

The Influence of Personality on Health Complaints and Quality of Life in Women With Breast Implants

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Aesthetic Surgery Journal
2023, Vol 43(2) 245–252
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<https://doi.org/10.1093/asj/sjac247>
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OXFORD
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Abstract

Background: A causal relation between systemic symptoms and breast implants has not been established. Psychological factors, such as personality and psychological distress, are strongly associated with the development of medically unexplained symptoms. It can be hypothesized that psychological factors may be related to the development of breast implant illness (BII).

Objectives: This study was conducted to evaluate the correlation between self-reported health complaints, health- and breast-related quality of life (QoL), and personality, in women with cosmetic breast implants.

Methods: Women who attended the plastic surgery outpatient clinic of Maastricht University Medical Center between October 2020 and October 2021 for reasons related to their implants and women recruited for a BII study at the Center during this period were invited to participate in this study. Only women who underwent cosmetic breast augmentation were eligible. Participants completed a physical complaints score form and the BREAST-Q, SF-36, and EPQ-RSS questionnaires via an online survey.

Results: In total, 201 women completed the questionnaires. Extroversion and social desirability were predominant personality traits in women with breast implants, followed by neuroticism. Relatively high levels of neuroticism were found compared with normative data. Neuroticism correlated significantly with health status and breast-related QoL. Physical and mental health-related QoL had the strongest correlations with neuroticism ($\beta = -3.94$, $\beta = -4.86$, $P < 0.001$).

Conclusions: Personality can play a role in the development of complaints. High levels of neuroticism are seen in cosmetic surgery patients and are negatively correlated with subjective health and patient-reported outcomes in women with breast implants. Therefore, neuroticism may be a factor in the development of BII.

Level of Evidence: 4

Editorial Decision date: September 1, 2022; online publish-ahead-of-print September 8, 2022.



Since their introduction in the 1960s, silicone breast implants have been hypothesized to be associated with systemic disease. This is referred to as breast implant illness (BII). Although many studies have explored this hypothesis, they have failed to show a relation between nonspecific symptoms such as fatigue, myalgia, arthralgia, cognitive impairment, and silicone breast implants.¹

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Psychological factors, such as personality and high levels of psychological distress, are strongly associated with the development of medically unexplained symptoms in general.² Furthermore, female gender and reporting of various physical complaints appear to be risk factors for the development of unexplained (functional) syndromes.³ Risk factors for the development of BII have only been elucidated to a limited extent. However, it has been suggested that BII is a functional somatic syndrome, similar to fibromyalgia.⁴ From that perspective, the patient's psychological profile may play an important role in understanding and treating BII.

It is known that women who opt for breast surgery differ in demographic, medical, and psychological characteristics from other women.^{5,6} Some authors suggest that women who undergo cosmetic breast augmentation are more likely to have a history of depression, anxiety, and neurotic personality.⁷⁻⁹ Several studies show an up to 2- to 3-fold increase in the risk of suicide among these women.¹⁰⁻¹⁶ However, Joiner suggests that this is to be expected given the difference in demographic and personality features, and when these differences are taken into account the suicide risk is in fact relatively low.¹⁷

Negative body image and low self-esteem are strongly correlated to psychological stress and may be an explanation for the high rate of psychiatric problems in cosmetic surgery candidates.¹⁸ Moreover, body image is related to personality. Neuroticism, in particular, is associated with negative body perception. Individuals who score highly on this personality trait are more likely to experience more negative emotions.¹⁹ For example, neuroticism was found to be associated with greater breast size dissatisfaction, which in turn has negative consequences for the psychological and physical well-being of women.²⁰

In addition, personality dimensions play an important role in outcomes, including satisfaction with surgical results, subjective well-being, quality of life (QoL), and even illnesses.^{5,19,21} Therefore, it can be hypothesized that psychological factors, such as personality traits, may be related to the development of BII. The objective of this study was to evaluate the correlation between self-reported health complaints, health- and breast-related QoL, and personality, in women with cosmetic breast implants.

METHODS

Study Population

This cross-sectional survey was conducted in October and November 2021. All women who had visited the plastic surgery outpatient clinic of Maastricht University Medical Center (MUMC+) between October 2020 and October 2021 for reasons related to their breast implants were invited to participate. Furthermore, all women who had responded to invitations from other BII studies performed

by our research group during the same period were invited to participate in this survey. In addition, the invitation was published on the platform of the Dutch Foundation for Women with Illness due to Breast Implants (Meldpunt Klachten Siliconen). Only women aged over 18 years who had undergone breast augmentation for cosmetic reasons were eligible, even if they had undergone explantation surgery. Male gender was an exclusion criterion. All subjects signed an online informed consent form. This study was reviewed and approved by the medical ethics review committee of AZM/Maastricht University (METC 2020-2324).

Data Collection

Patients were invited to participate in this study by means of an invitation letter by mail or e-mail. They were able to confirm their interest by sending an e-mail to the coordinating researcher, from whom they then received a link to the online questionnaire (Qualtrics, Provo, UT). Participants were requested to complete the questionnaire within 3 weeks and a reminder was sent after 2 weeks. The online survey was anonymous and consisted of items on demographics, medical history, physical complaints, health-related QoL (Short Form-36 [SF-36]), breast-related QoL (BREAST-Q; augmentation module), and personality traits (Eysenck Personality Questionnaire [EPQ]).

Sum of Physical Complaints

For the evaluation of the physical complaints related to BII, patients were asked to score 8 commonly reported ailments.²² This questionnaire was not validated but was based on the most reported complaints ([Supplemental Appendix](#)). The query was provided in Dutch and translated into an understandable language. For the following physical complaints, a score was given on a Likert scale from 0 to 5: fatigue, myalgia, arthralgia, skin problems, sicca, fever, cognitive impairment, and hair loss. Subsequently a sum of these scores was made, resulting in a minimum score of 0 and a maximum score of 40, with a higher score indicating an increase in burden due to physical complaints.

SF-36

The SF-36 health survey is a validated questionnaire consisting of 36 items measuring health status and its related QoL.²³ It comprises 8 domains: physical functioning, the impact of the health status, pain, general health, vitality, social functioning, the impact of the mental health, and mental health. The sum of these 8 domains results in 2 summarized measures: a physical health component and a mental health component. For this study the 2 summarizing domains were used for statistical analysis. Scores range from 0 to 100, with higher scores indicating a better health status.

BREAST-Q

The BREAST-Q is patient-reported outcome measure for health-related QoL and patient satisfaction. The questionnaire is developed for different types of breast surgery, such as mastectomy, reconstruction, and augmentation. The 2 main domains of the BREAST-Q are the QoL domain, consisting of 3 subdomains (physical well-being, sexual well-being, and psychosocial well-being), and the satisfaction domain, again consisting of 3 subdomains (satisfaction with breasts, satisfaction with outcome, and satisfaction with care).²⁴

Eysenck Personality Questionnaire

EPQ-RSS, a short version of the EPQ, was used as a tool for measuring the most important dimensions of personality. The 48 questions result in 4 domains of personality: psychoticism, extroversion, neuroticism, and social desirability.²⁵ A higher score indicates a stronger correlation with the personality domain. The Dutch version of the questionnaire was used.²⁶

Statistical Analysis

All data were statistically evaluated for normality of distribution. Patient demographics were analyzed with descriptive statistics and were reported as mean values and standard deviation (SD). Categorical variables were reported as total and percentage. Associations between personality and physical complaints, and breast-related and health-related QoL were tested with Pearson's correlation. The correlations were corrected for potential confounders (age, BMI, allergies, and relationship status) by multivariable linear regression. All analysis were performed in SPSS Statistics version 28 (IBM, Armonk, NY) and a *P*-value <0.05 was interpreted as statistically significant.

RESULTS

Baseline Characteristics

A total of 201 women were included in this study. Their mean age was 46.2 years (range, 21-75 years) and their average BMI was 24.3 kg/m² (range, 17.7-43.4 kg/m²). Eighty women (39.8%) had their implants removed. The baseline characteristics of the subjects are presented in Table 1.

Physical Complaints, Health-Related QoL, Breast-Related QoL, and Personality Traits

Table 2 shows the mean [SD] scores for the physical complaint score, the SF-36, the BREAST-Q, and the EPQ.

Table 1. Baseline Patient Demographics

Demographic	(n = 201)
Age (years)	46.2 [12.8]
BMI (kg/m ²)	24.3 [4.4]
Smoking, n (%)	
No	155 (77.1)
Yes	45 (22.4)
Allergies, n (%)	
Yes	86 (42.8)
No	115 (57.2)
Relationship status, n (%)	
Yes	145 (72.1)
No	56 (27.9)
Educational level, n (%)	
Elementary education	18 (8.9)
Secondary/middle level vocational education	120 (59.7)
Higher level vocational	52 (25.9)
Academic/doctoral degree	11 (5.5)
Occupation, n (%)	
Yes	119 (59.2)
No	82 (40.8)
Implants removed, n (%)	
Yes	80 (39.8)
No	121 (60.2)

Values are mean [standard deviation] or n (%).

Extroversion is the most prominent personality trait in this sample followed by social desirability and neuroticism (7.1 [3.2], 7.0 [2.5], 6.7 [3.5], respectively). Psychoticism had the lowest mean score (2.5 [1.5]). For breast-related QoL the mean scores for physical and psychosocial well-being were 55.2 [32.7] and 60.2 [19.9], respectively. The mean scores on the individual symptoms that resulted in the physical complaint score are shown in Figure 1. The physical component of the SF-36 had a mean score of 51.9 [27.8] and the mental component score had a mean of 53.3 [26.6].

Correlation Between Personality Traits and Health

Figure 2 shows the association between personality traits and physical complaints, health-related QoL, and

Table 2. Mean Scores of Physical Complaints, Health-Related QoL, Breast-Related QoL, and Personality Traits

Complaints	(n = 201)
Physical complaints ^a	21.7 [7.4]
SF-36	
Physical complaints	66.6 [27.2]
Limitation by physical status	40.0 [43.8]
Limitation by emotional status	56.7 [45.4]
Fatigue	40.4 [25.7]
Emotional well-being	60.2 [22.0]
Social functioning	55.7 [30.3]
Pain	56.8 [28.9]
General health	43.8 [25.9]
Physical component score	51.9 [27.8]
Mental component score	53.3 [26.6]
BREAST-Q	
Satisfaction with breast	60.2 [21.4]
Psychosocial well-being	60.2 [19.9]
Physical well-being	55.2 [32.7]
Sexual well-being	54.1 [22.3]
Satisfaction with outcome	62.2 [25.9]
Information given by doctor	50.1 [14.9]
EPQ	
Psychoticism	2.5 [1.5]
Extroversion	7.1 [3.2]
Neuroticism	6.7 [3.5]
Social Desirability	7.0 [2.5]

Outcomes are presented as mean [standard deviation]. ^aTotal score of physical complaints (range, 0-40), with higher score indicating a higher burden due to physical complaints. EPQ, Eysenck Personality Questionnaire; QoL, quality of life; SF-36, Short Form-36 (range, 0-100).

breast-related QoL, determined by the Pearson correlation. A correlation between neuroticism and all outcomes was found with the Pearson correlation, except for the physical well-being scale of the BREAST-Q (Figure 2f), ($r = 0.47, -0.50, -0.67, -0.27, -0.50, -0.37, -0.35, -0.23; P < 0.05$). Additionally, a correlation between extroversion and most outcomes was found. Table 3 presents the associations between personality traits and physical complaints, health-related QoL, and breast-related QoL,

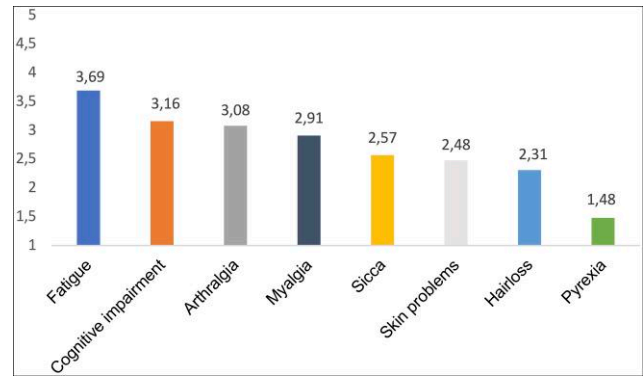


Figure 1. Mean scores of individual health symptoms. The sum of these scores gives the physical complaints score.

determined by multivariable linear regression, correcting for age, BMI, allergies, and relationship status. Most correlations persist after correction.

Neuroticism is correlated with all outcome measures except the physical well-being scale of the BREAST-Q. Higher levels of neuroticism correlate with more physical complaints ($\beta = 0.89, P < 0.001$) and higher levels of neuroticism correlate with lower scores on the SF-36 and the BREAST-Q, indicating lower physical health-related QoL ($\beta = -3.94, P < 0.001$), mental health-related QoL ($\beta = -4.86, P < 0.001$), and most breast-related QoL scales. Additionally, higher psychoticism levels are associated with lower satisfaction with outcome ($\beta = -3.52, P < 0.05$) and the idea of having been given less information ($\beta = -1.82, P < 0.05$). The highest impact of extroversion is on both the physical and mental parts of the health-related QoL ($\beta = 2.64, \beta = 2.20, P < 0.001$).

DISCUSSION

Personality plays an important role in satisfaction with outcomes, subjective well-being, and QoL. However, the role of personality factors in QoL after breast implant surgery and breast implant-related illness is still unknown. This cross-sectional study aimed to evaluate the association between self-reported health complaints, health- and breast-related QoL, and personality traits, in women with cosmetic breast implants.

First, we analyzed the personality profile of women with cosmetic breast implants. We found that extroversion and social desirability were predominant traits, followed by neuroticism. Psychoticism was the least characteristic feature of these women's personalities. This order of traits is similar to that of the EPQ-RSS normative data (control group with 64.3% women, and a mean age of 47.5 years).²⁶ However, in our study we found significantly higher levels of neuroticism than the levels described in normative

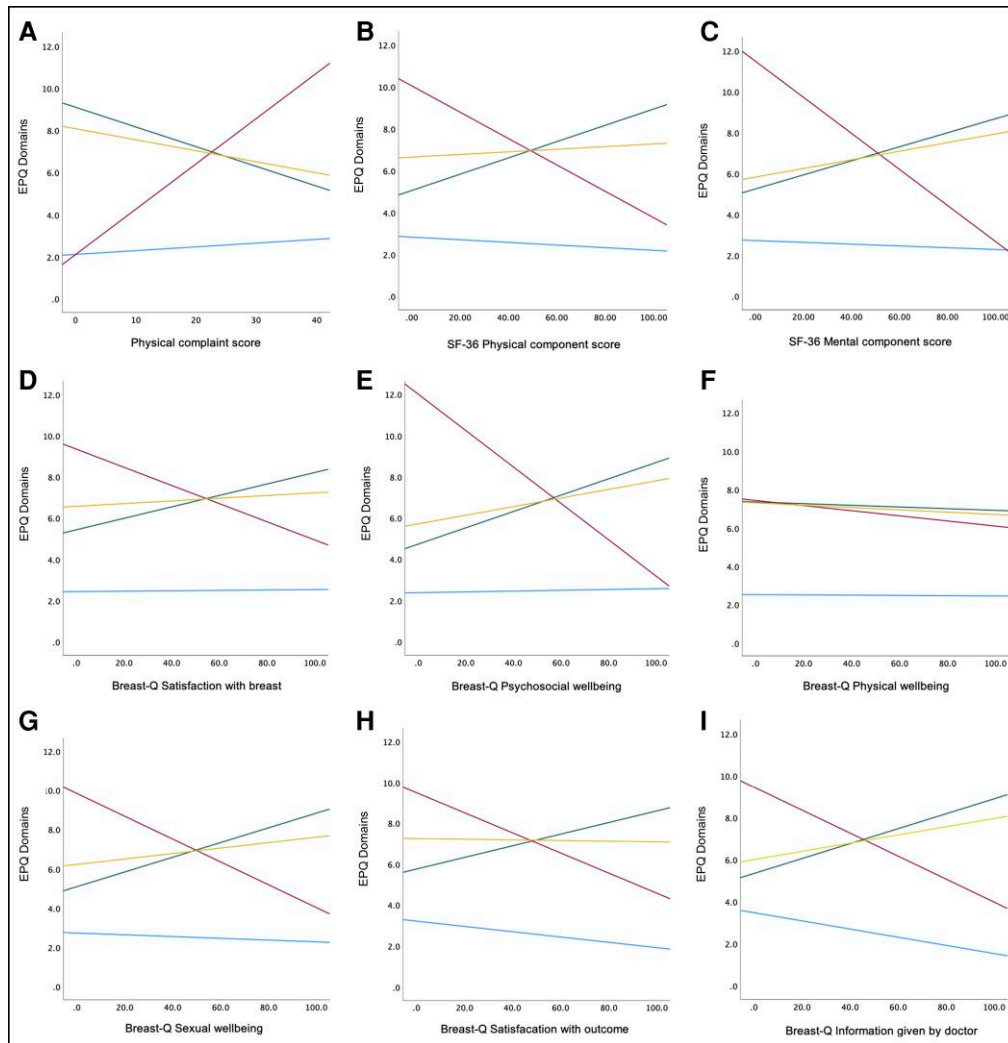


Figure 2. Correlation plots for EPQ domains and all outcomes. The y axis presents all 4 domains of the EPQ questionnaire. (A) Physical complaint score; (B) SF-36 physical component score; (C) SF-36 mental component score; (D) BREAST-Q satisfaction with breast; (E) BREAST-Q psychosocial well-being; (F) BREAST-Q physical well-being; (G) BREAST-Q sexual well-being; (H) BREAST-Q satisfaction with outcome; and (I) BREAST-Q information given by doctor. EPQ, Eysenck Personality Questionnaire; SF-36, Short Form-36.

data (mean, 6.7 vs 4.1), whereas the means of other traits were close to matching (psychoticism, 2.5 vs 2.3; extroversion, 7.1 vs 7.2; social desirability, 7.0 vs 6.6). These results may be explained by the fact that personality is correlated with body image.^{19,27} For example, neuroticism has a positive association with body dissatisfaction, whereas extraversion has a negative association with body dissatisfaction. As a consequence, people who are more neurotic are more likely to undergo cosmetic surgery. Indeed, higher levels of neuroticism in women undergoing cosmetic surgery, including breast augmentation, were found in previous studies and in this current study.²⁸ Only cosmetic patients were included in our study, as personality may distinguish cosmetic patients from reconstructive patients. Breast augmentation patients deliberately opt

for surgery to improve their appearance, driven by low self-esteem or other personal reasons, whereas breast cancer patients are involuntarily faced with the choice of restoring the shape of the breast through breast reconstructive surgery after losing their breast, regardless of their psychological profile.^{7,29} In other words, reconstructive patients can be considered a random sample of society or control group, assuming that personality has not changed as a result of the disease or treatments. Previous research on personality of breast cancer survivors showed no association between neuroticism and breast cancer risk.³⁰ Nor could a significant difference in neuroticism and extraversion between breast cancer survivors and controls be found.³¹ Nevertheless, low neuroticism and high levels of extraversion also appear to be protective factors associated with

Table 3. Regression Coefficients Between Personality Traits and Health- and Breast-Related Outcomes

EPQ dimensions	Psychoticism	Extroversion	Neuroticism	Social desirability
Physical complaints	0.40 (−0.33 to 1.13)	−0.45 ^a (−0.79 to 0.10)	0.89 ^a (0.59-1.20)	−0.32 (−0.79 to 0.15)
SF-36, physical component	−2.05 (−4.80 to 0.69)	2.64 ^a (1.37-3.91)	−3.94 ^a (−5.04 to 2.84)	0.60 (−1.19 to 2.39)
SF-36, mental component	−1.19 (−3.80 to 1.42)	2.20 ^a (0.98-3.42)	−4.86 ^a (−5.77 to −3.95)	1.83 ^a (−1.78 to 3.50)
BREAST-Q	0.26 (−1.90 to 2.41)	1.10 ^a (0.06-2.13)	−1.49 ^a (−2.45 to −0.53)	0.16 (−1.24 to 1.56)
Satisfaction with breast	0.40 (−1.56 to 2.36)	1.33 ^a (0.40-2.25)	−2.69 ^a (−3.48 to −1.91)	0.99 (−0.27 to 2.25)
Psychosocial well-being	−0.19 (−3.42 to 2.58)	−0.12 (−1.70 to 1.45)	−1.20 (−2.66 to 0.26)	−1.41 (−3.50 to 0.67)
Physical well-being	−0.91 (−3.10 to 1.29)	1.53 ^a (0.49-2.56)	−2.31 ^a (−3.25 to 1.38)	1.00 (−0.41 to 2.42)
Sexual well-being	−3.52 ^a (−6.92 to 0.12)	1.71 ^a (−1.07 to 1.69)	−2.17 ^a (−3.66 to −0.68)	−1.73 (−4.07 to 0.62)
Satisfaction with outcome	−1.82 ^a (−3.31 to 0.34)	0.76 ^a (0.04-1.48)	−0.88 ^a (−1.55 to −0.21)	0.51 (−0.46 to 1.49)
Information given by doctor				

Correlation coefficients calculated with multivariable linear regression correcting for BMI, age, allergies, and relationship status. EPQ, Eysenck Personality Questionnaire; SF-36, Short Form-36. ^a*P* < 0.05.

mental health in people with cancer.³² Nevertheless, we feel that these 2 groups should be studied separately in terms of personality traits and related outcomes, such as satisfaction with outcomes and QoL.

Second, neuroticism was found to be significantly correlated with the severity of physical complaints and both health-related and breast-related QoL in women with breast implants. The mean BREAST-Q scores in this study were lower than the normative data (control group with a mean age of 54 years and a mean BMI of 24 kg/m²) for both psychosocial well-being (60.2 vs 66) and physical well-being (55.2 vs 86).³³ Higher levels of neuroticism were associated with worse health status. This finding is consistent with the existing literature on neuroticism. Neuroticism is related to the tendency to experience negative emotions, a greater tendency to fear and see the world as a dangerous place, and is also linked to maladaptive coping.^{34,35} This results in worse physical and mental health outcomes.³⁶ For example, neuroticism has been associated with a higher risk of chronic pain as well as functional somatic syndromes and fibromyalgia.^{37–39} Neuroticism was positively associated with higher symptom severity, as well as higher levels of anxiety, depression, stress, and worse mental QoL in fibromyalgia patients.³⁷ Because the symptom complex of BII is very similar to that of fibromyalgia, and we found this correlation between neuroticism and subjective health in women with breast implants as well, we hypothesize that neuroticism may be a factor in the development of BII.⁴⁰

A factor that may be closely related to neuroticism and the development of health complaints in women with breast implants is the nocebo effect. The nocebo effect means that people develop complaints due to negative expectations; the opposite of the placebo effect.⁴¹ Some characteristics are known to be associated with the nocebo effect, for example, anxiety, psychological distress, and a history of medically unexplained symptoms.⁴² These characteristics are more common in people who are high in neuroticism as

well as in women with BII.⁴³ It is therefore not inconceivable that, due to this nocebo effect, these women experience more negative health effects than would normally be expected with breast implants. The negative expectations can be reinforced by media attention or via social media groups.⁴⁴ Women may seek information through these sources if they feel they are insufficiently informed about the risks of breast implants.⁴⁵ In our study, women reported low scores on the subscale “information given by doctor,” which was significantly negatively correlated with neuroticism and psychoticism. Therefore, these women will be more likely to seek their information elsewhere, which also puts them at risk of receiving misinformation.

The current study has a number of limitations. This study included a relatively small sample size due to the recruitment method used. Also, the lack of a control group is a significant limitation which was only partially relieved by the comparison with normative data. Therefore, a control group with similar demographics should be added in future studies. Furthermore, a form of selection bias may have occurred because women with negative experiences may be more likely to participate in scientific research and express their dissatisfaction. As a result, outcomes can be more negative than reality, as evidenced by the BREAST-Q scores. Results related to physical discomfort could also be affected negatively by physical complaints directly related to the implant, such as capsular contraction or pain. This information was not collected, which resulted in another limitation. Finally, it is not verifiable that participants completed the questionnaire about personality traits completely truthfully. Since these are very personal questions, there may be a tendency to fill in more desirable answers. This will most likely mean that the outcomes of neuroticism and psychoticism are an underestimate of reality and that the effect of these characteristics on patient-reported outcomes is stronger than this study suggests. This study shows a possible influence of personality on the

development of breast implant–related systemic symptoms. Due to the study design no causal relationships can yet be established. Therefore, future studies should elaborate on this theory by prospectively collecting data from an unselected group of women undergoing breast augmentation, regarding pre- and postoperative levels of personality traits, health complaints, and satisfaction with surgical outcomes. Comparing these results with reconstruction patients as well as a control group without breast implants would be valuable to gain more insight into the difference in personality between these groups.

CONCLUSIONS

Although some women report health problems related to breast implants, little is known about the origin and risk factors of these problems. Psychological factors, such as personality, can play a role in the development of complaints. High levels of neuroticism are seen in cosmetic surgery patients and are significantly negatively correlated with subjective health and patient-reported outcomes in women with breast implants. Therefore, neuroticism may be a factor in the development of breast implant–associated illness. Furthermore, the nocebo effect can cause complaints due to negative expectations, fed by (social) media. Large prospective comparative studies should be conducted to further investigate the effect of psychological factors on the development of BI.

Supplemental Material

This article contains [supplemental material](http://www.aestheticsurgeryjournal.com) located online at www.aestheticsurgeryjournal.com.

Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

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