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Sexual Health, Quality of Life, and Fertility Counselling in Breast Cancer Survivors Younger than 40 Years

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Abstract

Background: Young women treated for breast cancer may continue to experience sexual and reproductive problems after treatment. These issues are not always addressed in routine follow-up. We evaluated sexual health, quality of life, and fertility-related counselling in breast cancer survivors younger than 40 years. **Methods:** We performed a single-centre cross-sectional study including 65 women with non-metastatic breast cancer who had completed primary treatment at least 12 months earlier. Patients completed the EORTC QLQ-C30 and SHQ-22 questionnaires and an additional questionnaire on fertility preservation. **Results:** Overall quality-of-life scores were relatively preserved, although several domains remained affected, especially physical and role functioning, fatigue, and insomnia. Sexual problems were common, particularly low libido, vaginal dryness, treatment-related impairment of sexual life, and limited communication with healthcare professionals. Women receiving endocrine therapy reported poorer physical, emotional, and cognitive functioning, together with a higher symptom burden and more sexual complaints. Thirty-nine patients (60%) reported receiving information on fertility preservation before treatment, but only 11 underwent a fertility preservation procedure. Women who had undergone fertility preservation reported higher sexual activity scores. **Conclusions:** In this cohort of young breast cancer survivors, sexual difficulties remained frequent more than one year after completion of treatment, even when overall quality-of-life scores appeared relatively preserved. Fertility counselling was also not uniformly reported. These findings suggest that sexual health and reproductive issues should be addressed more consistently during follow-up care, especially in women receiving endocrine therapy.

Keywords: young breast cancer survivors; sexual health; quality of life; fertility preservation; endocrine therapy; EORTC QLQ-C30; EORTC SHQ-22; oncofertility

1. Introduction

Breast cancer remains the most frequently diagnosed malignancy among women worldwide, characterized by profound physical, emotional, and practical consequences. With an estimated 2.3 million new diagnoses each year, it continues to contribute significantly to cancer-specific mortality,

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with a reported fatality rate of approximately 7% in premenopausal adults [1,2]. The improvements in screening, systemic therapies, and multidisciplinary management have led to increased survival rates, resulting in a growing population of long-term survivors [1–3]. As a result, breast cancer care now extends beyond disease control and includes survivorship issues such as quality of life, psychosocial well-being, sexual health, and reproductive outcomes.

Sexual health is an important component of global health and can be affected by an oncologic diagnosis [4]. Breast cancer treatment—including surgery, chemotherapy, radiotherapy, endocrine therapy, and targeted agents—can negatively impact sexual function through mechanisms such as ovarian insufficiency, hormonal disruption, genitourinary syndrome of menopause, altered body image, neuropathy, fatigue, and psychological distress [5–7]. Previous studies indicate that 40–60% of breast cancer survivors experience persistent sexual dysfunction, including low desire, dyspareunia, arousal and orgasmic difficulties, and reduced sexual satisfaction [8]. These problems may negatively affect quality of life and are associated with anxiety, depression, and reduced adherence to therapy [4,9]. Despite these issues, sexual health continues to receive limited attention within routine oncologic care. Current evidence indicates that only a minority of patients experiencing sexual difficulties engage with or receive support from healthcare professionals [5,10–12].

For premenopausal patients, sexual dysfunction frequently coexists with fertility concerns. Chemotherapy-induced gonadotoxicity and prolonged endocrine therapy lead to diminished ovarian reserve and infertility [13,14]. Oncofertility has introduced strategies for fertility preservation, such as oocyte and embryo cryopreservation, ovarian tissue freezing, and ovarian suppression with gonadotropin-releasing hormone agonists during chemotherapy [15–17]. International guidelines from the American Society of Clinical Oncology (ASCO) and the European Society for Medical Oncology (ESMO) recommend fertility counselling for all reproductive-age patients prior to initiating cancer therapy [17,18]. Despite this, fertility preservation discussions remain inconsistently implemented in clinical practice, and many young survivors report difficulties related to reproductive planning and sexual well-being [17,19].

Genetic predispositions, such as germline BRCA1/2 pathogenic variants, add further complexity to survivorship care. Patient with BRCA mutations often undergo more aggressive surgeries and systemic treatment. They might also have risk-reducing salpingo-oophorectomy at an younger age, which can affect their ability to have children and their sexual health [20,21]. Moreover, the increasing application of assisted reproductive technologies (ART) among breast cancer survivors has raised clinical questions regarding ovarian stimulation outcomes, timing relative to systemic therapy, and long-term reproductive success rates [22–24].

To evaluate the multidimensional impact of breast cancer treatment on QoL, validated patient-reported outcome measures are essential. The European Organisation for Research and Treatment of Cancer (EORTC) developed instruments such as the QLQ-C30 and breast cancer–specific modules that assess global QoL, functional domains, symptom burden, and treatment side effects [25,26]. These tools enable systematic quantification of factors including fatigue, pain, body image concerns, sexual problems, and overall functioning, thereby capturing both physical and psychosocial sequelae of therapy.

In light of the growing cohort of young survivors and the importance of sexual and reproductive health in long-term QoL, a cross-disciplinary integration of oncology, reproductive medicine, psycho-oncology, and survivorship care is needed.

2. Materials and Methods

2.1. Study Design and Subject Recruitment

This unicentric cross-sectional study was conducted at the Cancer Institute "Prof. Ion Chiricuta", Cluj-Napoca, Romania. The Institute's internal review board approved the study protocol. Patients were contacted by telephone, informed about the study procedures and objectives, and all

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participants provided informed consent prior to inclusion. The primary objective was to evaluate the global and sexual QoL of women younger than 40 years old with breast cancer who had completed primary treatment for breast cancer at least 12 months prior. We used the EORTC C30 and SHQ-22 questionnaires. The secondary objective was to evaluate the information patients received about fertility preservation. Eligible women were younger than 40 years old, self-declared sexually active, diagnosed with nonmetastatic breast cancer, and had completed surgery as well as chemotherapy and/or radiotherapy when indicated.

2.2. Data and Measures

General health and socio-demographic information, including employment status, physical activity, and partner status, were self-reported by participants. Age at diagnosis, pathology report, type of treatment (type of surgery, radiotherapy, and chemotherapy) as well as comorbidities were collected from the medical records. Patients were invited to complete the two EORTC questionnaires only once. The general EORTC QLQ-C30 questionnaire dedicated to all cancer patients includes 30 items assessing the global health status with 5 functional scores (physical, role, cognitive, social, and emotional) and 9 symptom scores (nausea and vomiting, pain, fatigue, dyspnea, sleep disturbances, appetite loss, constipation, diarrhea, and financial difficulties). The EORTC SHQ-22 is a multi-dimensional QoL instrument used to measure sexual health in patients with cancer (men or women). This new tool covers both sexual functioning and psychosexual components. It includes 8 items on sexual satisfaction, 3 items on sexual pain, and 11 single items in an integrative approach, leading to 7 functional scales and 4 symptom scales. In these questionnaires, higher scores on the functioning scales indicate a better functional level, whereas higher scores on the symptom scales indicate greater problem severity. Additionally, we used a supplementary questionnaire containing 8 questions presented to patients to explore information on the fertility preservation option.

2.3. Statistical Considerations

Patients were identified from the institutional oncology database between January 2023 and December 2024. Scores from the two EORTC questionnaires were calculated according to the EORTC Scoring Manuals and are presented as means with standard deviations (SD) and medians with interquartile ranges (IQR), as appropriate.

All the data from the study were analysed using IBM SPSS Statistics 25 and illustrated using Microsoft Office Excel/Word 2024. Qualitative variables were written as counts or percentages.

Quantitative variables were written as means with standard deviations or medians with interquartile ranges. Normality of the quantitative variables was assessed using the Shapiro-Wilk Test. Quantitative independent variables with non-parametric distribution were tested between groups using the Mann-Whitney U Test/Kruskal-Wallis H Test. Quantitative independent variables with normal distribution were tested between groups using the Student T-Test/One-Way ANOVA Test (after verifying the homogeneity of variances using Levene's test).

The threshold considered for the significance level for all tests was $\alpha = 0.05$.

3. Results

3.1. Patient Characteristics

A total of 134 new cases of breast cancer patients younger than 40 years old were registered from January 2023 to December 2024. The first phase of this study consisted of collecting data from the medical records of women under clinical follow-up with inclusion determined after systematic sampling. Women were contacted by telephone and invited to participate in the study. Among the 134 women, 5 declined participation, 3 patients had died, and 61 patients did not respond despite repeated telephone calls, SMS messages, or e-mail contact. A total of 65 women who received breast cancer treatment were included in this study. Data from **Table 1** show the characteristics of the analysed patients. Most of these patients were classified in stage II (50.8%); 92.3% of the patients

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received chemotherapy, 78.5% radiotherapy and 72.3% hormonotherapy and only 2 patients (3.1%) had a relapse. 60% of the patients were informed regarding fertility issues before treatment; 16.9% of the patients had undergone fertility preservation procedures; 29.2% of the patients intended to have a pregnancy after treatment.

Table 1. Characteristics of the analysed patients.

Parameter	Value (Nr., %)
Disease stage	
Stage I	10 (15.4%)
Stage II	33 (50.8%)
Stage III	22 (33.8%)
Chemotherapy	60 (92.3%)
Radiotherapy	51 (78.5%)
Hormonotherapy	47 (72.3%)
Relapse	2 (3.1%)
Fertility informing before treatment	39 (60%)
Fertility preservation procedure	11 (16.9%)
Pregnancy intention	19 (29.2%)

3.2. The EORTC Questionnaires

Data from **Table 2** show the description of analysed scores in the study group. Results show the following:

- For QLQ-C30 scores:
  - In functional scales, the most affected were physical functioning (median = 86.67, IQR = 73.33-93.33) and role functioning (median = 83.33, IQR = 66.67-100) indicating a high level of impairment in these functions. Emotional functioning (Emotional Functioning), cognitive functioning (Cognitive Functioning), and social functioning (Social Functioning) showed score values consistent with a moderate to high level of impairment.
  - In symptom scales, the most frequent symptoms (expressed by the highest scores) were fatigue (median = 33.33, IQR =22.22-66.67) and insomnia (median = 33.33, IQR = 33.33-66.67), with financial difficulties also being commonly reported (median = 33.3, IQR = 0–66.7).
  - Median global health score was 66.67 points (IQR = 66.67-83.33) indicating a good status;
- For QLQ-SH22 scores:
  - Regarding the specific aspects assessed by the questionnaire, the most adversely affected domains of sexual life (as indicated by higher score values) were reduced libido (median = 66.7, IQR = 33.3–100), treatment-related impairment of sexual life (median = 66.7, IQR = 33.3–100), inadequate communication with healthcare professionals (median = 100, IQR = 66.7–100), and vaginal dryness (median = 66.7, IQR = 33.3–66.7).
  - Median sexual satisfaction score was 62.5 points (IQR = 40.83-75) indicating a high level of dissatisfaction;
  - Median sexual pain score was 33.33 points (IQR = 0-66.67) indicating a low towards moderate level of pain.

Table 2. Description of analysed scores in the study group.

Parameter (*QLQ-C30 scores)*	Value (Mean ± SD, Median (IQR))
Score-PF (Physical functioning)	82.67 ± 15.58, 86.67 (73.33-93.33)
Score-RF (Role functioning)	80 ± 25.03, 83.33 (66.67-100)
Score-EF (Emotional functioning)	61.79 ± 26.71, 66.67 (41.67-83.33)
Score-CF (Cognitive functioning)	65.38 ± 27.05, 66.67 (50-83.33)
Score-SF (Social functioning)	67.69 ± 24.27, 66.67 (66.67-83.33)

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Score-Fatigue	44.62 ± 27.32, 33.33 (22.22-66.67)
Score-Nausea	13.08 ± 17.55, 0 (0-16.67)
Score-Pain	34.87 ± 26.47, 33.33 (16.67-50)
Score-Dyspnoea	17.95 ± 26.4, 0 (0-33.33)
Score-Insomnia	43.59 ± 31.69, 33.33 (33.33-66.67)
Score-Appetite loss	16.41 ± 28.33, 0 (0-33.33)
Score-Constipation	22.56 ± 27.7, 0 (0-33.33)
Score-Diarrhoea	19.49 ± 29.4, 0 (0-33.33)
Score-Financial difficulties	31.28 ± 31.66, 33.33 (0-66.67)
Score-GH (Global health)	68.33 ± 17.25, 66.67 (66.67-83.33)
QLQ-SH22 scores	
Score-SA (Sexual activity)	50.26 ± 25.76, 33.33 (33.33-66.67)
Score-DL (Decreased libido)	64.1 ± 34, 66.67 (33.33-100)
Score-IN (Incontinence)	29.23 ± 27.32, 33.33 (0-50)
Score-FA (Fatigue)	50.77 ± 34.41, 33.33 (33.33-66.67)
Score-TR (Treatment)	58.46 ± 34.87, 66.67 (33.33-100)
Score-CO (Communication with professionals)	81.54 ± 23.59, 100 (66.67-100)
Score-PA (Partnership)	43.08 ± 34.72, 33.33 (0-66.67)
Score-BI (Body image)	50.26 ± 34.42, 33.33 (33.33-66.67)
Score-VD (Vaginal dryness)	51.02 ± 23.67, 66.67 (33.33-66.67)
Score-SS (Sexual satisfaction)	60.95 ± 22.56, 62.5 (40.83-75)
Score-SP (Sexual pain)	38.72 ± 33.56, 33.33 (0-66.67)

Stratified analyses according to disease stage and chemotherapy exposure revealed no statistically significant differences in any of the analysed scores (all $p > 0.05$), as shown in **Tables 3 and 4.**

Table 3. Comparison of analyzed scores according to disease stage.

Stage/Score		Stage I	Stage II	Stage III	p*
Score-PF	**Mean ± SD**	86 ± 18.17	83.03 ± 11.67	80.61 ± 19.5	0.539
	Median (IQR)	93.3 (76.6-100)	86.6 (73.3-93.3)	86.6 (70-95)	
Score-RF	**Mean ± SD**	81.67 ± 16.57	82.83 ± 21.03	75 ± 32.83	0.861
	Median (IQR)	75 (66.7-100)	83.3 (66.7-100)	91.6 (62.5-100)	
Score-EF	**Mean ± SD**	50 ± 34.47	65.4 ± 22.06	61.74 ± 28.94	0.392
	Median (IQR)	45.8 (27-75)	66.7 (45.8-83.3)	75 (47.9-83.3)	
Score-CF	**Mean ± SD**	70 ± 33.14	63.13 ± 24.91	66.7 ± 28.17	0.550
	Median (IQR)	83.3 (45.8-100)	66.7 (50-83.3)	66.7 (50-87.5)	
Score-SF	**Mean ± SD**	66.7 ± 28.32	69.2 ± 20.46	65.91 ± 28.4	0.972
	Median (IQR)	66.7 (45.8-100)	66.7 (66.7-83.3)	66.7 (62.5-83.3)	
Score-Fatigue	**Mean ± SD**	34.44 ± 32.05	47.47 ± 21.74	44.95 ± 32.43	0.366
	Median (IQR)	27.7 (8.33-55.5)	44.4 (33.3-66.7)	38.9 (22.2-77.7)	
Score-Nausea	**Mean ± SD**	8.33 ± 8.78	14.14 ± 17.24	13.64 ± 20.98	0.819
	Median (IQR)	8.33 (0-16.7)	0 (0-33.3)	0 (0-16.7)	
Score-Pain	**Mean ± SD**	26.67 ± 23.83	37.37 ± 19.1	34.85 ± 35.97	0.324
	Median (IQR)	25 (0-50)	33.3 (33.3-50)	25 (0-66.7)	
Score-Dyspnoea	**Mean ± SD**	23.3 ± 35.31	14.1 ± 18.7	21.2 ± 31.78	0.888
	Median (IQR)	0 (0-41.67)	0 (0-33.3)	0 (0-41.67)	
Score-Insomnia	**Mean ± SD**	43.3 ± 38.65	48.48 ± 28.97	36.36 ± 32.38	0.350
	Median (IQR)	33.3 (0-75)	33.3 (33.3-66.7)	33.3 (0-66.7)	
Score-Appetite	**Mean ± SD**	16.67 ± 36	15.15 ± 25.12	18.18 ± 30.39	0.816
	Median (IQR)	0 (0-16.7)	0 (0-33.3)	0 (0-33.3)	

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Score-Constipation	**Mean ± SD**	20 ± 28.11	24.24 ± 26.7	21.21 ± 30.07	0.745
	Median (IQR)	0 (0-41.67)	33.3 (0-33.3)	0 (0-33.3)	
Score-Diarrhoea	**Mean ± SD**	16.67 ± 23.57	16.16 ± 27.79	25.76 ± 34.01	0.545
	Median (IQR)	0 (0-33.33)	0 (0-33.33)	0 (0-41.67)	
Score-FD	**Mean ± SD**	20 ± 28.1	30.31 ± 28.1	37.88 ± 37.51	0.398
	Median (IQR)	0 (0-41.67)	33.3 (0-50)	33.3 (0-66.7)	
Score-GH	**Mean ± SD**	65.83 ± 28.17	69.19 ± 11.31	68.18 ± 19.18	0.909
	Median (IQR)	70.83 (50-85.4)	66.7 (66.7-83.3)	70.8 (64.5-83.3)	
Score-SA	**Mean ± SD**	56.67 ± 22.49	48.48 ± 27.75	50 ± 24.66	0.697
	Median (IQR)	66.7 (33.3-66.7)	33.3 (33.3-66.7)	33.3 (33.3-66.7)	
Score-DL	**Mean ± SD**	56.67 ± 41.72	69.7 ± 30.46	59.09 ± 35.53	0.488
	Median (IQR)	66.7 (0-100)	66.7 (50-100)	66.7 (33.3-100)	
Score-IN	**Mean ± SD**	23.33 ± 22.5	35.35 ± 30	22.7 ± 23.87	0.238
	Median (IQR)	33.3 (0-33.33)	33.33 (0-66.7)	33.3 (0-33.3)	
Score-FA	**Mean ± SD**	56.7 ± 41.72	53.54 ± 34.3	43.9 ± 31.51	0.475
	Median (IQR)	66.7 (0-100)	66.7 (33.3-83.3)	33.3 (33.3-66.7)	
Score-TR	**Mean ± SD**	53.3 ± 42.16	59.6 ± 34.11	59.09 ± 34.01	0.938
	Median (IQR)	66.7 (0-100)	66.7 (33.3-100)	66.7 (33.3-100)	
Score-CO	**Mean ± SD**	73.3 ± 34.42	83.84 ± 20.61	81.82 ± 22.36	0.758
	Median (IQR)	83.3 (58.3-100)	100 (66.7-100)	100 (66.7-100)	
Score-PA	**Mean ± SD**	40 ± 34.42	47.4 ± 36.35	37.8 ± 33	0.614
	Median (IQR)	33.3 (0-66.7)	33.3 (16.7-66.7)	33.3 (0-66.7)	
Score-BI	**Mean ± SD**	56.7 ± 41.72	50.5 ± 34.48	46.97 ± 31.97	0.720
	Median (IQR)	66.7 (0-100)	33.3 (33.3-66.7)	33.3 (33.3-66.7)	
Score-VD	**Mean ± SD**	46.7 ± 18.25	51.28 ± 23.53	51.85 ± 26.12	0.813
	Median (IQR)	33.3 (33.3-66.7)	66.7 (33.3-66.7)	66.7 (33.3-66.7)	
Score-SS	**Mean ± SD**	70.33 ± 22.92	60.61 ± 23.27	57.2 ± 21.08	0.314**
	Median (IQR)	74.58 (50-88.3)	66.7 (37.5-75)	62.5 (39.3-70.8)	
Score-SP	**Mean ± SD**	47.22 ± 39.65	42.42 ± 31.72	29.29 ± 32.8	0.294
	Median (IQR)	44.4 (0-87.5)	44.4 (11.1-66.7)	11.1 (0-50)	

*Kruskal-Wallis H Test, **One-Way ANOVA Test.

Table 4. Comparison of analyzed scores according to the existence of chemotherapy.

Chemotherapy/Score		Absent	Present	p*
Score-PF	**Mean ± SD**	82.67 ± 21.91	82.67 ± 15.19	0.729
	Median (IQR)	86.67 (63.33-100)	86.67 (73.33-93.33)	
Score-RF	**Mean ± SD**	80 ± 18.25	80 ± 25.63	0.765
	Median (IQR)	66.7 (66.7-100)	83.33 (66.7-100)	
Score-EF	**Mean ± SD**	45 ± 41.5	63.2 ± 25.13	0.305
	Median (IQR)	50 (4.17-83.33)	66.7 (41.67-83.33)	
Score-CF	**Mean ± SD**	66.7 ± 40.82	65.28 ± 26.1	0.658
	Median (IQR)	66.7 (33.3-100)	66.7 (50-83.33)	
Score-SF	**Mean ± SD**	73.33 ± 27.89	67.22 ± 24.15	0.641
	Median (IQR)	66.7 (50-100)	66.7 (66.7-83.33)	
Score-Fatigue	**Mean ± SD**	46.67 ± 38	44.44 ± 26.67	0.952
	Median (IQR)	55.56 (11.1-77.7)	33.3 (25-66.7)	
Score-Nausea	**Mean ± SD**	10 ± 9.13	13.33 ± 18.1	0.952
	Median (IQR)	16.67 (0-16.67)	0 (0-16.67)	
Score-Pain	**Mean ± SD**	33.3 ± 26.35	35 ± 26.7	1.000
	Median (IQR)	33.3 (8.33-58.33)	33.3 (16.7-50)	
Score-Dyspnoea	**Mean ± SD**	40 ± 43.46	16.11 ± 24.15	0.231
	Median (IQR)	33.3 (0-83.33)	0 (0-33.33)	
Score-Insomnia	**Mean ± SD**	60 ± 43.46	42.22 ± 30.6	0.329

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	Median (IQR)	66.7 (16.67-100)	33.3 (33.3-66.7)	
Score-Appetite	**Mean ± SD**	40 ± 43.46	14.44 ± 26.3	0.186
	Median (IQR)	33.3 (0-83.33)	0 (0-33.3)	
Score-Constipation	**Mean ± SD**	46.67 ± 44.72	20.56 ± 25.37	0.212
	Median (IQR)	66.7 (0-83.33)	0 (0-33.33)	
Score-Diarrhoea	**Mean ± SD**	6.67 ± 14.9	20.56 ± 30.12	0.407
	Median (IQR)	0 (0-16.67)	0 (0-33.33)	
Score-FD	**Mean ± SD**	26.67 ± 27.89	31.67 ± 32.14	0.839
	Median (IQR)	33.3 (0-50)	33.3 (0-66.7)	
Score-GH	**Mean ± SD**	75 ± 18.63	67.78 ± 17.18	0.494
	Median (IQR)	75 (58.3-91.67)	66.7 (66.7-83.3)	
Score-SA	**Mean ± SD**	53.33 ± 18.25	50 ± 26.4	0.747
	Median (IQR)	66.7 (33.3-66.7)	33.3 (33.3-66.7)	
Score-DL	**Mean ± SD**	66.7 ± 40.82	63.9 ± 33.77	0.802
	Median (IQR)	66.7 (33.3-100)	66.7 (33.3-100)	
Score-IN	**Mean ± SD**	26.67 ± 27.89	29.44 ± 27.51	0.877
	Median (IQR)	33.3 (0-50)	33.3 (0-58.33)	
Score-FA	**Mean ± SD**	60 ± 36.51	50 ± 34.44	0.510
	Median (IQR)	66.7 (33.3-83.33)	33.3 (33.3-66.7)	
Score-TR	**Mean ± SD**	60 ± 43.46	58.33 ± 34.51	0.877
	Median (IQR)	66.7 (16.67-100)	66.7 (33.3-100)	
Score-CO	**Mean ± SD**	80 ± 44.72	81.67 ± 21.63	0.541
	Median (IQR)	100 (50-100)	100 (66.7-100)	
Score-PA	**Mean ± SD**	40 ± 43.46	43.33 ± 34.33	0.821
	Median (IQR)	33.3 (0-83.33)	33.3 (0-66.7)	
Score-BI	**Mean ± SD**	40 ± 43.46	51.11 ± 33.87	0.525
	Median (IQR)	33.3 (0-83.33)	33.3 (33.3-66.7)	
Score-VD	**Mean ± SD**	44.4 ± 19.24	51.45 ± 24.04	0.565
	Median (IQR)	33.3 (33.3-50)	66.7 (33.3-66.7)	
Score-SS	**Mean ± SD**	66.83 ± 25.08	60.46 ± 22.5	0.548**
	Median (IQR)	70.83 (41.67-90)	62.5 (40.42-74.58)	
Score-SP	**Mean ± SD**	44.44 ± 51.52	38.24 ± 32.23	0.933
	Median (IQR)	22.2 (0-100)	38.89 (2.78-66.67)	

*Mann-Whitney U Test, **Student T-Test.

Data from **Table 5** and **Figures 1–3** show the comparison of analysed scores according to the existence of hormonotherapy. Significant differences between groups were observed for the following scores:

- In case of QLQ-C30 functional scales, patients with hormonotherapy had significantly fewer issues (expressed by lower functional scores) regarding physical functioning (median = 80, IQR = 73.3-93.3 vs. median = 96.7, IQR = 80-100, **p=0.006)**, emotional functioning (median = 58.3, IQR = 41.67-75 vs. median = 83.3, IQR = 62.5-93.75, **p=0.025)** and cognitive functioning (median = 66.7, IQR = 50-83.33 vs. median = 91.67, IQR = 66.7-100, **p=0.001)** than patients without hormonotherapy;
- In case of QLQ-C30 symptom scales, patients with hormonotherapy had significantly more issues (expressed by higher symptom scores) regarding fatigue (median = 44.4, IQR = 33.3-66.7 vs. median = 27.78, IQR = 11.1-55.5, **p=0.009)**, pain (median =33.3, IQR = 16.7-66.7 vs. median = 25, IQR = 0-37.5, **p=0.035)** and insomnia (median = 33.3, IQR = 33.3-66.7 vs. median = 33.3, IQR = 0-33.3 **p=0.002)** than patients without hormonotherapy;
- Overall, patients with hormonotherapy reported a significantly lower global health (median = 66.7, IQR = 58.3-75 vs. median = 83.3, IQR = 66.7-83.3, **p=0.020);**
- In case of QLQ-SH22 sexual health scores, patients with hormonotherapy had significantly more issues (expressed by higher scores) regarding decreased libido (DL) (median = 66.7, IQR = 66.7-100 vs. median = 33.3, IQR = 25-66.7, **p=0.009)**, fatigue (FA) (median = 66.7, IQR = 33.3-100 vs.

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median = 33.3, IQR = 0-41.67, **p=0.005)**, treatment (TR) (median = 66.7, IQR = 33.3-100 vs. median = 33.3, IQR = 0-66.7, **p=0.005)** and sexual pain (median = 44.4, IQR = 11.1-77.7 vs. median = 0, IQR = 0-44.4, **p=0.002)**.

Table 5. Comparison of analysed scores according to the existence of hormonotherapy.

Hormonotherapy/Score		Absent	Present	p*
Score-PF	**Mean ± SD**	90 ± 14.32	79.86 ± 15.26	**0.006**
	Median (IQR)	96.7 (80-100)	80 (73.3-93.3)	
Score-RF	**Mean ± SD**	84.26 ± 28.28	78.37 ± 23.8	0.138
	Median (IQR)	100 (66.7-100)	83.3 (66.7-100)	
Score-EF	**Mean ± SD**	71.3 ± 30.41	58.16 ± 24.54	**0.025**
	Median (IQR)	83.3 (62.5-93.75)	58.3 (41.67-75)	
Score-CF	**Mean ± SD**	81.48 ± 24.84	59.22 ± 25.49	**0.001**
	Median (IQR)	91.67 (66.7-100)	66.7 (50-83.33)	
Score-SF	**Mean ± SD**	73.15 ± 27.5	65.6 ± 22.89	0.088
	Median (IQR)	75 (66.7-100)	66.7 (66.7-66.7)	
Score-Fatigue	**Mean ± SD**	30.86 ± 23.97	49.88 ± 26.9	**0.009**
	Median (IQR)	27.78 (11.1-55.5)	44.4 (33.3-66.7)	
Score-Nausea	**Mean ± SD**	12.04 ± 17.9	13.48 ± 17.59	0.771
	Median (IQR)	0 (0-16.7)	0 (0-16.7)	
Score-Pain	**Mean ± SD**	24.07 ± 27.54	39.01 ± 25.12	**0.035**
	Median (IQR)	25 (0-37.5)	33.3 (16.7-66.7)	
Score-Dyspnoea	**Mean ± SD**	11.1 ± 22.86	20.57 ± 27.41	0.136
	Median (IQR)	0 (0-8.33)	0 (0-33.3)	
Score-Insomnia	**Mean ± SD**	24.07 ± 25.06	51.06 ± 30.96	**0.002**
	Median (IQR)	33.3 (0-33.3)	33.3 (33.3-66.7)	
Score-Appetite	**Mean ± SD**	16.7 ± 28.58	16.31 ± 28.55	0.922
	Median (IQR)	0 (0-33.3)	0 (0-33.3)	
Score-Constipation	**Mean ± SD**	16.7 ± 28.58	24.82 ± 27.33	0.162
	Median (IQR)	0 (0-33.3)	33.3 (0-33.3)	
Score-Diarrhoea	**Mean ± SD**	14.81 ± 23.49	21.28 ± 31.41	0.543
	Median (IQR)	0 (0-33.3)	0 (0-33.3)	
Score-FD	**Mean ± SD**	25.93 ± 31.42	33.3 ± 31.85	0.364
	Median (IQR)	16.7 (0-41.67)	33.3 (0-66.7)	
Score-GH	**Mean ± SD**	75.46 ± 14.42	65.6 ± 17.6	**0.020**
	Median (IQR)	83.3 (66.7-83.3)	66.7 (58.3-75)	
Score-SA	**Mean ± SD**	57.41 ± 22.3	47.52 ± 26.69	0.173
	Median (IQR)	66.7 (33.3-66.7)	33.3 (33.3-66.7)	
Score-DL	**Mean ± SD**	46.3 ± 34.56	70.92 ± 31.56	**0.009**
	Median (IQR)	33.3 (25-66.7)	66.7 (66.7-100)	
Score-IN	**Mean ± SD**	20.37 ± 23.26	32.62 ± 28.22	0.116
	Median (IQR)	16.7 (0-33.3)	33.3 (0-66.7)	
Score-FA	**Mean ± SD**	31.48 ± 29.08	58.16 ± 33.67	**0.005**
	Median (IQR)	33.3 (0-41.67)	66.7 (33.3-100)	
Score-TR	**Mean ± SD**	38.9 ± 32.84	65.96 ± 32.96	**0.005**
	Median (IQR)	33.3 (0-66.7)	66.7 (33.3-100)	
Score-CO	**Mean ± SD**	83.3 ± 20.61	80.85 ± 24.81	0.856
	Median (IQR)	100 (66.7-100)	100 (66.7-100)	
Score-PA	**Mean ± SD**	29.63 ± 32.11	48.23 ± 34.62	0.053
	Median (IQR)	33.3 (0-66.7)	33.3 (33.3-66.7)	
Score-BI	**Mean ± SD**	44.4 ± 32.33	52.48 ± 35.26	0.373
	Median (IQR)	33.3 (33.3-66.7)	66.7 (33.3-66.7)	
Score-VD	**Mean ± SD**	47.62 ± 21.54	52.38 ± 24.63	0.491
	Median (IQR)	50 (33.3-66.7)	66.7 (33.3-66.7)	
Score-SS	**Mean ± SD**	56.11 ± 21.33	62.8 ± 22.97	0.132
	Median (IQR)	50.4 (36.4-67.7)	66.7 (45.8-79.1)	

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Score-SP	**Mean ± SD**	18.52 ± 24.7	46.45 ± 33.48	**0.002**
	Median (IQR)	0 (0-44.4)	44.4 (11.1-77.7)	

***Mann-Whitney U Test.**

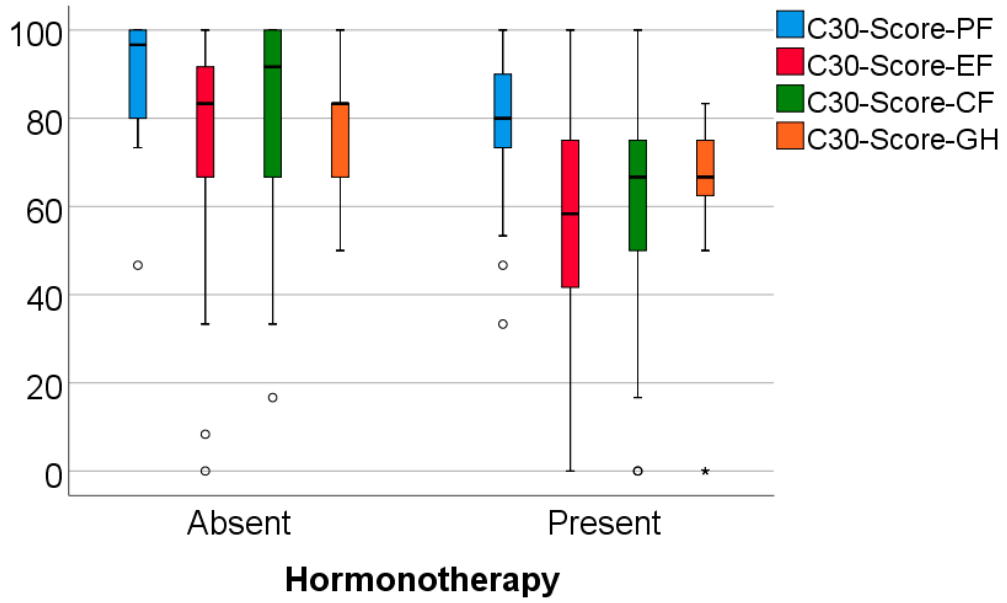

Figure 1. Comparison of QLQ-C30 physical functioning (PF), emotional functioning (EF), cognitive functioning (CF) and global health (GH) scores according to the existence of hormonotherapy.

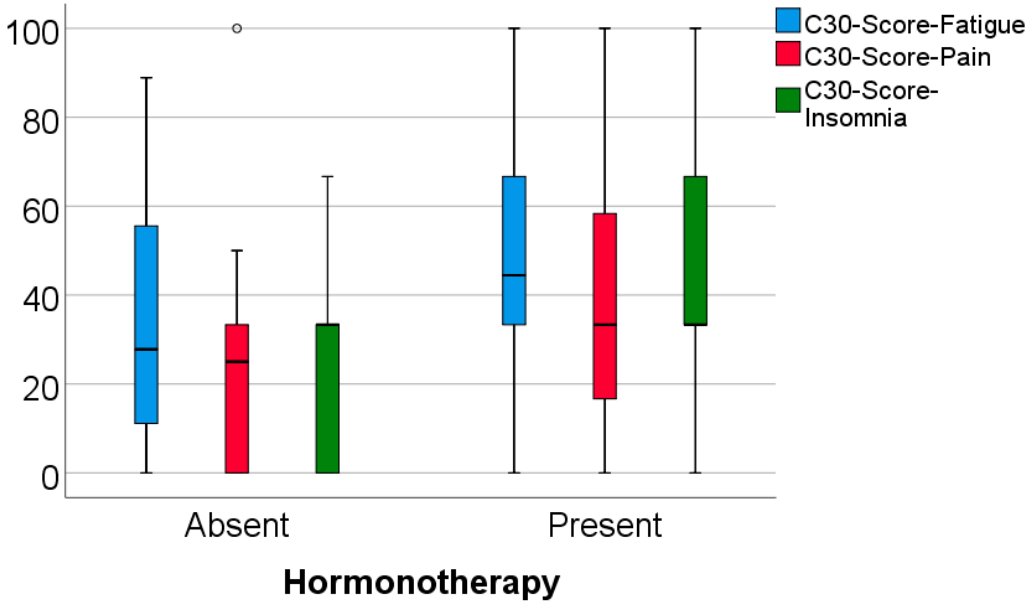

Figure 2. Comparison of QLQ-C30 fatigue, pain and insomnia scores according to the existence of hormonotherapy.

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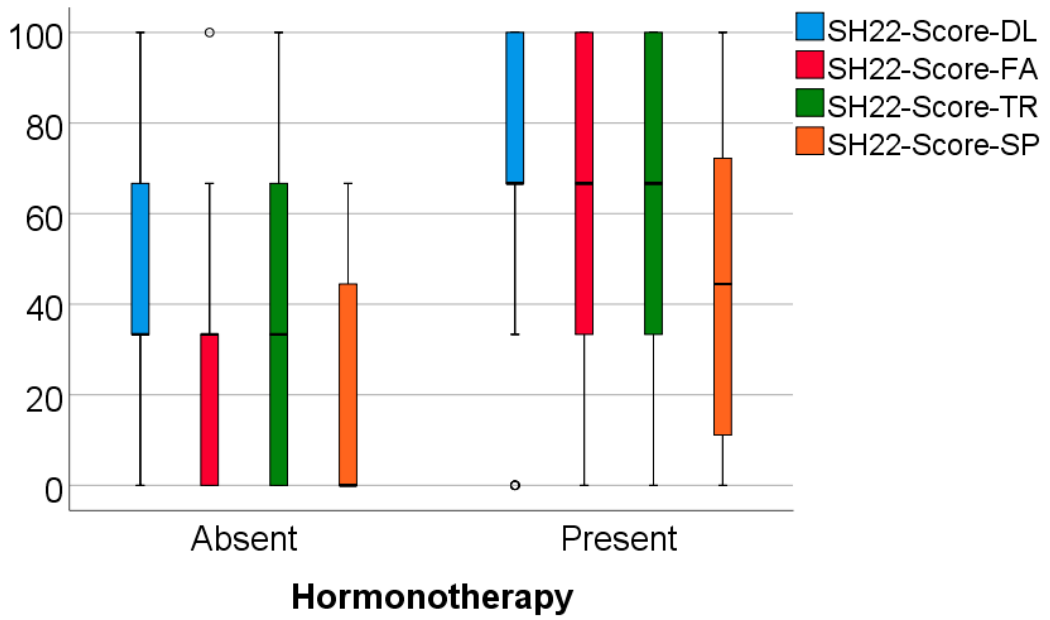

Figure 3. Comparison of QLQ-SH22 decreased libido (DL), fatigue (FA), treatment (TR) and sexual pain (SP) scores according to the existence of hormonotherapy.

Data from **Table 6** and **Figure 4** show the comparison of analysed scores according to the existence of fertility preservation procedure. Significant differences between groups were observed only for the sexual activity score (**p=0.015)**, patients that had undergone fertility preservation procedures, had significantly fewer issues regarding sexual activity (expressed by lower scores) (median = 33.3, IQR = 0-33.3 vs. median = 66.7, IQR = 33.3-100) in comparison to patients without these procedures.

Table 6. Comparison of analysed scores according to the existence of fertility preservation procedure.

Fertility preservation/Score		Absent	Present	p*
Score-PF	**Mean ± SD**	81.6 ± 16.32	87.88 ± 10.25	0.334
	Median (IQR)	86.7 (73.3-93.3)	86.7 (80-100)	
Score-RF	**Mean ± SD**	78.1 ± 26.26	89.4 ± 15.4	0.193
	Median (IQR)	83.3 (66.7-100)	100 (66.7-100)	
Score-EF	**Mean ± SD**	61.88 ± 26.82	61.36 ± 27.45	0.860
	Median (IQR)	66.7 (47.9-83.3)	66.7 (33.3-83.3)	
Score-CF	**Mean ± SD**	65.74 ± 27.55	63.64 ± 25.62	0.675
	Median (IQR)	66.7 (50-83.3)	66.7 (33.3-83.3)	
Score-SF	**Mean ± SD**	65.12 ± 24.92	80.3 ± 16.36	0.063
	Median (IQR)	66.7 (62.5-83.3)	66.7 (66.7-100)	
Score-Fatigue	**Mean ± SD**	44.24 ± 27.34	46.46 ± 28.46	0.853
	Median (IQR)	38.9 (22.2-66.7)	33.3 (22.2-77.7)	
Score-Nausea	**Mean ± SD**	14.51 ± 17.74	6.06 ± 15.4	0.066
	Median (IQR)	16.67 (0-16.67)	0 (0-0)	
Score-Pain	**Mean ± SD**	36.11 ± 26.25	28.8 ± 27.98	0.325
	Median (IQR)	33.3 (16.7-50)	16.7 (0-50)	
Score-Dyspnoea	**Mean ± SD**	17.9 ± 26.47	18.1 ± 27.34	0.992
	Median (IQR)	0 (0-33.3)	0 (0-33.3)	
Score-Insomnia	**Mean ± SD**	43.21 ± 30.8	45.45 ± 37.33	0.869
	Median (IQR)	33.3 (33.3-66.7)	33.3 (0-66.7)	
Score-Appetite	**Mean ± SD**	15.43 ± 26.47	21.21 ± 37.33	0.992
	Median (IQR)	0 (0-33.3)	0 (0-66.7)	

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Score-Constipation	**Mean ± SD**	22.2 ± 28.22	24.24 ± 26.2	0.686
	Median (IQR)	0 (0-33.3)	33.3 (0-33.3)	
Score-Diarrhoea	**Mean ± SD**	17.9 ± 28.01	27.27 ± 35.95	0.437
	Median (IQR)	0 (0-33.3)	0 (0-66.7)	
Score-FD	**Mean ± SD**	32.72 ± 31.38	24.24 ± 33.63	0.349
	Median (IQR)	33.3 (0-41.67)	0 (0-66.7)	
Score-GH	**Mean ± SD**	69.14 ± 15.83	64.4 ± 23.59	0.725
	Median (IQR)	66.7 (64.58-83.3)	66.7 (66.7-83.3)	
Score-SA	**Mean ± SD**	53.7 ± 23.71	33.3 ± 29.81	**0.015**
	Median (IQR)	66.7 (33.3-66.7)	33.3 (0-33.3)	
Score-DL	**Mean ± SD**	64.81 ± 32.64	60.61 ± 41.68	0.891
	Median (IQR)	66.7 (33.3-100)	66.7 (0-100)	
Score-IN	**Mean ± SD**	30.25 ± 26.9	24.24 ± 30.15	0.467
	Median (IQR)	33.3 (0-41.67)	0 (0-66.7)	
Score-FA	**Mean ± SD**	53.09 ± 33.34	39.39 ± 38.92	0.231
	Median (IQR)	66.7 (33.3-66.7)	33.3 (0-66.7)	
Score-TR	**Mean ± SD**	60.5 ± 33.7	48.48 ± 40.45	0.376
	Median (IQR)	66.7 (33.3-100)	66.7 (0-66.7)	
Score-CO	**Mean ± SD**	80.86 ± 23.88	84.85 ± 22.91	0.587
	Median (IQR)	100 (66.7-100)	100 (66.7-100)	
Score-PA	**Mean ± SD**	41.36 ± 34.22	51.52 ± 37.6	0.364
	Median (IQR)	33.3 (0-66.7)	66.7 (0-66.7)	
Score-BI	**Mean ± SD**	50.62 ± 33.48	48.48 ± 40.45	0.834
	Median (IQR)	33.33 (33.3-66.7)	33.3 (0-100)	
Score-VD	**Mean ± SD**	52.03 ± 22.42	45.83 ± 30.53	0.801
	Median (IQR)	66.7 (33.3-66.7)	66.7 (8.33-66.7)	
Score-SS	**Mean ± SD**	61.02 ± 20	60.61 ± 33.71	0.752
	Median (IQR)	64.58 (39.3-73.7)	62.5 (45.8-100)	
Score-SP	**Mean ± SD**	38.68 ± 33.07	38.9 ± 37.6	0.972
	Median (IQR)	38.9 (0-66.7)	33.3 (0-77.7)	

***Mann-Whitney U Test.**

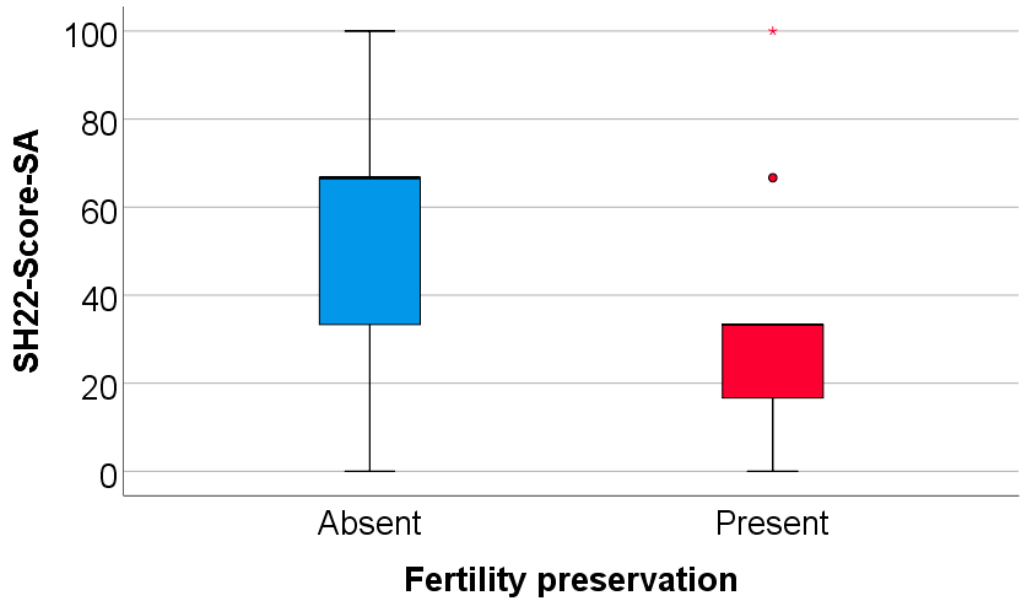

Figure 4. Comparison of QLQ-SH22 sexual activity (SA) score according to the existence of fertility preservation procedure.

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3.3. The Fertility Preservation Questionnaire

Thirty-nine of 65 patients (60%) reported receiving information from their medical oncologist regarding fertility preservation. The options discussed included oocyte cryopreservation (24.6%), embryo cryopreservation (1%), or both options (15.4%). Conversely, 26 patients (40%) stated that they had received no information or insufficient information to enable informed decision-making. In some cases, fertility preservation may be briefly mentioned during the oncology consultation without detailed counselling or referral to a fertility specialist, thereby limiting patients' understanding of individualized fertility preservation strategies. 11 patients underwent in vitro fertilization procedures, while 19 patients expressed an intention to pursue a future pregnancy. In contrast, 46 patients reported no intention to conceive, most frequently citing the reason: "I already have one or two children." For some patients, prioritization of oncologic treatment was the primary determinant, while religious considerations were also reported as influencing factors.

4. Discussion

This study provides evidence on global and sexual quality of life among young women diagnosed with breast cancer, while also addressing the current availability and quality of oncofertility counselling in Romania. By focusing on patients younger than 40 years old who had completed primary cancer treatment at least one year prior, our analysis captures long-term survivorship-related challenges that extend beyond the acute treatment phase. Despite its unicentric design, the study was performed in a national oncology referral centre, which strengthens the clinical significance of the results and may support their extrapolation to similar tertiary care environments.

In our cohort of young breast cancer survivors, sexual health emerged as a substantially impaired domain despite relatively preserved global health status. Although median global health scores suggested an overall satisfactory quality of life, several functional domains—particularly physical, role, emotional, and cognitive functioning—remained compromised. Fatigue and insomnia were the most prominent symptoms reported. These findings are consistent with previous evidence indicating that younger survivors often experience greater psychosocial and functional challenges compared with older women [27], potentially related to life-stage factors such as professional activity, childcare responsibilities, premenopausal status at diagnosis, and concerns regarding fertility and treatment-induced menopause [28]. Although global health scores were relatively preserved, several domains remained affected, particularly physical, role, emotional, and cognitive functioning. Fatigue and insomnia were among the most prominent symptoms. This pattern suggests that acceptable overall quality-of-life ratings may coexist with clinically relevant impairments in specific areas of survivorship, especially in younger women, who often face simultaneous treatment-related, professional, family, and reproductive pressures.

Sexual dysfunction was common in our cohort, with reduced libido, vaginal dryness, and treatment-related impairment of sexual life representing the most severely affected domains. Breast cancer itself confers an increased risk of sexual dysfunction, including dyspareunia, vaginal dryness, vaginal complications, and reduced libido. This excess risk was most pronounced within the first 5 years following diagnosis and among women younger than 50 years at the time of diagnosis. Exposure to radiotherapy, chemotherapy, and endocrine therapy was associated with a higher likelihood of sexual function symptoms, whereas a higher baseline body mass index appeared to confer a lower risk [29].

Endocrine therapy was one of the variables most clearly associated with poorer outcomes in our study. Patients reported worse physical, emotional, and cognitive functioning, as well as increased symptom burden, including fatigue, pain, and insomnia. In addition, endocrine therapy was associated with more pronounced sexual dysfunction, particularly decreased libido, treatment-related sexual impairment, and sexual pain. These findings are in line with existing literature describing the negative impact of endocrine treatment on menopausal symptoms, sexual functioning, and quality of life, and highlight the need for proactive symptom management and supportive

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interventions in this subgroup. Chang et al. demonstrated that endocrine therapy was associated with a 1.46-fold higher likelihood of a sexual dysfunction diagnosis, whereas radiotherapy was associated with a 1.17-fold increased risk [29].

Communication about sexual health with healthcare professionals was difficult in this cohort. Many patients reported insufficient counselling, despite the fact that sexual well-being is an important component of survivorship in younger women. This finding is consistent with previous literature showing that sexual concerns are frequently under-recognized in oncology settings. The American Society of Clinical Oncology advises that a member of the healthcare team should routinely initiate conversations regarding sexual health concerns and treatment-related sexual dysfunction [30]. Confronted with a breast cancer diagnosis—an experience that can be profoundly demoralizing—patients may abandon expectations of maintaining a satisfying sexual life [31,32]. In certain socio-cultural contexts, open discussions about sexuality are not actively encouraged, further reinforcing this withdrawal. In such circumstances, healthcare professionals bear an even greater responsibility to systematically assess sexual health and to initiate and sustain discussions when clinically appropriate [33,34]. The use of brief questionnaires or open-ended discussions about sexual health may help normalize these conversations and reduce stigma.

Importantly, the present study also points to persistent gaps in oncofertility counselling. Although 60% of patients reported receiving some information regarding fertility preservation prior to treatment, a substantial proportion (40%) indicated that the information was absent or insufficient to support informed decision-making. In many cases, fertility preservation appeared to be mentioned briefly during oncology consultations, without detailed discussion or referral to reproductive medicine specialists. This gap between guideline recommendations and clinical practice has been consistently reported across different healthcare systems.

The counselling rate observed in our cohort is comparable to the incomplete implementation reported in other healthcare systems. Large-scale data from the United States suggest that approximately 44% of reproductive-aged cancer patients receive fertility-related counselling prior to treatment, with higher rates observed among women than men [35]. European population-based studies report similar or lower rates, with counselling frequencies ranging between 30% and 50% [36]. Although targeted quality improvement initiatives have demonstrated that counselling rates can exceed 80% when standardized referral pathways and educational interventions are implemented, such approaches are not yet routinely integrated into everyday oncology practice [37].

In our cohort, only a minority of patients underwent fertility preservation procedures, while nearly one-third expressed an intention to pursue a future pregnancy. Conversely, the majority reported no desire for future childbearing, most commonly because they had already completed their families. Nevertheless, prioritization of oncologic treatment and religious considerations were also cited as influencing factors, underscoring the importance of individualized, culturally sensitive counselling that respects patient values while ensuring access to comprehensive information.

The strengths of this study include its focus on a young, understudied patient population, the use of validated EORTC instruments to assess both global and sexual quality of life, and the integration of patient-reported data on fertility preservation counselling. However, several limitations must be acknowledged. The single-centre design and relatively small sample size may limit generalizability. In addition, the cross-sectional nature of the study precludes causal inferences, and self-reported questionnaires may be subject to recall and response bias.

5. Conclusions

Young breast cancer survivors in our cohort reported persistent impairments in sexual health despite relatively preserved global quality-of-life scores, suggesting that overall survivorship assessments may underestimate clinically relevant difficulties in daily functioning, intimacy, and long-term well-being. Endocrine therapy emerged as one of the main factors associated with poorer physical, emotional, and cognitive functioning, as well as with a greater burden of sexual symptoms, including decreased libido, treatment-related sexual difficulties, and sexual pain. At the same time,

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our findings revealed important deficiencies in fertility-related counselling, as a substantial proportion of patients considered the information received before treatment to be absent or insufficient, even though many remained interested in future pregnancy. Taken together, these results support the need for a more integrated survivorship model in young breast cancer patients, in which routine care includes structured assessment of sexual health, proactive management of treatment-related symptoms, and timely, individualized oncofertility counselling delivered through closer collaboration between oncology and reproductive medicine teams

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