

Sexual function in premenopausal women with breast cancer

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Abstract

Background: This cross-sectional study assessed Female Sexual Function Index (FSFI) scores in premenopausal women with breast cancer diagnosis. We aimed to determine variables that are associated with sexual dysfunction and if these thematic is being addressed by healthcare professionals.

Methods: The FSFI questionnaire was administered to 199 premenopausal women 6 months after completing breast cancer initial treatment (surgery, radiation therapy or chemotherapy). A demographic questionnaire was administered. Scores were compared between sexually active women sub-groups. Questions, regarding FSFI acceptability and to find out if healthcare professionals are addressing these thematic were included.

Results: The study included 199 women. Thirty-three were excluded from analysis because they declared no sexual activity in the 4 weeks before the survey. Ninety-seven women met the FSFI cutoff score for a sexual dysfunction. FSFI Scores were significantly lower in women treated with radiation therapy and in women treated with radical mastectomy and lumpectomy when compared with mastectomy with immediate reconstruction. One hundred and thirty-eight women were never or rarely questioned about their sexual health even though 71.2% reported feeling comfortable about sharing this problematic with doctors. Both sexually active and non-active women provided positive feedback about the FSFI.

Conclusion: FSFI scores were compatible with sexual dysfunction in more than half of the sexually active women. Women treated with radiation therapy, radical mastectomy and lumpectomy had significant lower FSFI scores. With desirable acceptability, the FSFI is suitable for screening for sexual dysfunction in premenopausal women with

Introduction

Breast cancer is the most common female cancer [1]. Earlier detection screening and novel treatment approaches have contributed to high survival rates leading to increased consideration of the quality of life issues in these breast cancer women survivors [2]. As the number of breast cancer survivors increases, there is increased consideration of women's sexual functioning [3]. Female sexual dysfunction, which includes abnormalities in sexual desire, arousal, lubrication, satisfaction, orgasm, and dyspareunia, is one of the most common complications in women with breast cancer [4].

In 2000, Rosen et al. [4] published the female sexual function index (FSFI), a 19-item instrument that has been validated as a tool to measure sexual function among women with cancer, and it has been recognized as the most frequently used tool to measure sexual function in this population [5]. It assesses six domains of sexuality, including desire, arousal, lubrication, orgasm, satisfaction, and pain. Sexual dysfunction has been identified as an FSFI score < 26.55, with higher scores indicating higher levels of sexual function [4]. Although the FSFI is broadly used in breast cancer research [5], few studies have examined sexual problems exclusively in premenopausal women, resulting in a lack of knowledge regarding sexual function and reproductive concerns in these women [6]. However, a diagnosis of breast cancer is more traumatic for young women than for older women because of more severe psychosocial concerns due to the adverse

reproductive effects of treatment [7]. To refine the understanding of the impact of cancer therapies on this setting's sexuality, prospective data on the prevalence of Sexual Dysfunction is needed. The overall aim of the current study was to investigate the prevalence of sexual dysfunction in premenopausal women with breast cancer diagnosis and to assess the appropriateness of the FSFI when administered to these breast cancer patients. We also would like to determine the variables that are associated with sexual dysfunction. It was our concern to find out if these thematic is being addressed by healthcare professionals and if young women with sexual dysfunction diagnosis feel the need of being referenced to a specific appointment on sexual dysfunction.

Material And Methods

STUDY DESIGN AND PARTICIPANTS

Following approval to conduct this research from the Instituto Português de Oncologia Francisco Gentil - Coimbra Ethics Committee, participants were recruited from the medical oncology appointment. A convenience sample of female breast cancer survivors who had no evidence of recurrent disease was collected. Patients were included if they had completed surgery, radiation therapy and chemotherapy at least six months previous to the study. If the patients had completed their initial therapy but were continuing adjuvant hormonal therapy (i.e., tamoxifen), anti-HER2 therapy (i.e., trastuzumab), or LHRH agonists (i.e., goserelin), they also were recruited for the study. Patients, irrespective of sexual functioning status, were recruited at well-patient follow-up appointments between October 2019 and July 2020. Recruited breast cancer survivors were asked to complete the study questionnaire after the informed consent was signed. The study questionnaire included:

- The Female Sexual Function Index (FSFI) questionnaire was administered to premenopausal patients during medical appointments. This instrument consists of 19 questions on the sexual activity performed in the last four weeks. It enables the assessment of six sexual functioning domains: desire, arousal, lubrication, orgasm, satisfaction, and discomfort/pain [9]. Sub-domains are scored considering the values of each question and its respective conversion factors, and the total FSFI Score is the sum of the six results, ranging from 2 to 36, and better levels of sexual function are indicated by the highest scores.
- A demographic questionnaire on family, social, and educational history was also administered concomitant with FSFI to all patients to collect data on patient age, academic achievement, marital status, employment status, and the number of children.
- We included two questions to find out if healthcare professionals are addressing these thematic and if patients felt comfortable about sharing sexual problems in the appointments, rated on a 5-Point scale (Always; Very Frequently; Occasionally; Rarely; Never)
- To evaluate the user acceptability, we included four questions used in prior FSFI research [10] (e.g., 'I felt comfortable answering the questions') rated on a 5-Point Likert-Type scale ranging from 'strongly disagree' to 'strongly agree.' A mean score over three is considered as positive feedback.

- Patients were also asked about their wish to be referenced to a Sexual Oncology appointment in case of sexual dysfunction diagnosis.

Medical history, tumor data, and treatment course were collected by retrospective chart review. Tumor data included tumor pathology, stage, laterality, and receptor status. The treatment course included surgery type, the timing of surgery, chemotherapy and endocrine therapy type, and reconstruction data.

Statistical Analyses

Continuous variables were expressed as mean \pm standard deviation (in case of symmetric distribution) or median and interquartile range (for asymmetric distributions). Categorical variables were expressed as absolute and relative frequencies. Student's t-test or the one way ANOVA was used for between-group comparisons. Statistical significance was set to $\alpha = 0.05$. All analyses were conducted using the SPSS (Version 22, Armonk, NY: IBM Corp).

Results

Table 1
Demographic characteristics (n = 200)

Characteristics	Mean ± standard deviation	
Age at diagnosis	39.66 ± 5.76	
Age at study participation	42,52 ± 5.62	
	n	%
Age sub-group	5	2.5
20–30	13	6.5
31–35	46	23.1
36–40	62	31.2
41–45	73	36.7
>45		
Marital Status	144	72.3
Married	28	14.1
Single	24	12.1
Divorced	2	1
Widow	1	0.5
Missing data		
Children	162	81.4
Yes	37	18.6
No		
Number of children	37	18.6
0	75	37.7
1	79	39.7
2	7	3.5
3	1	0.5
4		

Characteristics		
Education level	54	27.1
Low (no education, primary education)	75	37.7
Secondary school (high school)	70	35.2
Higher (college, university)		
Employment status	133	66.8
Employed	30	15.1
Unemployed (and/or housewife)	29	14.6
Declared medically unfit	7	3.5
Retired		
Histological subtype	59	29.6
Luminal A	93	46.7
Luminal B	27	13.6
Luminal B HER2+	14	7
Triple-Negative	6	3
HER2+		
Clinical Stage	108	54.3
I	65	32.7
II	22	11.1
III	4	2
Missing data		
Neo-adjuvant therapies	84	42.2
Chemotherapy	23	11.6
Anti-Her2		
Adjuvant therapies	48	24.1
Chemotherapy	27	13.6
Anti-Her2	110	55.3
Radiotherapy	178	89.4
Endocrine-Therapy	142	71.4
LHRH agonists		

Characteristics		
Surgery type	120	60.3
Mastectomy with reconstruction	43	21.6
Lumpectomy / wide local excision	36	18.1
Total/modified radical mastectomy		

The study included an initial cohort of 199 breast cancer patients with at least six months of follow-up evaluation after completion of adjuvant treatment, with no evidence of active or recurrent disease and free of any oncologic treatment. Thirty-three patients declared no sexual activity in the four weeks before the survey (16.6%). These patients were excluded from further analysis.

The mean age at study participation was $42,52 \pm 5.62$ years (range 22–58 years), and the mean age at breast cancer diagnosis was 39.66 ± 5.76 years (range 22–57 years). The sample was predominately well-educated, married, white, female breast cancer survivors (Table 1). The majority (n = 108) were in the American Joint Committee Cancer 8th edition Stage I.

Means, standard deviation statistics are presented in Table 2. The two FSFI dimensions that were rated the lowest in terms of the level of functioning were Desire (M = 3.18, SD = 1.12) and Arousal (M = 3.69, SD = 1.37). Ninety-seven women (58.4%) met the FSFI clinical cutoff score for sexual dysfunction.

Table 2
– FSFI score (Means, standard deviations statistics)

	Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Score
N	166	166	166	166	166	166	166
Mean	3,1807	3,6904	4,1187	4,1470	4,6916	4,1410	23,9693
Median	3,6000	3,6000	4,2000	4,4000	4,8000	4,4000	24,7500
Std. Deviation	1,12970	1,25574	1,37116	1,44275	1,23654	1,51298	6,50106

The final FSFI score was compared, resorting to an independent sample t-test or the ANOVA for the variables Age group, Children, Education level, Employment status, Clinical Stage, Surgery type, Neo-adjuvant and adjuvant treatments, and Radiotherapy. No statistically significant differences were observed between age sub-groups ($p = 0.965$), women that had children when compared to those who didn't ($p = 0.826$), education level sub-groups ($p = 0.474$), employment status sub-groups ($p = 0.416$), clinical-stage subgroups ($p = 0.641$), and women that underwent through neoadjuvant or adjuvant systemic therapy when compared to those who didn't do any systemic therapy ($p = 0.419$).

Table 3
 – FSFI score – sub-group analysis (Means, standard deviations statistics)

Group	Sub-group	Mean	Std. Deviation	p-value
Age group	20–30	21,9800	11,03594	0.965
	31–35	24,2333	7,82494	
	36–40	23,7410	6,04282	
	41–45	24,0566	5,94887	
	> 45	24,1632	6,76099	
Children	no	24,2067	7,47630	0.845
	yes	23,9169	6,29551	
Education level	Low	23,0646	6,88531	0.474
	Secondary	24,0839	6,67322	
	Higher	24,6179	5,97766	
Employment status	Employed	24,1422	6,50476	0.416
	Declared medically unfit	24,3545	6,94535	
	Unemployed	22,2375	6,22085	
	Retired	27,2250	5,27534	
Clinical stage	I	24,1088	6,40013	0.641
	II	23,3107	6,95912	
	III	24,8800	5,31631	
Chemotherapy	no	24,5328	6,61063	0.419
	yes	23,6667	6,45205	
Radiotherapy	no	25,1697	5,80726	0.028
	yes	22,9556	6,90400	
Endocrine Therapy	no	24,2393	6,77202	0.810
	yes	23,9145	6,46882	
Type of surgery	TMRM	23,2677	6,25255	0.004
	MIBR	27,3030	4,85344	
	LWLE	22,8162	7,53247	

A statistically significant difference was found between the FSFI scores in patients that underwent through Radiotherapy when compared to those who did not ($p = 0.026$).

Table 4
– FSFI score - Radiation therapy sub-group analysis

	Radiotherapy	N	Mean	Std. Deviation	p-value
Desire	no	76	3,3868	1,08091	0.03
	yes	90	3,0067	1,14654	
Arousal	no	76	3,8566	1,25638	0.117
	yes	90	3,5500	1,24488	
Lubrication	no	76	4,3263	1,31660	0.071
	yes	90	3,9433	1,39888	
Orgasm	no	76	4,3105	1,33162	0.175
	yes	90	4,0089	1,52401	
Satisfaction	no	76	4,8474	1,02651	0.127
	yes	90	4,5600	1,38148	
Pain	no	76	4,4421	1,34910	0.016
	yes	90	3,8867	1,60226	
Score	no	76	25,1697	5,80726	0.026
	yes	90	22,9556	6,90400	

Post hoc tests with Bonferroni correction were used to assess differences between each surgery type sub-group. Statistically significant differences were found for FSFI score ($p = 0.004$) and the Arousal ($p = 0.01$), Lubrication ($p = 0.01$), Orgasm ($p = 0.005$) and Satisfaction domains. For the FSFI score, the post hoc tests reveal the existence of statistically significant differences between mastectomy with immediate reconstruction sub-group and Lumpectomy / wide local excision subgroup ($p = 0.01$) as well as between mastectomy with reconstruction sub-group and Single/double mastectomy sub-group (0.006). No statistically significant differences were observed between Lumpectomy / wide local excision subgroup and total/modified radical mastectomy sub-group ($p = 1.000$).

Table 5
FSFI score - Radiation therapy sub-group analysis

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Desire	TMRM	96	3,1125	1,13613	2,8823	3,3427	1,20	5,40
	MIBR	33	3,5273	1,18830	3,1059	3,9486	1,20	6,00
	LWLE	37	3,0486	1,02351	2,7074	3,3899	1,20	4,80
	Total	166	3,1807	1,12970	3,0076	3,3538	1,20	6,00
Arousal	TMRM	96	3,5656	1,26373	3,3096	3,8217	,00	6,00
	MIBR	33	4,2727	1,08434	3,8882	4,6572	1,20	6,00
	LWLE	37	3,4946	1,25542	3,0760	3,9132	,60	5,70
	Total	166	3,6904	1,25574	3,4979	3,8828	,00	6,00
Lubrication	TMRM	96	4,0375	1,30071	3,7740	4,3010	,00	6,00
	MIBR	33	4,7273	1,12508	4,3283	5,1262	2,10	6,00
	LWLE	37	3,7865	1,59899	3,2534	4,3196	,90	6,00
	Total	166	4,1187	1,37116	3,9085	4,3288	,00	6,00
Orgasm	TMRM	96	4,0083	1,45672	3,7132	4,3035	,00	6,00
	MIBR	33	4,8606	,93339	4,5296	5,1916	2,40	6,00
	LWLE	37	3,8703	1,60293	3,3358	4,4047	1,20	6,00
	Total	166	4,1470	1,44275	3,9259	4,3681	,00	6,00
Satisfaction	TMRM	96	4,5125	1,28696	4,2517	4,7733	,80	6,00
	MIBR	33	5,2606	,59263	5,0505	5,4707	3,60	6,00
	LWLE	37	4,6486	1,39316	4,1841	5,1132	,80	6,00
	Total	166	4,6916	1,23654	4,5021	4,8811	,80	6,00
Pain	TMRM	96	4,0313	1,53755	3,7197	4,3428	,00	6,00
	MIBR	33	4,6545	1,17396	4,2383	5,0708	2,00	6,00
	LWLE	37	3,9676	1,65026	3,4173	4,5178	,00	6,00

*. The mean difference is significant at the 0.05 level.

** TMRM (total/modified radical mastectomy); MIBR (mastectomy with immediate breast reconstruction; LWLE (lumpectomy / wide local excision)

	Total	166	4,1410	1,51298	3,9091	4,3728	,00	6,00
Score	TMRM	96	23,2677	6,25255	22,0008	24,5346	9,30	34,50
	MIBR	33	27,3030	4,85344	25,5821	29,0240	13,70	35,30
	LWLE	37	22,8162	7,53247	20,3048	25,3277	9,20	33,20
	Total	166	23,9693	6,50106	22,9730	24,9655	9,20	35,30

*. The mean difference is significant at the 0.05 level.

** TMRM (total/modified radical mastectomy); MIBR (mastectomy with immediate breast reconstruction; LWLE (lumpectomy / wide local excision)

Table 6
 – FSFI score – One way Anova surgery type multiple Comparisons

Bonferroni							
Dependent Variable	Surgery Type	Surgery Type	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Desire	TMRM	MIBR	-,41477	,22659	,207	-,9629	,1333
		LWLE	,06385	,21728	1,000	-,4617	,5894
	MIBR	TMRM	,41477	,22659	,207	-,1333	,9629
		LWLE	,47862	,26886	,231	-,1717	1,1290
	LWLE	TMRM	-,06385	,21728	1,000	-,5894	,4617
		MIBR	-,47862	,26886	,231	-1,1290	,1717
Arousal	TMRM	MIBR	-,70710*	,24794	,015	-1,3069	-,1073
		LWLE	,07103	,23776	1,000	-,5041	,6462
	MIBR	TMRM	,70710*	,24794	,015	,1073	1,3069
		LWLE	,77813*	,29420	,027	,0665	1,4898
	LWLE	TMRM	-,07103	,23776	1,000	-,6462	,5041
		MIBR	-,77813*	,29420	,027	-1,4898	-,0665
Lubrication	TMRM	MIBR	-,68977*	,27067	,035	-1,3445	-,0350
		LWLE	,25101	,25956	1,000	-,3768	,8789
	MIBR	TMRM	,68977*	,27067	,035	,0350	1,3445
		LWLE	,94079*	,32117	,012	,1639	1,7177
	LWLE	TMRM	-,25101	,25956	1,000	-,8789	,3768
		MIBR	-,94079*	,32117	,012	-1,7177	-,1639
Orgasm	TMRM	MIBR	-,85227*	,28361	,009	-1,5383	-,1662
		LWLE	,13806	,27196	1,000	-,5198	,7959
	MIBR	TMRM	,85227*	,28361	,009	,1662	1,5383
		LWLE	,99034*	,33652	,011	,1763	1,8043
	LWLE	TMRM	-,13806	,27196	1,000	-,7959	,5198

Bonferroni							
		MIBR	-,99034*	,33652	,011	-1,8043	-,1763
Satisfaction	TMRM	MIBR	-,74811*	,24407	,008	-1,3385	-,1577
		LWLE	-,13615	,23405	1,000	-,7023	,4300
	MIBR	TMRM	,74811*	,24407	,008	,1577	1,3385
		LWLE	,61196	,28960	,108	-,0886	1,3125
	LWLE	TMRM	,13615	,23405	1,000	-,4300	,7023
		MIBR	-,61196	,28960	,108	-1,3125	,0886
Pain	TMRM	MIBR	-,62330	,30268	,123	-1,3555	,1089
		LWLE	,06368	,29025	1,000	-,6384	,7658
	MIBR	TMRM	,62330	,30268	,123	-,1089	1,3555
		LWLE	,68698	,35915	,173	-,1818	1,5557
	LWLE	TMRM	-,06368	,29025	1,000	-,7658	,6384
		MIBR	-,68698	,35915	,173	-1,5557	,1818
Score	TMRM	MIBR	-4,03532*	1,27529	,006	-7,1202	-,9505
		LWLE	,45149	1,22292	1,000	-2,5067	3,4097
	MIBR	TMRM	4,03532*	1,27529	,006	,9505	7,1202
		LWLE	4,48681*	1,51321	,010	,8265	8,1472
	LWLE	TMRM	-,45149	1,22292	1,000	-3,4097	2,5067
		MIBR	-4,48681*	1,51321	,010	-8,1472	-,8265

*. The mean difference is significant at the 0.05 level.

** TMRM (total/modified radical mastectomy); MIBR (mastectomy with immediate breast reconstruction; LWLE (lumpectomy / wide local excision)

Acceptability to patients

Overall, the women provided positive feedback about the FSFI, as they reported feeling comfortable answering questions (M = 4.38, SD = 0.91), that the questions were easy to complete (M = 4.50, SD = 0.85) relevant to their experiences (M = 4.30, SD = 0.89); and the questionnaire was about the right length (M = 4.38, SD = 0.68).

Sexual health assessment

One hundred and thirty-eight women (69.3%) were never or rarely questioned about their sexual health during their medical oncology appointment even though 151 women (71.2%) reported feeling comfortable about sharing this thematic with their doctors.

Out of the 97 women that met the FSFI criteria for sexual dysfunction, 60 (61.9%) of the women with sexual functioning problems felt a need for a specific medical appointment related to sexual dysfunction.

Discussion

This study assessed sexual function in premenopausal women with breast cancer diagnosis treated at a large, public cancer center in a south European country. FSFI scores met the clinical cutoff score for sexual dysfunction in more than half (58.4%) of the 166 sexually active women in the study. This high prevalence of sexual dysfunction may be due to their Breast Cancer-specific treatment experiences, such as body image changes after breast surgery, hormone treatments, and the physiological and psychological effects of chemoradiotherapy. [11] Given these findings, it is important that greater attention be paid to the sexual function changes affecting women with breast cancer. These results may thereby help to increase the availability of assistance for women with BC who are facing sexual health problems.

Subgroup analysis showed that regarding FSFI score in women with Breast Cancer, there were statistically significant differences between women that did radiotherapy when compared to those who did not. Breast irradiation usually is given daily for about 3 to 6.5 weeks. It is associated with short term side effects (first three months after treatment) of fatigue and skin erythema, and long term side effects (3 months to 3 years after treatment) of breast edema, pain, fibrosis, and telangiectasia. Studies of patients treated with mastectomy have suggested that the addition of postoperative radiotherapy was associated with a higher incidence of psychological morbidities, such as depression and anxiety. [12–13] Breast-conserving therapy (lumpectomy plus breast irradiation) also have been suggested, when compared with mastectomy or lumpectomy alone, to be associated with an increase in affective symptoms. [14–15] Other studies have not shown any effect of postoperative radiation therapy on psychological distress but have suggested significant effects on physical symptoms, in particular, fatigue. [14–15]

Our results demonstrate a lower FSFI score in patients treated with radical mastectomy and lumpectomy when compared to mastectomy with immediate reconstruction. Women who undergo mastectomy with immediate reconstruction have the greatest opportunity for preservation of their native skin envelope, and theoretically, a natural cosmetic outcome. Given body image dissatisfaction has been linked to a more prevalence of sexual dysfunction, this fact might explain the outcomes for mastectomy patients [26–28]. Otherwise, radiotherapy was offered to all patients that had lumpectomy as breast surgery, conditions that could contribute to a higher prevalence of sexual dysfunction in this group of patients.

This study also investigated women's care needs and their experience with health professionals regarding the inclusion of problems with sexual functioning as part of treatment. The results showed that out of the 97 women that met the FSFI criteria for sexual dysfunction, 60 (61.9%) of the women with sexual functioning problems felt a need for a specific medical appointment related to sexual dysfunction. One hundred and thirty-eight women (69.3%) were never or rarely questioned about their sexual health during

their medical oncology appointment. This means that these women were deprived of care. Discussing sexual issues is difficult for both patients and for health care providers, and sexual concerns often remain unaddressed during treatment [18–21]. Although there is a tendency to consider sexual issues as taboo, our study found that cancer patients' opinions are different. Patients expressed a great desire to discuss and disclose information concerning their sexual life, as shown by the high percentage of study participants (71.2%). Based on the findings from this study, health care professionals should be encouraged to inquire about their patients' sexual concerns.

The participants in this study reported feeling comfortable answering the questionnaire, that the questions were easy to complete, relevant to their experiences, and the questionnaire was about the right length. These findings demonstrate that the FSFI has favorable psychometric properties and is acceptable for use by premenopausal women with breast cancer. The FSFI is, therefore, eminently suited for routine administration to screen for sexual dysfunction in clinical and research settings. The measure is simple to administer and score and is suitable for use by health professionals as a screening tool. As the FSFI is a self-report scale, it will take no additional practitioner time to administer, which is important for busy clinical practices.

This study has some strengths, including the prospective design, the use of a validated measure of sexual function, and the sample size. However, the present study suffers from certain limitations. Firstly, the subgroup sizes make comparisons among treatment groups difficult. Secondly, our analysis did not include medical comorbidities, which in turn might have affected sexual function. The third limitation concerns the use of FSFI, which, albeit criticized as not being the most suitable instrument for sexually inactive participants, has thus far been the better validated instrument for assessing sexual function available in Portugal.

Conclusion

Future studies may seek a therapeutic approach capable of minimizing the negative effects of these events on sexual quality of life and on patients' intimate partners.

It is imperative to provide a comprehensive review of the consequences of breast cancer treatments during medical appointments and educational tools to help clinicians describe realistic expectations for both aesthetic and functional outcomes.

Furthermore, health care providers are not properly trained to understand the patient's complaints or to obtain an adequate sexual history [22]. This is the key factor behind current difficulties in assessing the sexual quality of life in cancer patients.

The findings of the present study support the use of the FSFI questionnaire in women with breast cancer patients. Clinicians and researchers will be able to assess any perceived changes in functioning after cancer diagnosis and treatment as well as levels of distress experienced due to sexual difficulties. The latter is important in diagnosing sexual dysfunction and identifying women who would benefit from additional

treatment. Most importantly, the FSFI can be used to give women and professionals the permission to raise the subject of sexual functioning in clinical consultations.

Declarations

CONFLICT OF INTEREST

The authors have no financial relationships related to this manuscript to disclose.

*Declarations

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References

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray F (2015) Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 136(5):E359–E386
2. Den Oudsten BL, Van Heck GL, Van der Steeg AFW, Roukema JA, De Vries J (2009) The WHOQOL-100 has good psychometric properties in breast cancer patients. *J Clin Epidemiol* 62(2):195–205
3. World Health Organization: defining sexual health: report of a technical consultation on sexual health, 28–31 January 2002. In. Geneva; 2006
4. Boquiren VM, Esplen MJ, Wong J, Toner B, Warner E, Malik N (2016) Sexual functioning in breast cancer survivors experiencing body image disturbance. *Psychooncology* 25:66–76
5. Baser R, Li Y, Carter J (2012) Psychometric validation of the female sexual function index (FSFI) in cancer survivors. *Cancer* 118(18):4606–4618

6. Bakewell RT, Volker DL (2005) Sexual dysfunction related to the treatment of young women with breast cancer. *Clin J Oncol Nurs* 9:697–702. doi:10.1188/05.CJON.697-702
7. Ganz PA, Greendale GA, Petersen L, Kahn B, Bower JE (2003) Breast cancer in younger women: reproductive and late health effects of treatment. *J Clin Oncol* 21:4184–4193. doi:10.1200/JCO.2003.04.196
8. Arora NK, Gustafson DH, Hawkins RP, McTavish F, Cella DF et al (2001) Impact of surgery and chemotherapy on the quality of life of younger women with breast carcinoma: a prospective study. *Cancer* 92:1288–1298
9. Rosen R, Brown C, Heiman J et al (2000) The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2:191–208
10. Bartula I, Sherman KA (2015) The Female Sexual Functioning Index (FSFI): evaluation of acceptability, reliability and validity in women with breast cancer. *Support Care Cancer*
11. The Steering Committee on Clinical Practice Guidelines for the Care (1998) and Treatment of Breast Cancer. 6. Breast radiotherapy after breast-conserving surgery. *CMAJ* 158((Suppl 3):):S35–S42
12. Holland JC, Rowland J, Lebovits A, Rusalem R. Reactions to cancer treatment. Assessment of emotional response to adjuvant radiotherapy as a guide to planned intervention. *Psychiatr Clin North Am* 1979;2: 347–358
13. Silberfarb PM, Maurer LH, Crouthamel CS. Psychosocial aspects of neoplastic disease: I. Functional status of breast cancer patients during different treatment regimens. *Am J Psychiatr* 1980;137: 450–455
14. Fallowfield LJ, Baum M, Maguire GP. Effects of breast conservation on psychological morbidity associated with diagnosis and treatment of early breast cancer. *BMJ* 1986; 293: 1331–1334
15. Lasry J-C, Margolese RG, Poisson R, Shibata H, Fleischer D, Lafleur D, *et al.* depression and body image following mastectomy and lumpectomy. *J Chron Dis* 1987; 40: 529–534
16. 14 Hughson AVM, Cooper AF, McArdle CS, Smith DC. Psychosocial effects of radiotherapy after mastectomy. *BMJ* 1987; 294: 1515–1518
17. 16 Graydon JE. Women with breast cancer: their quality of life following a course of radiation therapy. *J Adv Nurs* 1994; 19: 17–22
18. Katz A (2005) The sounds of silence: sexuality information for cancer patients. *J Clin Oncol* 23(1):238–241
19. Park ER, Norris RL, Bober SL (2009) Sexual health communication during cancer care: barriers and recommendations. *Cancer J* 15(1):74–77
20. Brandenburg U, Bitzer J (2009) The challenge of talking about sex: the importance of patient-physician interaction. *Maturitas* 63(2):124–127
21. Bober SL, Carter J, Falk S (2013) Addressing female sexual function after cancer by internists and primary care providers. *J Sex Med* 10(Suppl 1):112–119
22. Tsimtsiou Z, Hatzimouratidis K, Nakopoulou E et al (2006) Predictors of physicians' involvement in addressing sexual health issues. *J Sex Med* 3:583–588