Striae Gravidarum in Iranian Women: Prevalence and Associated Factors

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Abstract: Striae gravidarum (SG) is one of the most common connective tissue changes during pregnancy that may be causing concerns. The purpose of this study was to identify associated factors with striae gravidarum (SG) in pregnant women and their possible association with the characteristics of themselves and their newborns. A cross-sectional study of 224 primiparous women delivering at an educational and therapeutic center was conducted. The data were collected via questionnaire and physical examination. The presence, absence, and severity of striae were evaluated by Davey's score. Data were analyzed by using descriptive and analytical statistics (Chi-square test, t test). 81.3 percent of the participants had developed SG. Women who developed SG had gained significantly more weight during pregnancy (14.04 ± 4.5 vs 12.2 kg ± 4.6; $P < 0.02$) and had more body mass index (23.47± 3.6 vs 21.76± 2.8; $p<0.002$). Family history of striae gravidarum in mother and sister have a significant association with the presence of SG. This study showed that genetic factors (family history striae gravidarum) and physical factors (weight gain during pregnancy and baseline body mass index) may have a very important role in developing striae gravidarum. The result of this study can help physicians to counsel Iranian pregnant women about their associated factors for striae gravidarum.

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Introduction:

The most common alteration in connective tissue of pregnant women is Striae gravidarum (SG);(1) that is no serious problem for bodily function, it is a disfiguring lesion that may cause cosmetic concerns in many women (2). SG mostly develop in the third trimester as reddish and slightly depressed streaks and disappear postpartum to leave permanent silvery scars, which are found sometimes over the breasts, thighs, hips and buttocks and commonly on the skin of abdomen.(3-5)

According to the findings of some surveys, although SG tend to occur in maximum skin stretching areas, the degree of striae formation is not correlated with the extent of body size enlargement during pregnancy. (6) In a study, Salter et al, found a correlation between the presence of striae and pelvic relaxation, a condition that is associated with decreased collagen content. (7)

It is estimated that up to 90% of pregnant women develop SG, even though some research report the prevalence to be as low as 50%. (8) Some suggested risk factors for development of SG include family history, skin type, race, birth weight (BW), baseline body mass index (BMI), age and weight gain are found; but most of these factors have not been confirmed. (3, 9, 10)

In this study, we want to evaluate the prevalence of striae gravidarum and associated factors in Iranian pregnant women who have a genetic background that might be different from previous reports. In addition to some of the previously studied risk factors, factors that affect healthy skin may be associated with striae gravidarum. Therefore, we looked at some factors, not studied in the past that may theoretically affect the risk of developing SG such as water intake, sleeping, bowel movement, fetal gender, and weight. Information of this present study can help physicians and midwives counsel and promote health care for pregnant women, and may lead to a better understanding of etiology of striae gravidarum with a possible cure.

Materials and Methods

A cross-sectional study was conducted on 224 women who had given first birth and attended to the postpartum wards of Kosar Hospital, Qazvin, Iran in September - October 2011. The main aim of this study was the calculation of sample size for the prevalence of striae gravidarum. We carried out a pilot study on 50 primiparous postpartum women. With the prevalence of 79% of presence of striae gravidarum, and with the acceptable error of 5%, the sample size was 224.

We excluded the pilot samples from the study. After obtaining written consent to participate in the study, all eligible participants were assessed during the postpartum period before their discharge from the hospital. The exclusion criteria included women with a history of diabetes mellitus, gestational diabetes and multiple pregnancies. The Data were collected via questionnaire and physical examination.

There were three categories of general data in our questionnaire including socioeconomic and some interesting history (age, first degree family history of striae, water drinking habit, sleep hours, smoking, bowel movement, onset of striae, baseline body mass index, Skin type), pregnancy data (gestational age at birth, fetal birth weight, fetal gender, weight gain during pregnancy), and use of cosmetic products (cream, lotion, or oil) to prevent striae (frequency and regularity of applying).

Socioeconomic status was determined based on the third party as low, moderate, and high socio-economic status. Family history of SG was considered positive if the woman's mother and/or sister had developed SG during her pregnancy. The water drinking habit was evaluated by asking about average number of cup of water drinking in each day. One cup was referred to the volume of about 200 ml. Skin type was determined by interview questions based on the Fitzpatrick classification, which is based on how often a person burns and how well they tan when exposed to the sun. (11)

Severity of SG was scored by Davey's method. (12) According to this scoring system, each of organs (breast, abdomen, tight) was divided into four quadrants. Each quadrant was scored 0 for clear skin, 1 for a moderate number of striae and 2 for many striae, giving a total score of 0-8. Physical examinations were carried out after completing the questionnaire by the author (NB).

The dependent variables in this study were the presence and absence of striae and the severity of the striae which was measured by Davey's score and the possible predictor with 16 variables. Independent t -test was used to compare all numeric variables within SG positive and negative groups when there was normally distributed continuous variable (tested with one-sample Kolmogorov–Smirnov test). Fisher's exact test and chi-squared test were used to compare the dichotomous characteristics in participants with or without SG where applicable. Some data have been reported as mean ± SD where necessary. Significance was set at 0.05.

This study was approved by the ethics committee of Qazvin University of medical sciences in Iran. Informed consent was obtained from all subjects. In return for their participation, women were given a packet of brochures about the postpartum period, breast feeding, and newborn care.

Results

During the study period, 496 women were admitted to the hospital for delivery. Of these, 224 were eligible for participation in the study. 246 women of them were multiparous, 17 women were discharged before it was possible to approach them, and 9 were not interested in participating in the study. Of the 224 women enrolled in the study, 182 (81.3%) developed SG in at least one of the assessed sites.

Amongst 182 women of positive striae group, 35.6 % had striae in more than one site; 32.4% in two sites and 31.8 % in more than two sites. 174 women (95.6%) developed SG on the abdomen, 74 (40.6%) developed SG on the breasts, and 110 (60.4%) developed SG on the thighs during their pregnancy. Mean and SD of Davey score in breast, abdomen and thighs were 1.08 ± 1.55, 4.31 ± 2.21 and 1.76 ± 2.02 respectively. Maternal age ranged between 13 and 37 years. The majority of the women were between 20 and 25 years of age

(44.2%), and the mean and SD of maternal age were 22.45 ± 4.4 years.

169 cases (75.4%) reported as having first degree family history of striae gravidarum (mother and/or sisters), in which 47 cases (21%), 89(39.7%) and 33 (14.7%) were mother, sisters and mother, and sisters, respectively. The average water intake in these women was 7.81 ± 2.9 cups/ day. All of the women were nonsmokers, and 32(14.3%) were of a low, 154(68.8%) moderate, and 38(17%) socioeconomic status. The average sleep in these women was 9.09 ± 1.9 hours/ day. In the striae group, women reported that the striae began to appear at average gestational age of 6.82 ± 1.4 months. Figure 1 shows the distribution of the began striae in participant. Baseline Body Mass Index ranged from 14.7 to 36.26 kg/m2 with a mean of 23.15 ± 3.5 kg/m2. The predominant skin type in our population was Fitzpatrick II 41 (18.3%), III 162 (72.3%), and IV 21(9.4%).

71 women (31.7%) had used some kinds of cosmetic products such as lotion, cream, or oil during their pregnancy in an attempt to avoid the development of SG, and 5 (2.2%) had used more than 1 cream or lotion. Amongst these women, 39.4% applied it regularly. There was a large variation in the types of creams used. The most commonly used products were olive oil 51(22.8%).

Of the 16 variables investigated, 3 variables were family history, maternal weight gain and Baseline Body Mass Index were found to be significantly associated with the presence of SG. No relationship was noted between other variables in this study and the risk of developing SG. These findings are summarized in Table 1 and 2.

Discussions

Striae gravidarum is a common cosmetic problem , which occurs during pregnancy. The present study provides a clinical assessment of the prevalence and associated factors for striae gravidarum in the cross sectional study of racially homogeneous women. This study is one of the few studies that authors evaluated striae gravidarum in other common sites including thighs, breasts and buttocks, and not only in the abdomen as in previous studies.

The results showed that the prevalence of SG was 81.3%. Among the investigated sites, mean score of Davey's scale in abdomen was more than the other sites. In most studies, the authors reported the prevalence of SG over 50 percent. (5, 8, 13) However, this prevalence in Western countries such as UK (47-52%) (5, 12) and USA (55%)(3) were lower than middle East such as Lebanon (60%)(8) and Iran (87.7%).(14) The present information shows that racial differences are important factors that may have an impact on the prevalence of SG.

In our study, SG developed in younger women more than the older ones. However, the difference was not statistically significant. On the other hand, in the studies of Osman & Ratree the mean age of women who developed SG was less than women who did not. (8, 15) Durmazlar et al also noted that women with SG had less median age than those with no SG.(16)

Some authors state that, the connective tissue of the young women with more collagen and less cross-linking of collagen is readier to undergo the partial tearing that occurs in response to the stretch associated with striae gravidarum formation. (4, 17) In addition, young skin has less Fibrillin than old one and this deficiency of Fibrillin has a role in the formation of SG. (18)

Much controversy exists in the literature about association of positive family history and SG. Similar to some of the previous studies,(5, 15) we found that the prevalence of SG in Women who had a positive family history of SG was more than those who did not have. There are different reports about the relationship between family history of SG and the risk of their development. Whereas, according to Lerdpienpitayakul et al, there was not significant relationship between family history of SG and the risk of its development. (13) Perhaps the explanation is that the quantitative setting of skin collagen is both individual and site specific and the control of this phenomenon relates to genetic. (17)

No correlation was found between cream use and SG development, which is consistent with previous Studies.(13, 15) Whereas, another study found that the use of oil and massage significantly reduced the likelihood of SG development. (12) There are different suggestions for prevention and treatment of SG that have been done, but no successful preventive interventions have been recognized. The nature of our study makes it difficult to draw any conclusion regarding a possible advantage or role of some of the creams utilized.

We also found out that maternal weight gain and BMI were significantly associated with the presence of SG. Some studies have shown that increase in maternal weight gain is associated with the presence of SG. (13, 15) Since the abdominal wall in women with higher pregnancy weight is more stretched, it is associated with a higher risk of SG. According to studies, rapid weight gain during pregnancy is an important factor in stretching or

tearing in the skin and correlating with SG development. (17)

Much controversy exists in the literature about association of water intake and SG. Some of the studies reported that prevalence of SG decreases by higher water intake.(13) Whereas, similar to Ratree's study (15) we found no significant association between water intake and prevalence of SG.

Higher water intake was believed to soak the skin and improve flexibility and elasticity of the skin. Some studies suggested that SG clearly relates to changes in structures that provide the collagen string of skin with its tensile strength, elasticity, flexibility, and reaction force.(7, 9, 18)

The most of women in this study stated that they had the normal bowel movement during pregnancy. There are few studies for the evaluation of relationship between bowel movement and SG. However, Ratree et al showed that no significant relationship exists between constipation and prevalence of SG.(15)

The authors found that baby's higher birth weight and sex were not significantly associated with SG.(5, 13) The present finding is inconsistent with previous studies. Atwal et al stated that the prevalence of SG is higher among mothers who had son rather than mothers who had daughter. (5) However, some authors mentioned that there is no significant relationship between the sex of baby and the prevalence of SG.(13) Thomas & Liston believed that the occurrence of SG was the result of the amount of stretch applied that depends on the size of the baby.(9) The size of the pregnancy content, which mainly relates to the size of the baby, is the factor of rapid skin stretch that results to SG.

Women with lower family income had more prevalence of SG than those with higher family income.(5, 13) In addition, low socioeconomic women may be more likely to get pregnant earlier which is associated with developing of SG.(5) But in our study, the socioeconomic status had no significant association with SG. Perhaps women who have lower socioeconomic status, gain lower weight during pregnancy, which reduces the chance of SG occurrence.

Similar to the Atwal & Osman study,(5, 8) we also found no significant relationship between skin type and severity of SG. On the other hand, Lerdpienpitayakul et al found that the prevalence of SG in women with lighter skin is more than darker skin.(13) Chang, et al, found that non- white women had a greater association with striae than white women.

It seems genetic and mechanical factors are more associated with higher incidence of SG, and type of skin alone cannot determine the severity of SG in women. (3) Unfortunately, our study population was too racially homogeneous to determine any differences with regard to SG risk related to skin type.

Conclusion:

This study showed that genetic factors (family history striae gravidarum) and physical factors (weight gain during pregnancy and baseline body mass index) may have a very important role in developing striae gravidarum. Pregnant women often request information regarding the risk factors of developing SG and means to prevent their appearance during their prenatal visits. Our findings can help physicians and midwives answer some of these questions when counseling patients about SG. Although some of the factors associated with SG are not modifiable (age and family history), other factors such as weight gain during pregnancy and Baseline body mass index are modifiable. Future research should focus on preventive methods that may reduce the likelihood of SG development. More specifically the prophylactic use of creams and lotions should be further investigated to determine once and for all if these treatments have any benefit.

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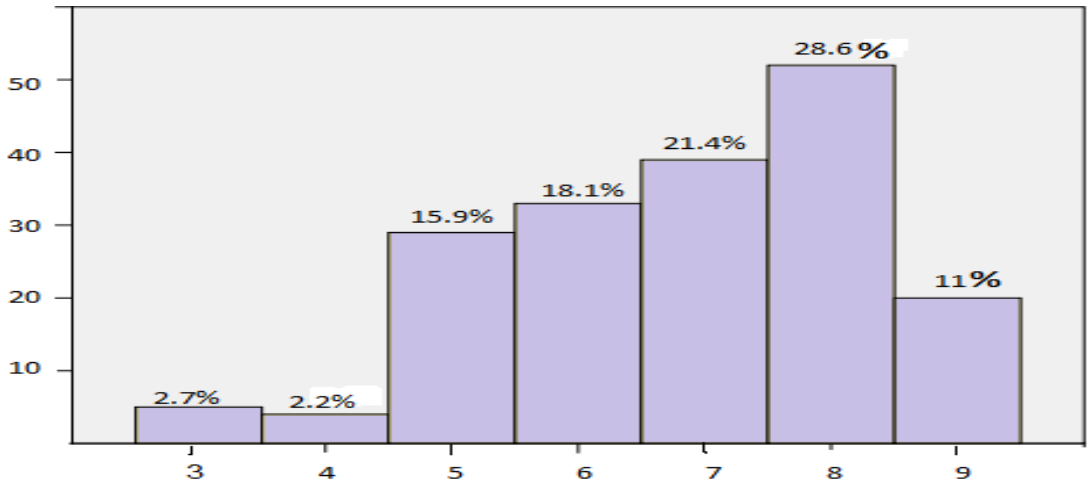

Figure 1: Distribution of the began striae gravidarum in participant base on month of pregnancy

Table 1. Antenatal and fetal characteristics and their association with development of striae gravidarum

Characteristic		striae gravidarum		Total (%)	P Value
		Present (%)	Absent (%)		
Family history	yes	147(87)	22(13)	169(100)	0.001*
	no	35(63.3)	20(36.4)	55(100)	
Cream or lotion use	yes	63(88.7)	8(11.3)	71(100)	0.06*
	no	119(77.8)	34(22.2)	153(100)	
Bowel movement	Constipation	37(86)	6(14)	43(100)	0.37*
	normal	145(80.1)	36(19.9)	181(100)	
Fetal gender	male	87(82.1)	19(17.9)	106(100)	0.76*
	female	95(80.5)	23(19.5)	118(100)	
Socioeconomic	low	24(75)	8(25)	32(100)	0.19*
	moderate	130(84.4)	24(15.6)	154(100)	
	good	28(73.7)	10(26.3)	38(100)	
Skin type	II	31(75.6)	10(24.4)	41(100)	0.22*
	III	136(84)	26(16)	162(100)	
	IV	15(71.4)	6(28.6)	21(100)	
Total		81.3(100)	18.7(100)	224(100)	

* Chi square test

Table 2. Numeric factors and characteristics of women with and without Striae gravidarum and their newborns

Characteristic	striae gravidarum		Total (%)	P -Value
	Present (%)	Absent (%)		
Maternal Age mean	22.37 ± 4.3	22.83 ±4.8	22.45 ± 4.4	0.57**
Liquid use mean cup/day	7.97 ±2.9	7.14 ± 2.7	7.81 ± 2.9	0.08**
Sleep/day	9.07 ± 1.9	9.16 ± 1.8	9.09 ± 1.9	0.77**
Weight gained	14.04 ± 4.5	12.28 ± 4.6	13.71 ± 4.5	0.02**
Body Mass Index	23.47 ± 3.6	21.76 ± 2.8	23.15 ±3.5	0.002**
Fetal weight	3201.48 ± 394	3138.09 ± 404	3189.59 ±395	0.36**
Total	81.3(100)	18.7(100)	22491000	

** Independent t test

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