Original Study

Factors Affecting Sexual Function and Body Image of Early-Stage Breast Cancer Survivors in Poland: A Short-Term Observation

Robert Kowalczyk,[1] Krzysztof Nowosielski,[2] Ida Cedrych,[3] Marek Krzystanek,[4] Iwona Glogowska,[5] Joanna Streb,[6] Jakub Kucharz,[7] Zbigniew Lew-Starowicz[8]

Abstract

This study aimed to evaluate correlates and impact factors of sexual function and body image of female breast cancer survivors. A total of 128 women aged 18 to 65 who were free of disease and who underwent surgical treatment for breast cancer were evaluated. The results indicated that the role of the partner and/or family support is important in maintaining sexual health and restoring body image.

Introduction: Knowing the important factors influencing sexual function and body image might facilitate the recovery process of breast cancer survivors. Surgery type, relationship quality, and partner support might be modified to create a space for psychosexual intervention. **Patients and Methods:** This retrospective questionnaire-based study was performed on 128 women aged 18 to 65 years who were free of disease at time of study entry and who underwent surgical treatment for breast cancer. *Diagnostic and Statistical Manual of Mental Disorders* criteria were used to assessed female sexual dysfunction (FSD). Changes in Sexual Functioning Questionnaire (CSFQ) were used to measure sexual function, whereas the Body Image After Breast Cancer Questionnaire (BIBCQ) was used to assess body image. The support of the partner was evaluated by the Provisions of Social Relation Scale (PSRS). **Results:** The median age of the studied respondents was 52.5 ± 10.1 years. FSD was diagnosed in 27.3% women. Lower physical satisfaction in relationship (odds ratio [OR] = 2.3), undergoing mastectomy (OR = 4.1) higher level of anxiety (OR = 4.2), and shorter duration of relationship (OR = 1.1) as well as not receiving adjuvant chemotherapy ($F = 3.54$), higher level of emotional satisfaction in relationship ($F = 20.32$), longer time after completion of oncologic treatment ($F = 8.76$), undergoing breast-conserving therapy (compared to mastectomy) ($F = 13.21$), and lower level of anxiety ($F = 31,25$) were important factors for the prevalence of FSD and positive body image, respectively. **Conclusion:** Type of surgery, time after completion of treatment, level of anxiety, adjuvant chemotherapy, partner support, and satisfying quality of relationship are important factors for sexual function, sexual quality of life, and body image in female breast cancer survivors.

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Introduction

Breast cancer constituted 10.9% of newly diagnosed incidents of cancer in the Polish National Cancer Registry from 2001 to 2014. After lung cancer, it was the second most frequently diagnosed oncologic disease among Polish women in these years. In 2015, the breast cancer frequency rate in Poland was 35%—lower than the European Union average in 2015.[1,2] Concurrently, the 5-year survival rate of female patients with breast cancer slightly

[1]Department of Sexology, Andrzej Frycz Modrzewski Krakow University, Krakow, Poland
[2]Department of Physiology, Opole Medical School, Poland
[3]Department of Systemic and Generalized Malignancies, Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Krakow Branch, Krakow, Poland
[4]Department of Psychiatry and Psychotherapy, Medical University of Silesia, Katowice, Poland
[5]Department of Breast Cancer and Reconstructive Surgery, Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland
[6]Department of Oncology, Jagiellonian University Medical College, Krakow, Poland
[7]Department of Uro-Oncology, Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland
[8]Department of Sexual Rehabilitation, Academy of Physical Education, Warsaw, Poland

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Address for correspondence: Krzysztof Nowosielski, MD, Department of Physiology, Opole Medical School, ul. Katowicka 68, 45-060 Opole, Poland
E-mail contact: dr.krzysztof.nowosielski@gmail.com

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increased in the first decade of the 21st century, from 75.0% in the years 2000-2002% to 77.2% in the years 2012-2014. Similar trends have been noted in other European countries and in the United States.[2-4]

Cancer therapy (surgery, radiotherapy, systemic treatment) may cause, among others, medical menopause, pain, depression, anxiety, fatigue, sleep disturbances, body disfiguration, disorders of bladder function, shortening of vagina, lack of vaginal lubrication, desire and arousal disorders, pain during sexual activities, and fear of "transmitting" cancer to the partner. After undergoing treatment of reproductive cancer, particularly breast, women tend to feel less feminine, which in turn may negatively affect their self-esteem, sexual life, and relationships with their partner.[5-7]

Sexuality is a basic element of human life, regardless of whether a person has a sexual partner. The ability of being sexually active, proper sexual function, sexual attractiveness, and restoration of sexual reactions are perceived by breast cancer survivors (BCS) as among the most important indicators of a successful treatment. Conversely, deterioration in any aspect of sexual activity and body image may be attributed to ineffective treatment and thus may reduce the expectations for recovery.[5-7]

Body image is a psychologic construct that captures the perceptions, emotions, and attitudes that people hold toward their own bodies. In BCS, that body image may be influenced by factors such as socioeconomic status, factors associated with oncologic disease itself, and factors related to patients' partners, treatment modalities, quality of life, and sexual function.[8]

A growing number of scientific studies have focused on sexual function, body image, and quality of life in women after oncologic treatment of breast cancer. The contemporary model of female sexuality assumes the existence of important factors affecting sexual function after the completion of treatment. Examples include medical factors associated with cancer and other comorbidities, factors associated with cancer therapy, sexual function before the diagnosis, one's partner's sexual function and support, body image and self-esteem, strategies of coping with stress, and the overall sociocultural context.[8-18]

Improved diagnostic and therapeutic options in breast cancer treatment have resulted in longer progression-free survival rates of female patients. In contemporary oncology, therapy focuses on not only the radical treatment of the underlying condition but also the improvement of general well-being after oncologic treatment, including restoration of sexual function and body image.

This study aimed to evaluate correlates and impact factors of sexual function, prevalence of sexual dysfunction, quality of sexual life, and body image of female BCS. Knowing such factors, especially those related to a partner support, type of surgery and treatment, and anxiety level, may influence patient choice for surgical treatment option, permit tailoring of counseling and therapeutic intervention before treatment, and facilitate rehabilitation process. An improvement in these aspects is expected to sexual function, body image, and sexual quality of life after breast cancer treatment.

Patients and Methods

Sample

This retrospective questionnaire-based study was conducted on 200 women who underwent surgical treatment for breast cancer and who were required to undergo postoperative radiotherapy and to receive different forms of adjuvant treatment (systemic chemotherapy, hormone therapy in the case of positive receptors for estrogen and progesterone, and monoclonal antibodies therapy in the case of positive receptors for human epidermal growth factor receptor 2 [HER2]), and other treatments. Participants were recruited from January 2015 to June 2016 in 4 oncologic centers in Kraków, Poland. All procedures involving human participants performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all participants included in this study. The study was sponsored by the Polish Ministry of Science and Higher Education. The study design was approved by the bioethics committee of the Academy of Physical Education (Warsaw, Poland).

The inclusion criteria for the study were surgical treatment for breast cancer (modified radical mastectomy or breast-conserving therapy [BCT]), early-stage breast cancer (stage IA to IIB),[19] at least 6 months after completion of oncologic treatment (surgery, radiotherapy, chemotherapy), free of disease at the time of study entry, age 18 to 65 years, patient's consent to the study, and a filled-out questionnaire.

The exclusion criteria included women with cancers of other areas, depression and other psychiatric disorders (past or current), overactive bladder, pelvic organ prolapse greater than stage II, previous cardiac surgeries (including those who underwent myocardial infarction < 6 months earlier), severe cardiovascular disorders (New York Heart Association 3/4), and unstable coronary angina, as well as those who were taking medication influencing sexual function.

Of the 200 women who underwent treatment for breast cancer, 150 satisfied the inclusion and exclusion criteria. Of the 150 participants, 12 did not consent to their participation in the study, and 10 returned incomplete questionnaire. Consequently, 128 participants, qualified for the final analysis, a response rate of 85.3%.

Procedure

All patients eligible for the study were recruited during regular medical checkups and were interviewed by one of the authors of this study. Participants were asked to complete the questionnaire in a quiet waiting room to ensure maximum privacy. Their medical data were filled in by the medical staff on the basis of their patient charts during or after the medical visit. A sexologic semistructured interview was subsequently performed.

Assessment Instruments

The research instrument was a questionnaire comprising a series of questions on breast cancer staging, type of surgery (mastectomy vs. BCT) and adjuvant therapy (radiotherapy, systemic treatment), socioeconomic factors, and the patient's partner (whether he or she was a steady partner, duration of the relationship, and level of satisfaction with the relationship).

Female sexual dysfunction (FSD) was diagnosed on the basis of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) criteria.[20] Sexual quality of life was measured by the Polish version of the Sexual Quality of Life Questionnaire (SQOL).[21,22] Sexual function was assessed by the standardized and validated Polish

version of the Changes in Sexual Functioning Questionnaire (CSFQ).[23] Anxiety and depression was measured by the Polish version of the Hospital Anxiety and Depression Scale (HADS).[24] Support from the partner was assessed by the Polish version of the Provisions of Social Relation Scale (PSRS).[25] Body image was measured by the Polish version of the Body Image After Breast Cancer Questionnaire (BIBCQ)[26] and questions 39 to 42 of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTEC QLQ BR23) questionnaire.[27]

Measurement Description

The SQOL addressed the impact on self-esteem, emotional well-being, and relationship impact, with a higher score indicating better sexual quality of life.[21,22]

The CSFQ analyzes sexual activity and sexual behavior in 5 subscales: pleasure, desire/frequency, desire/interest, arousal/excitement, and orgasm/completion. A higher score indicates better sexual function.[23]

For the HADS, the following norms were accepted: $\leq$ 10 and $\geq$ 11 indicated low and high level of anxiety/depression, respectively.[24]

The PSRS's 8-item subscale on perceived social support provided by the members of family was assessed. Higher sores represented more partner support.[25]

The BIBCQ evaluated body image using 6 domains: vulnerability, body stigma, limitations, body concerns, transparency, and arm concerns, with higher scores indicating a more negative body image.[26]

Answers to 4 questions of the EORTEC QLQ BR23[27] were coded as not at all = 1, a little = 2, quite a bit = 3, and very much = 4; these questions assessed physical attractiveness (question 39: Have you felt physically less attractive as a result of your disease or treatment?), feeling of being less feminine (question 40: Have you been feeling less feminine as a result of your disease or treatment?), feeling of shame when being naked (question 41: Did you find it difficult to look at yourself naked?), and body dissatisfaction (question 42: Have you been dissatisfied with your body?).

Power Analysis

With 128 individuals included in the study, the power of 90% with an alpha of 0.05 was achieved to detect the differences of 10 points, 4 points, 2.5 points, and 7 points between women with and without FSD in the SQOL, CSFQ, BIBCQ, and PSRS, respectively.

Statistical Analysis

Analyses were conducted to inspect the impact of socioeconomic status, oncologic therapy-related, relationship-related, and psychologic factors on the prevalence of FSD, sexual function, sexual quality of life, and body image. Statistical analyses were performed by Statistica 12.0 PL computer software (StatSoft, Kraków, Poland). The Shapiro-Wilk and Lilliefors tests were used to evaluate the normality of the variable distribution, and the Levene test was used to check for homogeneity. Because neither normality nor homogeneity was met, The Spearman rank correlation was used to evaluate correlation. To assess the influence of different variables on the prevalence of FSD, a forward logistic regression model was used. To assess the influence of variables on body image, sexual function, and sexual quality of life, forward multiple regression was used. Only variables that were statistically significant at $P < .05$ were included in the final models.

Results

Sociodemographic and Clinical Characteristic of Study Population

Of the 128 participants (median age, 52.5 $\pm$ 10.1 years), 83 (64.8%) were diagnosed with stage I breast cancer; the others were diagnosed with stage II disease. The median time after completion of oncologic treatment, including chemotherapy and radiotherapy, was 7 months (range, 7-18 months). Participants' characteristics are presented in Tables 1 and 2.

Sexual Health

FSD was diagnosed in 35 participants (27.3%). Fourteen women (40%) had one sexual dysfunction, 20 (57.1%) had two, and 1 (2.9%) had three. According to Spearman rank correlation, which evaluated the influence of tested variables on sexual function/dysfunction and sexual quality of life (Table 3), the presence of FSD was correlated with type of surgery, relationship quality, partner's sexual function, and participant's anxiety level. Furthermore, better sexual function was corelated with longer time after treatment, type of surgery, younger partner's age, better sexual function in partner, low anxiety level, higher physical and emotional satisfaction in relationship, and higher partner support level. Finally, higher sexual quality of life was correlated with undergoing BCT, better sexual function in partner, low anxiety level, higher physical and emotional satisfaction in relationship, higher mutual emotional closeness, and higher partner support level.

In order to check the influence of multiple variables on the presence of FSD, the sexual quality of life and sexual function regression analysis (logistic and multiple, respectively) was applied. In the first step, all variables were evaluated (Table 4). Only variables that had statistically significant impact on the outcomes ($P < .05$) were included in the further stepforward analysis (Table 5). The results indicated that the lower physical satisfaction in relationship, undergoing mastectomy, higher anxiety level, and shorter duration of relationship increased the risk of FSD in BCS (odds ratio [OR] = 2.3, 4.1, 4.2, and 1.1, respectively). Additionally, higher sexual quality of life was significantly affected by feeling feminine (degree of freedom [*df*] = 3, sum of square [SS] = 1653.5, $F = 2.78$), feeling comfortable looking at one's body when naked ($df = 3$, SS = 2301.2, $F = 12.84$), satisfactory frequency of sexual intercourses ($df = 1$, SS = 2542.4, $F = 12.83$), higher level of mutual emotional closeness ($df = 1$, SS = 7803.9, $F = 39.42$), higher level of physical satisfaction in relationship ($df = 1$, SS = 5035.1, $F = 25.43$), with adjusted R^2 for the model = 0.67, $df = 9$, $P = .001$ (Table 5). Finally, better sexual function was significantly influenced by younger partner's age ($df = 1$, SS = 367.5, $F = 8.98$), feeling physically attractive ($df = 3$, SS = 739.9, $F = 6.03$), higher partner support level ($df = 1$, SS = 463.9, $F = 11.35$), physical satisfaction in relationship ($df = 1$, SS = 1392.4, $F = 34.05$), longer time after

Table 1 General Characteristic of Studied Population—Quantitative Variable

Variable	Median	Upper Quartile	Lower Quartile	Quartile Deviation
Age (y)	52.53	45.58	59.16	10.11
Time after oncologic treatment completion (mo)	7.00	7.00	18.00	17.16
Partner's age	54.00	48.00	60.00	10.14
Relationship quality—physically satisfaction[a]	3.00	3.00	5.00	1.17
Relationship quality—emotional satisfaction[a]	4.00	3.00	5.00	1.03
Relationship quality—mutual affection[b]	4.00	3.00	4.00	0.90
Duration of relationship	28.00	17.00	34.00	10.80
Partners' sexual function[c]	3.00	3.00	4.00	0.75
No. of pregnancies	2.00	1.00	2.00	1.14
No. of deliveries	2.00	1.00	2.00	0.91
Physical attractiveness[d]	2.00	1.00	2.00	0.94
Feeling less feminine[d]	2.00	1.00	2.00	0.95
Feel shame when being naked[d]	2.00	1.00	2.00	0.93
Body dissatisfaction[d]	2.00	1.00	2.00	0.85
HADS—Anxiety	7.00	5.00	11.00	4.41
HADS—Depression	5.00	1.00	8.00	3.31
PSRS	34.00	31.00	39.00	5.98
SQOL	73.33	49.44	85.00	22.52
CSFQ—total score	44.00	35.00	50.00	9.50
CSFQ pleasure	3.00	3.00	4.00	1.10
CSFQ desire/frequency	6.00	4.00	6.00	1.59
CSFQ desire/interest	7.00	5.00	9.00	2.36
CSFQ arousal/excitement	9.00	6.00	11.00	2.60
CSFQ orgasm/completion	10.00	8.00	13.00	2.99
BIBCQ—total	137.00	124.00	150.00	16.75
BIBCQ—Vulnerability Score[a]	32.00	26.00	36.00	7.89
BIBCQ—Body Stigma Score[a]	35.00	30.00	40.00	6.90
BIBCQ—Limitations Score[a]	21.00	19.00	23.00	2.93
BIBCQ- Body Concerns Score[a]	23.00	20.00	26.00	4.67
BIBCQ—Transparency Score[a]	13.00	9.00	15.00	4.58
BIBCQ—Arm Concerns Score[a]	15.00	13.00	17.00	2.65

Abbreviations: BIBCQ = Body Image After Breast Cancer Questionnaire; CSFQ = Changes in Sexual Activity Questionnaire; HADS = Hospital Anxiety and Depression Scale; PSRS = Provisions of Social Relation Scale; SQOL = Sexual Quality of Life.
[a]Five-point Likert scale, where 1—extremely satisfied and 5—not satisfied at al.
[b]Four-point Likert scale, where 1—no mutual affection and 4—satisfactory mutual affection.
[c]Four-point Likert scale, where 1—have a sexual difficulties and 4—satisfying sexual function.
[d]Based on questions 39 to 42 from European Organization for Research and Treatment of Cancer Quality of Life Questionnaire.

completion of oncologic treatment ($df = 1$, SS = 283.4, $F = 23.45$), with adjusted R^2 for the model = 0.47, $df = 5$, $P = .0001$ (Table 5).

Body Image

The mean score for body image in BCS was 137 ± 16.75 points (Table 1). There was a significant correlation between positive body image and not receiving adjuvant chemotherapy, better sexual function in partner, better relationship quality, and low anxiety level (Table 3). A multiple regression analysis (Tables 4 and 5) revealed that positive body image was statistically affected by not receiving adjuvant chemotherapy ($df = 1$, SS = 253.9, $F = 3.54$), higher level of emotional satisfaction in relationship ($df = 1$, SS = 283.4, $F = 20.32$), longer time after completion of oncologic treatment ($df = 1$, SS = 673.1, $F = 8.76$), undergo BCT (compared to mastectomy) ($df = 1$, SS = 1268.7, $F = 13.21$), and lower anxiety level ($df = 1$, SS = 335.1, $F = 31.25$) (adjusted R^2 for the model = 0.35, $df = 5$, $P = .00001$).

Discussion

General Remarks

Most studies on BCS have been performed in the United States and other highly developed countries with modern approaches to breast cancer supportive care, especially in restoring sexual function. This study provides an interesting perspective of sexual health in BCS in less developed countries. The results showed that the needs for sexual counseling are high. Furthermore, support from family members is highly beneficial not only for general medical recovery but also, most importantly, for sexual function and body image restoration. These results may pave the way for developing a standard of care that promotes BCT and sexual well-being in Poland and other less developed countries.

Important Findings

The most important finding of this study is that sexual function, body image, and sexual quality of life in BCS is dependent on type

Table 2 General Characteristic of Studied Population—Qualitative Variable

Variable	N	%
Education		
Primary	20	15.6
Secondary	58	45.3
Tertiary	50	39.1
Employment		
Unemployed/retired	39	30.5
Blue-collar worker	60	46.9
White-collar worker	29	22.6
Residency		
Urban	27	21.1
Rural	101	78.9
Type of Surgery		
BCT	53	41.1
Mastectomy	75	59.6
Adjuvant radiotherapy	103	80.5
Adjuvant chemotherapy	114	89.1
HER2 therapy—trastuzumab	35	27.3
Hormone Therapy	74	57.8
GnRH	6	8.8
IA	6	8.8
Tamoxifen	56	82.4
HADS—Anxiety	33	26.0
Sexual Orientation		
Heterosexual	124	97.6
Homosexual	3	2.4
Steady partner	121	94.5
Sexually active in last 6 months	95	74.3
Satisfactory frequency of sexual activities—yes	76	61.3
Sexual distress	35	27.3
FSD	35	27.3
FSIAD	29	22.6
FOD	18	14.1
GPPPD	11	8.6
Lack of sexual satisfaction	23	18.0

Abbreviations: BCT = breast-conserving therapy; FOD = female orgasmic disorder; FSD = female sexual dysfunction; FSIAD = female sexual interest/arousal disorder; GnRH = gonadotropin-releasing hormone; GPPPD = genitopelvic pain/penetration disorder; HADS = Hospital Anxiety and Depression Scale; HER2 = human epidermal growth factor receptor 2; IA = aromatase inhibitors.

and time after surgery (better in BCT and improving with time), relationship quality (better in couples with high quality of relationship and mutual closeness but shorter duration), age of partner (better when younger), partner support level (the higher, the better), and anxiety level (better function with lower level). A reasonable area for psychosexual intervention exists because type of surgery is a matter of choice, and relationship quality and partner support or anxiety level could be modified. This intervention may improve recovery process and restore satisfactory body image and sexual function in female BCS.

Psychosexual Functioning of BCS

Women undergoing breast cancer treatment are confronted with various psychosocial challenges.[28-31] BCS experience depression, anxiety, alteration of femininity, changes in perception of self, lower level of attractiveness, poorer body image, and decline in sexual function and frequency of sexual activity. Between 33% and 78% of BCS during and after treatment reported a certain degree of distressing sexual problems. Receiving chemotherapy is a recognized factor affecting sexuality of BCS. Specifically, receiving chemotherapy has a direct negative impact on both sexual responsive tissues and hormone secretion (induced menopause). Furthermore, mastectomy with or without reconstruction, compared to BCT, may likewise adversely affect sexual function.[29-31]

The prevalence of FSD in reviewed studies varied between 32% and 93%, depending on the criteria used,[14,16,29-36] which is in line with results of this study: FSD was diagnosed in 27.3% of the respondents. Moreover, 74% of BCS participants reported lower desire or not feeling any need for sex after breast cancer treatment. This finding also supports the results of previous studies that indicating a decreased sexual desire or libido occurring between 23% and 64% of patients; decreased arousal or lubrication in between 20% and 48%; decreased orgasm in between 16% and 36%; and dyspareunia in between 35% and 52%.[14,16,29-36] In contrast, Hummel et al[30] found that among 169 women who underwent BCT and were diagnosed with FSD, hypoactive sexual desire disorder (according to DSM-IV-TR criteria) was detected in 82.9% of the patients, female orgasmic disorder in 9.5%, and genitopelvic pain/penetration disorder in 33.7%. However, the prevalence of female sexual interest/arousal disorder, female orgasmic disorder, and genitopelvic pain/penetration disorder in this study was much lower than that in Hummel et al, mostly because the latter used different diagnostic criteria (ie, DSM-IV-TR) and had a more homogenous study population (ie, only BCS with FSD).

According to recent researches, between 11.5% and 32.5% of BCS became sexually inactive after breast cancer treatment.[29-36] Similar tendencies were found in the presented study; 25.7% of the women declared that they did not engage in any sexual activities after breast cancer treatment.

Previous studies have shown that the correlation between age and sexual function in BCS varies. Both higher levels of FSD in older and unpartnered BCS[11,18,35] and higher levels of FSD in younger BCS, especially those receiving endocrine therapy resulting in the lack of menstruation, were described.[36] One study showed that the prevalence of FSD is similar in age-matched general healthy women and those after breast cancer surgery.[37] In this study, we found a correlation between younger age and better sexual function. However, in the multiple regression model, patient age was not an important factor in the prevalence of FSD, sexual function, or sexual quality of life. This contrasting finding could be attributed to the forward regression model used in the current study. That model utilized synchronous analysis of different factors, which suggested a more sophisticated intercorrelation of possible variables influencing sexuality in female BCS.

Depression and Anxiety

The prevalence of depression in BCS has been evaluated in only a few studies. One study indicated high prevalence (41%),[38] whereas

Table 3 Variable Intercorrelations—Spearman Rank Correlation

Variable	FSD	PSRS	SQOL	CSFQ	BIBCQ
Age	0.12	−0.19[a]	0.02	−0.20[a]	−0.05
Education	−0.02	−0.03	−0.02	0.01	−0.18
Employment	−0.20[a]	0.01	0	0.19[a]	0.10
Residency	0.02	−0.24[a]	−0.01	0.02	−0.12
Sexual orientation	−0.02	0.02	0.12	0.06	−0.09
Time after oncologic treatment completion	0.15	−0.13	0	0.20[a]	−0.11
Type of surgery	0.27[a]	−0.08	−0.18[a]	−0.24[a]	−0.06
Adjuvant radiotherapy	−0.05	0.03	0	0.04	0
Adjuvant chemotherapy	0.16	−0.07	0.04	0.01	0.19[a]
HER2 therapy	−0.06	−0.05	−0.06	−0.06	−0.14
Hormone therapy	0.03	−0.05	−0.02	−0.06	0.02
Sexually active in last 6 months	−0.52[a]	0.11	0.29[a]	0.50[a]	−0.12
Satisfactory frequency of sex	−0.12	0.14	0.44[a]	0.25[a]	−0.08
Steady partner	−0.08	0.15	0.07	0.03	0.01
Partner's age	0.12	−0.16	−0.03	−0.23[a]	−0.03
Duration of relationship	0.20	−0.16	−0.04	−0.19	0
Partners' sexual function	−0.22[a]	0.25[a]	0.42[a]	0.37[a]	−0.26[a]
Anxiety (HADS)	0.29[a]	−0.15	−0.36[a]	−0.37[a]	0.49[a]
Relationship quality—physically satisfaction	−0.27[a]	0.35[a]	0.56[a]	0.62[a]	−0.21[a]
Relationship quality—emotional satisfaction	−0.22[a]	0.52[a]	0.40[a]	0.45[a]	−0.32[a]
Relationship quality—mutual emotional closeness	−0.11	0.51[a]	0.49[a]	0.30[a]	−0.19[a]
No. of pregnancies	0.05	0.13	0.06	−0.17	0.09
No. of deliveries	0.11	0.15	0.05	−0.16	0.08
FSD	1.00	−0.16	−0.34[a]	−0.51[a]	0.02
EORTEC 39	0.23[a]	−0.05	−0.34[a]	−0.36[a]	0.39[a]
EORTC 40	0.23[a]	−0.11	−0.38[a]	−0.33[a]	0.36[a]
EORTC 41	0.04	−0.14	−0.34[a]	−0.26[a]	0.36[a]
EORTC 42	0.03	−0.07	−0.26[a]	−0.18[a]	0.36[a]
PSRS	−0.16	1.00	0.47[a]	0.43[a]	−0.11
SQOL	−0.34[a]	0.47[a]	1.00	0.70[a]	−0.24[a]
CSFQ	−0.51[a]	0.43[a]	0.70[a]	1.00	−0.15
BIBCQ	−0.02	−0.17	−0.24[a]	−0.15	1.00

Abbreviations: BIBCQ = Body Image After Breast Cancer Questionnaire; CSFQ = Changes in Sexual Activity Questionnaire; EORTC 40 = Have you been feeling less feminine as a result of your disease or treatment?; EORTC 41 = Did you find it difficult to look at yourself naked?; EORTC 42 = Have you been dissatisfied with your body?; EORTEC 39 = Have you felt physically less attractive as a result of your disease or treatment?; FSD = female sexual dysfunction; HADS = Hospital Anxiety and Depression Scale; HER2 = human epidermal growth factor receptor 2; PSRS = Provisions of Social Relation Scale; SQOL = Sexual Quality of Life.
[a]Statistically significant ($P < .05$).

2 others found low prevalence (4.2%-6.4%).[30,39] We decided to exclude women with symptoms of depression, as evaluated by HADS, because it is well established that psychiatric disorders (eg, obsessive-compulsive disorder, schizophrenia) or depression might be risk factors for sexual disorders.[28] In that context, depression could be a confounding factor in the statistical analysis. Furthermore, according to the latest research,[30] the number of BCS with clinically important scores in HADS depression domain is very low, at 4.2%. Excluding women with depressive symptoms according to HADS would thus result in eliminating only a small proportion of BCS but would give a pure study group without known confounders. This is not the case in anxiety levels measured by HADS. Anxiety might change with time and might influence sexual function directly. However, sexual dysfunction might cause depressive symptoms, although the correlation may be inverse (depressive symptoms might cause sexual problems). Such dependencies are not recognized for anxiety.

The frequency of anxiety in BCS has been described by a few authors. One study indicated that 46% of BCS had a high level of anxiety,[38] whereas 2 others showed a lower prevalence—between 5.5% and 13.1%.[30,39] The prevalence of anxiety in BCS in the current study was 26.0%. Additionally, the level of anxiety was an important factor influencing the prevalence of FSD. The differences might be due to different cutoff scores in the former study[38] and the longer posttreatment time in the latter ones.[30,39]

Partner-Related Factors

Previous studies on the impact of partner-related factors on sexual function in BCS indicated that poor relationship quality was associated with the presence of FSD,[40] and having a steady partner

Table 4 Regression Analysis—First Step—*P* Values

Variable	FSD, Step I	SQOL, Step I	CSFQ, Step I	BIBCQ, Step I
Age	.16	0.92[a]	.04[a]	.39
Education	064	.50	.60	.21
Employment	.03[a]	.52	.13	.17
Residency	.85	.75	.90	.68
Sexual orientation	.82	.18	.57	.24
Time after oncologic treatment completion	.02	.91	.001[a]	.01[a]
Type of surgery	.001[a]	.04[a]	.01[a]	.002[a]
Adjuvant radiotherapy	.56	.92	.61	.39
Adjuvant chemotherapy	.04	.74	.97	.04[a]
HER2 therapy	.47	.55	.59	.08
Hormone therapy	.75	.98	.48	.64
Sexually active in last 6 months	—	.001[a]	—	.36
Satisfactory frequency of sex	.002[a]	.0001[a]	.006[a]	.28
Steady partner	.36	.45	.54	.75
Partner's age	.18[a]	.81	.03[a]	.54
Duration of relationship	.01[a]	.77	.11	.93
Partners' sexual function	.01[a]	.0001[a]	.001[a]	.03[a]
Anxiety (HADS)	.001[a]	.0001[a]	.0001[a]	.0001[a]
Relationship quality—physically satisfaction	.002[a]	.0001[a]	.0001[a]	.002[a]
Relationship quality—emotional satisfaction	.02[a]	.0001[a]	.0001[a]	.003[a]
Relationship quality—mutual emotional closeness	.12	.0001[a]	.0001[a]	.28
No. of pregnancies	.34	.41	.07	.87
No. of deliveries	.19	.41	.10	0,84
FSD	—	—	—	.92
EORTEC 39	.001[a]	.0001[a]	.001[a]	.001[a]
EORTC 40	.001[a]	.0001[a]	.002[a]	.01[a]
EORTC 41	.01[a]	.0001[a]	.04[a]	.01[a]
EORTC 42	.01[a]	.001[a]	.25	.14
PSRS	.01[a]	.0001[a]	.0001[a]	.04[a]
SQOL	—	—	—–	.01[a]
CSFQ	—	—	—	.06
BIBCQ	.01[a]	.01[a]	.36	—

Abbreviations: BIBCQ = Body Image After Breast Cancer Questionnaire; CSFQ = Changes in Sexual Activity Questionnaire; EORTC 40 = Have you been feeling less feminine as a result of your disease or treatment?; EORTC 41 = Did you find it difficult to look at yourself naked?; EORTC 42 = Have you been dissatisfied with your body?; EORTEC 39 = Have you felt physically less attractive as a result of your disease or treatment?; FSD = female sexual dysfunction; HADS = Hospital Anxiety and Depression Scale; HER2 = human epidermal growth factor receptor 2; PSRS = Provisions of Social Relation Scale; SQOL = Sexual Quality of Life.
[a]Statistically significant ($P < .05$).

predicts better sexual functions.[41] This study supports these findings, revealing that partner support and adequate relationship quality (physical and emotional satisfaction, mutual emotional support) are important factors for better sexual functioning and decreasing the risk of FSD.

Clinical Factors

Clinical factors associated with treatment of breast cancer (chemotherapy, radiotherapy, type of surgery [ie, BCT vs. mastectomy with or without reconstruction]) negatively affect sexual function in BCS.[33,39] However, the results of other studies are inconclusive. One study revealed deterioration of sexual function with chemotherapy,[42] whereas others observed no influence.[8,33,40,41,43] One study demonstrated greater deterioration of sexual function in women who underwent mastectomy compared to those who had BCT,[44] whereas others confirmed no effect of surgery type.[29,31,43,45] Other studies established the negative influence of aromatase inhibitors or tamoxifen on sexual functioning,[9,16,30,46] whereas one study observed no effect.[47] Additionally, one Polish study revealed better sexual function in the mastectomy group. However, only women who underwent mastectomy with reconstruction were included, with a low response rate (61%) and marked age differences between the BCT and mastectomy groups (50.8 vs. 60.3 years).[48] Another Polish study showed no correlation between type of surgery and sexual function. However, the study population was small (42 women), and the assessment of sexual function was performed 3 months after the treatment.[49] The current study revealed that compared to BCT, mastectomy had a more deleterious effect on sexual function and quality of life, and increased the prevalence of FSD. Moreover, the longer the duration of postsurgical treatment, the better the sexual function. None of the various forms of adjuvant therapy affected the

Table 5 Forward Multiple Regression Analysis

Outcome		SQOL			CSFQ			BIBCQ		
Effect	**Effect Level**	**β**	***t***	***P***	**β**	***t***	***P***	**β**	***t***	***P***
EORTEC 39	Not at all	—	—	—	0.34[a]	4.20[a]	.00[a]	—	—	—
EORTEC 39	A little	—	—	—	0.08	1.01	.32	-	—	—
EORTEC 39	Quite a bit	—	—	—	−0.17[a]	−1.99[a]	.05[a]	—	—	—
EPRTEC 40	Not at all	0.17[a]	2.13[a]	.04[a]	0.25[a]	3.37[a]	.00[a]	—	—	—
EPRTEC 40	A little	0.15[a]	2.02[a]	.05[a]	—	—	—	—	—	—
EPRTEC 40	Quite a bit	0.04	0.62	.54	—	—	—	—	—	—
EPRTEC 41	Not at all	0.07	0.83	.41	—	—	—	—	—	—
EPRTEC 41	A little	−0.08	−1.09	.28	—	—	—	—	—	—
EPRTEC 41	Quite a bit	−0.17[a]	−2.49[a]	.01[a]	—	—	—	—	—	—
Satisfactory frequency of sex	No	−0.23[a]	−3.36[a]	.00[a]	—	—	—	—	—	—
Mutual emotional closeness	No mutual affection	−0.32[a]	−2.39[a]	.02[a]	—	—	—	—	—	—
Mutual emotional closeness	Little mutual affection	−0.25[a]	−2.12[a]	.04[a]	—	—	—	—	—	—
Mutual emotional closeness	High level of mutual affection	0.19	1.54	.13	—	—	—	—	—	—
Relationship quality—physically satisfaction	—	0.35[a]	5.18[a]	.00[a]	0.18[a]	2.53[a]	.01[a]	−0.25[a]	−3.07[a]	.00[a]
Partner's age	—	—	—	—	−0.21[a]	−3.00[a]	.00[a]	—	—	—
PSRS	—	—	—	—	0.25[a]	3.37[a]	.00[a]	—	—	—
Time after oncologic treatment completion	—	—	—	—	0.43[a]	5.84[a]	.00[a]	−0.27[a]	−3.38[a]	.00[a]
Type of surgery	BCT	—	—	—	—	—	—	−0.22[a]	−2.76[a]	.01[a]
Adjuvant chemotherapy	No	—	—	—	—	—	—	−0.18[a]	−2.34[a]	.02[a]
Anxiety (HADS)	No	—	—	—	—	—	—	−0.35[a]	−4.17[a]	.00[a]

Abbreviations: BCT = breast-conserving therapy; BIBCQ = Body Image After Breast Cancer Questionnaire; CHT = chemotherapy; CSFQ = Changes in Sexual Activity Questionnaire; EORTC 40 = Have you been feeling less feminine as a result of your disease or treatment?; EORTC 41 = Did you find it difficult to look at yourself naked?; EORTEC 39 = Have you felt physically less attractive as a result of your disease or treatment?; HADS = Hospital Anxiety and Depression Scale; PSRS = Provisions of Social Relation Scale; SQOL = Sexual Quality of Life.
[a]Statistically significant ($P < .05$).

sexuality of patients who received BCT. These findings indicated that partner support and relationship quality could have played a significant role in restoring sexual function. Moreover, certain adverse effects of treatment modalities may resolve with time.

Body Image

Body image is a complex, dynamic, and multifactorial construct that may change across a women's life and that might be influenced by, among others, personality, economic, cultural, and social factors.[32] Adverse changes in body image seems to be a critical psychologic issue in BCT women. Losing a breast is perceived to be a major body disfiguration, which in turn causes distress and activates different coping strategies.[50-54]

Previous studies have revealed factors that negatively affect body image in female BCS. Body image was worse in women who underwent mastectomy, with or without reconstruction, compared to those who had BCT[45,48,54-61] and those who received chemotherapy, especially when evaluated after 3 months of postsurgical treatment[54,60,61]; in those with higher preoperative body mass index[62]; in those whose partner had difficulty understanding their feelings[54]; and in younger women. In contract, older women might have worse physical function or body image related to aging, but they may cope better with the cancer and its treatment modalities. They might also have more support from family and a partner. Furthermore, the information on breast cancer may be not as shocking as for younger women.[60] Other factors negatively influencing body image described in the literature were poor economic status, being unemployed, lower education level, depression and anxiety,[60] poor relationship with a partner, and poor partner support.[60,61]

Compared to BCT, mastectomy also reduces the comfort and intimacy of sexual contact with a partner.[56] However, the studies have various results: improving body image with time after the surgery,[63] lack of that influence,[45,46,48,49,58,64-66] or worse image with immediate versus delayed breast reconstruction.[29,64] The results of the current study indicate that adjuvant chemotherapy, mastectomy, anxiety level, and time after treatment statistically significantly affect body image in BCS. Moreover, a satisfactory relationship with a partner and his or her support improved body perception. The latter finding supports the contemporary concepts of the role of perceived partner and social support in posttreatment recovery, especially in regaining positive body image. This perceived support can be defined

as the extent to which an individual believes that her needs for support, information, and feedback are fulfilled.[57] This finding suggests that female BCS without a partner do not receive proper social support. Their physical appearance is important, and they have a low level of body image perception. Thus, they might have difficulties in forming and engaging in new romantic relationships.[67] These observations were incorporated in the American Cancer Association recommendation for care of BCT patients (offering psychoeducational support).[67] It remains to be applied in clinical practice.

Limitations

This study has some limitations. First, the results are not generalizable because it only included women diagnosed with early-stage breast cancer in one breast. None of the patients underwent reconstructive surgery. It considered only a short-term follow-up, and most women had a steady sexual partner. Second, the majority of BCS had a steady partner. For that reason, we were not able to analyze the influence of having a partner on sexual function, quality of life, or body image. Third, the presence of vasomotor symptom and vaginal dryness were not assessed. However, these symptoms in BCS are caused by chemotherapy and hormone therapy. Therefore, the use of these treatments was analyzed as a potential important factor for sexual function, sexual quality of life, and body image. Last, we did not evaluate the partner's sexual dysfunction with a validated instrument, which might correlate with sexual function or body image of female BCS, as shown in Hummel et al.[30] However, we checked for partner's sexual satisfaction and support using a validated questionnaire. We also used a multivariate regression model, which enabled us to establish potential impact factors for sexual function/dysfunction, sexual quality of life, and body image. Other than these limitations, this study added interesting novel information in the growing knowledge on female BCS' performance and recovery process, suggesting important implications for further clinical care of breast cancer patients.

Conclusion

Compared to women who underwent BCT, those who had mastectomy are at a greater risk for sexual dysfunction and having a more negative body image. Body image and sexual function improve with time after oncologic treatment. Adjuvant chemotherapy worsens body image perception. Partner support and a satisfying relationship lowers the risk for deterioration of sexual function and body image. In contrast, a high level of anxiety may affect the occurrence of FSD and a more negative body image.

Clinical Practice Points

- Different treatment approaches may have similar outcomes but may differ in adverse effects. Thus, the planed treatment type and its potential health consequences on further health, sexual function and body image should be carefully discussed with a patient.
- A psychologic intervention must be taken in all patient to decrease the level of anxiety and thus reduce the risk of FSD and body image disturbances.
- The information on the importance of regaining sexual function after breast cancer therapy must be clearly provided to all patient in all age groups.
- All patients must be provided with an option for a consultation with a sexual medicine specialist.
- The role of the partner and/or family support must be emphasized. The partner and family of female BCS must be recruited to ensure their constant support, and they should be provided with tips regarding support during the recovery process, including sexual functioning.

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