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ORIGINAL ARTICLE

Risk factors of striae gravidarum and chloasma melasma and their effects on quality of life

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Abstract

Objective: This study aims to determine the risk factors associated with striae gravidarum (SG) and chloasma melasma (CM) and their effects on the quality of life.

Methods: This descriptive and cross-sectional study was carried out in Turkey with 1000 pregnant women at 36 weeks of gestation and above. Personal information form, Quality of Life (SF36) Scale, Skindex-29 Scale, and MelasQoL-TR questionnaire were applied to pregnant women. Besides, skin types of pregnant women were determined using Fitzpatrick Skin Type Classification. Davey's score was used to determine the severity of SG.

Results: In the study, the prevalence of SG was found as 67.9% ($n = 679$), and the prevalence of CM 23.5% ($n = 235$). There was a significant relationship between young age, low education level, high BMI before pregnancy, history of SG in her previous pregnancy, family history of SG, and development of SG in pregnant women ($p = 0.001$). There was a significant relationship between CM in her previous pregnancy and family history of CM and development of CM ($p = 0.001$). The quality of life of pregnant women with SG was found to be lower than without SG ($p < 0.001$). The quality of life of pregnant women with CM was found to be lower than without CM ($p < 0.001$).

Conclusions: As a result, in the study, it was determined that young age, low education level, high BMI, history of SG in previous pregnancy, and family history of SG were risk factors for SG. The risk factors of CM, on the other hand, were found as the history of CM in the previous pregnancy and the family. It was identified that SG and CM have adverse effects on the quality of life.

KEYWORDS
chloasma Melasma, quality of Life, risk Factors, striae Gravidarum

1 | INTRODUCTION

Striae gravidarum (SG) is characterized clinically by hypo-pigmented pinkish or purplish bands and white atrophic linear scars on the abdomen, breasts, and thighs.[1,2] The prevalence of SG is monitored between 39.1% and 90%.[1,3-7] SG generally develops after the sixth and seventh months of gestation and initially occurs as dark pink and bright atrophic bands, and gradually fade to become skin colored. However, SG never disappears spontaneously.[2] Although its etiology remains unknown at present but clearly relates to the hormonal changes in pregnancy and dermal damage caused by stretching of the skin. It has been postulated that some hormones, like estrogen, relaxin, and adrenocortical hormones, decrease the adhesiveness between collagen fibers and increase ground substance, which results in the formation

of SG in areas of stretching. SG may form due to structural connective tissue changes that include realignment and reduced elastin and fibrillin in the dermis.[1] However, some studies in the literature have shown that young age, history of SG in her previous pregnancy, weight before pregnancy, weight gain during pregnancy, gestational diabetes, skin type, family history of SG, and chronic diseases are reported as risk factors in terms of the development of SG.[1,2,8,9]

Melasma is an acquired, mostly symmetrical form of hyperpigmentation that appears commonly on the sun-exposed skin areas such as face and neck, in particular. It is clinically characterized by irregular, light or dark brown macules, and patches with determined margins.[10-14] The occurrence of melasma during pregnancy is called the "mask of pregnancy" or "chloasma melasma (CM)." The prevalence of CM is reported to be between 36.4% and 70%.[12,13,15,16] The pathophysiology of melasma is not fully known.[11,12] In the literature, pregnancy, genetic susceptibility, exposure to sunlight, combined oral contraceptives, and drugs are shown as the factors leading to the development of melasma. During pregnancy, increased estrogen and progesterone levels are thought to play a role.[11-15,17] It can disappear completely with treatment 1 year after birth. However, it is permanent in 30% of women.[17]

Quality of life is the general well-being of individuals and an expression of subjective satisfaction in different areas of life. Since they are generally seen as non–life-threatening problems, SG and CM are deemed as minor clinical status. However, this psychologically distressing and difficult-to-treat state can negatively affect the quality of life of pregnant women.[4,6,7,11,17,18] In the literature, there are studies indicating that SG adversely affects quality of life in pregnancy.[4,6,7,18] However, there is no study in the literature examining the effect of CM on quality of life in pregnancy. There are studies showing that the melasma arising from reasons other than pregnancy negatively affects the quality of life.[19-21]

There are many studies on the risk factors of SG and CM, which negatively affect the quality of life of pregnant women.[2,5,9,14,22-24] Besides, in the literature, there are studies that investigate the effects of SG on quality of life.[4-7,18] However, there is no study in the literature which stria gravidarum and CM are evaluated together both in terms of risk factors and quality of life. Both dermatological conditions can negatively affect the quality of life. In studies where only one condition was examined, the other dermatological condition was ignored. In this study, both dermatological issues were examined together. This study, therefore, aims to determine the risk factors associated with striae gravidarum and CM and their effects on the quality of life.

2 | METHODS

2.1 | Design and Place of the Study

This descriptive and cross-sectional research was carried out between the dates of January-December 2019 in Balikesir Province of Turkey, at City Hospital Maternity Service and Outpatient Polyclinics of Gynecology and Obstetrics.

2.2 | Sample

In the hospital where the study was conducted, a total of 4152 deliveries, including 2223 vaginal deliveries and 1929 cesarean deliveries, were performed in 2018. The prevalence of striae gravidarum was found between 39.1% and 90%,[2-7,9,25] whereas CM was between 36.4% and 70% in pregnant women.[12,15,16] The deviation was taken as 0.05, and the sample size calculated with the Epi info Statcalc program in the 95% confidence interval was calculated as 265. To increase the power of our study, the sample number was kept high. A total of 1000 pregnant women in the third trimester (36–40 weeks) who were volunteer to participate in the study and filled the consent form were included in the research. The power analysis indicated that the sample size of the study had a power of 97% with $\alpha = 0.05$. The decrease in quality of life in pregnant women with SG compared to pregnant women without SG had an effect size of 0.24. In terms of CM, on the other hand, it showed that the sample size has 100% power with $\alpha = 0.05$. The decrease in quality of life of pregnant women with CM compared to pregnant women without CM had an effect size of 0.54.

In terms of the inclusion criteria, all pregnant women in the third trimester (36–40 weeks) were included in the study. The exclusion criteria were the state of being in the first and second trimester.

2.3 | Data collection

Personal information form that was developed in line with the literature,[2,6,9,14-16,24,25] the Short Form (36) Health Survey, Skindex-29 Questionnaire, and MelasQol-TR scale were applied to all pregnant women in the third trimester (36–40 weeks) at the Maternity Service and Outpatient Polyclinics of Gynecology and Obstetrics. Besides, skin types of pregnant women were determined using Fitzpatrick Skin Type Classification. The interviews lasted about 30 minutes.

2.4 | Measures

***Personal Information Form*:** The personal information form, an investigator-developed survey, consisted of 45 questions divided into 3 sections: demographic characteristics, pregnancy and obstetric history, and SG and CM characteristics (Table 1 and Table 2).

***SF 36 Quality of Life Scale*:** Turkish validity and reliability of the scale that was developed by Ware, and Sherbourne (1992) was carried out by Koçyiğit et al. (1999).[19] The scale consists of 36 items and eight subscales. Subscales of the health survey are as follows: physical functioning, physical role, bodily pain, general health perceptions, vitality, social functioning, emotional role, and mental health. The second item of the scale investigates the perception of change in health in the last 12 months, whereas other items are evaluated considering the last four weeks. The fourth and fifth items of the scale are evaluated under yes/no scoring, whereas other questions are evaluated by Likert-type (3, 5, and 6 points) scoring. In the

TABLE 1 Risk factors of striae gravidarum

Risk factors	Davey's score			*p*
	Absent (0) *n* (%)	Mild (1–2) *n* (%)	Severe (3–8) *n* (%)	
Age ≤19 20–29 ≥30	14 (4.4) 169 (52.7) 138 (42.9)	11 (4.9) 154 (68.8) 59 (26.3)	29 (6.4) 295 (64.8) 131 (28.8)	0.001
Education Primary School High School University	106 (33.1) 81 (25.2) 134 (41.7)	76 (33.9) 84 (37.5) 64 (28.6)	176 (38.7) 149 (32.7) 130 (28.6)	0.001
Body Mass İndex ≤18.4 18.5–24.9 25–29.9 ≥30	25 (8.1) 190 (61.9) 65 (21.2) 27 (8.8)	11 (5.2) 131 (61.5) 48 (22.5) 23 (10.8)	19 (4.4) 216 (49.4) 115 (26.3) 87 (19.9)	0.001
Being employed with income Yes No	98 (30.5) 223 (69.5)	47 (21) 177 (79)	84 (18.5) 371 (81.5)	0.001
Parity Primiparae Multiparae	126 (39.3) 195 (60.7)	99 (44.2) 125 (55.8)	195 (42.9) 260 (57.1)	0.455
Infertility Treatment Yes No	30 (9.3) 291 (90.7)	27 (12.1) 197 (87.9)	49 (10.8) 406 (89.2)	0.666
Smoking Yes No	54 (16.8) 267 (83.2)	43 (19.2) 181 (80.8)	102 (22.4) 353 (77.6)	0.129
Weight gain during pregnancy (Mean ± SD)	10.8 ± 6.52	11.24 ± 7.19	11.88 ± 7.27	0.124
Chronic Disease Yes No	37 (11.5) 284 (88.5)	26 (11.6) 198 (88.4)	70 (15.4) 385 (84.6)	0.227
History of SG in Previous Pregnancy Yes No	31 (15) 176 (85)	79 (70.5) 33 (2.5)	198 (75.9) 63 (24.1)	0.001
Family History of SG Yes No	130 (40.5) 191 (59.5)	148 (66.1) 76 (33.9)	298 (65.5) 157(34.5)	0.001
Using Method to Prevent SG in Pregnancy (cream / oil etc.) Yes No	123 (41.1) 176 (58.9)	93 (43.3) 122 (56.7)	187 (42.3) 255 (57.7)	0.888
Methods used to prevent SG Oils Creams Both Oils and Creams	74 (60.2) 42 (34.1) 7 (5.7)	59 (63.4) 23 (24.7) 11 (11.9)	120 (64.1) 48 (25.7) 19 (10.2)	0.256
Fitzpatrick Skin Type Type I/II Type III Type IV	28 (8.7) 151 (47) 142 (44.3)	20 (8.9) 105 (46.9) 99 (44.2)	27 (5.9) 223 (49) 205 (45.1)	0.559

Note: Chi-Square Test, Fisher's Exact Test

SG: Striae Gravidarum

TABLE 2 Risk factors of chloasma melasma

Risk factors	Pregnant with CM ($n = 235$)	Pregnant without CM ($n = 765$)	p
Age ≤19 20–29 ≥30	7 (3) 144 (61.3) 84 (35.7)	47 (6.1) 474 (62) 244 (31.9)	0.188
Education Primary School High School University	92 (39.1) 70 (29.8) 73 (31.1)	266 (34.8) 244 (31.9) 255 (33.3)	0.452
Being Employed with İncome Yes No	60 (25.5) 175 (74.5)	169 (22.1) 596 (77.9)	0.281
Parity Primiparae Multiparae	79 (33.6) 156 (66.4)	341 (44.6) 424 (55.4)	**0.003**
Infertility Treatment Yes No	31 (13.2) 204 (86.8)	75 (9.8) 690 (90.2)	0.127
Combined Oral Contraceptive Use History Yes No	52 (22.2) 183 (77.8)	136 (17.8) 629 (82.2)	0.100
Smoking Yes No	57 (24.3) 178 (75.7)	142 (18.6) 623 (81.4)	0.054
Chronic Disease Yes No	49 (20.9) 186 (79.1)	85 (11.2) 680 (88.8)	**0.001**
History of CM in Previous Pregnancy Yes No	134 (85.9) 22 (14.1)	28 (6.6) 396 (93.4)	**0.001**
Family History of CM Yes No	85 (36.2) 150 (63.8)	76 (9.9) 689 (90.1)	**0.001**
Using Method to Prevent CM in Pregnancy (cream / oil etc.) Yes No	24 (10.2) 211 (89.8)	26 (33.4) 739 (96.6)	**0.001**
Methods used to prevent CM Creams Oils	22 (91.7) 2 (8.3)	17 (65.4) 9 (34.6)	0.072
Fitzpatrick Skin Type Type I/II Type III Type IV	18 (7.6) 120 (51.1) 97 (41.3)	57 (7.5) 359 (46.9) 349 (45.6)	0.493

Note: Chi-Square Test, Fisher's Exact Test.
CM: Chloasma Melasma.

evaluation of the scale, all responses are transformed to a linear scale of 100, varying from 0 to 100, whereas 0 points indicate that the quality of life dimension is poor and 100 points indicate that it is good. In this study, Cronbach Alpha's internal consistency coefficient was determined as.860 for the total scale.

Skindex-29 Scale: Turkish validity and reliability of the scale that was developed by Chren et al. (1997) was carried out by Aksu et al. (2007).[3,26] The scale consists of 29 items in total. Subscales consist of domains of symptoms, emotions, and functioning. The questions are answered considering the condition of skin disease in the last 1 month. The items are evaluated with 5-point Likert-type scoring (1 (never) 5 (always)). The high score indicates that the quality of life is poor. The scale of symptoms measures the physical burden of the disease such as soreness, itching, burning/stinging, anxiety, irritation, sensitivity, or bleeding. The scale of emotion measures the psychological effects such as concerns about the severity of disease,

getting hurt, worsening of disease, depression, feeling ashamed, anger, frustration, disparagement, or embarrassment. The scale of functioning focuses on the changes in daily life such as business/hobby, sleep, social life, relationships, stay at home, impediment of sexual life, and tiredness. In this study, Cronbach Alpha's internal consistency coefficient was determined as.973 for the total scale.

***MelasQoL-TR Questionnaire*:** Turkish validity and reliability of the scale were carried out by Doğramacı et al. (2009).[10] The questionnaire is used to evaluate the effect of CM on quality of life. It consists of 10 questions in total. The questions are evaluated under 7-point Likert-type scoring (1 (never) 7 (always)). The high score shows that the quality of life is poor. In this study, Cronbach Alpha's internal consistency coefficient was determined as.959 for the total scale.

***Fitzpatrick Skin Type Classification*:** The scale was developed by Fitzpatrick in 1975 to describe the skin type and the skin's response to sunlight. It is a 4-point Likert-type survey in which six skin types are categorized. The categories of the Fitzpatrick scale are as follows: Type I (scores 0–6); Type II (scores 7–13); Type III (scores 14–20); Type IV (scores 21–27); Type V (scores 28–34); and Type VI (scores ≥35).[18] The researchers evaluated each participant's Fitzpatrick Skin Type Classification.

***Davey's score*:** The abdomen was divided into quadrants using the midline and horizontal line through the umbilicus. Each quadrant was scored 0 (=clear skin), 1 (=moderate number of striae), or 2 (=many striae). Total sum scores ranged from 0 to 8. The severity of SG, as assessed by Davey's score, was categorized in three groups: 0 (absent), 1–2 (mild), and 3–8 (severe).[4,27] The researchers evaluated each participant's Dave's score.

2.5 | Ethics approval

Ethics committee approval was obtained from the Clinical Studies Ethics Committee of the Medical Faculty in Turkey (Decision no:2019/36), and approval of the study was obtained from the Provincial Health Directorate. It was explained to the pregnant women who agreed to participate in the study that the purpose of the study and their identity information would be kept confidential. Volunteer Information Form and written consent of pregnant women were taken.

2.6 | Statistical Analysis

The dependent variable of this study is quality of life, SG, and CM. Sociodemographic and obstetric characteristics that may affect SG and CM are also independent variables of the study. Median, standard deviation, numbers, and percentages were used in the evaluation of the data. Whether the data show normal distribution was determined by the Kolmogorov-Smirnov test. Chi-square test, Fisher's exact test, and independent sample t test were used to determine the relationship between SG and CM and risk factors. Logistic regression analysis was used to find categorical potential risk factors for SG and CM. Independent sample t test and Mann-Whitney U test (data are not distributed normally) were used to determine the relationship between SG and CM and quality of life. Linear regression analysis was used for an advanced analysis of the relationship between SG and CM and quality of life.

3 | RESULTS

The average age of pregnant women participating in the study was 27.59 ± 5.41. The prevalence of SG was 67.9% ($n = 679$). The severity of SG, as assessed by Davey's score, was categorized in three groups: 0 (absent), 1–2 (mild), and 3–8 (severe).[4,27] It was found that SG was absent in 32.1% of the pregnant women, mild in 22.4%, and severe in 45.5%. SG was monitored in the abdominal region of 54.4% of pregnant women, whereas both in the abdominal and femur regions of 15%. SG started to be seen for the first time in the third trimester in 44.2% of pregnant women. The prevalence of CM was 23.5% ($n = 235$). Among 40.9% of the pregnant women, CM was monitored in the third trimester. Table 1 shows the risk factors associated with SG. There was a significant relationship between SG and age, education, wage-earning employment, history of SG in her previous pregnancy, and family history of SG ($p < 0.001$). It was determined that there was SG history in the mother of 36.3% of pregnant women with SG and in the sister of 14.1%.

Table 2 shows the risk factors of CM. It was found that CM was statistically significantly high in the multiparae pregnant women who have a history of CM in her previous pregnancy, a family history of CM, chronic disease, and using methods to prevent CM ($p < 0.05$). It was determined that there was CM history in the mother of 37.6% of pregnant women with CM and in the sister of 25.9%. Of pregnant women with CM, it was found that 23.5% of them have diabetes and 21.6% have HT. 10.2% of pregnant women with CM were using methods to prevent CM.

Table 3 shows the effects of SG and CM on quality of life. Statistically significant differences were found in the averages of total quality of life, physical function, physical role, general health perception, social function, total Skindex-29, symptoms, functioning, and emotions scale in pregnant women with and without SG ($p < 0.05$). On the other hand, there was statistically advanced significant differences in the averages of total quality of life, physical function, physical role, bodily pain, general health perception, vitality, social function, mental role, and MelasQol-TR in pregnant women with and without CM ($p < 0.001$).

The effects of major risk factors on SG and CM were evaluated by Multivariate Logistic Regression analysis. The probability of developing SG in the presence of other variables was approximately 0.3 times greater than those over the age of 30 for those aged ≤19 and 20–29. It was found that those who were primary and high school graduates have a 0.5 times higher probability of developing SG compared to those who are university graduates. It was determined that pregnant women with a BMI of 25 kg/m^2 and above had a 5 times higher probability of developing SG than those with a BMI of 18.4 kg/m^2. It was

TABLE 3 Effect of stria gravidarum and chloasma melasma on quality of life

	Pregnant with SG	Pregnant without SG	*p*	Pregnant with CM	Pregnant without CM	*p*
Quality of Life Total	94.87 ± 15.05	98.43 ± 14.24	0.001	89.81 ± 15.75	97.97 ± 14.06	0.001
Physical Function	21.64 ± 6.18	22.58 ± 6.07	0.024	19.56 ± 6.41	22.68 ± 5.89	0.001
Physical Role	5.67 ± 1.68	5.98 ± 1.71	0.006	5.16 ± 1.51	5.96 ± 1.71	0.001
Pain	7.09 ± 2.94	7.29 ± 2.49	0.300	6.29 ± 2.14	7.43 ± 2.93	0.001
Overall Health Perception	16.58 ± 3.04	17.18 ± 2.88	0.003	15.93 ± 3.13	17.03 ± 2.92	0.001
Vitality	12.68 ± 4.47	13.17 ± 4.63	0.109	12.21 ± 5.99	13.03 ± 3.96	0.001
Social Function	7.74 ± 2.08	8.13 ± 1.98	0.006	7.12 ± 2.37	8.11 ± 1.89	0.001
Mental Role	4.53 ± 1.6	4.66 ± 1.73	0.243	4.12 ± 1.38	4.72 ± 1.69	0.001
Mental Health	17.66 ± 2.45	17.84 ± 2.54	0.267	17.63 ± 2.25	17.74 ± 2.55	0.561
Skindeks 29 Total*	12.61 ± 16.98 6.03	7.32 ± 12.09 3.44	<0.001	-	-	-
Symptom Scale*	20.19 ± 18.76 14.28	14.29 ± 14.95 10.71	<0.001	-	-	-
Function Scale*	9.26 ± 17.21 0	4.69 ± 11.97 0	<0.001	-	-	-
Emotion Scale*	11.89 ± 19.17 2.5	5.9 ± 13.75 0	<0.001	-	-	-
MelasQol-TR*	-	-	-	18.29 ± 13.06 11.5	13.29 ± 8.11 10	0.001

Note: Independent sample t test * The high score shows that the quality of life is poor. SG: Striae Gravidarum, CM: Chloasma Melasma. Skindeks 29 is applied for Striae Gravidarum. MelasQol-TR is applied for Chloasma Melasma.

found that the probability of developing SG in pregnant women with a history of SG in her previous pregnancy was 15 times higher than those without SG history. The probability of developing SG is approximately 2 times higher in pregnant women with a family history of SG than those without a family history. The probability of developing CM in the presence of other variables was approximately 44 times higher in pregnant women with CM in her previous pregnancy than those without a history of CM. It was found that pregnant women with a family history of CM have approximately 3 times more probability of developing CM than those without a family history of CM (Table 4).

In this study, a linear regression analysis was performed to examine the relationship between SG and CM and quality of life (Table 5). As a result of the analysis, it was found that there was a significant relationship between SG and total score of quality of life, physical functioning, physical role, general health perception, social function, total Skindex-29, scales of symptoms, functioning, and emotions (Model 1). There was a significant relationship between CM and total score of quality of life, physical functioning, physical role, bodily pain, general health perception, vitality, social functioning, mental role, and MelasQol-TR (Model 2).

4 | DISCUSSION

Due to the cosmetic anxiety, they create in pregnant women, SG and CM can negatively affect the quality of life and lead to psychological problems.[4,7,18] In this study, the prevalence of SG was found as 67.9%. It was found that SG was absent in 32.1% of the pregnant women, mild in 22.4%, and severe in 45.5%. It was found that SG occurs in the abdominal region, and in the third trimester of 44.2% of pregnant women. In studies in the literature, SG prevalence is reported to be between 39.1% and 90%.[1-7,9,25] It has been postulated that increased estrogen and relaxin during pregnancy decrease the adhesiveness between collagen fibers and increase ground substance, which results in the formation of SG in areas of stretching. SG may form due to structural connective tissue changes that include realignment and reduced elastin and fibrillin in the dermis. Therefore, the risk of developing SG during pregnancy is high.[8] Kasielska-Trojan et al. (2015) found that SG occurs most frequently in the abdominal region.[9] Kocaöz et al. (2019) identified that the onset of SG happens in the third trimester of 70.9% of pregnant women.[2] The result of this study is similar to the results of the studies in the literature.

In the study, it was found that the probability of developing SG is about 0.3 times higher in pregnant women under 30 years old. In their systematic review, Farahnik et al.[1] (2017), Celik et al (2018),[28] Ersoy et al (2016),[25] Picard et al (2015),[5] Cakir et al (2014),[29] Osman et al (2007),[22] and J-Orh et al (2008)[23] reported that young age is a risk factor for SG. It was reported that the structure of fibrillin is more fragile in young women, which can lead to the development of SG more easily.[25]

In the study, the probability of developing SG was found to be approximately 0.5 times higher in those who had a lower educational

TABLE 4 Evaluation of risk factors of striae gravidarum and chloasma melasma with logistic regression analysis

Risk Factors SG	*B*	*SE*	*P*	*OR*	*%95 CI*	
Age ≥30 versus ≤19 ≥30 versus 20–29	−1.179 −1.137	0.583 0.239	0.043 0.001	0.307 0.321	0.098 0.201	0.964 0.512
Education University versus Primary school University versus High school	−0.571 −0.685	0.282 0.277	0.043 0.013	0.565 0.504	0.325 0.293	0.983 0.867
Body Mass İndex ≥25 kg / m^2 versus ≤18.4 kg / m^2 ≥25 kg / m^2 versus 18.5–24.9 kg / m^2	1.632 0.174	0.500 0.227	0.001 0.444	5.115 1.190	1.921 0.763	13.622 1.856
Being employed with income Yes versus no	−0.048	0.268	0.858	0.953	0.563	1.613
History of SG in Previous Pregnancy Present versus absent	2.745	0.246	0.001	15.566	9.604	25.229
Family History of SG Present versus absent	0.856	0.214	0.001	2.353	1.548	3.576
Pseudo (Nagelkerke) $R^2 = 0.437$; Hosmer-Lemeshow $X^2 = 15.505$; $p = 0.050$. Dependent variable: 1 = SG absent; 0 = SG present.						
Risk Factors CM						
Parity Primiparae versus multiparae	−0.219	0.289	0.449	0.803	0.456	1.415
History of CM in Previous Pregnancy Present versus absent	3.794	0.262	0.001	44.422	26.582	74.237
Family History of CM Present versus absent	1.214	0.312	0.001	3.368	1.829	6.205
Using Method to Prevent CM in Pregnancy (cream / oil etc.) Yes versus no	0.887	0.507	0.080	2.428	0.899	6.555

Note: Pseudo (Nagelkerke) $R^2 = 0.572$; Hosmer-Lemeshow $X^2 = 1.142$; $p = 0.887$. Dependent variable: 1 = Chloasma Melasma absent; 0 = Chloasma Melasma present.

Abbreviations: CI: confidence interval; OR: odds ratio; SE: standard error; SG: Striae Gravidarum. The level of statistical significance was set at $p < .05$. SG: Striae Gravidarum, CM: Chloasma Melasma.

level than those who were university graduates. Ersoy et al. (2016)[25] reported that there was a significant relationship between low education level and SG. It is thought that pregnant women with low education level do not have sufficient information about healthy nutrition. Besides, educational levels can have an impact not only on diet but also on exercise habits. Findik et al. (2011)[30] reported that decreased levels of vitamin C in the blood are risk factors for SG. SG can be prevented with a healthy nutrition and regular exercise. However, these two variables were not investigated in our study.

It was determined that pregnant women with a BMI of 25 kg/m^2 and above had a 5 times higher probability of developing SG than those with a BMI of 18.4 kg/m^2. Kasielska-Trojan et al (2015),[9] Kocaöz et al (2019),[2] Doğan et al (2016),[31]Lurie et al (2011),[32] J-Orh et al (2008),[23] Ersoy et al (2016),[25] and Picard et al (2015)[5] reported that more SG develops in pregnant women with higher BMI before pregnancy. Women with high BMI have poor skin tone, so these women are thought to have a high tendency to SG in their pregnancy.

It was found that the probability of developing SG in pregnant women with a history of SG in her previous pregnancy was 15 times higher, whereas it was 2 times higher in those who have a family history of SG. In the literature, it was reported that there was a significant relationship between SG and history and family history.[1,2,5,8,9,22,25,28,30] The fact that SG is associated with the family history shows that genetic factors may also play a role in the development of SG. Therefore, steps such as determining pregnant women with genetic susceptibility and applying protective measures to these pregnant women are thought likely to prevent SG development.

In the study, the prevalence of CM was found as 23.5%. In studies in the literature, the prevalence of CM is reported to be between

TABLE 5 Evaluation of quality of life with striae gravidarum and chloasma melasma with linear regression analysis

	R	R^2	*Durbin-Watson (p)*	*B*	*t*	*p*	*%95 CI*	
Model 1.								
Quality of Life Total	0.112	0.013	1.715 ($p < 0.01$)	3.562	3.410	0.001	1.512	5.612
Physical Function	0.072	0.005	1.677($p < 0.05$)	0.946	2.256	0.024	0.123	1.769
Physical Role	0.087	0.008	1.941($p < 0.01$)	0.317	2.748	0.006	0.091	0.544
Overall Health Perception	0.094	0.009	1.642($p < 0.05$)	0.608	2.984	0.003	0.208	1.008
Social Function	0.088	0.008	1.691($p < 0.05$)	0.387	2.768	0.006	0.113	0.662
Skindex−29 Total	0.158	0.025	1.700($p < 0.0001$)	−5.296	−4.966	0.001	−7.388	−3.203
Symptom Scale	0.155	0.024	1.775($p < 0.0001$)	−5.901	−4.935	0.001	−8.248	−3.555
Function Scale	0.135	0.018	1.622($p < 0.0001$)	−4.566	−4.251	0.001	−6.673	−2.458
Emotion Scale*	0.157	0.025	1.675($p < 0.0001$)	−5.992	−4.998	0.001	−8.345	−3.640
Model 2.								
Quality of Life Total	0.233	0.054	1.724($p < 0.0001$)	8.155	7.257	0.001	5.949	10.36
Physical Function	0.215	0.046	1.710($p < 0.0001$)	3.121	6.919	0.001	2.236	4.007
Physical Role	0.202	0.041	1.946($p < 0.0001$)	0.803	6.454	0.001	0.559	1.048
Pain	0.173	0.030	1.762($p < 0.0001$)	1.141	5.512	0.001	0.735	1.547
Overall Health Perception	0.154	0.024	1.652($p < 0.0001$)	1.091	4.892	0.001	0.653	1.525
Vitality	0.076	0.006	1.937($p < 0.05$)	0.813	2.389	0.017	0.145	1.481
Social Function	0.202	0.041	1.742($p < 0.0001$)	0.979	6.463	0.001	0.682	1.276
Mental Role	0.156	0.024	1.915($p < 0.0001$)	0.604	4.931	0.001	0.364	0.844
MelasQol-TR	0.218	0.047	1.625 ($p < 0.0001$)	−0.009	−7.040	0.001	−0.012	−0.007

Note: Model 1. Effect of Striae Gravidarum on Quality of Life.
Model 2. Effect of Chloasma Melasma on Quality of Life.

36.4% and 70%.[12,13,15,16] In the study, the prevalence of CM was found lower than studies in the literature. Although many factors play a role in the pathogenesis of CM, its etiology remains unknown at present.[14] The probability of developing CM in the presence of other variables was approximately 44 times higher in pregnant women with CM in her previous pregnancy than those without a history of CM. Handel et al. (2014)[24] reported that 79% of women with melasma had CM in their pregnancy history. In the literature, it was reported that there is a risk of recurrence of melasma, even if it is treated. Therefore, it is thought that increased estrogen, progesterone, and melanocyte-stimulating hormone occur during pregnancy. Reproductive effects and genetic susceptibility include the etiological factors of melasma and at least one relative of 40% of patients is affected by the disease.[14] In the study, it was found that pregnant women with a family history of CM have approximately 3 times more probability of developing CM than those without a family history of CM. Verma et al. (2015)[15] and Handel et al. (2014)[24] found that more than half of women with CM in their family had melasma. It is thought that melasma is more common in people with genetic susceptibility. The occurrence of CM only in some pregnant women despite the increased amount of hormones in all pregnant women supports this view. Melasma is a difficult-to-treat health problem. Therefore, steps such as determining pregnant women with genetic susceptibility and applying protective measures to these pregnant women are thought likely to prevent CM development.

Although it is frequently observed during pregnancy and considered as physiological, SG is an important factor affecting the physical appearance and it causes anxiety in pregnant women. Besides, the persistence of SG after delivery increases the level of anxiety. This anxiety state can negatively affect women's quality of life.[4,6] In the study, it was determined that SG affects the quality of life negatively. Kordi et al. (2016)[18] and Yamaguchi et al. (2012 and 2014)[4,7] found that the quality of life of pregnant women with SG was significantly lower compared to pregnant women without SG. Ogrum and Doğru (2019)[6] found that emotional symptom scores of pregnant women with severe SG were negative compared to pregnant women without SG. SG is often seen as a cosmetic concern and can be ignored by clinicians. It should be remembered that anxiety caused by the long-term persistence of SG lesions in pregnant women will negatively affect the quality of life. Therefore, the quality of life of pregnant women with SG should be determined and care should be provided in this direction. Because the negative quality of life can also affect pregnancy and its consequences negatively. Clinical guidelines and case management models should be developed to improve health-related quality of life in pregnant women with SG.

CM seen in pregnancy is a benign condition and usually disappears spontaneously within a year after delivery. On the other hand, in some cases, melasma may take longer. Even if the incidence of persistence was reported to be less than 10% of all patients, one study

found that after 10 years, 30% of cases had persistence.[11,17] This chronic and recurrent condition has a detrimental effect on the quality of life.[19] In the study, it was determined that CM negatively affects the quality of life. In the literature, there was no study examining the quality of life in pregnant women with melasma. However, in the studies in the literature, it was found that melasma negatively affects the quality of life in non-pregnant women.[19-21] The reductive understanding that melasma represents only a "cosmetic" problem restricts the diagnosis and the possibility of treatment options.[17] However, women with CM are disappointed, and they report their feelings such as feeling ashamed, loss of self-confidence, low self-esteem, anhedonia, dissatisfaction, and lack of motivation. Suicidal ideation was also reported in the literature.[13,14,17] It is thought that the adverse quality of life will affect the pregnancy process negatively, too. Therefore, the quality of life of pregnant women with CM should be evaluated and midwifery care and psychological intervention should be provided. The treatment that will be applied to pregnant women will not only improve the clinical results of pregnant women but also ensure the general well-being of pregnant women and provide psychological and emotional well-being. In other words, the quality of life of pregnant women will increase.

5 | LIMITATIONS

The limitation of this study, firstly, is the generalization of the research only to Balıkesir province. The effect of SG and CM on the quality of life can be affected by cultural differences. Therefore, the findings of the study cannot be generalized to the entire pregnant Turkish female population. Secondly, this study is the first study on pregnant women in terms of the effect of CM on quality of life. For this reason, we were not able to compare the results of the current study with the previous study.

6 | CONCLUSION

As a result, in the study, it was determined that young age, low education level, high BMI, history of SG in previous pregnancy, and family history of SG were risk factors for SG. The risk factors of CM, on the other hand, were found as the history of CM in the previous pregnancy and the family. Given that SG and CM are significant incurable cosmetic problems, screening of risk factors that cause SG and CM in pregnant women is important. Informing pregnant women who have risk factors for SG and CM about the prevention methods and supporting them in the use of methods will prevent the development of these cosmetic problems.

In the study, it was identified that SG and CM have adverse effects on the quality of life. The negative effect of SG and CM on the quality of life can be prevented by preventing the development of SG and CM first and foremost. All healthcare providers should determine the quality of life of pregnant women who develop SG and CM and they should provide counseling and training to these pregnant women to increase their level of knowledge on methods of overcoming SG and CM. Providing psychological intervention to pregnant women whose quality of life is negatively affected is one of the important roles for healthcare providers.

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CONFLICTS OF INTEREST

The authors have no competing interests to declare.

The authors have no conflicts of interest relevant to this article.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article

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