ISSN- 2581-575X

Indian Journal of Health, Sexuality and Culture

REVIEW ARTICLE

The Impact of Breast Cancer Treatment on Body Image, Sexual Function, and Fertility: A Narrative Review (*The Hidden Morbidity*)

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Abstract

Breast cancer is the most common malignancy among women, accounting for 26% of all cancers and 10.7% of cancer-related mortality. Advances in diagnosis and therapy have significantly improved survival, especially among women of reproductive age, shifting the focus toward survivorship and quality of life. Sexual health, a vital yet often neglected domain, is profoundly influenced by the disease and its treatment. This narrative review explores the multifaceted impact of breast cancer and its therapies on sexuality, body image, psychosocial well-being, and fertility, emphasizing implications for comprehensive survivorship care. A narrative review of the published literature was conducted using databases such as PubMed, Scopus, and Embase. Studies addressing the psychosocial, sexual, and reproductive consequences of breast cancer and its treatments were included, with emphasis on adult and reproductive-age women. Breast cancer and its treatments, like surgery, chemotherapy, radiotherapy, and endocrine therapy, exert complex biological and psychosocial effects leading to sexual dysfunction, altered body image, and psychological distress. These issues are compounded by premature menopause, fatigue, and fertility loss. Younger women, in particular, face significant challenges related to intimacy, femininity, and motherhood. Positive post-traumatic growth, however, may occur with adequate emotional support and adaptive coping mechanisms. Sexuality in breast cancer survivors is influenced by intertwined biological, psychological, social, and cultural factors. Integrating sexual health assessment and counseling into routine oncologic care is crucial to promote holistic recovery and improve the quality of survivorship among women with breast cancer.

ARTICLE INFO

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Dates:

Received: 22-02-2026
Accepted: 15-05-2026
Published: 30-06-2026

Keywords:

Breast cancer, Sexuality, Body image, Psychosocial impact, Survivorship, Fertility

How to Cite:

Raam M, Rahalkar A, Godi P, Singh KR, Ramakant P, Mishra AK. The Impact of Breast Cancer Treatment on Body Image, Sexual Function, and Fertility: A Narrative Review (The Hidden Morbidity). Indian Journal of Health, Sexuality and Culture. 2026;12(1): 15-21.

***DOI:** 10.21590/ijhsc.12.01.04*

Introduction

Breast cancer is the leading cause of cancer amongst women (26%) and the highest contributor to mortality (10.7%). With an incidence of 1,92,020 and a 5-year prevalence of 5,26,248, it is a major public health burden in our country.[1] While the incidence of breast cancer has increased from 42 to 84 per 1 lakh population over the past years, the advent of effective systemic and targeted

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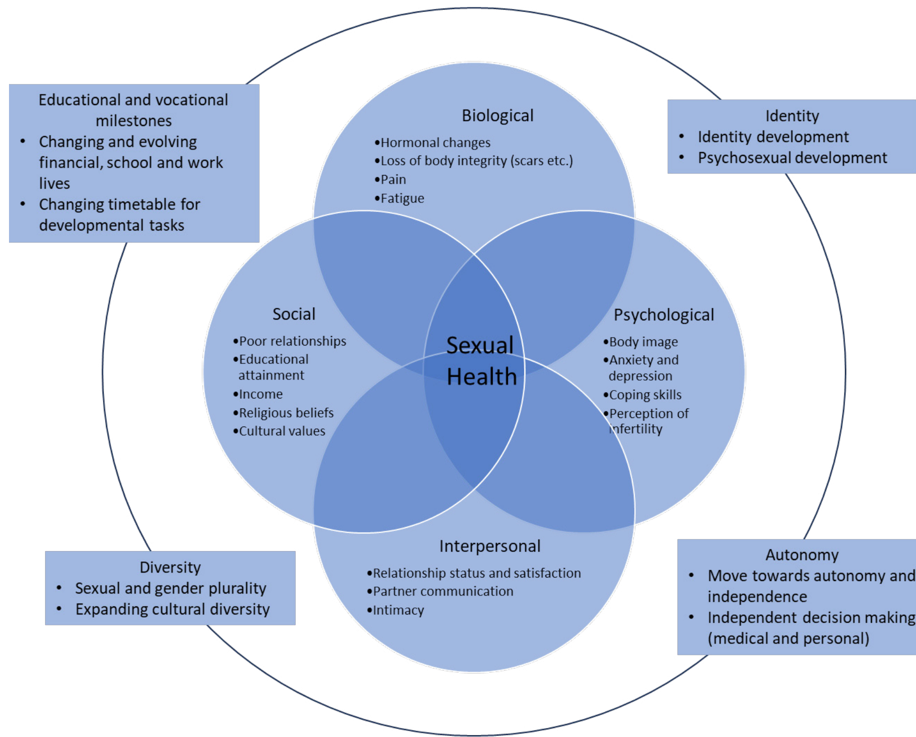

Figure 1: Developmental and biopsychosocial factors influencing sexual health among adolescents and young adults with cancer

therapy has consistently reduced the mortality over the past 10 years, leading to an increased number of survivors. It is predicted that there will be a 78% increase in breast cancer incidence over the next 30 years, thereby making survival not an exception but rather a norm.[2]

Among the different age groups, the reproductive age group (15–49 years) accounts for the second-highest incidence (26.1%) and mortality (20.2%).[3] This time period in a woman's life is considered a crucial period as it is not only the part of her life where they are most productive economically but also because they go through various important events and phases in life such as establishing relationships, marriage and most importantly motherhood, which is a cornerstone of emotional development and social stability with varied emotional, psychological, biological, and social dimensions.

In this context of a disease that is reaching epidemic proportions and improving survival due to advanced therapy, the impact of breast cancer on the various domains of sexuality, especially in the reproductive age group, is an important facet of survivorship (Figure 1).[4] This review aims to elucidate the multiple aspects of the disease, its treatment, and their impact on psychosocial and sexual health domains.

Methods

This narrative review explores the multifaceted impact of breast cancer and its therapies on sexuality, body image, psychosocial well-being, and fertility, emphasizing implications for comprehensive survivorship care. A review of the published literature was conducted using databases such as PubMed, Scopus, and Embase. Studies addressing the psychosocial, sexual, and reproductive consequences of breast cancer and its treatments were included, with emphasis on adult and reproductive-age women. Studies were reviewed using MeSH terms "breast cancer" and "sexuality". A total of 2,060 studies were conducted in the last 10 years. After excluding duplicate studies, 1087 studies were available. Exclusion criteria were publications in languages other than English, case reports and series, and studies where

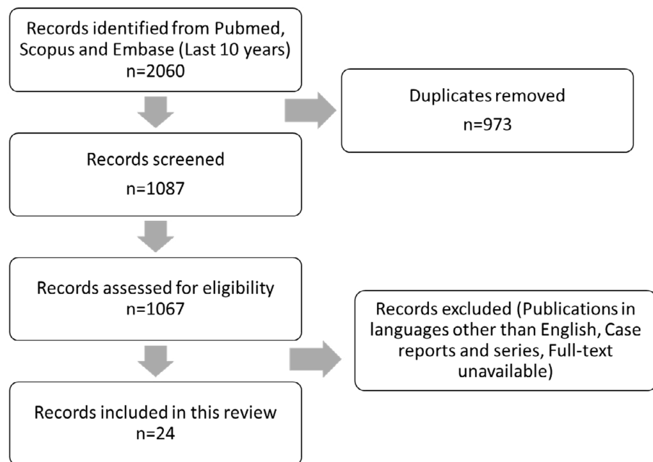

Figure 2: Flow chart for studies included in review

the full-text was not available. After screening 1067 records, 24 studies were included for this review as depicted in the flowchart (Figure 2).

Results

Breast cancer and its treatment were associated with significant disturbances in body image, sexual function, and fertility-related concerns. Body image scores were lowered by changes in breast appearance brought on by the tumor itself, surgery, radiation, and reconstruction operations; the impairment was worse with more extensive surgical procedures. Treatment-related side effects as baldness, weight fluctuations, skin changes, lymphedema, and sensory loss exacerbated dissatisfaction with physical appearance and self-perception.

Sexual dysfunction was very common throughout the course of treatment. Sexual desire, arousal, lubrication, orgasm, and general satisfaction all showed declines, especially after endocrine therapy and chemotherapy. Sexual functioning was strongly impacted by hormonal changes that resulted in weariness, vulvovaginal atrophy, dyspareunia, and early menopause. Autonomic dysfunction, musculoskeletal complaints, and neurophysiological alterations also caused impaired sexual response. Psychological distress, including depression and anxiety, further mediated reduced sexual satisfaction and intimacy.

Among women of reproductive age, fertility issues have become a significant survivorship concern. Reduced reproductive potential and ovarian suppression were linked to endocrine and chemotherapy treatments. Emotional burden was exacerbated and sexuality and general quality of life were adversely affected by the expected or actual loss of fertility, dread of recurrence, and societal expectations around parenting.

Overall, both physical and psychosocial domains were substantially affected across studies, highlighting the multi-dimensional impact of breast cancer and its treatment on women's identity, intimacy, and reproductive health.

Discussion

Breast Cancer and its Impact on Body Image

Body image is an amalgamation of self-perception, attitudes, and emotions about one's own body.[5] Breast cancer significantly impacts body image, not only due to the presence of the disease but also due to the effects of treatment. Breasts are a symbol of femininity and form an important part of a woman's personality.[6] Over and beyond form and shape, they are vital organs that enable the nourishment of the young, a characteristic that is unique to this class of living beings, which are hence called "mammals.[7]" The effect of breast cancer on self-perception of body image influences self-confidence, resulting in low morale, difficulty in maintaining healthy relationships with partners, as well as issues with sexual intimacy.

The presence of any lump, especially cancerous, results in an alteration of the shape and size of the breast, apart from adding to the burden, other symptoms such as breast pain or nipple discharge. In developing countries, the proportion of women who present with locally advanced disease is much higher than that of early breast cancer.[8] These women often present with involvement of the skin leading to ulceration, puckering, redness, involvement of the chest wall, leading to pain, or may present with heavy lymph nodal burden in the axilla, causing pain, restriction of shoulder movement, and arm lymphedema. Disruption of the body image is distressing to the patient, resulting in anxiety,

depression, and low self-esteem that is caused by the change in physical appearance.

Surgery for breast cancer is often the culprit in the disintegration of body image for a person diagnosed with breast cancer. Anderson *et al* showed that more extensive surgery resulted in a reduction in body image scores (Mastectomy 68% *vs* lumpectomy 34%).[9] Thakur *et al*, reported higher body image disturbance in patients who underwent mastectomy, irrespective of age, menopausal status, presence of anxiety, depression, or stress, thus denoting that the body image disturbance transcends the traditional belief that only young patients are concerned with body image.[10]

Apart from surgery, radiotherapy results in thickening of the skin, changes in shape, consistency, and size of the breast. Studies have shown a deterioration in body image scores following initiation of radiotherapy, which worsened with time.[11-13] Chemotherapy causes unpleasant side effects such as nausea, vomiting, alopecia, weight fluctuations, loss of appetite and taste, peripheral neuropathy, etc., which result in poorer body image scores. The body image scores, however, tend to improve with time, once the side effects of chemotherapy diminish.[11]

Breast Cancer and its Impact on Sexual Health

Sexual function is an intricate process that is altered by biological, psychosocial, and socio-cultural factors that may promote or inhibit sexual response. The components of the sexual response system include desire, arousal and orgasm. Desire (libido) is influenced by past sexual experiences, sex education, personal beliefs, relationships, and the physical and psychological health of the patient. Arousal is a congestion of the nipple areolar complex or genitalia. that occurs in response to sexual stimulation or desire, eventually resulting in orgasm, a rhythmic contracture of the pelvic musculature.

Sexual dysfunction is highly prevalent amongst women with breast cancer, ranging from 17.5% at the time of diagnosis to as high as 86%, 6 months after initiation of hormonal therapy.[14] This is often affected by a host of factors. Older age, menopausal status, previous sexual issues, low body image, breast cancer treatment such as hormonal therapy, severe musculoskeletal pain, obesity and other comorbid conditions such as diabetes mellitus, coronary artery disease, etc. can be significantly detrimental to a woman's sexual health.[15]

As mentioned earlier, surgery for breast cancer not only results in body image disturbances due to reduced volume of breast, asymmetry, fat necrosis, seroma, but also may result in loss of sensation of the nipple, breast, causing diminished arousal, or may result in lymphedema. Hyperaesthesia or dysaesthesia of the chest wall is also known to accentuate the inability to feel pleasurable sensations.[16] Breast conservation surgery was associated with less disturbance in sensuality and sexual function as compared to mastectomy.[17,18] Preservation of nipple in nipple sparing mastectomy, as well as nipple areolar reconstruction, was associated with lesser impairment of arousal.[19]

Administration of cytotoxic chemotherapy results in chemotherapy-induced premature menopause and ovarian insufficiency. This causes damage to blood vessels and ovarian cortical damage resulting in follicular atresia, apoptosis and depletion.[20] Both these events result in reduced estrogen levels, which lead to vulvovaginal atrophy in ~60% of postmenopausal women and 40% of younger breast cancer patients.[21] leading to dryness, loss of vaginal elasticity and dyspareunia. Reduced androgen levels are also found to be associated with sexual dysfunction, as testosterone is a main modulator of arousal and is associated with nitric oxide-induced congestion of the ciliary body.[22] Thus, both androgens and estrogen are involved in various functions such as increased elastin and collagen, elasticity, prevention of epithelial thinning and proper urogenital function. Some agents, such as taxanes, can result in central and peripheral neuropathy, altered genital sensation, tingling, numbness and inability to achieve orgasm. Involvement of the autonomic nervous system can result in bladder and bowel incontinence, making sexual activity distressing for the woman. Body image disturbances due to alopecia, weight fluctuation, pain, depression and anxiety, neuropsychiatric issues such as fatigue, neuropathy, pelvic floor dysfunction, and autonomic dysfunction, result in diminished sexual drive and desire. High levels of cytokines from chemothera-

py-induced tissue damage and low estrogen levels bring about depressive affect, whilst also affecting the frontal neural networks that are associated with sexual arousal.[23] Thus, both physical and psychological domains are affected by the administration of chemotherapy.

Radiotherapy may also result in premature menopause or loss of nipple sensation, fatigue, edema of the breast, skin changes, and undesirable hyperpigmentation of the skin. Chronic effects include pneumonitis, lymphedema, hypothyroidism, cardiac toxicity, and altered cosmetic outcome of breast reconstruction.

Endocrine therapy, which is often continued for up to 10 years, results in significant hormonal changes. Ovarian suppression results in early menopause, vaginal dryness, hot flashes, dyspareunia, myalgia, weight gain, and sleep disturbances. Tamoxifen, a selective estrogen receptor modulator (SERM), can cause hot flashes, endometrial cancer, and polyps, whereas aromatase inhibitors result in deterioration of bone health, leading to osteoporosis. They also cause musculoskeletal pain, hot flashes, fatigue, and vaginal dryness.[24,25] Though Aromatase inhibitors are associated with a superior benefit as compared to SERMs, they have been associated with worse sexual dysfunction.[26]

An analysis of the various domains of sexual dysfunction revealed a significant deterioration of sexual dysfunction scores following treatment. Sexual desire scores deteriorated, ranging from 14.5% following surgery to 79% before hormonal therapy. Sexual arousal was affected in 8.2% before diagnosis, up to 72.1% following completion of treatment. Lubrication issues were found to exist in 2.2% before diagnosis, up to 59%, 6 months after hormonal therapy. Dyspareunia was reported to range from 3% pre-diagnosis to 41.9% after treatment, whereas orgasm disorder was found in 4.8% before diagnosis to 51.2% after treatment. These factors were associated significantly with chemotherapy-induced amenorrhea, with no effect due to age, marital status, current hormonal therapy, type of surgery, depression, time since diagnosis, previous gonadotropin-releasing hormone (GnRH) treatment or comorbidities.[14]

Reduced sexual satisfaction was reported in 4.1% before diagnosis to 27% after 6 months of hormonal therapy. This was impacted by emotional closeness to partner, depression, breast conservation surgery, days lost due to disability, menopausal symptoms, mood disorder and chemotherapy-induced amenorrhea.[14]

It is not only the presence of physical changes due to disease or its treatment that causes issues with sexual health, but also its psychosocial impact. Starting from the presence of a breast lump, all the way through diagnosis and treatment of breast cancer, there exists a significant psychological burden amongst young women. In a systematic review and meta-analysis by Tang *et al*, the prevalence of psychological distress amongst women with breast cancer ranged from 27% to 63%, with a higher proportion in developing countries (53%). Younger age group, unmarried status, number of children, previous psychological issues, short time since diagnosis or completion of treatment, presence of metastases, chemotherapy, surgery, and poor emotional and social support were found to be significant factors that correlated with psychological distress.[27] Psychological distress thus leads to reduced sexual arousal and satisfaction, resulting in poor sexual health.

Breast Cancer and its Impact on Fertility

Motherhood is an important part of a woman's life. A woman's desire to have children is influenced by a host of socio-cultural and economic factors.[28] With a high proportion of breast cancer being diagnosed in women of reproductive age, onco-fertility has emerged as an important aspect of survivorship.[29,30] On one hand, while the majority of the young women diagnosed with breast cancer desire spontaneous conception, various therapies for breast cancer, such as chemotherapy and endocrine therapy, cause acute and chronic detrimental effects on fertility due to the suppression of ovarian function.[31] The emotional and psychological burden of potential infertility, burden of disease, fear of recurrence, partner and societal expectations with respect to child-bearing, leads to a significant negative effect on sexuality.[32]

Conclusion

While breast cancer has reached epidemic proportions, it is no longer a death sentence. More and more younger women are being diagnosed with breast cancer, which has placed a unique set of challenges on the caregiver. It is imperative to understand that it is not only the disease, but also its treatment that affects the psychosocial domain, body image, sexual health, and fertility. The sexuality and sexual health of breast cancer survivors are multi-dimensional. Social factors (peer relationships, education, income, religious and cultural beliefs), biological factors (hormonal changes, body image disturbance, pain, fatigue), psychological factors (anxiety, depression, fear of disease) and interpersonal factors (relationships, communication and intimacy) play a role in influencing the sexual health and hence need to be considered to ensure a wholesome quality of life after cancer diagnosis throughout their survivorship.

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