

Scar Perception: A Comparison of African American and White Self-identified Patients

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Background: Scars can have significant morbidity and negatively impact psychological, functional, and cosmetic outcomes as well as the overall quality-of-life, especially among ethnic minorities. The objective of this study was to evaluate African American and White patients' perception of their scars' impact on symptoms, appearance, psychosocial health, career, and sexual well-being, using validated assessment tools.

Method: A total of 675 abdominoplasty and breast surgery patients from four providers completed the SCAR-Q, and Career/Sexual Well-Being scales via phone or email. A higher score on both assessments indicates a more positive patient perception.

Results: Of the 675 respondents, 77.0% were White, and 23.0% were African American. White patients scored significantly higher on the SCAR-Q (232 ± 79 versus 203 ± 116), appearance (66 ± 26 versus 55 ± 29), and Career/Sexual Well-Being (16 ± 2 versus 15 ± 5) scales than African American patients ($P < 0.001$, $P < 0.001$, $P < 0.001$, respectively). There was no significant correlation between duration after surgery and symptoms or appearance scores for African American patients ($P = 0.11$, $P = 0.37$). There was no significant correlation between patient age and SCAR-Q score or time after surgery and psychosocial scores.

Conclusions: African American patients are more likely to have lower perceptions of their scarring appearance, symptoms, psychosocial impact, career impact, and sexual well-being impact than White patients. Scar appearance and symptoms are less likely to improve over time for African American patients. This study highlights the need to address patient ethnicity when considering further follow-up, counseling, or other measures to enhance scar perception. (*Plast Reconstr Surg Glob Open* 2022;10:e4345; doi: 10.1097/GOX.0000000000004345; Published online 23 May 2022.)

INTRODUCTION

Wound healing is a dynamic and complex mechanism involving a balance of regulatory pathways. Although patients expect total tissue regeneration, this is only observed in fetal tissue and cannot be replicated in normal human skin.^{1,2} The development of scars, that is, erythematous, firm, pruritic, raised fibrous masses, which remain within the limits of the original wound, can result from disturbances to the normal physiological response.³ Scars often have significant morbidity and negatively

impact psychological, functional, and cosmetic outcomes as well as the overall quality-of-life.⁴

As demonstrated by the propensity of patients with a family history or with darker skin to develop more aggressive scars, genetic factors can be driving factors in scars development.⁵⁻⁷ These factors may be attributable to single nucleotide polymorphisms or variations in chromosomes.⁸ The differences in genetic susceptibility might explain the various occurrences of scars in different ethnic populations. Several assessment tools have been developed to evaluate patient-reported outcomes after surgery. The SCAR-Q is a similar assessment scale that has been thoroughly validated for use internationally in adults and children.⁹ It covers the domains of psychosocial well-being, symptoms, and appearance. The Career/Sexual Well-Being (CS) scale has been developed from a previously established framework of scar themes generated from patient interview discussions.¹⁰ It covers a broadened spectrum of quality-of-life themes such as sexual well-being and career, which have not yet been studied by previous patient-reported outcomes measures.

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Received for publication December 23, 2021; accepted April 1, 2022.

Data from this study were presented at the Wound Healing Society Meeting, May 10-14, 2021.

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DOI: 10.1097/GOX.0000000000004345

Disclosure: The authors have no financial interest to declare in relation to the content of this article.

A previous study evaluated cosmetic outcomes of African American and White women following breast conserving therapy (BCT).¹¹ When comparing African American and White patients, the study reported a statistically significant difference in how African American patients rated their skin's appearance.¹¹ Despite having comparable objective measures of cosmesis, African American patients likely perceive and are perceived as having poorer cosmetic outcomes than White patients. This suggests that surgical technique alone may not be enough to improve outcomes; a psychological aspect may also play a role.

The objective of this study was to evaluate African American and White patients' perception of the impact of their scars on symptoms, appearance, psychosocial health, career, and sexual well-being using the SCAR-Q and CS scales. Outcomes across patients of different ethnicities, ages, and durations after surgery were studied.

METHODS

Study Participants

Participants were recruited from Northwestern Memorial Hospital directly calling or emailing patients who had undergone abdominoplasty or breast surgery from four providers. The inclusion of various procedures served to cover a wider variety of scars and experiences within each ethnic group. Only patients who indicated their ethnicity as White or African American were included in this study. Patients who were English-speaking and 18 years of age or older were invited to participate in the study. The study was reviewed and approved by the Northwestern University IRB (STU00213090).

Scar Assessment Scales

Use of the SCAR-Q, authored by Drs. Klassen and Pusic, was made under license from McMaster University, Hamilton, Canada. The SCAR-Q contains an appearance scale with 12 questions, symptoms scale with 12 questions, and psychosocial impact scale with five questions.^{9,12,13} All three scales were given to patients, and a standardized Rasch score out of 100 was calculated for each scale. A higher Rasch score indicated a better scar perception. The CS questionnaire containing four questions was developed based on a previously established framework of scar themes extracted from patients discussing the quality-of-life impact of their scars.¹⁰ The CS scale discussed patient experiences regarding scar impact in a career setting and during sexual encounters. Specifically, the scale asked if the scar has caused hindrances in the patient's career due to insecurities about the scar and if the patient feels that the scar has caused them to look unprofessional. The CS scale also asked patients if they feel self-conscious during sexual encounters due to the scar and if they make attempts to cover the scar or make it less visible during sexual encounters. The CS scale consists of 16 points, and a higher CS score indicated a better scar perception.

Questionnaire Distribution

Questionnaires contained the SCAR-Q and CS scales and were distributed from June to November of 2020.

Takeaways

Question: Are there ethnic differences in perception of scar impact?

Findings: Through completion of the SCAR-Q and Career/Sexual Well-being scar scales, we found that African American patients scored lower than White patients, on the scales covering scarring appearance, symptoms, psychosocial impact, career impact, and sexual well-being impact.

Meaning: African American patients are more likely to have lower perceptions of their scarring appearance, symptoms, psychosocial impact, career impact, and sexual well-being impact than White patients, which highlights the need to address patient ethnicity when considering further follow-up, counseling, or other measures to enhance scar perception.

Patients who met the inclusion criteria were administered the questionnaire via email or phone and completed online consent forms or gave verbal consent, respectively. The questionnaire was distributed to 2190 patients via an emailed Qualtrics survey link with several follow-up emails. Responses were collected 2 weeks after the final reminder email. Ninety-two patients were also contacted by phone as well as with follow-up emails. Three trained interviewers conducted phone interviews. The online survey was completed by 30.8% of patients and phone interview by 31.5%, for a total of 675 patients who are presented in this study. The response rate was 32.1% for African American patients and 30.5% for White patients.

Data Analysis

De-identified questionnaires were reviewed and analyzed by the scores each patient received for the SCAR-Q and CS scales. Scores were compared and analyzed in RStudio (2020) by patient ethnicity, age, and duration after surgery. For non-normally distributed data, non-parametric tests were used. The Mann-Whitney U test was utilized for comparison between ethnic groups and comparison between procedure types. Spearman's rank correlation tests were performed to evaluate the relationship between duration after surgery and age with symptoms and appearance scales scores.

RESULTS

Patient Demographics

Of 675 patients, 35.7% had abdominoplasty, 39.1% breast reduction, 14.8% mastectomy, 5% breast lift, 4% breast augmentation, and 2% breast reconstruction surgery (Fig. 1). In addition, 77.0% of the patients were White, and 23.0% were African American. The results of the survey showed that all patients had a median appearance score of 64 ± 29 , symptoms score of 77 ± 33 , psychosocial score of 77 ± 42 , SCAR-Q score of 228 ± 81 , and CS score of 15 ± 2 (Table 1).

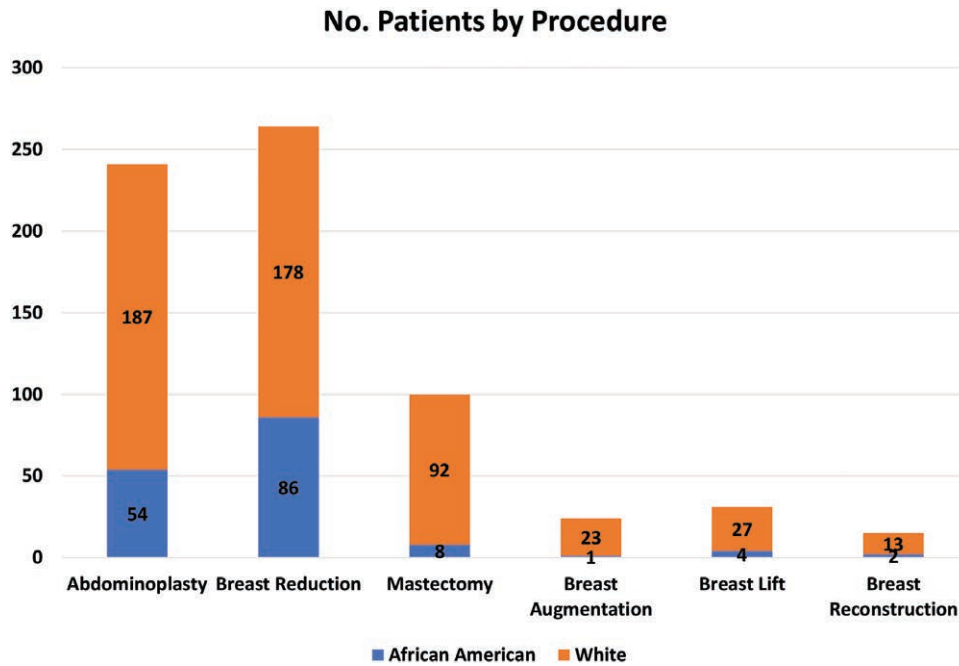


Fig. 1. Ethnicity breakdown by procedure. The number of African American and White patients is shown for each procedure type.

SCAR-Q and CS Scales

Figure 2 shows the variability of scores across different ethnicities (Table 1). White patients had a significantly higher median SCAR-Q score of 232 ± 79 and CS score of 16 ± 2 , whereas African American patients had a median SCAR-Q score of 203 ± 116 and CS score of 15 ± 5 ($P < 0.001$, $P < 0.001$, respectively). Furthermore, the median appearance, symptoms, and psychosocial scores for White patients (64 ± 29 , 77 ± 33 , and 77 ± 42 , respectively) were significantly higher than for African American patients (55 ± 29 , 77 ± 28 , and 69 ± 58 , respectively) ($P < 0.001$, $P = 0.009$, $P = 0.003$, respectively).

Specific Appearance, Symptoms, and Psychosocial Questions

African American patients scored significantly worse on questions regarding their scar color and scar pain than White patients ($P < 0.001$, $P < 0.001$, respectively). Furthermore, African American patients reported feeling more embarrassed, upset, and unhappy regarding their scar significantly more than White patients ($P < 0.001$, $P = 0.001$, $P = 0.001$, respectively).

Procedure Type

Twenty-two percent of abdominoplasty patients were African American and 77.6% were White. White patients who underwent abdominoplasty had a median appearance score of 64 ± 31 , which was significantly higher than in African American patients who had a median appearance score of 55.5 ± 33 ($P = 0.006$) (Table 1, Fig. 3). Thirty-three percent of breast reduction patients were African American, and 67.4% were White. White patients who underwent breast reduction had a median SCAR-Q score of 239 ± 59 and CS score of 16 ± 2 , which was significantly higher than African American patients, who had a median SCAR-Q score of 207 ± 107 and CS score of 15 ± 4 ($P < 0.001$, $P = 0.001$, respectively) (Table 1, Fig. 3). Furthermore, White patients had a higher median appearance score of 68 ± 23 , symptoms score of 89 ± 27 , and psychosocial score of 87 ± 31 than African American patients, who had a median appearance score of 56 ± 29 , symptoms score of 82 ± 33 , and psychosocial score of 69 ± 62 ($P < 0.001$, $P = 0.025$, $P < 0.001$, respectively).

Overall, breast surgery patients had a higher median symptoms scale score of 82 ± 30 compared with

Table 1. Comparison of African American and White Patient Median Scores

Procedure	No. Pts	Appearance	Symptoms	Psychosocial	SCAR-Q	CS
Abdominoplasty						
African American	54	55 ± 33	73 ± 26	77 ± 50	199 ± 111	15 ± 2
White	187	64 ± 31	77 ± 24	77 ± 42	228 ± 80	16 ± 2
Breast Reduction						
African American	86	56 ± 29	82 ± 33	69 ± 62	207 ± 107	15 ± 4
White	178	68 ± 23	89 ± 27	87 ± 31	239 ± 59	16 ± 2
Total	675	64 ± 29	77 ± 33	77 ± 42	228 ± 81	15 ± 2
African American	155	55 ± 29	77 ± 28	69 ± 58	203 ± 116	15 ± 5
White	520	66 ± 26	82 ± 33	87 ± 37	232 ± 79	16 ± 2
P		<0.001	$= 0.009$	$= 0.003$	<0.001	<0.001

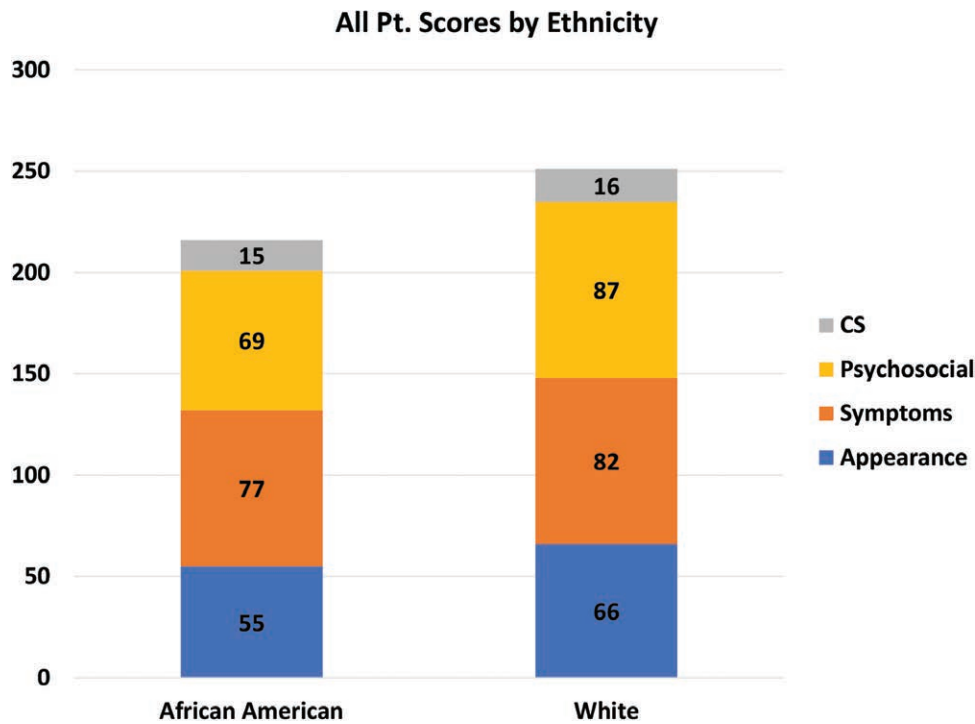


Fig. 2. SCAR-Q and CS median scores by patient ethnicity. The breakdown of the SCAR-Q scale into mean appearance, symptoms, and psychosocial scale scores is shown for African American and White patients.

abdominoplasty patients who had a median symptoms scale score of 73 ± 24 ($P < 0.001$). In addition, breast surgery patients reported significantly more numbness in their scar than abdominoplasty patients did ($P < 0.001$).

Age

Table 2 shows the distribution of scores across patients of different age groups. Patients aged 60 and above had a higher mean SCAR-Q score of 227 than patients of age 18–30, who had a mean score of 224. However, there was no significant correlation between age of patient and SCAR-Q, appearance, symptoms, and psychosocial scores. There was a very weak positive correlation between age and CS scores ($r = 0.10$, $P = 0.019$).

Duration after Surgery

Figure 4 shows the distribution of symptoms scores across patients with different durations after surgery. For White patients, duration after surgery was weakly positively correlated with symptoms scale score ($r = 0.18$, $P < 0.001$), appearance scale scores ($r = 0.14$, $P = 0.004$), and overall SCAR-Q scores ($r = 0.14$, $P = 0.004$). However, in African American patients, there was no significant correlation between duration after surgery and symptoms, appearance, or SCAR-Q scores ($P = 0.11$, $P = 0.37$, $P = 0.43$).

DISCUSSION

Overall Ethnic Group Differences

This study evaluated the differences in scarring impact between African American and White patients. Patients

have varying scar outcomes that depend on several factors, both environmental and genetic. We found that African American patients perceived their scars more negatively than White patients in terms of appearance, symptoms, psychosocial health, career, and sexual well-being. To date, no studies have discussed how patients of various ethnicities perceive their scars. However, differences in susceptibility to scarring have been reported in the literature, where Asian and African patients were shown to be more vulnerable to developing more aggressive scarring than White patients.¹⁴ Research has also shown that African American patients have a 15- to 20-fold greater risk of keloid formation than patients with less pigmented skin.^{15,16} Kelly suggested that the increased risk may be due to melanocyte-stimulating hormone abnormalities.¹⁶ Poor scarring outcomes may be related to the lower reported symptoms scores for African American patients in our study. This study suggests that African American patients are more susceptible to lower perceptions of their scars than White patients. Factors that may contribute to scar perception differences could be scar color, physical symptoms, and psychosocial variables.

Scar Color

Marston et al studied physicians' ratings of scar appearance in Black and White cleft-lip patients, and found that worse scar outcomes were associated with patients of the Black race, and with hypopigmented scar colors.¹⁷ However, no correlation analysis was conducted between Black patients and hypopigmented scars. In general, it is understood that scars begin as red and then mature to become light colored.¹⁸ Compared with White patients,

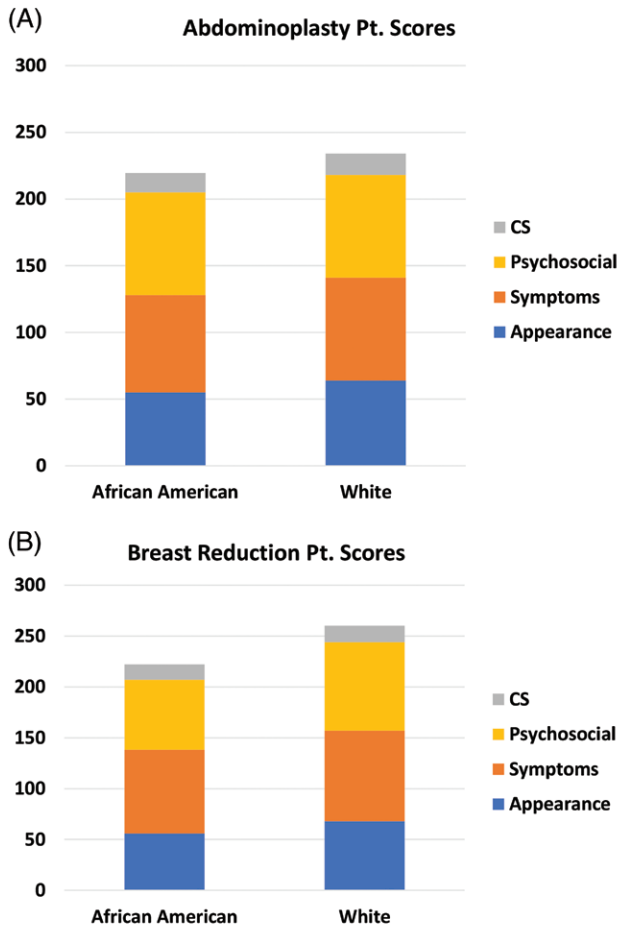


Fig. 3. Comparison of Ethnic Group scores within procedure types. The breakdown of the SCAR-Q scale into mean appearance, symptoms, and psychosocial scale scores is shown for African American and White ethnic groups within abdominoplasty patients (A) and within breast surgery patients (B).

African American patients felt significantly more negative about the color of their scar. Specifically, African American patients felt worse regarding scar-skin color mismatch more frequently than White patients did. These results indicate that African American patients have worse perceptions of their scar color than White patients, possibly due to hyperpigmentation in melanin-rich skin.

Symptoms

It is established that scars can cause physical discomfort and pain.¹⁸ However, studies have not yet compared scar pain levels in patients of different ethnicities. The formation of a perineural scar increases the tension on

the nerve and may lead to prolonged ischemia, causing painful scar neuropathy.^{19,20}

In our study, African American patients were more likely to significantly report their scars to be more painful, swollen, itchy, and sensitive. Such symptoms may have exacerbated the overall differences in scar perception between African American and White patients. Our findings indicate that African American patients are more likely to experience scar pain than White patients, contributing to an overall lower scar perception.

Psychosocial Well-being

Scars can have a much more significant impact on patient well-being than expected, as the presence of scars has been reported to significantly decrease the perception of a patient having a promising future.²¹ Previous studies have not compared the psychosocial impact of scars in patients of different ethnicities. Compared with White patients, African American patients reported more significant embarrassment and unhappiness due to their scar. The previously discussed factors influencing scar appearance and symptoms, which affect African American patients to a greater extent, might also negatively influence psychosocial well-being. Scar pain and sensitivity may contribute to overall unhappiness, and negative perceptions of scar appearance may lead to embarrassment in social settings. Cultural factors, and pre and postoperative follow-up counseling may also play a role and should be investigated further.

Understanding the impact of scars from the patient’s perspective is critical in uncovering specific factors that negatively impact patients and in understanding the more significant psychosocial impact on African American patients. African American patients may emphasize certain scar characteristics such as color and pain than White patients. Improved pre and postoperative care should be implemented for African American patients on further follow-up, including comprehensive counseling and other measures to enhance scar perception.

Career and Sexual Well-being

The impact of scars on a patient’s career and sexual well-being has not been investigated before. Hsieh et al suggest that these themes are important aspects of scarring based on content-elicitation interviews with patients and the CS scale questions reflect specific career and sexual-wellbeing-related scenarios identified by these patients.¹⁰ Scarring can affect a patient’s career in the form of emotional suppression and social alienation in the workplace.⁴ Patients may have feelings of insecurity surrounding their scar, causing a shift in typical social behavior, including during sexual encounters. To combat this shift in social pattern, which could negatively

Table 2. Comparison of SCAR-Q and CS Mean Scores by Age

Age	No. Pts	Appearance	Symptoms	Psychosocial	SCAR-Q	CS
18–30	62	63.5	82.9	77.8	224.1	14.2
30–40	133	62.4	78.4	79	212.6	14.1
40–50	153	62.2	76.5	72.8	211.5	14.5
50–60	128	63.3	77.2	73.1	213.6	14.1
60+	70	68	80.1	78.4	226.6	15.1

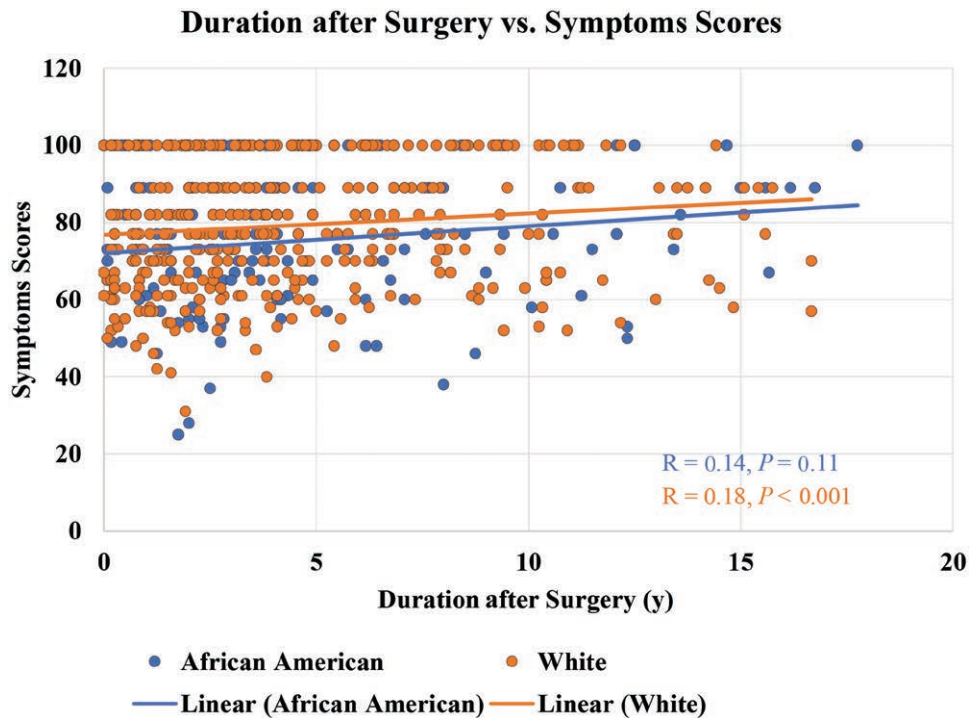


Fig. 4. Symptoms scale scores according to duration after surgery. All symptoms scores are plotted against patients' durations after surgery and organized according to ethnicity. Spearman's rank correlation tests were performed to evaluate the relationship between duration after surgery with symptoms scale scores.

impact their workplace interactions and sexual well-being, patients may benefit from seeking treatment such as cognitive behavioral therapy, which could improve their self-perception and decision-making capacity.⁴

Compared with White patients, African American patients had significantly worse perceptions of their scars' impact on career and sexual well-being. African American patients were also more likely to feel self-conscious and cover their scar during sexual encounters. The previously discussed factors influencing scar appearance and symptoms might also negatively influence sexual well-being. An undesirable scar color could create insecurities during sexual encounters.

Regarding career, African American patients were more likely to report that their scar caused them to appear unprofessional and that insecurities regarding their scar had hindered their career. An undesirable scar color could also create insecurities in a professional environment and contribute to the feeling that the scar appears unprofessional. Patients in this study had abdominal and breast scars, which may not be visible in a professional setting. However, some patients with nonvisible scars can experience significantly greater psychosocial duress than patients with visible scars.²²

Duration after Surgery

Although most scars are permanent, scars can show signs of fading over a period of time as collagen remodeling continues. For White patients, as time after surgery increased, patients' perception of their scar symptoms and appearance was better. However, in African American

patients, there was no significant association found between time after surgery and symptoms and appearance. These results suggest that African American patients scar symptoms and their attitudes toward their scar appearance tend to not improve over time. This could be because the factors affecting scar perception, such as color and pain, may not improve over time for African American patients. It could also be that socioeconomic factors may prevent African American patients from accessing scar improvement treatments, as there is a positive correlation between disposable income and cosmetic procedures.^{23,24} Future studies may compare scar perception in the same cohort over time paired with interviews to understand why scar perception may or may not be improving.

Age

In our study, there was no statistically significant association between scar appearance, symptoms, and psychosocial impact and age, which was likely due to the small sample size. However, we found that the oldest group of patients aged 60 and above had a better perception of their scar appearance, symptoms, psychosocial health, impact on career, and sexual well-being than patients of other age groups. The differences in scar perception between younger and older patients may be due to the difference of importance of career and sexual well-being stages in their life. In addition, thinner scars and a lower incidence of keloid and hypertrophic scar formation have been observed in older patients compared with younger patients.²⁵ However, regardless of how much a scar may fade over time, perceptions in African American patients were not changing significantly over

time, which further emphasizes the need for appropriate counseling and follow-up care.

Limitations

Many patients did not indicate their ethnicity, which resulted in the exclusion of some patients in the study and a small sample of African American patients compared with White patients. Furthermore, differences between ethnicities for mastectomy, breast augmentation, breast lift, and breast reconstruction were unable to be analyzed due to the small sample sizes. A greater sample size of African American patients would be necessary to increase the power of our analyses. One limitation of our study is that a third-party was not used to rate the appearance of the scars, which would have ensured that there was no difference between the scars when comparing perception. There is also a greater concern for keloids among dark skinned patients, which could have potentially contributed to lower scar perceptions; however, keloids and scar types were not analyzed in this study. Another limitation of the study was that the CS scale has not been validated. It could be that the CS scale did not fully capture the impact of scarring on career and sexual well-being. However, a future validation study would strengthen the scale. In regard to the CS scale results, the interquartile ranges result in an overlap between the median scores between the ethnic groups. However, the confidence interval was 13.2–14.0 for Black patients' CS scores and 14.2–14.6 for White patients' scores, and because the intervals do not overlap, we were able to achieve statistical significance. The low response rate of 31%–32% for the study is also a limitation and narrows the patient responses to those who tend to feel strongly about their scar (either negatively or positively). In addition, scar perceptions for individual patients were not tracked over time, and thus the duration after surgery analysis was unable to support the improvement of individual patients' scar perception over time. Assessment of scar perception at multiple follow-ups would allow for the comparison of scar perception improvement among various ethnicities.

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ACKNOWLEDGMENT

The authors thank Rena Upadhyay from Northwestern University for assistance with data compilation in RStudio.

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