum occurring during pregnancy in puerperal women and the factors affecting the formation of striae gravidarum. In this context, the research questions are;

- 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?

MATERIAL 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 the 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 the study, n=239 samples were reached. The population of this study consisted of women (n=239) who were on the inpatient ward of the Gynaecology and Obstetrics Department of a University Hospital located in the Turkish Republic of North Cyprus (TRNC), who had just given birth and were willing to participate in this study.

Variables of the Study

The independent variables of this study are sociodemographic factors and the products used to prevent the striae, while the dependent variable is the presence of striae gravidarum.

Inclusion Criteria

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

Application of Study

The data were collected with the 'Data Collection Form' comprising 30 questions prepared by the researchers. The data collection form was prepared by taking the advice from the experts (3 specialist nurses). A pilot study was conducted using the data collection form (n=30, these participants were included in the study because 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 striae gravidarum (SG

development, number of SG, time 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 the severity was recorded as mild, moderate or severe. The presence of 1-5 striae in the localised region was classed as mild, 6-10 striae was classed as moderate and over 11 striae was classed as severe SG (11,12). In addition, visuals were added to the questionnaire to determine the location of the striae. The body regions of puerperant women with striae gravidarum were visually evaluated by the researchers.

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

Data Analysis

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 $p < 0.05$.

Ethical Considerations

In order for the data collection forms to be administered, institutional permission, ethical board permission (XX-2017/45-385 Ethics Committee) and informed consent was received from the participants.

RESULTS

A total of 83.7% of the women who developed striae gravidarum during pregnancy were between the ages of 25-40 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 normal margins (2500-4000 gr.) (Table 1). Thirty one percent of the participants (n=40) had severe SG (11 and 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 the family history was determined to be a statistically significant factor with regard 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 and 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 the Body Mass Index (BMI). It was determined that women with higher BMI had more striae (before pregnancy; $p < 0.001$, 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 that 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 ($p=0.465$), baby's gender ($p=0.620$), and 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 the pregnancies and its etiology is not yet known (9). When the literature is reviewed with regard to the causes and precautions taken against striae gravidarum, 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 striae gravidarum ($p=0.001$). 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 who have a high BMI before and during pregnancy are 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 B 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 newborn. When the results of other studies are considered, it is 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.

Our study also showed that there is 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 to prevent striae gravidarum. These studies show that although the use of products reduces the severity of SG, they cannot remove the SG or prevent it from occurring. For example, in a study conducted with 100 nulliparous women to measure the effect 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 prevent the severity or 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 Taavani 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 have on SG are examined, it can be seen that these oils also do 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 use these could 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 which they used them did not work was their genetic tendencies to develop striae gravidarum. Our results showed that an 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 suggested 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 shows 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 that 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 does not directly affect SG ($p=0,276$).

Limitations

Our research is limited to women who applied to a university hospital in Northern Cyprus to give birth between April-July 2018 and agreed to participate in the research, and increasing the sample size will increase the power of the study.

CONCLUSION

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

In addition, to determine the formation of striae gravidarum and related factors during pregnancy we recommend to carry 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 that prevent the formation of striae gravidarum.

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

Socio-demographic characteristics		Striae Gravidarum n=129 (%54)		No Striae Gravidarum n=110 (%46)		x ²	p
		n	%	n	%		
		Age	18-24	4	3,1		
	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		
	High education	96	74,4	39	84,5		
Number of pregnancies	Primipary	69	53,5	71	64,5	3,010	0,084
	Multiparous	60	46,5	39	35,5		
Birth weight of babies	Below 2500 gr	8	6,2	8	7,3	0,248	0,883
	2500-4000 gr	115	89,1	98	89,1		
	Over 4000 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	Girl	58	45	53	48,2	0,248	0,620
	Boy	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 proximity of 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, Aunt)	8	6,2	9	8,2		

χ^2 : Chi-Squared Tests ; $p < 0,05$

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 + breast	8	6,2	17	15,5		
	Abdomen + hip	20	15,5	5	4,5		
	Abdomen + hips + breast	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 ; $p < 0,05$

SG Features		n	%
How many SG have developed	1-5	42	32,6
	6-10	47	36,4
	11 and above	40	31,0
Area where SG developed	Abdomen	5	50,4
	Hip	11	8,5
	Abdomen + Breast	18	14,0
	Breast	11	8,5
	Abdomen + Hip	12	9,3
	Abdomen + Hip + Breast	6	4,7
	Hip + Breast	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 women who developed Striae Gravidarum were included.