

Original Research

Sexual Function in Breast Cancer Survivors: A Case–Control Study Using the Female Sexual Function Index

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Abstract

Background: Sexual dysfunction is a common but often under-addressed concern among breast cancer survivors and may substantially affect quality of life. Evidence specifically addressing sexual function in premenopausal survivors remains limited. This study aimed to evaluate sexual function in premenopausal breast cancer survivors compared with healthy women and to identify factors associated with sexual dysfunction during survivorship. **Methods:** A cross-sectional case–control study was conducted in 80 premenopausal women, including 40 breast cancer survivors and 40 healthy controls, recruited from hospital-based clinics in Spain. Sexual function was assessed using the Female Sexual Function Index (FSFI). Sociodemographic and clinical variables were collected. Between-group comparisons were performed using appropriate statistical tests, and logistic regression analysis was used to evaluate associations. **Results:** Breast cancer survivors showed significantly lower total FSFI scores compared with controls (median 26.1 vs. 31.4; $p < 0.05$), with impairments observed in the domains of desire, arousal, lubrication, satisfaction, and pain. Sexual dysfunction (FSFI ≤ 26.55) was identified in 55% of survivors and 10% of controls. Breast cancer survivorship was significantly associated with sexual dysfunction (odds ratio [OR]: 11.0; 95% confidence interval [CI]: 3.29–36.80). No significant differences were observed according to type of surgery or treatment-induced menopause. **Conclusions:** Breast cancer survivorship was associated with significantly higher odds of sexual dysfunction across multiple domains of sexual health. These findings highlight the need for routine assessment and management of sexual function as part of survivorship care.

Keywords: breast cancer; sexuality; sexual dysfunction; Female Sexual Function Index (FSFI)

1. Introduction

Advances in breast cancer screening and treatment significantly improved survival rates worldwide [1]. As a consequence, survivorship has emerged as a critical phase of care characterized not only by medical follow-up but also by long-term psychosocial adaptation [2]. Among the domains affected by cancer and its treatment, sexual functioning remains one of the most prevalent yet insufficiently addressed concerns [3,4].

Sexuality in the context of breast cancer extends beyond physiological function and encompasses body image, femininity, self-esteem, relational intimacy, hormonal changes, and emotional well-being [5,6]. Surgical interventions, particularly mastectomy, may alter body image and sexual identity [7,8]. Chemotherapy and endocrine therapies frequently induce ovarian suppression, leading to premature menopause, vaginal dryness, dyspareunia, and decreased libido [9,10]. Psychological factors, including anxiety, depressive symptoms, and fear of recurrence, may further exacerbate sexual difficulties [11,12].

Meta-analytic evidence suggests that the prevalence of sexual dysfunction among women with cancer ranges

between 60% and 70% [13]. Despite this high prevalence, sexual health is often insufficiently addressed during oncology consultations [14,15]. Barriers include limited consultation time, clinician discomfort, and sociocultural taboos surrounding female sexuality [4]. Consequently, sexual concerns may remain unrecognized and untreated, adversely affecting quality of life and intimate relationships [16,17].

Although sexual dysfunction is a well-recognized consequence of breast cancer and its treatment, evidence characterizing sexual health among premenopausal breast cancer survivors remains limited. In particular, comparative studies that use validated patient-reported outcome measures to comprehensively assess sexual functioning in this population are scarce. The present study sought to address this evidence gap.

The Female Sexual Function Index (FSFI) is one of the most widely used and extensively validated patient-reported instruments for assessing female sexual function across multiple domains and has been widely used in breast cancer research.



The primary objective of this study was to compare sexual functioning between premenopausal breast cancer survivors and healthy women using the FSFI, a validated and widely used instrument for assessing female sexual function [18]. Secondary objectives included examining the associations between sexual functioning and clinical variables, including type of surgery, adjuvant treatment, and treatment-induced menopause.

2. Materials and Methods

2.1 Study Design and Setting

A cross-sectional case–control study was conducted in the hospital-based breast pathology and gynecologic clinics in Valme University Hospital in Seville, Spain. Participants were recruited over a 3-month period between April and June 2023.

2.2 Participants

The study included 80 women. The case group comprised 40 breast cancer survivors who had been premenopausal at the time of diagnosis, whereas the control group included 40 premenopausal women without a history of breast malignancy. Cases were recruited during follow-up visits at breast cancer clinics after completion of primary surgical treatment. Controls were recruited from gynecologic clinics during routine consultations and had no history of breast cancer.

For the case group, inclusion criteria were a previous diagnosis of breast cancer in women who were premenopausal at the time of diagnosis, completion of primary surgical treatment, and attendance at follow-up visits. For the control group, inclusion criteria were premenopausal status and no history of malignant breast pathology. Exclusion criteria for both groups included pregnancy, perimenopausal status, and inability to complete the questionnaire due to cognitive or language difficulties.

Participants were recruited consecutively throughout the study period. Most participants in both groups reported being in a stable relationship and sexually active at the time of assessment.

2.3 Variables and Data Collection

The primary outcome was sexual functioning, assessed using the FSFI, with breast cancer survivorship status (case vs. control) as the primary exposure variable.

Additional variables collected included age, marital status, type of surgery (breast-conserving surgery or mastectomy), adjuvant treatments (chemotherapy, radiotherapy, and hormone therapy), presence of comorbidities, age at diagnosis, and treatment-induced menopause. Treatment-induced menopause was defined as permanent amenorrhea occurring after systemic cancer treatment in women who were premenopausal at the time of diagnosis. These variables were selected based on their potential association with sexual functioning.

2.4 Measurement

Sexual functioning was evaluated using the FSFI, a validated 19-item questionnaire. All participants completed the validated Spanish-language version of the FSFI [19]. The instrument evaluates 6 domains of female function: desire, arousal, lubrication, orgasm, satisfaction, and pain. Domain scores are weighted and summed to generate a total score ranging from 2 to 36, with higher scores indicating better sexual function. A cutoff score of 26.55 was used to define sexual dysfunction [18].

All data were collected using self-administered questionnaires completed during clinical visits under standardized conditions for both groups. Breast cancer survivors completed the questionnaires during routine follow-up visits approximately 6 months after primary surgical treatment. Control participants completed the questionnaires during their routine gynecological outpatient consultations.

2.5 Bias

To minimize selection bias, cases and controls were recruited from comparable clinical settings during the same study period. Restriction of the sample to premenopausal women was intended to reduce confounding related to age and hormonal status. The use of a standardized, validated instrument further ensured consistency in the assessment of sexual functioning across groups.

2.6 Statistical Analysis

Continuous variables were summarized using medians and interquartile ranges (IQRs), whereas categorical variables were summarized as frequencies and percentages. No formal normality test was performed. Between-group comparisons for continuous variables were performed using the Mann–Whitney U test. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate.

Binary logistic regression analysis was performed to evaluate the association between breast cancer survivorship (independent variable) and sexual dysfunction (dependent variable), defined as an FSFI total score ≤ 26.55 .

Results are presented as odds ratios (ORs) with 95% confidence intervals (CIs). Statistical significance was defined using a two-sided alpha level of 0.05. Analyses of individual FSFI domains were considered exploratory; therefore, no formal adjustment for multiple comparisons was applied, and these findings should be interpreted with appropriate caution. All statistical analyses were performed using IBM SPSS Statistics for Windows, version 23.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1 Participant Characteristics

A total of 80 women were included in the analysis, comprising 40 breast cancer survivors and 40 controls. The

median age was comparable between groups (43.5 years in breast cancer survivors vs. 41.5 years in controls), with no statistically significant between-group differences.

Most participants in both groups reported being in a stable relationship and sexually active at the time of assessment. All breast cancer survivors had undergone surgical treatment, and the majority had received adjuvant therapies, including chemotherapy and hormone therapy. Treatment-induced menopause was reported in 82.5% of survivors.

No statistically significant difference in age was observed between groups.

3.2 Sexual Functioning

Overall sexual functioning was significantly lower among breast cancer survivors compared with controls (Table 1). The median total FSFI score was 26.1 (IQR: 18.1–30.2) in the survivor group and 31.4 (IQR: 29.2–33.0) in controls.

Table 1. Sexual function scores on the FSFI among breast cancer survivors and controls.

Domain	Controls, median (IQR)	Survivors, median (IQR)	<i>p</i> -value
Desire	3.6 (3.6–4.2)	3.0 (2.4–3.6)	<0.05
Arousal	5.4 (5.0–5.7)	4.8 (2.7–5.4)	<0.05
Lubrication	5.7 (5.3–6.0)	3.8 (2.7–5.6)	<0.05
Orgasm	5.6 (4.8–6.0)	5.0 (3.6–5.6)	0.12
Satisfaction	5.6 (5.2–6.0)	5.2 (4.0–5.6)	<0.05
Pain	5.4 (4.4–6.0)	4.4 (2.6–5.6)	<0.05
Total FSFI	31.4 (29.2–33.0)	26.1 (18.1–30.2)	<0.05

Abbreviations: FSFI, Female Sexual Function Index; IQR, interquartile range.

Significant between-group differences were observed across several FSFI domains (Table 1). Breast cancer survivors reported lower scores for desire, arousal, lubrication, satisfaction, and pain. No significant difference was observed in orgasm scores.

3.3 Prevalence of Sexual Dysfunction

Based on the established FSFI cutoff (≤ 26.55), sexual dysfunction was identified in 55% of breast cancer survivors compared with 10% of controls (Table 2; $p < 0.001$). In binary logistic regression analysis, breast cancer survivorship was significantly associated with sexual dysfunction (OR: 11.0; 95% CI: 3.29–36.80), reflecting significantly higher odds of sexual dysfunction compared with the control group.

3.4 Subgroup Analyses

No statistically significant differences in total FSFI scores were observed according to surgical approach, comparing breast-conserving surgery with mastectomy (Table 3). Similarly, treatment-induced menopause was not sig-

nificantly associated with differences in sexual functioning among breast cancer survivors (Table 4).

4. Discussion

Our findings are consistent with previous studies reporting impaired sexual functioning among breast cancer survivors, particularly in the domains of desire, arousal, lubrication, and pain [13,20]. In the present study, desire was significantly impaired among breast cancer survivors compared with controls.

Although biological mechanisms such as hormonal suppression and vaginal dryness contribute to sexual dysfunction [9,10], the mechanisms underlying sexual dysfunction may vary according to breast cancer subtype and treatment strategy. In particular, endocrine therapy for hormone receptor-positive disease is known to exacerbate menopausal symptoms that may adversely affect sexual functioning [9,10]. However, the persistence of desire-related impairment in our cohort also highlights the potential contribution of psychological and relational factors [20]. Changes in body image, fear of rejection, altered perceptions of femininity, and emotional distress may substantially influence sexual desire and motivation [6,8]. Although our study was not powered to assess differences according to molecular subtype or endocrine treatment, these factors may contribute to heterogeneity in sexual outcomes and warrant further investigation in larger prospective studies. In addition, other psychosocial factors, such as relationship quality, social support, coping strategies, and socio-cultural influences, may also affect sexual functioning. Because these variables were not assessed in the present study, they should be considered in future research.

No statistically significant differences in sexual functioning were observed according to surgical approach or treatment-induced menopause in our sample. However, these subgroup findings should be interpreted with caution given the limited sample size, particularly among women without treatment-induced menopause. Larger studies are needed to determine whether these clinical factors influence sexual functioning among breast cancer survivors.

Importantly, many participants reported limited discussion of sexual concerns during medical consultations, consistent with previous research documenting communication barriers in oncology settings [14,15]. This finding reflects broader cultural and clinical obstacles that may contribute to the underrecognition of sexual health needs in survivorship care.

4.1 Limitations

Several limitations should be acknowledged when interpreting these findings. First, the relatively small sample size may have limited statistical power, particularly for subgroup analyses; therefore, non-significant findings should be interpreted with caution. Consequently, we were unable to evaluate potential differences according to molec-

Table 2. Prevalence of sexual dysfunction (FSFI ≤ 26.55).

Group	n	Sexual dysfunction, n (%)	No dysfunction, n (%)	OR (95% CI)	p-value
Controls	40	4 (10%)	36 (90%)		
Survivors	40	22 (55%)	18 (45%)	11.0 (3.29–36.8)	$p < 0.001$

Abbreviations: OR, odds ratio.

Table 3. Sexual function scores on the FSFI according to surgical approach among breast cancer survivors.

Domain	Breast-conserving (n = 24), median (IQR)	Mastectomy (n = 16), median (IQR)	p-value
Desire	3.0 (2.4–3.6)	2.7 (1.5–3.6)	>0.05
Arousal	4.8 (3.6–5.3)	4.2 (2.1–5.4)	>0.05
Lubrication	4.2 (3.2–5.6)	2.9 (2.0–5.0)	>0.05
Orgasm	5.2 (3.8–5.6)	4.8 (2.2–6.0)	>0.05
Satisfaction	5.4 (4.8–5.6)	4.8 (3.6–6.0)	>0.05
Pain	4.4 (3.6–5.6)	4.0 (2.4–5.6)	>0.05
Total FSFI	26.7 (21.0–30.2)	22.9 (16.0–30.5)	>0.05

Table 4. FSFI Scores by treatment-induced menopause among breast cancer survivors.

Domain	Menopause (n = 33), median (IQR)	No Menopause (n = 7), median (IQR)	p-value
Desire	3.0 (2.4–3.6)	3.0 (1.8–3.6)	>0.05
Arousal	4.8 (3.3–5.1)	3.6 (1.2–5.4)	>0.05
Lubrication	3.9 (2.7–5.4)	3.0 (1.4–5.0)	>0.05
Orgasm	5.2 (4.0–5.6)	4.8 (1.6–5.8)	>0.05
Satisfaction	5.2 (4.0–5.6)	4.8 (1.8–5.6)	>0.05
Pain	4.4 (2.8–5.6)	4.4 (1.8–5.6)	>0.05
Total FSFI	26.0 (19.6–30.3)	27.4 (10.3–29.6)	>0.05

ular subtype, endocrine treatment, or histological subtype, all of which may influence sexual functioning in breast cancer survivors. Future studies involving larger and more heterogeneous cohorts are needed to explore the contribution of these disease-related characteristics to sexual health outcomes. Given the limited sample size, multivariable modelling incorporating several potential confounders was not considered appropriate, given the risk of model overfitting. In addition, baseline pre-treatment sexual function was not available. Therefore, it was not possible to determine whether the observed differences predated breast cancer diagnosis or developed following cancer treatment. Longitudinal studies including pre-treatment assessments are needed to better characterize changes in sexual functioning over time.

Second, the cross-sectional case-control design precludes establishing temporal or causal relationships between breast cancer survivorship and sexual dysfunction. In addition, hospital-based recruitment may have introduced selection bias, as both cases and controls were recruited

from clinical settings and may not fully represent the general population. Furthermore, participation was voluntary, and women who agreed to participate may have differed from those who declined, particularly in their willingness to discuss sexual health concerns.

Third, although both groups were restricted to premenopausal women to improve comparability, residual confounding cannot be excluded. Psychosocial factors, including emotional distress, relationship quality, or socioeconomic status, were not fully assessed and may have influenced sexual functioning. In addition, demographic characteristics that may influence sexual functioning, such as educational attainment and socioeconomic status, were not available for analysis and therefore could not be considered as potential confounders.

Finally, sexual functioning was evaluated using a self-reported instrument. Although the FSFI is a validated measure, responses may be influenced by subjective perception and the sensitive nature of the topic.

Despite these limitations, this study provides clinically relevant insights into sexual functioning among breast cancer survivors. As a single-center study, the generalizability of our findings may be limited, and the observed associations should therefore be interpreted with caution. External validation in independent populations would strengthen the robustness and reproducibility of these findings. Future studies with larger and more diverse populations are warranted to confirm these findings.

4.2 Implications for Psychosocial Providers or Policy

Sexual health should be systematically incorporated into survivorship care models. Routine screening using validated instruments such as the FSFI can facilitate the early identification of women experiencing sexual difficulties but should be accompanied by open and proactive communication addressing emotional, relational, and body image concerns [16]. Recent clinical reviews and international recommendations emphasize that healthcare professionals should initiate these conversations rather than waiting for patients to raise the topic, as sexual concerns frequently remain underreported in routine oncology practice [21,22,23].

Psychosocial care providers play a critical role in normalizing discussions about sexual concerns, reducing stigma, and offering targeted interventions. Couple-based interventions and multidisciplinary interventions have shown promise in improving sexual outcomes among breast cancer survivors [16,24].

Our findings also highlight the importance of identifying breast cancer survivors at increased risk of sexual dysfunction. Although the present study was not designed to develop or validate a prediction model, the observed associations may inform future risk stratification strategies aimed at identifying women who may benefit from early assessment and timely supportive interventions. Future multicenter studies should consider developing predictive models incorporating clinical, treatment-related, and psychosocial factors.

Management should ideally involve a multidisciplinary team comprising oncologists, gynecologists, psycho-oncologists, pelvic floor physiotherapists, and sexual health specialists. Current clinical guidelines support individualized interventions combining patient education, nonhormonal therapies for genitourinary symptoms, psychological support, couple-based counselling, pelvic floor physical therapy, and referral to specialized care when appropriate. Such approaches may improve both sexual functioning and overall quality of life among breast cancer survivors [21,22,23,25,26].

Cancer survivorship policy frameworks should explicitly recognize sexual health as a core component of quality of life. Training oncology professionals in communication skills and routinely assessing sexual well-being may help overcome existing barriers to care and facilitate the earlier identification and management of sexual dysfunction [14,22,23,27].

5. Conclusions

Breast cancer survivorship was associated with significantly higher odds of sexual dysfunction across multiple domains. Routine assessment of sexual health and targeted interventions should be integrated into survivorship care.

Availability of Data and Materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization, EIB; methodology, NFP and EAE; software, EAE; validation, AAS, and EIB; formal analysis, NFP, CFP, and EAE; investigation, AAS; writing—original draft preparation, CFP; writing—review and editing, CFP; visualization, NFP; supervision, EIB; project administration, AAS. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Macarena Hospital (Seville, Spain; protocol code 1557-N-23, April 2023). Although the study was conducted at Valme University Hospital, ethical approval was obtained from the Research Ethics Committee of Virgen Macarena University Hospital as the local Research Ethics Committee was temporarily unavailable due to administrative circumstances beyond the authors' control. Written informed consent was obtained from all participants.

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Conflicts of Interest

The authors declare no conflicts of interest.

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