

STRIAE GRAVIDARUM: RISK FACTORS, PREVENTION, AND MANAGEMENT: A SYSTEMATIC REVIEW

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Abstract

Objective: Striae Gravidarum (SG) is one of the most prevalent skin disorders in pregnancy. The pathogenesis of SG involves complex hormonal changes. The effect of SG could deteriorate the aesthetic and psychological function in pregnant women. In spite of that, a review of the risk factors, prevention, and treatment of SG is lacking. Therefore, this literature is aimed to summarize the risk factors, prevention, and treatment in order to reduce the incidence and negative impact of SG in pregnant women.

Materials and methods: A systematic search strategy was conducted across several electronic reference databases (PubMed, Cochrane Library, Google Scholar) and included articles published between 2018–2023. Duplicate publications, review articles, and incomplete articles were excluded.

Results: Database search yielded 2461 articles, which were systematically eliminated, leaving 6 relevant articles. Analyzed articles showed the association between diabetes mellitus and hidradenitis suppurativa.

Conclusion: BMI, height, sedentary lifestyle, consumption of milk, eggs, and lower back pain were the risk factors for SG. Studies support the use of olive oil in the treatment and prevention of SG. Certain local herbs are also useful to prevent SG.

Keyword: prevention; risk factor; treatment; striae gravidarum

INTRODUCTION

As the atrophic linear scars that commonly persists in pregnancy, striae gravidarum (SG) potentially cause the psychological change in women^{1,2}. The condition present as the second most prevalent manifestation of the skin during the pregnancy³⁻⁵. The pathogenesis of SG is accounted due to the hormonal changes in pregnancy, which often happen in the third trimester and resolves post-partum⁶.

The presence of SG can be distressing to the pregnant women, mainly in the aesthetic function. SG often exist in the abdomen, breasts, and thighs of pregnant women. SG accounted for 52-90% occurrence in all ethnicities. Initially, the striae present as a streak of slightly, depressed, and reddish scar. The risk factors of SG are classified as modifiable and non-modifiable risk factors. However, the association of the SG and its' risk factors have been variably identified¹.

Due to the existing disturbance of cosmetic and psychological impact, the treatment of striae gravidarum have been tried to be done albeit the costs^{7,8}. While the event is common, comprehensive review regarding SG is limited. The research regarding SG is also considered to be lacking. This study aimed to review the risk factors, prevention, and management of SG and evaluate the present research correlated to the topic as a basis for future intervention^{9,10}.

Methods

This study was a systematic review, with a systematic literature search on the PubMed, Cochrane Database of Systematic Reviews, and Google Scholar databases. The search was conducted in English, using keywords related to striae gravidarum risk factors, prevention, and treatment. The search was performed with a combination of some or all of these keywords, both in the title and abstract. Search is limited to publications in the period of February 2018 to February 2023.

Study designs included in this study were before-and-after studies with or without controls, retrospective and prospective cohort studies, interrupted time series analysis, and randomized controlled trials. Literature review articles, case series, letters, notes, conference abstracts, and conference articles were excluded. Data were extracted using a standardized table that classified as the risk factors, prevention, and management of SG that includes the name of the authors, year of publication, study design, study setting, number of subjects, and the key findings of each study. After searching and filtering articles based on search keywords, article analysis was done manually by considering the titles and abstract's relevance. Articles that meet the inclusion and exclusion criteria that are unclear will be analyzed further by reading the full text of the article and entering the relevant information in the data extraction table. The results obtained in the included studies will be compared with those of other systematic reviews and literature.

Result

Study Selection

A systematic search was carried out and yielded 2461 articles (Fig. 1). A total of 252 articles remained, after rechecking and excluding duplicated articles. A total of 18 articles were eligible for this study. Then, after a comprehensive review of the full-text articles, the remaining 17 articles were included in this study. The database search results are described in Table 1 and Figure 1. The summary of each included study is described in Table 2.

Included Articles

Of the 6 included studies, 3 were randomized-controlled trial (RCT) studies, and 2 were cross-sectional studies.

Figure 1. Systematic Search

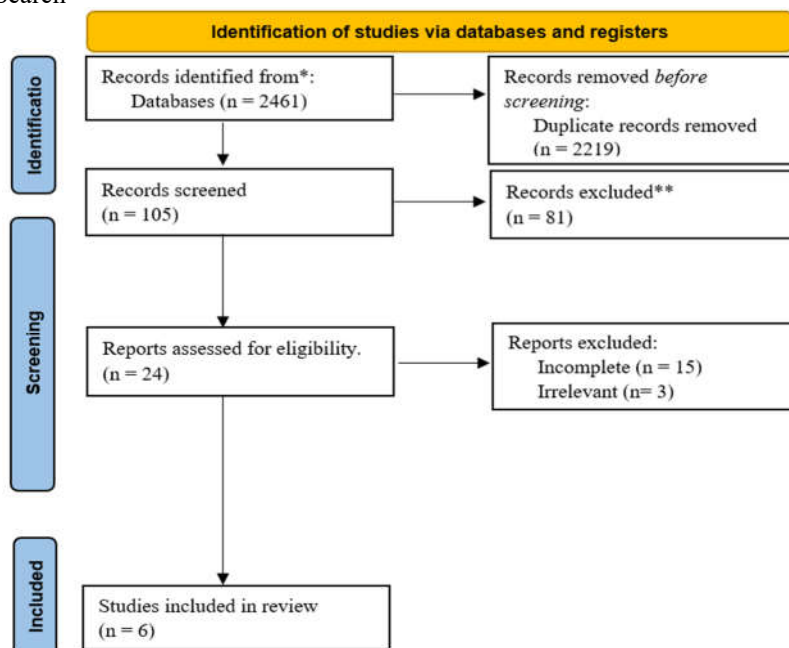


Table 1. Risk Factors of SG

Author	Design	Country	Subjects	Age (Years)	Findings
Ren et al. (2019) ¹¹	Cross-sectional	China	200	≥18	(1) The pregnant women who had striae gravidarum were generally lower in height than those who did not have striae gravidarum and had a higher BMI index than those who did not have striae gravidarum before and after childbirth. (2) In the pregnant women who have had striae gravidarum, the incidence of abdominal striae gravidarum in sedentary women is significantly lower than those in nonsedentary women, the incidence of striae gravidarum in legs is higher than those in non-sedentary women, and no significant difference in hip striae gravidarum. (3) In all pregnant women who have striae gravidarum, abdomen striae gravidarum tend to be lighter and leg striae gravidarum tends to be heavier in sedentary women, but no significant effect on the hip. (4) Regular consumption of honey, milk, trotters, freshwater fish, eggs, and tremella can reduce the incidence of striae gravidarum.
Kokanali et al, 2018 ¹²	Cross-sectional	Turkey	200	23-26	118 (59%) had low back pain. The Davey score was higher in women with low back pain (6.6 vs. 4.4; p < 0.001). Davey score and total Oswestry Disability Index score were positively correlated with Visual Analogue Scale in women with low back pain (r = 0.570, p < 0.001 and r = 0.329, p < 0.001, respectively). There were also significant positive correlations between Davey scores and Oswestry Disability Index scores of each different situation (pain intensity, personal care and lifting, walking, sitting, standing, sleeping, sexual life, social life and travelling).

Table 2. Treatment of SG

Author	Design	Country	Subjects	Age (Years)	Findings
Tang et al. (2021) ¹³	RCT	Ireland	14	≥18	The use of 1565-nm non-ablative fractional laser (NAFL) and fractional microneedle radiofrequency (MRF). Both demonstrated effective improvement (p=0.0082 and p=0.0158)

Table 3. Prevention of SG

Author	Design	Country	Subjects	Age (Years)	Findings
Tang et al. (2021) ¹⁴	RCT	India	17	20-40	Kumaryadi cream effective to prevent SG with no apparent evidence of complication.

Discussion

Stretch marks in women due to pregnancy has led to distress and concern, causing some psychological issue¹⁵. Therefore, this systematic review aim to describe what are the risk factors for SG incidence, how to prevent it and what treatments can be used as a relief to those concerns¹⁶.

Risk factor for SG

Striae gravidarum has several associated risk factors, such as low body height, high BMI index, and sedentary lifestyle (measured by daily sitting time).¹⁷

There was no significant data showing an association between SG and maternal age, weight gain during pregnancy, and fetal weight^{18,19}.

However, another study contrarily showed a different result about maternal age²⁰. The risk factors obtained from this study are young maternal age, family history of SG, high maternal pre-pregnancy and pre-delivery weight, and also high fetal height. This result can be influenced by confounding factors such as alcohol consumption, water consumption, blood vitamin C level, and expecting a male baby²¹⁻²³.

Other influencing factors contributing to the incidence of SG are chronic illnesses such as hypertension, diabetes mellitus, dermatological conditions, immunological diseases, epilepsy, and hypothyroidism which decrease SG development fivefold^{20,21}.

Another research by Kokanali and Caglar reveals a hidden association between low-back pain and striae gravidarum which etiology has not fully elucidated but it seems to be mechanical and hormonal^{11-13,22}.

Gestational age may have an influence on SG development and is predicted to be in the late third trimester, but the mean gestational in a study is approximately 25 weeks, which is way earlier than the prediction. They conclude that relevant factors contributing to SG may occur earlier in pregnancy²³.

Prevention of SG

Application of Kumaryadi cream twice a day (10 gram) on the abdomen area, thigh, and breast for two months work in the skin health promotion and prevention of stretch marks¹¹⁻¹⁵. This cream has natural ingredients such as *Aloe barbadensis*, *Terminalia chebula*, *Acacia arabica*, *Symplocos racemosa*, *Hemidesmus indicus*, and *Rotula equatica*²⁴.

The use of olive oil is beneficial to reduce the severity of SG and prevent its progression. This study classifies the severity of SG using Davey's Severity Score which results in a lower score in the intervention group (2) versus control group (4)²⁵.

This result is supported by another study, which reported that olive oil was effective in the prevention of SG²⁶.

Treatment of SG

Other than NAFL, topical tretinoin helps with decrease in SG severity. Tretinoin cream 0.1% daily for 3 months significantly improved the clinical appearance of pregnancy-related stretch marks^{11-16, 25}.

Conclusion

From the studies, there are several risk factors associated with SG. BMI, height, sedentary lifestyle, consumption of milk, eggs, and lower back pain were the risk factors for SG. Studies support the use of olive oil in the treatment and prevention of SG. Certain local herbs are also useful to prevent SG. Further studies, specifically in different region or population is recommended in order to elaborate further the risk factors, prevention, and management in SG.

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