Body Image Concerns and Psychological Outcomes of Different Surgical Treatment of Breast Cancer

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Breast cancer stands as the second leading cause to cancer related fatalities in women. In the United States 1 in 8 women develop breast cancer in their lifetime. The average diagnosis age is 62 and it is considered rare to be diagnosed at age 45 or younger. However, depending on racial background it changes, for instance Triple Negative breast cancer (TNBC), shows higher incidence in younger women compared to other subtypes (Iacopetta et al., 2023). Most common current treatments for breast cancer are chemotherapy, radiotherapy and surgery. Patients undergoing these treatments show some physical side effects such as hair loss, mouth sores, fatigue, nausea, etc. (Centers for Disease Control and Prevention, 2023).

Beyond the physical implications of breast cancer, patients' mental well-being and their response to treatments are profoundly influenced by their stress levels. A significant proportion of breast cancer patients experience elevated stress levels during diagnosis and post-treatment phases. The primary contributor to this increased anxiety among breast cancer patients is a negative body image, which can lead to concerns such as reduced femininity and attractiveness. Patients who had mastectomy or invasive breast surgery show higher body image distress compared to patients who received non-invasive treatment (Chen et al., 2012). Previous study showed lower body image, physical attractiveness, and femininity among breast cancer survivors compared to pre-surgery/treatment. Data collected from different treatment recipients showed that almost 40% of the patients experienced stress in looking at their naked body. Those results also stated that there is a significant relationship between body image and stress, which leads to lower quality of life (Begovic-Juhant et al., 2012). Increased stress levels have a negative impact on overall quality of life and treatment response, ultimately leading to decreased survival rates among breast cancer patients.

This study reviews and analyzes previous studies on the psychological effects of different surgical treatments for breast cancer, specifically focusing on aspects related to body image and stress levels. It is postulated that patients who receive more extensive primary surgical treatment shows greater body image concerns and resulting in lower quality of life.

In this context, the background of breast cancer and current treatments and their side effects are given to have better understanding of the disease and how it affects the patients. The detailed process of analyzing selected studies is added in the Methodology section. In literature review, summary and result of selected studies are given to have a better foundation of this study. Presented outcomes are analyzed and discussed in Result section.

Background and Significance

Every year approximately 2.3 million women are diagnosed with breast cancer worldwide and 240,000 in the United States (Iacopetta et al., 2023). After skin cancer, it is the most common cancer, covering %30 of new cases, in female patients. Average diagnosed age is 62 in the U.S. which has slight changes in racial and ethnic groups. For instance, mean age for breast cancer diagnosis among Black women is 60 which is lower than White patients with a mean of 64. Black breast cancer patients have the highest mortality rate. Part of the reason of this is that Black women are in a higher risk group for Triple Negative Breast cancer, which is considered to be the most aggressive subtype due to its metastatic behavior (*Cancer Facts and Figures*, 2024). Stage of disease describes how much cancer cells spread throughout the body. The earliest stage of breast cancer, ductal carcinoma in situ, is stage 0, then it ranges from I to IV as cancer cells spread to other parts of the body.

Current treatment options for breast cancer are surgery, chemotherapy, radiotherapy, hormonal and biological therapies. Most of the time patients receive more than one type of therapy (Centers for Disease Control and Prevention, 2023). The treatment type and timing is determined by the stage of the cancer, patient's general health and preferences and clinician's medical recommendation (Rautalin et al., 2021). There are two main types of surgical treatment; mastectomy and breast conserving surgery, also known as lumpectomy. Mastectomy removes all breast tissue, which might include chest wall and lymph nodes depending on the stage of the cancer, whereas lumpectomy only removes the tumor while aiming to preserve most of the breast tissue (Abdallah Shams El-din et al., 2021).

At any stage of the cancer, patients' psychological well-being can be affected by age, type of treatment and physical side effects (Moreira et al., 2011). According to the National Comprehensive Cancer Network, almost half of the patients experience psychological and physical side effects related to cancer treatment. The change in the body's appearance (loss or conformity of breast, scars from surgery, alopecia,etc.) resulting from the treatment can cause distress due to body image concerns (Abdallah Shams El-din et al., 2021). The increased stress among the breast cancer patients doesn't merely affect their quality of life and mental health but also exerts an impact on their response to treatment. It is known that severe chronic stress negatively affects immune cell response in breast cancer patients. Elevated stress has a negative correlation with natural killer (NK) cell lysis and ability of NK cells. Patients with low NK cells have higher risk of infection, and prolonged disease (Andersen et al., 1998). Decreased immune response leads to lower survival rate among breast cancer patients.

This study is important to understand how patients' are affected by the treatment they receive to improve the studies on breast cancer. Understanding the psychological outcomes of

the current breast treatments can help to offer the best possible treatment regarding patients' medical and quality of life needs.

Methodology

Research criteria and strategies

Due to recruitment and time limitations, instead of conducting new research, previous studies on body image among breast cancer patients were reviewed and analyzed. Between August 2023 and April 2024, articles from 1987 to 2012 were gathered from databases including PubMed, Taylor and Francis, Oxford Academic, and Sciencedirect Elsevier. The key words were entered into the database such as "*breast cancer*", "*body image*", "*quality of life*", "*mastectomy*", "*lumpectomy*", "*body image distress*", "*breast cancer treatments*", "*psychological outcomes*". Articles assessed body image with at least mastectomy and lumpectomy experimental groups were selected. Articles were selected that were conducted in different countries and different timelines to have a broader study sample. Additionally, selected articles had conducted studies with patients with various stages of breast cancer (from early stage to stage III B).

Data Collection and Analyze

The goal of the study is to assess body image differences between different surgical methods among breast cancer patients. To narrow the focus group, the aim is to collect data only from patients undergoing mastectomy and lumpectomy. However, except two of the selected articles, most studies have additional experimental groups. To gather the data only from mastectomy and lumpectomy groups and avoid the overlaps with reconstruction groups following methods were conducted on selected articles.

In "*Short-Term and Long-Term Psychosocial Adjustment and Quality of Life in Women Undergoing Different Surgical Procedures for Breast Cancer"* (Parker et al.,2007), mastectomy with reconstruction groups was excluded. In "*Effects of Breast Cancer Surgery and Surgical Side Effects on Body Image Over Time*" (Collins et al., 2010), data from patients who had mastectomy with reconstruction excluded from final data however it is included in the Literature Review section to have a better understanding of patients' perspective on their body image. Same criteria is applied for "*Role of Breast Reconstructive Surgery in Physical and Emotional Outcomes Among Breast Cancer Survivors*" (Rowland et al., 2000). Data gathered from lumpectomy patients who also had radiation therapy and reconstruction groups were excluded from "*Depression and Body Image Following Mastectomy and Lumpectomy"* (Lasry et al., 1987) and "*Body Image in Women Treated for Breast Cancer*" (Mock, 1993), respectively. Finally, all experimental groups were included from "*Body Image and Its Predictors in Breast Cancer Patients Receiving Surgery*" (Chen et al., 2012) and "*Impact of Medical and Demographic Factors on Long-term Quality of Life and Body Image of Breast Cancer Patients*" (Härtl et al., 2003).

Data from body image surveys analyzed according to given explanation from the selected studies. For instance, in some studies higher score indicates poor body image while others indicate more positive body image. Analyses were made based on the mean scores, correlation coefficients (r) and p-values.

Literature Review

In "*Body Image and Its Predictors in Breast Cancer Patients Receiving Surgery*", Chun-Lan Chen et al. aimed to assess breast cancer patients' level of distress, anxiety, body image and disease impact, and identify the factors related with body image during postoperative time. The key argument is that patients who had mastectomy or invasive breast surgery show higher body image distress compared to patients who received non-invasive treatment.The study group consists of breast cancer patients who were newly diagnosed and treated with surgery at a medical center in northern Taiwan. From a total of 102 participants, mean age was 46.5 years, ranging between 28 and 71. 49% of the patients were at stage I and 51% were at stage II at the time of study. 41.2% of the subjects had lumpectomy and 58.8% were undergoing mastectomy. Authors used the Hospital Anxiety and Depression Scale (HADS) to measure patients' anxiety and depression levels. Higher scores indicate higher levels of anxiety and depression where the score range is 0-21. To assess the body image perceived by the patient, they used a 10-item Body Image Scale (BIS). Each item score ranged between 0 (not at all) to 3 (very much). Higher scores indicate greater body image concern. They also used 25-item Symptom Distress Scale – Modified for Breast Cancer (SDS-mbc), which measures postoperative distress, and the Impact of Event Scale (IES) to understand the effect of the disease and treatment on breast cancer patients. Results showed that 23.5% of the participants experienced clinical anxiety, while 16.7% experienced clinical depression. Additionally, 13.7% and 21.6% were classified as having borderline anxiety or depression, respectively. According to BIS results, mean (SD) body image score was 8.55 (3.08). After statistical analysis, Chen and collaborators found that mastectomy patients showed significantly higher body image concerns ($r=0.52$, $P < 0.001$) compared to others. They also also found significant positive correlation between anxiety, depression and

body image (at the $P < 0.001$ level). The study results showed that breast cancer patients' emotional state is negatively affected by the treatment. At the end, authors suggested longer term investigation since body image concerns can last several months after surgery.

In "*Effect of Breast Cancer Surgery and Surgical Side Effects on Body Image Over Time*", Karen K. Collins et al. investigated the body image differences over time between different treatment groups. Authors postulated that surgical effects are important to understanding the relationship between body image and surgery type. In this study they worked with 549 breast cancer patients from the midwest USA who had no prior history of cancer, already completed definitive surgery and did not get chemotherapy before the surgery. Approximately half of the participants were diagnosed with stage I, 33.5% with ductal carcinoma in situ, and 15.1% with stage II. Sixty five percent of the patients received lumpectomy (BCS), 12% had mastectomy alone and 23% had mastectomy with reconstruction surgery. Participants interviewed at 4 different time points, 4-6 weeks (T1), 6 months (T2), 12 months (T3) and 24 months (T4), after surgery. Collins and her colleagues used an 8-item body image questionnaire by using modified items from Cancer Rehabilitation Evaluation System (CARES). Each item scored between 1 (not at all) and 5 (all of the time) where higher total scores indicate higher body image concerns. To measure the anxiety and depression levels of the participants within a month and a week, respectively, the researchers used the 21-item Beck Anxiety Inventory and the 20-item CES-D. Authors found that higher body image concern was associated with younger age, higher depression and anxiety level, more surgical side effects and higher body mass index (BMI). Results demonstrated that body image

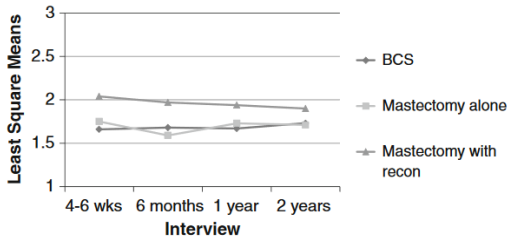

Figure 1 Least square means of body image problems over time by Collins et al.

concerns perceived by patients differed by the surgery they received but not by the stage of the disease. Mastectomy with reconstruction patients scored higher on body image survey compared to BCS patients at T1-T3 and to mastectomy only patients at T2. By the T4 there was no significant difference on body image scores between different treatment groups (Figure 1). Patients who received only mastectomy showed similar results with BCS patients at all time points. Authors suggested that outcomes of the different surgeries, including body image and quality of life, should be considered during the planning of the breast cancer treatment.

In "*Role of Breast Reconstructive Surgery in Physical and Emotional Outcomes Among Breast Cancer Survivors"*, Julia Rowland et al. studied the relationship between different surgical treatments and quality of life, body image, physical and sexual functioning. Participants were recruited from two metropolitan cities (LA & DC) in the USA. Eligibility criteria for the study was; diagnosed with breast cancer within 1-5 years, completed the treatment minimum 3 months prior the study, currently cancer free and had no psychiatric condition. The study involved a total of 1957 participants, with 57.18% undergoing lumpectomy, 26.11% undergoing mastectomy, and 16.71% receiving mastectomy followed by reconstruction surgery. Rowland et al. used the RAND 36-item Health Survey that measures health related quality of life from different aspects such as physical and social functioning, bodily pain, emotional well being, etc. CARES was used to analyze body image concerns where higher scores indicate greater dissatisfaction with one's physical appearance. To examine the relationship of depression on the outcomes they used 20-item CES-D with the same scoring criteria mentioned above. Authors

	Lumpectomy	Mastectomy with reconstruction	Mastectomy alone
CARES body image			
Mean (SD)‡	0.65 (0.92)	1.24 (1.25)	1.37 (1.32)
CI	0.59–0.70	1.11–1.38	1.25–1.48
Uncomfortable with changes in body, %§			
Not at all/a little	78.5	64.4	64.6
Fair amount to very much	21.5	35.6	35.4
CI	19.2–23.9	30.4–40.8	31.2–35.5
Don't feel sexually attractive, %§			
Not at all/a little	73.5	65.9	60.6
Fair amount to very much	26.5	34.1	39.4
CI	23.9–29.1	28.9–39.2	35.2–43.7

Figure 2 CARES body image scores by Rowland et al.

also used Medical Outcomes Study Social Support Survey, Revised Dyadic Adjustment Scale, and Watts Sexual Function Questionnaire to analyze characteristics of patients from different treatment groups. From health related quality life aspects there was no significant difference found between experimental groups. After statistical testing was performed, the lumpectomy group showed significantly lower body image concerns and less feelings of sexual attractiveness compared to others. On the body image scale, patients who had reconstruction surgery after mastectomy scored similar to mastectomy alone patients compared to lumpectomy group. Therefore authors stated that the benefit of reconstruction on body image was found lower than expected. Overall, this study demonstrated that lumpectomy patients had more positive outcomes compared to both mastectomy groups. Refer to Figure 2 for CARES body image mean scores for each group.

Jean-Claude M. Lasry and his colleagues examined psychological and social adjustment of breast cancer patients after primary surgical treatment in "*Depression and Body Image Following Mastectomy and Lumpectomy*". Inclusion criteria for the study 1) younger than 70 years old, 2) tumor size smaller than 4 cm, 3) with or without palpable axillary nodes and 4) no grave clinical signs. They recruited 123 patients (35.77% lumpectomy, 34.96% mastectomy and 35.77% lumpectomy with radiotherapy) from four Montreal (Canada) area hospitals. Average time since the patients received surgery was 41.3 months, where it ranges from 0 to 9 years. As previous researchers, Lasry et al. used CES-D scale to measure participants' self-reported depression level. Total scores range from 0 to 60 based on Likert type response. To measure body image

	Treatment groups		
	TM	LPR	LP
Body Image Index[1]	25.6	29.8	30.9
Satisfaction with breast appearance	3.75	4.54	5.19
Satisfaction with breast texture	4.19	4.87	5.14
Satisfaction with body appearance	3.67	4.47	4.34
Attractiveness of patient according to others	4.45	4.68	4.64
Attractiveness change due to operation	3.40	3.69	3.86
Description of scar (revolting–beautiful)	3.78	4.23	4.29
Fear of not being sexually attractive	2.60	3.75	4.23

Figure 3 Mean Body Image Index scores with subcategories by Lasry et al.

scores, they generated a 10-item questionnaire where higher scores indicate better body image. After reliability analysis, they excluded 3 questions from the Body Image index and used the remaining 7 questions. Results showed that all three treatment groups scored two times higher than normal population, where average score is 8, on CES-D scale. Forty one percent of the lumpectomy, 50% of lumpectomy with radiotherapy and 50% of mastectomy patients scored higher than 15 which is a cutoff score for clinical depression. Among three groups, patients who received lumpectomy with radiotherapy scored slightly higher on CES-D scale. Results demonstrated that mastectomy recipients are clearly affected by the type of treatment they had. They scored lower, indicating worse body image, on Body Image index compared to lumpectomy groups (Figure 3). When lumpectomy groups were compared, there was no significant difference on body image score. Authors stated that breast cancer patients were affected negatively by the more extensive surgical treatment.

"*Body Image in Women Treated for Breast Cancer*" by Victoria Mock compares perceived body image by breast cancer patients after surgery. In this study breast cancer patients who completed their treatment at least 2 months but no more than 2 years prior to study, had no recurrence, no major cognitive impairment and had no other disease that affect body image were selected. From a total of 257 participants, 35.02% received breast conservative surgery (a.k.a lumpectomy), 24.13% had mastectomy only, 22.57% underwent immediate reconstruction following the mastectomy, and 18.28% had delayed reconstruction surgery. Mock used 22-item BIS to measure participants' satisfaction with their body based on a 6-point Likert scale from "extremely dissatisfied" to "extremely satisfied. Higher scores indicate higher satisfaction with one's body. Addition to that, she used Tennessee Self-Concept Scale (TSCS) which consists of five major subscales; physical,moral-ethical, personal, family and social. The 18-item Physical-

Self subscale was used to measure body image where higher scores indicate better body image. To have more sensitive measurement, Mock also used Body Image Visual Analogue Scale (BIVAS) which measures the intensity of the participants' satisfaction with their body. BIVAS, which higher scores demonstrate better body image, was used as the primary focus in this study. Results showed significant differences in body image between surgical groups. Lumpectomy groups scored significantly higher on BIVAS, mean (SD) is 72.24 (19.34), compared to mastectomy groups, where mean (SD) scores are 60.72 (25.31), 63.57 (22.28) and 66.94 (20.85) for mastectomy only, immediate reconstruction and delayed reconstruction groups, respectively. Mock stated that lower scores on reconstruction groups might be related to prolonged healing process and look and feeling difference between reconstructed breast and healthy breast. Results also showed no significant differences in anxiety and depression levels between surgical groups.

In "*Impact of Medical and Demographic Factors on Long-term Quality of Life and Body Image of Breast Cancer Patients"*, K. Härtl et al. evaluate the impact of breast cancer and its treatment on cancer patients from various aspects such as long-term quality of life (QoL), body image, satisfaction with surgery and cosmetic results. They worked with patients from various stages (I-III) who had completed their primary surgical treatment and no recurrence. Total of 274 participants were recruited from a university hospital in Munich. One hundred seventy one (62.4%) patients had lumpectomy, while 103 (37.6%) received mastectomy. Authors used QLQ-C30 version 2.0 of European Organization for Research and Treatment of Cancer (EORTC) Study Group on Quality of Life to assess QoL with 5 functional subscales including physical, role, emotional, cognitive and social. Higher scores indicate better functioning therefore higher QoL. Additionally 6 items appended to QLQ-C30, for measuring body image, satisfaction with primary treatment, fear of recurrence and cosmetic results. Higher scores indicate negative body

image, less satisfaction with treatment, higher fear and higher satisfaction with cosmetic results. Participants took the survey after a mean time interval of 4.2 years postoperative. Mean age at the time of study was 60 (SD=11.6). Results demonstrated that patients who received lumpectomy showed significantly ($p<0.05$) more positive body image (mean=17.2, SD=21.6) compared to mastectomy group where mean (SD) score was 37.5 (28.0). Lumpectomy patients also showed higher satisfaction (mean=4.0, SD=15.6) with their treatment compared to mastectomy patients (mean=10.7, SD=25.3). Despite the body image and satisfaction with surgery scores, mastectomy patients showed less fear of recurrence. Authors found no statistical significance between surgical groups on QoL aspect.

In "*Short-Term and Long-Term Psychosocial Adjustment and Quality of Life in Women Undergoing Different Surgical Procedures for Breast Cancer"* by Patricia A. Parker et al. studied psychosocial and quality of life differences related with different treatments among breast cancer patients. They studied with 258 women with stage I or II breast cancer. From 258 participant 42.25 % had mastectomy with reconstruction, 17.44% underwent mastectomy only and 40.31% received breast conserving therapy (BCT). Authors used 20-item CES-D, the State Trait Anxiety Inventory (STAI) and the Sexual Activity Questionnaire to assess depression, anxiety and sexual functioning, respectively. To assess satisfaction with one's physical appearance they used the Multidimensional Body-Self-Relations Questionnaire – Appearance Evaluation (MBSRQ) and BIVAS. Items from both surveys rated

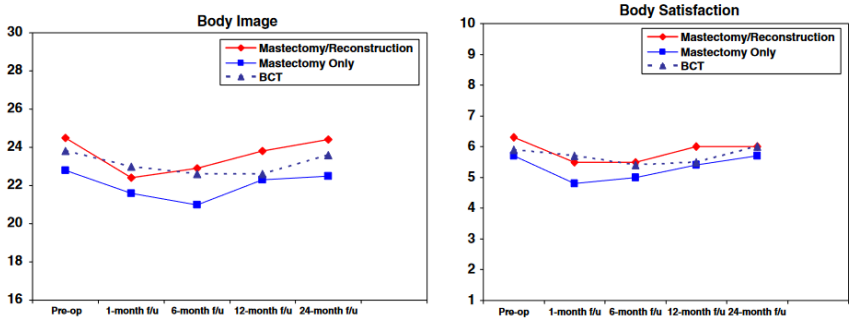

Figure 4 Body image and body satisfaction scores over time by Parker et al.

on Likert scale. High scores indicate greater satisfaction with one's body. Health related QoL was measured by the Medical Outcomes Study 36-item Short Form survey (SF-36). Participants interview at 5 different time points; preoperative and 1,6,12 and 24 months after surgery. Results after preoperative assessment showed that 26.4% of the patients scored above the clinical cutoff score, 16, on the CES-D. Depressive symptoms and anxiety levels at preoperative assessment did not differ between surgical groups. Average score on MBSRQ and overall body satisfaction were 23.9 and 6.0, respectively, before surgery, and no significant differences found between groups. Post hoc analysis showed that one month after the surgery BCT patients showed less decrease in body satisfaction compared to both mastectomy groups. However at the end of the study there was no significant difference between surgical groups. Overall, at the end of the study, 2 years after treatment, patients returned to baseline body image and body satisfaction scores in each surgical group (Figure 4).

Results and Discussion

After analyzing seven studies that explores psychological outcomes between different primary surgical treatments for breast cancer, following results are concluded.

Patients experience more negative body image as surgical treatment gets more extensive. When results from selected studies were analyzed all studies demonstrated that patients who received mastectomy showed more body image concerns compared to breast conserving, lumpectomy, patients. The study by Chen et al. showed that type of the surgery is correlated with body image distress with $r=0.52$ and $p<0.001$. The results from a study conducted by Parker et al. did not show statistically significant difference on body image scores between surgical groups, however BCT patients always scored higher, which indicates more positive body image, at all time points compared to mastectomy only patients. In "*Body Image in Women Treated for*

Breast Cancer" by Victoria Mock, body image scores showed statistically significant difference ($p<0.01$) between treatment groups where mastectomy patients showed higher body image concerns.

Anxiety and depression levels show positive correlation with poor body image. Studies conducted by Chen et al. and Collins et al. showed statistically significant correlations between anxiety and depression with body image, at levels of $p<0.001$ and $p<0.01$, respectively. In "*Short-Term and Long-Term Psychosocial Adjustment and Quality of Life in Women Undergoing Different Surgical Procedures for Breast Cancer*" by Parker et al. BCT patients showed more positive body image while they also scored lower on CES-D and STAI scales compared to the mastectomy only group. Furthermore, results from Lasry et al. support this argument by demonstrating more negative body image with mastectomy patients where half of the group scored higher than cutoff score for clinically depressive symptoms. Based on the explanations provided, it can be concluded that type of the treatment may affect breast cancer patients' anxiety and depression levels.

Younger breast cancer patients might experience greater body image distress caused by surgical treatments. Parker et al. found that age was significantly related ($p=0.03$) with how patients' satisfaction with their body. It is also found in "*Impact of Medical and Demographic Factors on Long-term Quality of Life and Body Image of Breast Cancer Patients"*, and "*Effect of Breast Cancer Surgery and Surgical Side Effects on Body Image Over Time*" that age is negatively correlated with poor body image. Chen et al. also found that young women showed more body distress where age is negatively correlated with body image with $r=-0.28$. The explanation of these findings might be that young patients are more aware of their bodies and have higher expectations on their physical appearance.

Additionally, studies showed that the stage of the disease at the time of diagnosis is related to body image (Collins, 2010 & Härtl, 2003). Study conducted by Collins et al. found that patients with stage II breast cancer showed poorer body image, mean=1.86, compared to stage I and ductal carcinoma in situ patients whose mean scores were 1.71 and 1.79, respectively. As the disease progresses, the success rate of treatment and survival rate decrease, while the patients experience more serious side effects. This situation can lead to a decrease in the patients' coping skills, resulting in more severe psychological side effects. As mentioned above, increased levels of anxiety and depression has a significant negative effect on the patients' body image. Therefore, an inverse relationship can be established between the stage of breast cancer and body image. In the same study, Collins et al. also found a positive correlation between the rate of physical side effects experienced by patients and poor body image ($r=0.370$, $p<0.01$). Another study conducted by Rowland et al. found that the mastectomy group, which showed a poorer body image, experienced more physical symptoms compared to the lumpectomy group. From these findings, it might be concluded that experiencing more physical pain leads to more anxiety and depression, therefore resulting in negative self-perception on one's body.

Body image is about how patients perceive themselves and their physical appearance. Therefore it can be affected by the patients' social environment, coping skills and how much they attribute a meaning to breast. With improving technologies, breast reconstruction surgeries can reduce the body image distress caused by breast cancer treatments. However it is still important to consider patients' concerns and psychological and physical outcomes of the offered therapies when planning a treatment for newly diagnosed patients.

Conclusion

In this study we examined the previous studies on body image concerns in women undergoing different surgical treatments for breast cancer. Studies conducted at different years on different sociodemographic populations and patients with various stages of breast cancer were selected to have broader study sample. Results collected from selected studies and analyzed in terms of body image scores. During the analysis, surveys conducted, the mean age of the participants, as well as anxiety and depression scores, were taken into consideration to have better understanding of their impact on body image scores. Results showed that 1) patients who receive mastectomy experience higher body image concerns compared to lumpectomy, breast conserving therapy, patients, 2) there is a significant relationship between anxiety levels and body image concerns, 3) younger patients are more negatively affected by the treatment they receive, 4) stage of the cancer and physical side effects of the treatment may have an impact on body image scores. Our findings suggest that considering psychological outcomes of the breast cancer treatment can improve the quality of life of the patients and their respond to the treatment. It is recommended that patients' psychological and physical needs be considered during treatment planning, along with the clinician's medical recommendations.

It is important to note that body image scores were measured by self-reported surveys with consented participants. The actual body image scores among breast cancer patients would likely be lower than the presented scores above, as there is a high chance that patients struggling with signficant anxiety and depression may not have accepted the study invitations.

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