



The Influence of the Surgical Treatment Method on the Quality of Life of Women With Breast Cancer

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ABSTRACT

Objective: Breast cancer is the most common malignant neoplasm among women in Poland. The primary treatment for breast cancer is surgery. The choice of surgical treatment method can significantly affect the quality of life of women with breast cancer.

Materials and Methods: Women treated surgically because of breast cancer were included. The quality of life was assessed by survey using the quality of life questionnaire (QLQ)-C30 and QLQ-BR23 (European Organization for the Research and Treatment of Cancer) questionnaires, taking into account the following factors: The method of surgery performed and comparing breast conserving therapy (BCT) with mastectomy, and breast reconstruction or the lack of it.

Results: The study included 243 subjects. Women had a reduced overall quality of life (53.88 points out of 100), in particular emotional (59.77) and sexual (17.49) functioning, and a poor body image assessment (61.57). Patients after BCT functioned better in physical ($p = 0.001$) and sexual ($p = 0.007$) terms, and also experienced lower pain intensity ($p = 0.003$) and shoulder discomfort ($p = 0.024$). The quality of life was significantly higher ($p = 0.003$) in the opinion of women who underwent breast reconstructive surgery.

Conclusion: The quality of life of women depends on the surgical treatment method used when treating breast cancer. For this reason, the choice of method, whenever possible, should promote breast protection or its postoperative reconstruction.

Keywords: Breast cancer; quality of life; mastectomy; conserving therapy; reconstruction

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Key Points

- Generally, women surgically treated for breast cancer had a reduced overall quality of life.
- A relatively higher declared quality of life was found in the group who underwent breast conserving therapy (BCT) as compared to patients who underwent mastectomy.
- After BCT, patients functioned better physically and sexually.
- A higher declared quality of life was also reported by patients who underwent breast reconstruction compared to the group who did not undergo reconstruction.
- In order to ensure the highest possible quality of life for women with breast cancer, the surgical method, whenever possible, should include breast protection or the possibility of reconstruction.

Introduction

Breast cancer is the most often diagnosed malignant neoplasm in women. Globally, there are over 2.2 million new cases diagnosed annually and almost 700 thousand deaths from this cancer (1, 2). In Poland, the number of new diagnoses of breast cancer increases year by year and currently it is the most frequently diagnosed cancer among women. This cancer is also the second most common cause of death in the female population. In 2020, 24,644 new cases of breast cancer

were confirmed, which accounted for 24.2% of all cancer diagnoses in women (2, 3). Despite significant progress in the diagnosis and treatment of breast cancer, it has a marked negative impact on the quality of life of affected women (4). Due to the increase in the number of cancer cases, as well as higher 5-year survival rates, which together result in an increasing number of women completing treatment, it is important to ensure the highest quality of life for these patients. Quality of life largely depends on clinical practice, for example the

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choice of therapy, and is increasingly important in the objective and subjective assessment of treatment outcomes (5, 6).

Surgery, the main task of which is to completely excise the tumour with a reserve of healthy tissues, is central in the treatment of breast cancer. It should be remembered that the methods of surgical treatment have evolved over time. With the development of biological and genetic laboratory techniques and imaging methods, there has been a shift from the use of extensive but tolerated surgery to minimally invasive surgery that is equally effective (7). Surgical treatment of the breast is considered to be very aggressive, causing fear and anxiety, mainly in terms of the aesthetic effects of the treatment, but also the uncertainty of effects in the context of the underlying disease. Patients fear disability, death, and also fear the breaking up of their family (8). Patients who have undergone radical surgical treatment may suffer from the “half woman/body complex” which can cause lowered self-esteem. They feel defective, have lowered self-esteem in terms of femininity and shaky self-esteem in the social dimension. Moreover, among women who have undergone surgical treatment, depression, problems in the sexual sphere and financial difficulties are observed as a consequence of the disease (9, 10).

Conducting research on the assessment of the quality of life after surgical treatment of breast cancer is particularly important because the results of such research may clearly indicate the need for individual adjustment of the therapeutic process, especially psychotherapy, to the real needs of women.

The objective of the study was to assess the influence of the surgical treatment used on the quality of life of women with breast cancer. The assessment takes into account the method of surgery, specifically mastectomy vs breast conserving therapy (BCT) and the performance or non-performance of breast reconstruction.

Materials and Methods

Data Collection Process

Studies to assess the quality of life were carried out among women diagnosed with breast cancer who had undergone surgery. All women were treated at the Podkarpackie Oncology Centre in Brzozów, Poland. The quality of life was assessed, taking into account surgical method (BCT vs. mastectomy) and whether or not breast reconstruction had been performed. Characteristics of the respondents taking into account the surgical treatment method is presented in Figure 1.

The inclusion criteria for the study were: Diagnosis of breast cancer; undergoing a stage of surgical treatment; and giving informed consent to participate in the study. The exclusion criteria were: non-breast cancer in the last 5 years; bilateral breast cancer; life expectancy less than half a year; age under 18 or over 75 years; and immediate breast reconstruction. All patients participating in the study were informed about the purpose of the research, guaranteed confidentiality and anonymity, and the voluntary nature of participation, as well as the possibility to withdraw from the study at any stage.

Methods

The research used a diagnostic survey method, and the research tools were a standardized questionnaire to measure the quality of life of women treated for breast cancer. These were the quality of life questionnaire (QLQ)-C30 and the QLQ-BR23 (breast cancer) module in the Polish version (11, 12). In order to obtain socio-demographic

and medical data, an original questionnaire was used. In Poland, the accuracy and reliability of the QLQ-C30 questionnaire and its version BR-23 were assessed, which confirmed the legitimacy of their use in assessing the quality of life of patients with breast cancer (12).

The QLQ-C30 questionnaire consists of five scales that assess the quality of life in terms of physical functioning, performing social roles, emotional, and cognitive and social functioning, as well as general assessment of health and quality of life. The QLQ-C30 questionnaire also includes scales assessing disease symptoms, such as fatigue, nausea and vomiting, and pain. In addition, this questionnaire contains six individual items (questions) also determining the intensity of symptoms - dyspnoea, insomnia, loss of appetite, constipation, diarrhoea, and financial problems resulting from the disease.

The European Organization for the Research and Treatment of Cancer (EORTC) QLQ-BR23 scale is a complementary module to QLQ-C30 and is dedicated to women with breast cancer. In the case of QLQ-BR23, body image, sexual functioning, sexual pleasure, perspective of the future and the following symptom scales are assessed: side effects of systemic treatment; breast-related ailments; shoulder-related ailments; and sadness/stress related to hair loss.

The research was approved by the Society for Quality of Life Research at the European Commission, based in Brussels, and the director of the Fr. B. Markiewicz’s Podkarpackie Oncological Centre in Brzozów. The project also received a positive opinion from the Bioethics Committee and was in line with the recommendations of the Helsinki Declaration.

Statistical Analysis

The results were statistically processed according to the EORTC guidelines. For each patient, the raw coefficient was calculated, and then a linear transformation was performed to obtain the value of the score. All scales range from 0 to 100. In the case of functional scales, the higher coefficient corresponds to a better (higher) level of functioning, while the higher the score for symptom scales and individual symptoms, the greater the symptom severity and the worse the patient feels.

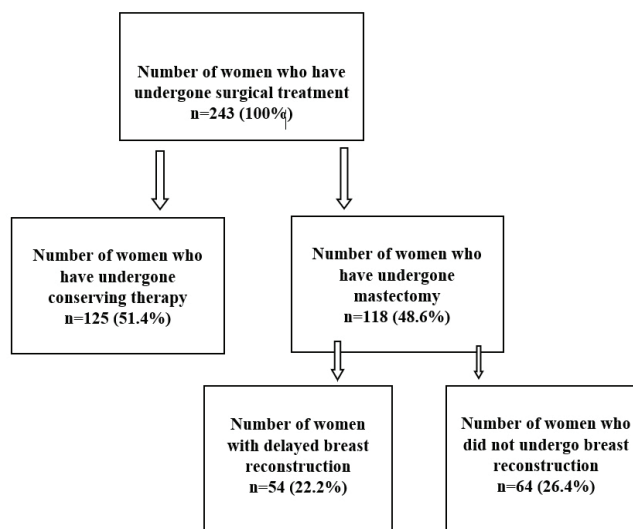


Figure 1. Characteristics of the respondents in the field of the surgical treatment method

The Statistica 10.0 program (StatSoft Inc., 2011) was used for statistical analysis (13). The consistency of the distribution of quantitative variables with the normal distribution was tested using the Shapiro–Wilk test. In the event of failure to meet the assumptions regarding the use of parametric methods, non-parametric methods were used to verify statistical hypotheses. The following non-parametric tests were used: Mann–Whitney U test, Kruskal–Wallis test (including Dunn’s Post–hoc test). The significance level was assumed to be $\alpha = 0.05$. The results were considered statistically significant when the calculated test probability p met the inequality $p < 0.05$.

Results

Study Participants

The mean \pm standard deviation (SD) age of the patients participating in the studies was 55.4 ± 13.7 years. The largest group consisted of patients aged over 60 to 75 ($n = 79$; 32.4%), while the smallest group were patients in the age group 20–30 ($n = 11$; 4.4%). Moreover, the proportion of patients in the age groups 31–40, 41–50, 51–60 was, respectively, 22.5% ($n = 54$), 24.6% ($n = 60$), and 16.1% ($n = 39$). The majority of the respondents lived in cities - 56.3% ($n = 137$), with the greatest number of women living in cities with up to 10,000 inhabitants (29.1%; $n = 71$) and cities with up to 50,000 inhabitants (16.6%; $n = 40$), and the smallest percentage were women living in cities with more than 50,000 inhabitants (10.6%, $n = 26$). Most of the women were married or in a partner relationship (68.1%, $n = 165$). The largest group of respondents had secondary education (38.2%; $n = 93$), slightly less women had higher education (35.3%; $n = 86$), and just over a quarter had basic vocational education (26.5%; $n = 64$). Information on socio-demographic data is presented in Table 1.

Table 1. Socio-demographic characteristics of the whole study group

| Variable | n | % |
|---|-----|------|
| Age group (years) | | |
| 20–30 | 11 | 4.4 |
| 31–40 | 54 | 22.5 |
| 41–50 | 60 | 24.6 |
| 51–60 | 39 | 16.1 |
| 61–75 | 79 | 32.4 |
| Place of residence | | |
| Village | 106 | 43.7 |
| City up to 10.000 inhabitants | 71 | 29.1 |
| City of more than 10.000 and less than 50.000 inhabitants | 40 | 16.6 |
| City with more than 50.000 inhabitants | 26 | 10.6 |
| Marital status | | |
| In relationship | 165 | 68.1 |
| Single | 78 | 31.9 |
| Education | | |
| Primary/vocational | 64 | 26.5 |
| Secondary | 93 | 38.2 |
| Tertiary | 86 | 35.3 |

The number of women who underwent BCT was 125 (51.4%), while the remaining women (48.6%; $n = 118$) underwent mastectomy. The study group was balanced in terms of systemic treatment - chemotherapy, radiotherapy and hormone therapy. All patients underwent the same type of axillary surgery, i.e. dissection of the axillary lymph nodes (Table 2).

General Quality of Life

The evaluation of individual functional scales QLQ-C30 showed that the participants had a reduced overall quality of life and health (mean = 53.88, median = 50.00, SD = 19.72). Physical functioning (mean = 74.86, median = 80.00, SD = 18.07), performing social roles (mean = 73.87, median = 66.67, SD = 22.89), cognitive (mean = 70.32, median = 66.67, SD = 25.52) and social (mean = 69.86, median = 66.67, SD = 28.69) functioning were rated the highest, and emotional functioning (mean = 59.77, median = 66.67, SD = 24.99) was rated the lowest. The women included in the study were significantly concerned about their futures (mean = 30.97, median = 33.33, SD = 33.86). It should be highlighted that in functional assessment, women rated sexual functioning the lowest (mean = 17.49, median = 0.00, SD = 23.56). The mean sexual satisfaction score of sexually active patients was 46.41 (median = 33.33, SD = 33.86). The mean value of the scale assessing patients’ body image was 61.57 (median = 66.67, SD = 32.95) (Figures 2, 3).

Quality of Life and Surgical Method

Significant differences were observed between patients who underwent BCT and mastectomy in terms of health and quality of life ($p = 0.002$) and physical functioning ($p = 0.001$). Patients who underwent BCT had a higher quality of life in these domains compared to women who underwent mastectomy. The majority of the women did not differ in terms of the intensity of symptoms resulting from the disease. The values of symptom scales in patients who underwent BCT were similar to the results achieved by women after mastectomy, with the exception of intensity of pain, which was reported to be higher in women after mastectomy (Table 3).

Significant differences were reported between the following subscales of the functional scales of the QLQ-BR23 questionnaire: Body image ($p = 0.003$), sexual functioning ($p = 0.007$) and sexual satisfaction ($p = 0.005$), and in the case of symptom scales, the differences concerned shoulder-related ailments ($p = 0.024$). Sexual functioning, sexual satisfaction and body image were rated higher by women who underwent BCT and lower by respondents who underwent mastectomy. Women who underwent mastectomy indicated a greater severity of shoulder-related ailments compared to the respondents after conserving therapy (means of 31.56 vs. 26.56, respectively). Detailed data is included in Table 4.

Quality of Life and Breast Reconstructive Surgery

The quality of life was higher in the opinion of women who underwent breast reconstruction compared to the group of respondents who did not undergo such surgery. A higher assessment of the quality of life was expressed by higher values of functional scales and symptom scales QLQ-C30 and BR23 (Tables 5 and 6). Women with breast cancer who did not undergo breast reconstruction assessed their health and quality of life lower, as well as their physical functioning, performing social roles, emotional functioning and social functioning. The decrease in the quality of life was influenced by the intensification of symptoms in the group of women who did not undergo breast reconstruction.

Table 2. Characteristics of the study group taking into account medical factors

| Treatment group | Breast-conserving surgery | | Total mastectomy without reconstruction | | Total mastectomy with reconstruction | |
|---|---------------------------|------|---|------|--------------------------------------|------|
| Variable | n | % | n | % | n | % |
| Systemic treatment | | | | | | |
| Chemiotherapy | 125 | 51.4 | 64 | 26.4 | 54 | 22.2 |
| Radiotherapy | 122 | 50.2 | 62 | 25.5 | 54 | 22.2 |
| Hormotherapy | 118 | 48.6 | 60 | 24.7 | 52 | 21.4 |
| Type of axillary surgery - axillary lymph node dissection | 125 | 51.4 | 64 | 26.4 | 54 | 22.2 |

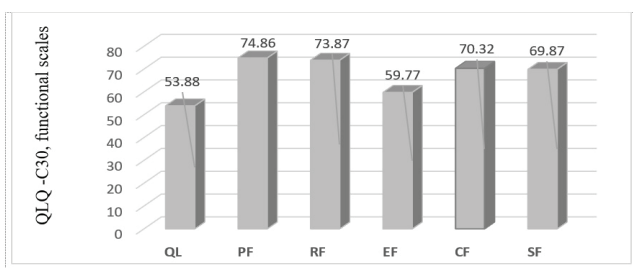


Figure 2. Assessment of women’s quality of life-categories related to QLQ-C30, functional scales 5QL – health status and quality of life

PF: physical functioning; RF: performing social roles; EF: emotinal functioning; CF: cognitive functioning; SF: social functioning

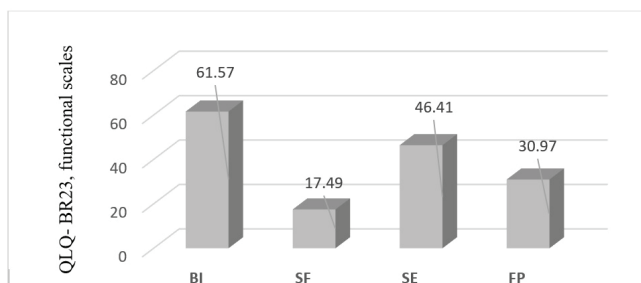


Figure 3. Assessment of women’s quality of life – categories related to QLQ-BR23, functional scales

(An image of your own body. SF: sexual function; SE: sexual satisfaction; FP: the prospect of the future)

These patients indicated a greater severity of symptoms, including fatigue, pain and loss of appetite. At the same time, the respondents emphasized the emergence of financial problems as a result of the disease. These differences were so large that they were statistically significant (Table 5).

The values of the functional and symptom scales of the QLQ-BR23 questionnaire also indicated a reduced assessment of the quality of life in the group of women not undergoing breast reconstructive surgery (Table 6). The respondents who underwent breast reconstructive surgery had a statistically significantly higher assessment of their body image compared to women who did not undergo breast reconstruction. Moreover, patients after reconstructive surgery rated their quality of sex life higher and, to a lesser extent, indicated side effects of systemic treatment, shoulder-related ailments and breast-related ailments were less severe.

Discussion and Conclusion

Surgery is of fundamental importance in the treatment of women diagnosed with breast cancer. The choice of the method, which may include BCT, mastectomy, mastectomy with simultaneous or delayed reconstruction, and removal of lymph nodes significantly determines the quality of life of patients. Breast cancer is a disease that particularly affects the emotional functioning of patients. On the one hand, it is a life-threatening disease, and on the other hand, it interferes with the psyche of women who are afraid of losing their femininity and sexuality (14). Therefore, the reasons for making decisions about breast reconstructive surgery primarily include the desire to maintain the current appearance and physical activity (15).

This study assessed the quality of life of women depending on the surgical method (conserving therapy *vs.* mastectomy). The results suggest that a significant problem for women after mastectomy is the low quality of life in the sexual sphere, and therefore the need for support for affected women, especially in this area. The results of the research conducted by Kowalczyk et al. (16) show greater disorders of sexual functions in women after mastectomy compared to patients after BCT, and our results are in agreement with this. According to Kowalczyk et al. (16) in this situation, the partner’s support and proper relationships are of particular importance, as they reduce the risk of deteriorating sexual functioning and low body image assessment. Similar studies were also conducted by Alicikus et al. (17) among Turkish women comparing selected aspects of women’s quality of life divided into patients after mastectomy and after conserving therapy. The group of women who underwent mastectomy more often reported a decrease in libido, which resulted in a reduction in their quality of life. Although in these studies, 80% of patients were satisfied with the overall appearance, only 54% of them accepted their naked body. In contrast, patients included in our study rated sexual functioning the lowest, which implies that both body sexuality and functioning in this area constitute a special problem for women who are surgically treated for breast cancer.

An important issue, physical rather than psychological, to which patients with breast cancer pay attention, involves shoulder-related ailments. We showed that women who underwent mastectomy reported greater ailments compared to the respondents after conserving therapy. Other authors also drew attention to the problem of upper limb ailments (18, 19). However, there is a lack of long-term follow-up, conducted several years after surgery, to assess the severity of these ailments and the possible transiency of the symptom. A small number

Table 3. Mean values of the QLQ-C30 scale and the surgical method

| QLQ | p | Surgical method | | | |
|----------------------------|-------|--------------------|-------|------------|-------|
| | | Conserving therapy | | Mastectomy | |
| | | M | SD | M | SD |
| QLQ-C30 | | | | | |
| Health and quality of life | 0.002 | 56.05 | 18.09 | 54.19 | 18.53 |
| Physical functioning | 0.001 | 77.32 | 16.50 | 74.78 | 16.72 |
| Performing social roles | ns | 71.84 | 23.75 | 72.95 | 20.03 |
| Emotional functioning | ns | 58.72 | 24.00 | 60.63 | 23.99 |
| Cognitive functioning | ns | 69.92 | 25.14 | 75.36 | 20.33 |
| Social functioning | ns | 68.97 | 28.77 | 72.22 | 24.86 |
| Fatigue | ns | 37.42 | 18.42 | 35.27 | 19.15 |
| Nausea/vomiting | ns | 34.48 | 38.11 | 35.99 | 36.89 |
| Pain | 0.003 | 21.46 | 17.22 | 25.91 | 18.19 |
| Dyspnoea | ns | 19.54 | 24.67 | 16.91 | 23.34 |
| Insomnia | ns | 38.70 | 27.32 | 37.20 | 27.73 |
| Loss of appetite | ns | 39.08 | 33.03 | 36.72 | 32.41 |
| Constipation | ns | 10.73 | 19.35 | 15.46 | 23.28 |
| Diarrhoea | ns | 9.58 | 16.00 | 8.69 | 14.75 |
| Financial problems | ns | 32.18 | 34.64 | 32.37 | 28.57 |

M: mean; SD: standard deviation; ns: not significant

Table 4. Mean values of the QLQ-BR23 scale and the surgical method

| QLQ BR-23 | p | Surgical method | | | |
|---------------------------|-------|--------------------|-------|------------|-------|
| | | Conserving therapy | | Mastectomy | |
| | | M | SD | M | SD |
| Body image | 0.003 | 58.97 | 32.22 | 52.70 | 32.85 |
| Sexual functioning | 0.007 | 24.90 | 26.15 | 13.53 | 20.47 |
| Sexual satisfaction | 0.005 | 47.59 | 27.74 | 44.46 | 24.22 |
| Perspective of the future | ns | 31.42 | 33.47 | 26.09 | 30.18 |
| Side effects of treatment | ns | 33.55 | 21.5 | 30.3 | 18.06 |
| Shoulder-related ailments | 0.024 | 26.56 | 20.15 | 31.56 | 18.24 |
| Breast-related ailments | ns | 27.49 | 17.75 | 23.55 | 19.7 |
| Hair loss | ns | 71.53 | 35.05 | 65.79 | 39.88 |

M: mean; SD: standard deviation; ns: not significant

of studies in this field have shown that five years after diagnosis, 38% of patients still experienced shoulder discomfort, significantly affecting their quality of life (20). In particular, these problems involve oedema and the limited range of motion of the upper limb.

In our study, a significantly higher quality of life was demonstrated in the group of women who underwent conserving therapy. This concerned, in particular, the scope of physical functioning, body image assessment, sexual functioning and satisfaction, as well as pain and

shoulder-related ailments. Similarly, the studies conducted by Akça et al. (21) showed that BCT has a more beneficial effect on overall health and quality of life, physical, cognitive and social functioning, and the severity of symptoms in women compared to mastectomy. Patients who underwent mastectomy had a lower quality of life compared to women after BCT. Similar results were obtained by Enien et al. (22), who reported that patients after BCT had a higher quality of life in terms of functioning. Moreover, women after mastectomy reported

Table 5. Mean values of the QLQ-C30 scale and breast reconstructive surgery

| QLQ-C30 | p | Breast reconstructive surgery | | | |
|----------------------------|-------|-------------------------------|-------|----------------|-------|
| | | No reconstruction | | Reconstruction | |
| | | Mean | SD | Mean | SD |
| Health and quality of life | 0.003 | 56.31 | 19.21 | 70.25 | 18.35 |
| Physical functioning | 0.007 | 68.56 | 18.26 | 82.36 | 19.04 |
| Performing social roles | 0.002 | 73.26 | 22.25 | 79.85 | 22.56 |
| Emotional functioning | 0.005 | 57.46 | 20.58 | 63.45 | 20.14 |
| Cognitive functioning | ns | 68.59 | 22.45 | 77.55 | 21.35 |
| Social functioning | 0.033 | 73.15 | 22.48 | 83.49 | 19.85 |
| Fatigue | 0.001 | 42.18 | 21.16 | 30.56 | 19.58 |
| Nausea/vomiting | ns | 42.38 | 22.58 | 38.59 | 19.65 |
| Pain | 0.002 | 31.25 | 20.81 | 21.55 | 19.55 |
| Dyspnoea | ns | 21.58 | 25.85 | 17.95 | 15.89 |
| Insomnia | ns | 42.59 | 22.77 | 38.66 | 25.18 |
| Loss of appetite | 0.00 | 45.89 | 25.48 | 31.24 | 22.48 |
| Constipation | ns | 15.89 | 22.15 | 14.58 | 20.38 |
| Diarrhoea | ns | 17.45 | 19.25 | 15.25 | 18.25 |
| Financial problems | 0.01 | 44.15 | 18.45 | 35.25 | 17.25 |

SD: standard deviation; ns: not significant

Table 6. Mean values of the QLQ-BR23 scale and breast reconstructive surgery

| QLQ-BR23 | p | Breast reconstructive surgery | | | |
|-------------------------------|-------|-------------------------------|-------|----------------|-------|
| | | No reconstruction | | Reconstruction | |
| | | Mean | SD | Mean | SD |
| Body image | 0.002 | 58.73 | 31.16 | 68.64 | 36.23 |
| Sexual functioning | 0.003 | 16.58 | 20.31 | 25.46 | 19.65 |
| Sexual satisfaction | ns | 42.86 | 20.15 | 45.13 | 21.3 |
| Perspective of the future | ns | 35.42 | 32.33 | 30.15 | 21.28 |
| Side effects of the treatment | 0.001 | 34.72 | 20.91 | 25.69 | 20.46 |
| Shoulder-related ailments | 0.002 | 26.52 | 15.23 | 20.51 | 18.48 |
| Breast-related ailments | 0.004 | 28.12 | 18.18 | 18.12 | 17.23 |
| Hair loss | ns | 65.24 | 36.48 | 68.18 | 35.25 |

SD: standard deviation; ns: not significant

more shoulder-related ailments. Similar conclusions can also be drawn from the study conducted by Arora et al. (23). These authors showed that patients who underwent mastectomy had worse social functioning compared to patients after tumorectomy and had a lower assessment of their own body image. It should be noted that in recent years there has been an increase in the number of mastectomies performed, and at the same time, as a result of increased awareness of women and the development of surgical and oncoplastic techniques, an increase in breast reconstructive procedures is also evident (24-26).

Women treated for breast cancer had a reduced overall quality of life. A relatively higher declared quality of life was observed in the group of patients who underwent BCT compared to patients who underwent mastectomy. Patients after BCT functioned better physically and sexually. Higher declared quality of life was also observed in the group of patients who underwent breast reconstruction compared to the group who did not undergo reconstruction. In order to ensure the highest possible quality of life for women with breast cancer, the surgical method, whenever possible, should include breast protection or the possibility of its reconstruction.

Ethics Committee Approval: The project also received a positive opinion from the Bioethics Committee and was in line with the recommendations of the Helsinki Declaration (approval number: 47/2016, date: 09.12.2016 - Wyszynski University Bioethics Committee).

Informed Consent: All patients gave informed consent before enrolment in this study.

Peer-review: externally peer-reviewed.

Authorship Contributions

Concept: M.K., A.F.; Design: M.K., A.F.; Data Collection or Processing: M.K., A.F.; Analysis or Interpretation: M.K., A.F.; Literature Search: M.K., A.F.; Writing: M.K., A.F.

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