



Evaluation of Sexual Function in Breast Cancer Survivors Using Female Sexual Function Index: A Systematic Review

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Abstract

Objectives: Breast cancer is known as one of the most common women's neoplasms and the Diagnosis and Treatment of cancer has a great effect on women's sexual function. Considering the high survival rates of breast cancer, attention to sexual function is very important as a domain in the quality of life. Therefore, this research aimed to review studies on women's sexual function using the female sexual function index (FSFI).

Materials and Methods: To this end, PubMed, Web of Science, Scopus, and ProQuest databases were considered and Iranian studies on sexual function in breast cancer, which were in Persian or English and used the FSFI tool, were selected in this regard. In addition, these studies were methodologically evaluated and the keywords included "breast cancer" and "sexual function", along with their synonyms.

Results: A total of 128 studies were identified out of which 5 cases having the inclusion criteria were selected after reviewing the title, abstract, and quality assessment. The rate of sexual dysfunction in the survivors of breast cancer varied between 52.5% and 100%. Based on the domains of FSFI, the lack of desire and lubrication dysfunction were the most common disorders while satisfaction with sexual life obtained the highest score.

Conclusions: Overall, it is necessary to systemically measure sexual dysfunction after cancer diagnosis and treatment employing an appropriate tool. Finally, effective interventions are required to improve sexual function.

Keywords: Breast cancer, Sexual dysfunction, Survivors, Female sexual function index

Introduction

Breast cancer is considered as one of the most prevalent cancers and the second cause of death from cancer in women worldwide (1-3). In addition, this type of cancer has the highest incidence among all types of women's cancers and is the second reason for the death of women after lung cancer, with an annual death rate of 411 000 people per year. It is worth mentioning that 1.5 million women are globally affected by breast cancer per year (4-6).

Similarly, breast cancer is common among Iranian women and has an incidence rate of 22 cases per 100 000 people annually. Based on the reports, 25% of women's cancers in Iran are allocated to this type of cancer and the mean age of its onset in Iranian women is at least 10 years earlier than that of women in developed countries (1,5,7).

Considering the above-mentioned explanations, breast cancer imposes many burdens on society. In a study conducted in Tehran from 1998 to 2001, disability-adjusted life years 4252 year (98% CI: 3896-4604) was reported with 17.09% breast cancer incidence rate and a survival rate of 75% (8). The studies conducted during

2003-2010 indicated a higher overall mortality rate of breast cancer from 0.96 to 4.33 per 100 000 with a similar pattern of mortality in the general population of women and an increase in the incidence of 16-28.3 per 100 000. Considering the years of life lost, it is estimated that the rate of breast cancer is rising in Iran (9).

However, the survival rate with no evidence of the disease is increasing due to early detection and progression in the treatment of this cancer. Paying attention to the quality of life among breast cancer survivors, especially women's quality of sexual life has steadily grown in clinical trials (2, 9-13). Further, the development of educational programs reduces death and disability caused by breast cancer in women (14).

Based on a study in the United States, 3 million women, previously diagnosed with breast cancer with a proportion of 48%, constitute higher cancer surviving population (15).

Considering the increased incidence of cancer, including Iran, one should expect a significant increase in the economic burden of the disease. In a previous study, the economic burden of breast cancer was \$947 374 468 for all

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patients in 2012. Totally, 77% of this amount was related to the loss of production due to death resulting from cancer and only 18.56% was related to direct medical costs such as chemotherapy and hormone therapy. Therefore, breast cancer has a substantial economic burden on society. For example, the costs of breast cancer are 3 times greater than those of the most common cancers in men, namely prostate cancer (16).

On the other hand, the quality of life, especially, the sexual function of women with breast cancer has attracted much attention since the survival rate of this cancer is over 80%, (6).

Sexual dysfunction is a common long-term problem caused by cancer (13), which may occur at every stage of disease diagnosis throughout the treatment period, and during the survival period. It can even be as unpleasant as the cancer itself (2,10-12).

There are few studies on the burden of sexual dysfunction, most of which are related to male sexual dysfunction. Only one restricted study in a 3-month period is available in which a higher cost of female sexual dysfunction (FSD) is reported compared to male sexual dysfunction, which is 472 pounds and 335 pounds, respectively. This study did not include the quality of life criteria, related dysfunctions, or the psychological rate of FSD. There are not enough studies in this area and thus we should only accept that FSD alone leads to anxiety, depression, interpersonal problems, marital disruption, and pregnancy disorders, therefore, these factors should be considered in the calculation of FSD rate (15).

Furthermore, sexual problems can be related to common pathophysiologic changes which occur with cancer diagnosis and treatment, including surgery, chemotherapy, radiotherapy, hormone therapy, and cytotoxic therapy (17-20).

It is estimated that between 15% to 64% of the breast cancer survivors experience sexual dysfunction symptoms like a decrease in arousal, the loss of sexual desire, vaginal dryness, and dyspareunia. Moreover, early menopause and dyspareunia, along with body image impairment, low sexual confidence, and sexual dissatisfaction are other cases which were reported by women (2,4,21). The study of sexual function is psychologically and clinically important in breast cancer patients who have a mastectomy and are sexually active (22) since the breast is a symbol of sexuality and femininity. Cancer and its treatment adversely affect sexual identity and femininity. Additionally, arousal caused by breast stimulation reduces following breast surgery and hormone therapy is likely to decrease sexual response (23).

In a population-based cohort study on breast cancer patients, 65% of patients declared that they were sexually active while 52% of these active patients suffered from sexual dysfunction in two or more phases (24).

Similarly, sexual issues are considered important in the quality of life and are part of human existence.

Accordingly, we should pay special attention to sexual issues when providing individual-based care in cancer and this is an important aspect of the quality of caring against cancer (11). In addition, improving the quality of services based on patients' opinions and requests creates a positive attitude and approach and leads to effective participation in health care affairs (5).

Considering the fact that health care providers, compared to other medical team members, spend more time with the patient, they play an effective role in improving the health and sexual issues of the survivors. Therefore, health care providers must have knowledge about the impact of breast cancer on sexual issues and know when and how to talk with the patient and her husband (7,17). Unfortunately, patients' sexual concerns and issues are often neglected in many countries. As a result, patients often become anxious to discuss their sexual concerns with service providers. This is even more evident in Islamic countries like Iran. Talking about sexual issues is a taboo and women are cautious regarding speaking about their sexual problems or asking for help (17,22,25).

Based on the reports, less than one-third of the patients with breast cancer converse with health care providers about their sexual concerns (2,21,23). In a study by Southard and Keller, many patients wished someone would ask them about sexual problems. In another study, Perz et al emphasized the important role of health care providers in addressing the survivors' concerns by starting a conversation about sexuality and intimacy (10,21). Using a valid self-reporting tool might be helpful for removing this deficiency. So far, several instruments have been used to evaluate female sexual function. Female sexual function index (FSFI), developed by Rosen et al in 2000, is an instrument that measures female sexual function (26). Although it is not specifically designed for women with cancer, it is the most widely used instrument in this field and numerous studies. The FSFI is a 19-item questionnaire with a self-reporting approach and seems to be the only instrument the validity of which is studied in the general population (27).

The literature review about sexual dysfunction in those who have recovered from breast cancer is heterogeneous. Two systematic reviews of cancer and sexual dysfunction are published in studies using FSFI. The former screens sexual dysfunction in breast cancer patients (23) and the latter evaluates sexual dysfunction in women with cancer (27). The current study, using the FSFI tool, sought to evaluate sexual dysfunction in breast cancer survivors by increasing time period. Unlike Maiorino et al (27) who applied only 3 databases and restricted their study to breast cancer issues, the researchers of the present study utilized the data in ProQuest electronic journal in addition to 3 other databases (i.e., PubMed, Scopus, and Web of Science). Therefore, the current study differed from the two previous studies (23,27) in that it covered longer time and evaluated the studies by only using FSFI.

Materials and Methods

Observational studies were used for this review. The following method was applied for searching resources, as well as selecting and assessing the quality of studies.

Search Strategy

Two main keywords “breast cancer”, “sexual dysfunction”, and their synonyms were searched in at least 4 databases such as PubMed, Scopus, ProQuest, and Web of Science. Further, MeSH and Iran doc thesaurus systems were used to identify the synonyms. Some of these breast cancer synonyms included breast tumors, breast neoplasm, breast carcinoma, mammary neoplasm and some other synonyms for sexual dysfunction were sexual disorders, psychological sexual dysfunction, and hypoactive sexual desire disorder. “AND” operator was used to combine these two words.

First, databases were searched without considering time and place restrictions. Then, a period from January 1, 2000 to the end of December 2017 was added to the search syntax. Since the FSFI was first designed and used by Rosen et al in 2000, searching started from the year 2000 (26). Finally, the studies that were conducted in Iran and met the criteria were selected for the purpose of the study. The searching process was conducted based on title, abstract, and full article. A sample of searching syntax in the PubMed database is shown in Table 1.

Study Selection

English or Persian observational descriptive and analytical descriptive studies, the full text of which were available and FSFI tool, were used to measure the sexual function. The lack of access to full text, review articles, clinical trials, case reports, and letters to the editor were the reasons for article exclusion. From the participants' point of view, studies in which participants with breast cancer were confirmed and

completed the course of treatment (except for hormone therapy) were selected. However, studies with fewer than 30 participants or including those diagnosed with primary and secondary metastatic cancers were excluded from the review. All studies have been conducted in Iran.

Quality Control

Using the Newcastle-Ottawa scale (NOS), two of the authors (MM and ZK) evaluated the quality of the studies and disagreements were resolved by consensus. NOS assesses the quality of non-randomized studies, including case-control and cross-sectional ones (29). Further, this scale includes some questions regarding the selection, comparability, and exposure/outcome sections. In case-control studies, questions in the selection section were about the adequate and proper definition of the samples, the representativeness of the community, proper selection, and the definition of a control group. The comparability of case and control groups in both the design of the study, and analysis were the items in comparability, and finally, assurance about exposure, the application of the same method for the case and control group, and the rate of non-response in the exposure group were assessed in exposure part.

The NOS scale version of cross-sectional studies was used as well. Questions in Selection Section included community representatives, sample size, non-response rate, risk factor, and the possibility of comparing groups with different outcomes related to the comparability section. The questions in the Outcome Section included outcome evaluation and statistical tests. Finally, 5 studies were selected with medium to good quality according to the Newcastle-Ottawa checklist.

Data Extraction

The required data were extracted from the selected studies

Table 1. Search Syntax in PubMed

Search Round	Syntax	NNR*	Records Number
1	“Breast Neoplasm” OR (Neoplasm AND Breast) OR “Breast Tumor” OR (Tumor AND Breast) OR (Neoplasms AND Breast) OR “Breast Carcinoma” OR (Carcinoma AND Breast) OR (“Mammary Neoplasms” AND Human) OR “ Human Mammary Neoplasm” OR (Neoplasm AND “Human Mammary”) OR (“Mammary Neoplasm” AND Human) OR “Breast Cancer” OR (Cancer AND Breast) OR “Mammary Cancer” OR (Cancer AND Mammary) OR “Mammary Cancers” OR “Malignant Neoplasm of Breast” OR “Breast Malignant Neoplasm” OR “Malignant Tumor of Breast” OR “Breast Malignant Tumor” OR “Cancer of Breast” OR “Cancer of the Breast”) AND (“Sexual dysfunction” OR “Physiological Sexual Dysfunction” OR (“Sexual Dysfunctions” AND Physiological) OR (“Sexual Disorders” AND Physiological) OR “Physiological Sexual Disorder” OR (“Sexual Disorder AND Physiological”) OR “Sex Disorders” OR (Dysfunction AND “Psychological Sexual”) OR “Psychological Sexual Dysfunction” OR (“Sexual Dysfunction AND Psychological”) OR “Psychosexual Dysfunctions” OR (Dysfunction AND Psychosexual) OR “Psychosexual Dysfunction” OR “Psychosexual Disorders” OR (Disorder AND Psychosexual) OR “Psychosexual Disorder” OR “Hypoactive Sexual Desire Disorder” OR “Sexual Aversion Disorder” OR (“Aversion Disorders” AND Sexual) OR (Disorders AND “Sexual Aversion”) OR “Sexual Aversion Disorders” OR “Orgasmic Disorder” OR “Sexual Arousal Disorder” OR (Arousal Disorders AND Sexual) OR (Disorders AND Sexual Arousal) OR Frigidity) AND 2000/01/01:2017/12/30[dp]	~33	455
2	#1+ AND (Iran[tiab] OR Iran [pl] OR Iran[ad])		8

Note. *NNR: The number of the obtained article need to read for finding 1 included article (28). The synonyms were searched through MeSH.

by two researchers (MM, and ZK). These data encompassed the first author's name, the year of publication, the city of the study, the study design, the number of participants, age, and control group, as well as information about sexual dysfunction including the prevalence of disorder and the FSFI score. The study was conducted independently and the agreement was the basis for disputing the resolution (Table 2).

Results

Figure 1 shows the results of the study. Out of 128 initial articles, 30 studies were first selected based on the title, followed by excluding 98 studies including 12 review articles, 26 randomized controlled trials (RCTs), 10 qualitative studies, and two studies related to male sexual dysfunction. Furthermore, 48 other excluded studies were not related to breast cancer, or they were only the abstracts related to congress and non-related to breast disease. Finally, 5 studies with a total sample size of 1175 were selected for investigation. These studies were conducted during 2012-2017 and included 3 case-control, 2 cross-sectional, and 1 prospective studies. Moreover, studies were performed in Tehran (22, 30), Mashhad (31, 32), and Mazandaran (33) and the prevalence of sexual dysfunction ranged from 52.5% to 78.5%.

The cut-off point of the overall FSFI score was either equal or less than 28 (22, 33) or 26.5 (31, 32). However,

the overall FSFI score was not mentioned in the last study (30). Despite the differences in the cut-off studies, the average FSFI score ranged from 21.05 to 26.6.

Considering the scores of different FSFI domains (i.e., desire, arousal, lubrication, orgasm, satisfaction, and pain), the lowest scores belonged to desire with 2.8 ± 1.13 (22) and lubrication with 2.8 (30) while the highest score was related to satisfaction with 5.09 ± 1.14 (31).

Discussion

Sexual dysfunction is commonly recognized during breast cancer diagnosis and treatment. This disorder may lead to emotional distress, the loss of sexual intimacy, and, consequently, may negatively affect the patients' survival process (31).

Accordingly, it is essential for health service providers to evaluate the effects of cancer treatments on sexual function of patients in order to provide women with sufficient information regarding the early stages of treatment (22,34, 35).

Sexual dysfunction, after breast cancer, encompasses a wide range of low to high rates. In this study, some factors such as the method of study, the method of evaluation, the identification of sexual problems, the time of the study, and the medical or characteristics of the participants were responsible for this variation (6).

Therefore, only observational studies that used the

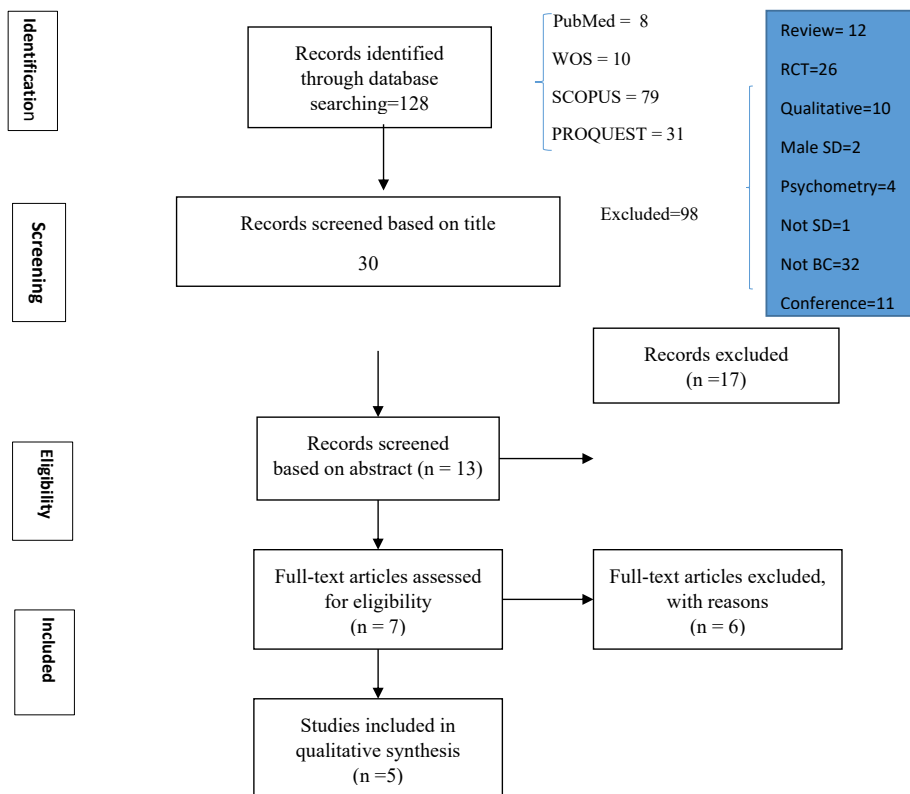


Figure 1. Characteristics of the Reviewed Studies.

Table 2. Characteristics and Results of Observational Studies in Iran Measuring Sexual Function Using FSFI in Breast Cancer Survivors

First Author	Year	Design	Place of Study	No. of Patients	No. of Control	Age	Prevalence of SD	FSFI Score
Shandiz	2016	Cross-section	Mashhad	94	-	45.20±8.63	67%	≤26.5= SD mean score 24.34±4.42 Desire =3.60±0.85; Arousal =3.85±1.1; Lubrication =4.64±1.52; Orgasm =4.75±1.09; Satisfaction =5.09±1.14; Pain =2.39±1.54
Safarinejad	2012	Cross-section Case-control	Tehran	186	204	37.7±6.4 vs. 37.2±6.1	52.5% Patients 28.7% Control	FSFI cut-off not mentioned Desire =3.7; Arousal =4.0; Lubrication =2.8; Orgasm =3.7; Satisfaction =3.3; Pain =4.6 for patients
Harirchi	2012	Prospective	Tehran	216	-	44.3±8.6	52% Pretreatment, 84% Posttreatment	≤28= SD Mean FSFI score pretreatment =26.6±4.26 and 22.1±5.89 post Post: desire =2.8±1.13; Arousal =3.2±1.45; Lubrication =4.3±1.48; Orgasm =4.0±1.47; Satisfaction =3.0±1.26; Pain =4.5±1.63
Chirani	2017	Cross-section	Mazandaran	104	-	47.33±9.03	78.5%	<28= SD Mean FSFI score of patients =21.05±7.9 Desire 3.3,arousal3.4,lubrication 3.7,orgasm 3.4,pain 3.8, satisfaction 3.8
Sales	2017	Case-control	Mashhad	245	126	41.44±5.87	75.1% cases vs. control 52.4%	<26.55= FSD Mean FSFI score of patients =21.54±7.3 P: (Desire =2.93±1.03; Arousal =3.34±1.44; Lubrication =3.71±1.67; Orgasm =3.44±1.57; Satisfaction =4.59±1.28; Pain =3.52±1.92)

Note: SD, Diagnosis of sexual dysfunction based on FSFI score. FSFI cut-off varies in different studies.
FSFI: Female sexual function index.

FSFI was selected to reduce diversity. FSFI is one of the instruments that is widely used for evaluating the sexual function and its validated Persian version is also available (36-38). At the same time, studies with a sample size of less than 30 people were excluded to reduce heterogeneity.

By limiting the inclusion criteria, 5 studies from PubMed, Web of Science, Scopus, and ProQuest databases had inclusion criteria. Two of the selected studies with a control group provided a good benchmark for data comparison (9, 32). In these two studies, the effective factors respecting sexual dysfunction in breast cancer patients were evaluated as well. The findings of these two studies were consistent and showed no contradiction (30, 31).

FSFI Score and Prevalence of Sexual Dysfunction

The FSFI cut-off point was less than 28 (22,33) in 2 studies and less than 26.5 in two other studies (31,32) while it was not determined in the remaining study (30). In all studies, the average FSFI score for the study group was less than the mentioned values (the lowest and highest scores were 22.05 and 34.44, respectively), which indicated sexual dysfunction following breast cancer diagnosis and treatment. Despite the variation in FSFI average scores in above mentioned studies, the same results were observed in other studies in terms of the age of the participants, the menopausal status, the type of surgery, and the like (39-42).

More than 50% of the breast cancer survivors suffered from sexual problems. Additionally, the highest rate of 84% was observed in a study performed by Harirchi et al. (22) while the lowest rate of 52.5% was found in a study by Safarinejad et al (30). The lower rate of sexual dysfunction in Safarinejad et al may be attributed to the characteristics of the participants because the participants of this study were younger women at primary stages of cancer and only suffered from tumor removal surgery (lumpectomy) (30). In another study by Shandiz et al, age was the only effective factor for sexual dysfunction and sexual dysfunction increased by 0.16 for per unit increase in age (31). In addition, Chirani et al reported a similar result and showed that sexual function decreased with an increase in age (33).

The impact of surgical type on sexual dysfunction was similar to that of the Cortés-Flores study. In this study, the rates of radical mastectomy, conservative surgery, and radical mastectomy with breast reconstruction surgery were 63%, 14%, and 29%, respectively (37). However, Yektatab et al found no relationship between surgical type and sexual dysfunction (43).

In studies by Safarinejad et al and Sales et al (32), the rate of sexual dysfunction was 28.7% in the control group (30) and 52.4%. This shows that regardless of breast cancer, the rate of sexual dysfunction is relatively high among Iranian women, which is in agreement with the findings of Ebrahimi et al. (44).

FSFI Domains

In all 5 studies, the same scoring system was used for FSFI domains. This means that the sum of the scores in each domain was multiplied by the factor of that domain in order to obtain the score for each domain. Factor domain was 0.6 for desire, 0.3 for arousal and lubrication, and 0.4 for orgasm, satisfaction, and pain. Therefore, at least 2 and at most 36 scores were assigned to the total score of the domains and lower scores indicated further dysfunction in the domain. Based on this scoring method, the most dysfunction was observed in the desire phase in 4 out of 5 studies (80%). In the studies by Harirchi et al, Sales et al, Chirani et al, and Shandiz et al, these values were 2.8 ± 1.13 , 2.93 ± 1.03 , 3, 3, and 3.6 ± 0.85 , respectively. A similar result was observed in several other studies (39, 41, 45-47). Desire is regarded as one of the most important aspects of sexual function and is more affected by the quality of relationships rather than the effect of medication and treatment (22).

Qualitative studies of sexual life about experiences after breast cancer indicate that the quantity and quality of sexual relationship reduce after mastectomy. Losing a part of the breast, reducing or losing femininity, and reducing physical attraction as a result of losing one valuable bio-psycho-social component gradually put a person in a defective cycle and, ultimately, lead to sexual dysfunction (33). Only in one study, lubrication with a score of 2.8 was assigned the lowest score (30). Differences in subgroup scores of FSFI may be related to the bio-psycho-social nature of human sexuality.

Limitations

Several tools are used to evaluate the sexual function in cancer patients. We just included studies that used FSFI for assessing sexual function, which is considered as one of the limitations of the current study. Although this is an instrument that is widely used to measure sexual function and its Persian version is available, it is not particularly designed for cancer patients. Therefore, it may not be able to fully evaluate the sexual function of these individuals. A structured interview and an accurate history are necessary to be added to the studies. Further, because of various factors affecting sexual dysfunction, it is suggested that further studies consider different subgroups such as patients' age group, the stage of the disease, and the type of treatment in order to reach more homogeneity.

Conclusions

This study was a literature review about evaluating sexual function in breast cancer survivors which increased our understanding of the experiences of breast cancer patients. Based on the result, breast cancer survivors had low FSFI scores and many of them were suffering from sexual dysfunction. Sexual concerns of the patients are often neglected as well. Based on a bio-psycho-social view, a multidisciplinary team is needed to work together for

addressing the sexual concerns in breast cancer patients. Furthermore, it is highly recommended to evaluate and compare sexual function in various age groups, at different stages, and treatment types. Identifying the best instrument for evaluating sexual function in breast cancer patients helps to find better solutions for this problem and enables patients to enter their new sexual life after surviving breast cancer.

Conflict of Interests

All authors declared that they have no conflict of interests in this article.

Ethical Issues

This article was part of a dissertation project approved by the Research Council affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran (under the ethics code of IR.SBMU.PHNM.1395.496, dated 24 October 2016).

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