

Occurrence of depression symptoms measured by the Beck Depression Inventory (BDI) in women after mastectomy and breast reconstruction with regard to the assessment of quality of life

Występowanie objawów depresji mierzonych skalą Becka u kobiet po mastektomii i po rekonstrukcji piersi w odniesieniu do oceny jakości życia

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Przegląd Menopauzalny 2013; 4: 293–299

Summary

Introduction: More women with less advanced breast cancer have been recently offered tumorectomy, and, if mastectomy is necessary, most women can benefit from breast reconstruction, reimbursed by the National Health Fund.

The aim of the study was to determine whether there are differences in the assessment of the depression intensification measured by the Beck Depression Inventory (BDI) among women after mastectomy and breast reconstruction in correlation with quality of life measured by EORTC QLQ-C30 and QLQ-BR23.

Material and methods: The research covered a group of 241 women from oncology hospitals in Lublin. 55.19% ($n = 133$) were women after mastectomy, while 44.81% ($n = 108$) were women after breast reconstruction. During the research, the following questionnaires were used: EORTC QLQ-C30 – to assess the quality of life of cancer patients, QLQ-BR23 – to assess the quality of life of women with breast cancer, and a screening questionnaire to assess the risk of depression, i.e. BDI. Statistical analyses were conducted based on STATISTICA 8.0 Program, assuming a significance level of $p < 0.05$.

Results: The research shows that breast reconstruction has a significant effect on the assessment of the quality of life of operated women and that, in this population, the depression symptoms measured by BDI occur less frequently.

Conclusions: Because of higher intensification of depression in women after mastectomy, they assess the quality of life lower than women after breast reconstruction.

Key words: breast cancer, mastectomy, breast reconstruction, quality of life, assessment of depression.

Streszczenie

Wstęp: Do niedawna u kobiet z rozpoznaniem rakiem piersi stosowano mastektomię, która okaleczała fizycznie kobietę i powodowała niekorzystne skutki psychiczne. Następnie pacjentkom oferowano protezy piersi. W ostatnim okresie coraz częściej kobietom przy mniej zaawansowanym nowotworze oferuje się tumorektomię, a gdy istnieje konieczność usunięcia piersi, większość kobiet może skorzystać z refundowanej przez NFZ rekonstrukcji piersi.

Cel pracy: Celem pracy było określenie, czy istnieją różnice w ocenie nasilenia objawów depresji mierzonej skalą Becka wśród kobiet po mastektomii i rekonstrukcji piersi w korelacji z ich jakością życia mierzoną skalą do oceny jakości życia kobiet z rakiem piersi – EORTC QLQ-C30 oraz QLQ-BR23.

Materiał i metody: Badaniem objęto grupę 241 kobiet ze szpitali onkologicznych Lublina. 55,19% ($n = 133$) stanowiły kobiety po mastektomii, natomiast 44,81% ($n = 108$) po rekonstrukcji piersi. W badaniach posłużono się

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kwestionariuszami do oceny jakości życia chorych na nowotwory złośliwe, to jest EORTC QLQ-C30 oraz osobnym kwestionariuszem (QLQ-BR23) do oceny jakości życia kobiet z rakiem piersi, jak również kwestionariuszem przesiewowym do oceny ryzyka wystąpienia depresji, tj. skalą Becka. Analizy statystyczne przeprowadzono z wykorzystaniem programu STATISTICA 8.0, przyjmując poziom istotności $p < 0,05$.

Wyniki: Z badań wynika, że rekonstrukcja piersi wpływa w znaczącym stopniu na ocenę jakości życia kobiet oraz że w tej populacji rzadziej występują objawy depresji mierzone skalą Becka (BDI).

Wnioski: Nasilenie depresji mierzone skalą Becka przekłada się na jakość życia kobiet. Większe nasilenie depresji u kobiet po mastektomii powoduje, że jakość życia oceniają one niżej niż kobiety po rekonstrukcji piersi, u których stwierdzono mniejsze nasilenie objawów depresji mierzone skalą Becka.

Słowa kluczowe: rak piersi, mastektomia, rekonstrukcja piersi, jakość życia, ocena nasilenia depresji.

Introduction

Breast cancer affects 1 out of 12 women in Poland and is the cause of 13% of deaths from cancer among women [1]. The diagnosis of cancer usually causes a sense of anxiety about the outcome of treatment and complications.

Breast cancer is a specific situation for women because it is associated not only with the fact that most women treat cancer as incurable disease but also with the need to undergo treatment which includes mastectomy and long-term systemic treatment including surgery, chemotherapy, radiotherapy, and hormone therapy [2]. More and more women do not have to undergo mastectomy and as a result use a breast prosthesis, but have the ability to have the breast reconstructed. As for malignant disease, it is important to treat it, but the quality of life is also crucial. To assess coping with cancer there are a number of tools constructed to assess the quality of life [3]. In recent literature, the most widely used questionnaire to assess malignant cancer patients' quality of life is EORTC QLQ-C30 (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-30). For women with breast cancer, a separate questionnaire (QLQ-BR23) was developed. The indispensable part of the assessment of quality of life is the assessment of mental health. To achieve this there are screening scales to register symptoms of depression, anxiety and PTSD (post-traumatic stress disorder). One of the most frequently used screening questionnaires to assess the risk of depression is the Beck's questionnaire. The aim of this study was to determine how mastectomy and breast reconstruction affect the psychological state and quality of life of women who underwent the above-mentioned surgeries.

Material and methods

In the paper, there was applied an assessment method with the use of numerical scale techniques with three tools: a research questionnaire EORTC QLQ-C30 (version 3.0) and EORTC QLQ-BR23 as well as the Beck Depression Inventory (BDI).

The scale of the EORTC QLQ-C30 is used to determine the quality of life of people suffering from cancer. It is an international, standardized research tool consisting of 5 functional scales, three symptomatic scales

and the scale to assess the overall quality of life (QoL) and six single points.

The EORTC QLQ-BR23 scale is used to determine the quality of life of women with breast cancer. It includes the following subscales: adverse symptoms of treatment, body image, sexual functioning, symptoms from the upper limb and from the breast and single points: the perspective of life, sexual satisfaction and stress associated with the loss of hair. The Beck Depression Inventory (BDI) is a self-assessment scale. It consists of 21 points evaluated on a 0 to 3 scale. This tool allows you to assess the strength of each depressive symptom such as lowered mood, anxiety, and fear, low self-esteem, loss of the ability to experience happiness, feeling of guilt, expectation of punishment, self-dislike, suicidal thoughts, tearfulness, feelings of anxiety and the loss of libido.

Statistical analyses were performed basing on the STATISTICA 8.0 program, assuming the significance level of $p < 0.05$.

The approval of the Ethical Committee of the Medical University was obtained to conduct testing and the approval of the management of units in which women were treated.

Results

The study group of 241 women come from the Lublin district. Among respondents, 55.19% ($n = 133$) were women after mastectomy, and 44.81% ($n = 108$) after breast reconstruction. The average time after the mastectomy was 4.13 ± 3.46 years, while the average time from the breast reconstruction to the study was 1.89 ± 1.25 years.

The research of women after mastectomy was conducted among members of Amazon associations in three towns of the Lublin district. The women after breast reconstruction were recruited from hospitals where these procedures were performed. They underwent a questionnaire survey procedure in the clinic at the check-up examinations and through the telephone survey after receiving the consent of patients to complete the study.

Among respondents after mastectomy surveyed by the Beck scale (BDI), 49.62% of the women did not suffer from depression, whereas 30.83% had mild depression, 13.53% moderate and 6.02% were diagnosed with

severe depression. Among respondents after breast reconstruction, the proportion of women without depression was significantly higher (87.04%), while those with mild depression accounted for 7.41% and with moderate depression 5.56%, and there were no women with severe depression ($p < 0.00001$).

The results are shown in Table I.

The presence of symptoms of depression measured by the Beck scale reflects the quality of life of women after mastectomy measured by the EORTC QLQ-C30. The precise information confirming such results is shown in Table II.

In a group of women after breast reconstruction there were significant differences between women without the symptoms of depression assessed by the Beck scale and having severe symptoms of depression according to the scale in all aspects except for social functioning.

The quality of life was higher among women with no depressive symptoms. The results obtained are presented in Table III.

Table I. Level of depression measured by the Beck scale in a group of women after mastectomy and breast reconstruction

Intensity of depression	Group after mastectomy		Group after breast reconstruction	
	<i>n</i>	%	<i>n</i>	%
No depression	66	49.62	94	87.04
Mild depression	41	30.83	8	7.41
Moderate depression	18	13.53	6	5.56
Severe depression	8	6.02	0	0.00
Statistical analysis: $\chi^2 = 38.95$; $p < 0.00001^*$				

Table II. Functioning of women after mastectomy in terms of functional scales and overall quality of life, taking into account the presence of depression measured by the Beck scale (BDI)

Assessment with EORTC QLQ-C30 scale	No depression (BDI)				Present symptoms of depression (BDI)				Statistical analysis
	Average	Trust -95.00%	Trust +95.00%	Standard deviation	Average	Trust -95.00%	Trust +95.00%	Standard deviation	
QoL	64.02	59.61	68.42	17.91	47.51	42.82	52.21	19.25	$Z = -4.44$ $p = 0.000009^*$
PF2	78.99	75.57	82.41	13.90	65.97	61.71	70.23	17.45	$Z = -4.33$ $p = 0.00002^*$
RF2	79.04	74.05	84.04	20.32	64.43	57.95	70.91	26.57	$Z = -3.14$ $p = 0.002^*$
EF	67.69	63.13	72.26	18.43	52.24	46.91	57.57	21.84	$Z = -4.39$ $p = 0.00001^*$

QoL – general quality of life, PF2 – physical functioning, RF2 – fulfilling social roles, EF – emotional functioning

Table III. Functioning of women after breast reconstruction in terms of physical functioning, fulfilling social roles, emotional functioning, social, cognitive function and the assessment of the overall quality of life, taking into account the presence of depression according to the BDI scale

Assessment with EORTC QLQ-C30	No depression (BDI)				Present symptoms of depression (BDI)				Statistical analysis
	Average	Trust -95.00%	Trust +95.00%	Standard deviation	Average	Trust -95.00%	Trust +95.00%	Standard deviation	
QoL	72.16	68.35	75.97	18.60	51.79	44.68	58.89	12.31	$Z = -3.76$ $p = 0.0002^*$
PF2	84.04	80.96	87.12	15.03	66.67	53.86	79.48	22.19	$Z = -2.83$ $p = 0.005^*$
RF2	86.88	82.38	91.38	21.98	66.67	52.05	81.29	25.32	$Z = -3.00$ $p = 0.003^*$
EF	72.87	69.30	76.45	17.45	46.43	31.97	60.89	25.05	$Z = -3.59$ $p = 0.0003^*$
CF	86.52	82.77	90.28	18.34	75.00	59.10	90.90	27.54	$Z = -1.66$ $p = 0.10$
SF	80.32	76.68	83.96	17.79	53.57	38.39	68.75	26.29	$Z = -3.60$ $p = 0.0003^*$

QoL – general quality of life, PF2 – physical functioning, RF2 – fulfilling social roles, EF – emotional functioning, CF – social functioning, SF – cognitive functioning

As a result of the statistical analysis, differences concerning breast problems in women after breast reconstruction were found between women with and without depression ($p = 0.08$). These problems are more pronounced in the group with symptoms of depression measured by the Beck scale (19.64 ± 17.79) as compared to women without depression symptoms (11.17 ± 13.75). In other instances, there were no statistically significant differences between the women questioned ($p > 0.05$). The results obtained are shown in Table V.

The study also shows that negative symptoms of treatment measured by the EORTC QLQ-BR23 scale to assess the quality of life of women with breast cancer were statistically more severe among patients after mastectomy who suffered from depression (33.90 ± 18.63) in comparison to the patients without depression symptoms (20.61 ± 14.09) ($p = 0.00003$). The body image was more satisfying for women without symptoms of depression measured by the Beck scale (28.03 ± 21.22 vs. 45.27 ± 26.80) ($p = 0.0001$). Sexual functioning as-

Table IV. Assessment of adverse symptoms of treatment, outlook for the future, body image, sexual functioning and sexual satisfaction among women after mastectomy, including the occurrence of depression

Assessment with EORTC QLQ-BR23	No depression (BDI)				Present symptoms of depression (BDI)				Statistical analysis
	Average	trust -95.00%	trust +95.00%	standard deviation	Average	trust -95.00%	trust +95.00%	standard deviation	
BRST Side effects of treatment	17.20	14.54	19.87	13.00	23.30	13.80	32.80	16.45	$Z = 1.35$ $p = 0.18$
BRBI Body image	25.68	20.84	30.52	23.63	36.31	22.36	50.26	24.15	$Z = 1.59$ $p = 0.11$
BRFU Outlook for the future	50.71	44.01	57.41	32.69	40.48	20.25	60.70	35.03	$Z = -0.97$ $p = 0.33$
BRSEF Sexual functioning	29.26	25.05	33.46	20.55	21.43	11.14	31.72	17.82	$Z = -1.22$ $p = 0.22$
BRSEE Sexual satisfaction	30.82	25.35	36.30	26.57	30.95	16.90	45.00	24.33	$Z = 0.05$ $p = 0.96$
BRAS Problems with the upper limb	19.62	15.77	23.48	18.82	26.19	9.38	43.00	29.11	$Z = 0.56$ $p = 0.57$
BRBS Problems with breast	11.17	8.35	13.99	13.75	19.64	9.37	29.91	17.79	$Z = 1.74$ $p = 0.08$

Table V. Evaluation of side effects of treatment, outlook for the future, body image, sexual function and sexual satisfaction among women after breast reconstruction including the occurrence of depression

Assessment with EORTC QLQ-BR23 scale	No depression				Present symptoms of depression				Statistical analysis
	Average	Trust -95.00%	Trust +95.00%	Standard deviation	Average	Trust -95.00%	Trust +95.00%	Standard deviation	
BRST Side effects of treatment	17.20	14.54	19.87	13.00	23.30	13.80	32.80	16.45	$Z = 1.35$ $p = 0.18$
BRBI Body image	25.68	20.84	30.52	23.63	36.31	22.36	50.26	24.15	$Z = 1.59$ $p = 0.11$
BRFU Outlook for the future	50.71	44.01	57.41	32.69	40.48	20.25	60.70	35.03	$Z = -0.97$ $p = 0.33$
BRSEF Sexual functioning	29.26	25.05	33.46	20.55	21.43	11.14	31.72	17.82	$Z = -1.22$ $p = 0.22$
BRSEE Sexual satisfaction	30.82	25.35	36.30	26.57	30.95	16.90	45.00	24.33	$Z = 0.05$ $p = 0.96$
BRAS Problems with the upper limb	19.62	15.77	23.48	18.82	26.19	9.38	43.00	29.11	$Z = 0.56$ $p = 0.57$
BRBS Problems with breast	11.17	8.35	13.99	13.75	19.64	9.37	29.91	17.79	$Z = 1.74$ $p = 0.08$

Table VI. Assessment of side effects of treatment, outlook for the future, body image, sexual function, sexual satisfaction, problems with the upper limb and breast among women after mastectomy taking into consideration the occurrence of depression measured by the Beck scale

Assessment with EORTC QLQ-BR23 scale	No depression				Present symptoms of depression				Statistical analysis
	Average	Trust -95.00%	Trust +95.00%	Standard deviation	Average	Trust -95.00%	Trust +95.00%	Standard deviation	
BRST Side effects of treatment	20.61	17.15	24.08	14.09	33.90	29.36	38.45	18.63	$Z = 4.21$ $p = 0.00003^*$
BRBI Body image	28.03	22.81	33.25	21.22	45.27	38.74	51.81	26.80	$Z = 3.85$ $p = 0.0001^*$
BRFU Outlook for the future	40.40	33.43	47.37	28.35	35.32	26.96	43.68	34.27	$Z = -1.17$ $p = 0.24$
BRSEF Sexual functioning	29.55	24.42	34.67	20.84	18.43	12.59	24.28	23.77	$Z = -3.05$ $p = 0.002^*$
BRSEE Sexual satisfaction	45.14	38.08	52.20	24.30	48.57	39.22	57.92	27.23	$Z = 0.59$ $p = 0.56$
BRAS Problems with the upper limb	27.10	20.82	33.39	25.57	42.45	35.85	49.06	27.07	$Z = 3.35$ $p = 0.0008^*$
BRBS Problems with breast	14.77	9.95	19.59	19.60	26.95	21.07	32.82	24.08	$Z = 3.37$ $p = 0.0008^*$

sessed by the EORTC QLQ-BR23 scale was assessed significantly higher by women without depressive symptoms (29.55 ± 20.84) in comparison to women with depression (18.43 ± 23.77) ($p = 0.001$). Also, symptoms of the upper limb occurred more often in a group of women with depression ($p = 0.0008$) and so did problems with breast ($p = 0.0007$). The results obtained are shown in Table VI.

As a result of the statistical significance analysis, there were some differences concerning breast problems in a group of women after breast reconstruction between women with and without depression measured by the Beck scale ($p = 0.08$). These problems were more severe in a group with symptoms of depression (19.64 ± 17.79) as compared to women without such symptoms (11.17 ± 13.75). In other aspects, there were no significant statistical differences between the two groups ($p > 0.05$).

Discussion

The diagnosis of cancer interferes with the functioning of each of the patient's domains: physical, psychological and social and causes a feeling of insecurity, fear and anxiety [4, 5].

This diagnosis is strongly associated with a feeling that life is threatened, uncertainty about the future, loss of control over their own lives, insufficient amount of information about the disease and treatment.

Cancer disrupts the functioning of the body, often changes the patient's appearance (effects of chemotherapy and radiotherapy), interferes with the functioning of

the family and social functioning, deteriorates the financial situation of the patient and his/her family [6, 7].

Breast cancer is not only a life-threatening disease but it also has an impact on the image of the female body and her sexuality [8-10].

In many cultures, the breast is associated with an aspect of female sexuality and motherhood [11].

The research conducted with EORTC QLQ-C30 and EORTC QLQ-BR23 questionnaires shows that the general quality of life (QoL) among women after breast reconstruction was significantly higher in comparison to those after mastectomy. The average score for women after mastectomy was 55.70 ± 20.29 , and for women after breast reconstruction 69.52 ± 19.14 ($p = 0.000001$).

Among the female respondents after mastectomy questioned by the Beck scale, 49.62% of women did not suffer from depression, whereas 30.83% had mild depression, 13.53% were assessed to have moderate depression and 6.02% severe depression.

The removal of the breast can lead to a reduced sense of femininity, lowered self-esteem and sexual interest and in some cases it leads to depression [12].

Psychiatric disorders such as anxiety and depression occur more frequently in patients suffering from cancerous diseases [13-15]. The disorders mentioned above usually appear before the diagnosis, and are present during and after treatment as it is not known whether the cancer will recur [16].

Among respondents after breast reconstruction, the rate of women without symptoms of depression measured by this scale was significantly higher

(87.04%), while those with symptoms of mild depression was 7.41%, 5.56% were diagnosed with moderate symptoms. There were no women diagnosed with severe depression ($p < 0.00001$).

In the research on the quality of life assessed by the EORTC QLQ-C30 and EORTC QLQ-BR23 scales, in women after reconstruction, there were significant differences among women without symptoms of depression assessed by the Beck scale and suffering from severe symptoms of depression according to the scale in all respects except for social functioning. The quality of life was assessed higher by women without depressive symptoms.

The research conducted among women after mastectomy shows that side effects of treatment measured by the EORTC QLQ-BR23 scale were significantly more severe in patients with symptoms of depression measured by the Beck scale (31.97 ± 18.86) compared to the patients without symptoms of depression (19.07 ± 13.69) ($p = 0.00004$).

The body image was assessed higher in women without symptoms of depression measured by the BDI (71.97 ± 21.22 vs. 54.73 ± 26.80) ($p = 0.0001$).

Problems with the upper limb measured by the EORTC QLQ-BR23 scale were more severe in women with depression ($p = 0.0008$). This included also complaints concerning the breast ($p = 0.001$).

Depression concerns about 6% of the population, however, the incidents of depression in hospitalized patients concern 22-24% of them, while in the case of cancer patients, it may concern 4.5% to 58% of patients.

The occurrence of depression in patients with a diagnosis of cancer can depend on the type of disease and disability level of the patient [17].

According to Piątek *et al.*, depression is one of the most common and important emotional problems among patients suffering from cancer. It occurs four times more often than in the general population [18].

According to Massie, the incidence of this disorder in a population of oncological patients varies between 11% and 50% [19].

According to Hagell *et al.*, there is a certain group of people among women treated for breast cancer with diagnosed mental illnesses, which include: episodes of depression, recurrent depression, anxiety or traumatic stress disorder [20]. Women in the first year after diagnosis are particularly exposed to the risk of mental disorders [21].

Recently much attention has been paid to the influence of breast reconstructive procedures on the improvement of women's quality of life, especially including the sexual sphere.

Several studies have proven that patients who underwent surgery and were offered the possibility of breast reconstruction, assess the quality of life better than patients after a more extensive surgery [22, 23]. Other studies showed that there was no difference in the general state of patients as well as in social activi-

ties, or in quality of life associated with the physical activity, but a group of patients without breast reconstruction performed after mastectomy assess their appearance significantly worse than groups after tumorectomy and breast reconstruction.

According to Arora *et al.*, women shortly after mastectomy perceived their image far worse and functioned worse in the social environment than patients after tumorectomy. In a subgroup analysis, women after breast reconstruction felt better than women after mastectomy without reconstruction or tumorectomy [24]. Rowland *et al.* compared, in terms of quality of life, groups of patients after mastectomy with reconstruction, mastectomy without reconstructing and conserving therapy. The group was observed at two time points – one year and five years after a surgery [25]. The study showed that the breast reconstruction and treatments of breast (less extensive than mastectomy) were performed more frequently among younger wealthy women, having a partner and at least high school education.

It was also noted that women after reconstruction frequently stated that the diagnosis of cancer had a negative impact on their sexual life.

Conclusions

1. Symptoms of depression measured by the Beck scale (BDI) occur significantly more often among women after mastectomy than breast reconstruction.
2. The presence of symptoms of depression measured by the Beck scale reflects the quality of women's lives measured by the EORTC QLQ-C30 and EORTC QLQ-BR23 scales. Women, who achieved higher scores in the evaluation of the quality of life, also achieve lower scores for the level of depression measured by the Beck scale.
3. It is important for women in Poland to undergo breast reconstruction because it helps them to function better in the mental sphere.
4. Due to the possibility of depression among women treated for breast cancer, they need to be provided with support by health professionals.

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