

Does the weight of an external breast prosthesis play an important role for women who undergone mastectomy?

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ABSTRACT

Aim: The aim of the study was an evaluation of daily functioning and activity in post-mastectomy women who use EBP, with particular focus on the weight of the prosthesis.

Background: There is a large group of breast cancer patients who need comprehensive care including professional help with EBP. Some researchers have reported the advantages and disadvantages of using EBPs in women who undergo mastectomy. Among the latter, dissatisfaction with the weight, comfort and movement of the prosthesis was identified.

Materials and methods: The study included 125 women who had undergone unilateral mastectomy. This was a survey with a self-constructed questionnaire which was administered to breast cancer women. In the second part, the author analyzed current objective studies about the implementation of EBP in body motion assessments.

Results: The analysis of the answers of the women studied showed that they used their first EBP about 6 months after mastectomy, and changed it every two years. The method of choosing EBP had a significant impact on satisfaction with EBP as well as on the prosthesis' weight. Patients who chose EBP themselves were more satisfied with it. There was no statistically significant correlation between the age of the women studied and their satisfaction with the EBP or its weight and size.

Conclusion: EBP plays an important role in the satisfaction with daily functioning and activity of breast cancer women who have undergone unilateral mastectomy despite the fact that the weight of EBP is not an important factor in an objective analysis of body motions in many studies in this group of patients.

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1. Background

Despite the fact that women after unilateral mastectomy undergo breast reconstruction immediately after the procedure or later on, a lot of breast cancer patients were and still are treated only by mastectomy. This situation depends on the stage of breast cancer. A considerable number of affected patients or surgeons who believe that mastectomy is safer than breast conservative treatment or reconstruction. There is a large group of breast cancer women who need comprehensive care including professional help with external breast prosthesis (EBP) and EBP bras. Some researchers have reported the advantages and disadvantages of using EBPs in women who have undergone mastectomy. Among the latter, dissatisfaction with the weight, comfort and movement of the prosthesis was identified. For example, Borghesan et al.¹ found that 56.6% of women treated with unilateral mastectomy were sat-

isfied with their EBP. However, some women reported pain and discomfort with EBP at the operated side. This group of patients should be more thoroughly observed in the aspect of daily functioning or quality of life and experience using EBP. In a study by Jetha et al.,² the authors indicated that using EBP is important not only for cosmetic purposes but also for body balance, improving socialization or increasing self-confidence. Thijs-Boer et al.³ suggested that this group of patients preferred an adhesive EBP over the conventional one as it was perceived to be a body part which stuck on the skin, as compared to a conventional EBP which continued to be external. In another study, Kubon et al.⁴ compared the preference of custom-made EBPs over conventional EBPs among post-mastectomy women in Canada. Although the quantitative part of their study showed no difference between custom-made EBPs over conventional EBPs, the qualitative part of the study reported more comfort and satisfaction with custom-made EBPs. Recent articles indicate that unilateral mastectomy to treat breast cancer can have deleterious effects on the posture and the musculoskeletal system such as an increased thoracic kyphosis and upper limb dys-

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functions, and a decrease of shoulder joint angles at the operated side,^{5,6} but other studies appear to contradict these statements.^{7,8}

The technique of surgery seems to make a difference after breast cancer treatment. Previous studies have shown that women who undergo one-side mastectomy alone, compared with women who undergo immediate breast reconstruction with abdominal flaps, show differences in the vertical alignment of the trunk, with greater asymmetry between the acromion and greater trochanter, which can cause trunk rotation.^{9–13} It is still unclear whether the weight of EBP affects the daily physical activity of women who undergo mastectomy.^{14,15} In another study, the authors reported a high cost of EBP and affordability was the main concern for breast cancer women after mastectomy.^{16,17} Since previous studies have shown that EBP is important in the medical and psychological care for many breast cancer patients, my study was an analysis of the influence of EBP on daily activity in post-mastectomy breast cancer women. In accordance with comprehensive oncological care, all aspects of patients' daily functioning are important for the onco-team. Therefore, this study will present an evaluation of daily functioning and activity in one-side post-mastectomy women who use EBP, as well as some practical findings.

In this study, I wanted to use a self-reported questionnaire to survey unilateral post-mastectomy women who had been fitted with EBP, focusing in particular on the aspects of their daily functioning and activity, and to answer the question whether the weight of EBP plays an important role for women who had undergone unilateral mastectomy.

2. Aim

The aim of the study was an evaluation of daily functioning and activity in post-mastectomy women who use EBP, with particular focus on the weight of the prosthesis.

3. Materials and methods

3.1. Design

This was an observational, clinical study. The study enrolled women with breast cancer who had undergone unilateral mastectomy and had been using EBP daily. The participants were recruited via a poster invitation in a daily rehabilitation ward in a local cancer center according to the study criteria between November 2018 and August 2019. The study was conducted in accordance with the Declaration of Helsinki. A self-constructed questionnaire was applied in the study. Participation in the study was anonymous and voluntary. All the participants were informed in detail about the research protocol and gave their informed consent to participate in the study.

3.2. Participants

Study participants met the following eligibility criteria: being female, having a history of breast surgery (modified radical mastectomy) minimum six months after the end of oncological treatment (surgical treatment, chemo- or radiotherapy) and being in otherwise good general health (Grade 0 or 1 of "Eastern Cooperative Oncology Group Performance Status"). Exclusion criteria for the study participation included quadrantectomies, neurologic diseases, cognition deficits, history of orthopedic problems, breast reconstruction, being engaged in activities that could cause posture asymmetries, musculoskeletal or cardiovascular disease that resulted in a decrease of physical fitness.

Table 1
Characteristics of the study group.

Characteristic No. = 125		Value
Age	Mean ± SD	59.3 ± 10.02
	Median	61
	Quartiles	54–66
Side of mastectomy	Left	62 (49.6%)
	Right	63 (50.4%)
Time since mastectomy (years)	Mean ± SD	5.08 ± 4.39
	Median	4
	Quartiles	2–7
Lymphedema	No	59 (47.2%)
	Yes	66 (52.8%)
Size of lymphedema*	Mean ± SD	1.95 ± 1.16
	Median	2
	Quartiles	1–2.75
Physical activity (per week)	Mean ± SD	4.29 ± 2.17
	Median	5
	Quartiles	2–7

* Only patients with lymphedema; SD – Standard Deviation.

3.3. Assessment

Patients were assessed using a self-constructed questionnaire and anthropological measurement. This was a pilot study to examine the attitudes toward and acceptance of EBP in women who had undergone one-side mastectomy. The questionnaire was pretested with 10 post-mastectomy women. The few remarks were analyzed, and the instrument was revised regarding its practicability, completeness of item formulation as well as comprehensibility. Semi-structured interviews were chosen for this purpose as they are considered a valid and consistent method of data collection in qualitative research.¹⁸

Participants were invited to fill in a self-constructed questionnaire which consisted of general questions about demographic data and special questions about measures in cancer rehabilitation such as time after mastectomy, additional oncological treatment (chemotherapy, radiotherapy, etc.), size of lymphedema, time when the women received their first EBP, and frequency of changing EBP (in years). Furthermore, questions were asked about possible and impossible performance of physical activity, and satisfaction with EBP (in terms of its weight, size).

3.4. Statistical analysis

Comparisons of qualitative variables in groups were conducted with the chi-squared test (with Yates' correction for 2 × 2 tables) or with Fisher's exact test (when low expected values occurred). Comparisons of quantitative variables in two groups were conducted with the Mann–Whitney test. Comparisons of quantitative variables in more than two groups were conducted with the Kruskal–Wallis test. Correlations between quantitative variables were assessed with Spearman's correlation coefficient. Analyses were conducted at the 0.05 level of significance.

R software, version 3.6.1 was used.¹⁹

4. Results

The study included 125 breast cancer women who had undergone unilateral mastectomy. Table 1 presents general characteristics of the study group.

Table 2 shows the main answers from the questionnaire about EBP in the study group. The analysis of the answers showed that most of the breast cancer women in our study had received the first EBP about six months after mastectomy, and changed it (next EBP) every two years. Most of the women studied used a special bra for EBP. To conduct an in-depth analysis of the method of choosing

Table 2
Analysis of the main answers from the questionnaire about EBP in the study group.

Characteristic		Value
When did you receive the first EBP after mastectomy? (years)	Mean ± SD	0.59 ± 0.92
	Median	0.5
	Quartiles	0.25–0.5
How often do you change your EBP? (years)	Mean ± SD	1.6 ± 1.24
	Median	2
	Quartiles	0–2
General satisfaction with EBP (0–10)	Mean ± SD	7.46 ± 2.45
	Median	8
	Quartiles	6–10
Who helped you with EBP choice?	I chose it myself	39 (31.2%)
	Shop assistant helped me	86 (68.8%)
	Other (nurse, hospital assistant)	0
	Just right	55 (44.0%)
What do you think about the weight of your EBP?	Too light	12 (9.6%)
	Too heavy	58 (46.4%)
	Just right	90 (72.0%)
What do you think about the size of your EBP?	Too small	15 (12.0%)
	Too large	20 (16.0%)
	Do you use a special bra for EBP?	No
	Yes	109 (7.2%)

EBP – external breast prosthesis; SD – Standard Deviation.

EBP, we divided the study group into women who had EBP chosen by a shop assistant and women who had bought EBP themselves. The method of choosing the prosthesis (alone or with other people) had a significant impact on ($p < 0.05$) general satisfaction with EBP as well as on its weight. Patients who chose EBP themselves were more satisfied (Table 3). Fig. 1 presents general satisfaction (using VAS0–10 points scale) with EBP in the breast cancer women studied who chose prosthesis alone or with the help of a shop assistant.

Another aspect assessed in the study was the quality of participants' EBP, the analysis of the relationship between satisfaction with EBP and the age of patients, time since mastectomy or the frequency of daily physical activity performed by the study participants during a week. The age of the women studied did not impact their satisfaction with their EBP nor its weight or size (Table 4). Patients' satisfaction with their EBP's size depended significantly ($p < 0.05$) on the time of mastectomy. Women who were up to 3 years after mastectomy rated it worse than women who were 4–5 and over 5 years after breast removal (Table 5). Additionally, Table 5 shows the relationship between time after mastectomy and the way of choosing EBP by the patients. There were no statistically significant differences between the subgroups of breast cancer women up to 3 or 4–5, and over 5 years after mastectomy ($p > 0.05$). But the subgroup who chose EBP themselves comprised mostly women in the later period after mastectomy, i.e. over 5 years (over 41% of this subgroup), and 4–5 years after mastectomy (30.07% of this subgroup). As regards the evaluation of the frequency of daily physical

Table 3
The way patients chose their EBP (in the store by the assistant or alone) in relation to the quality of their prosthesis.

		I chose it myself (N = 39)	Shop assistant helped me (N = 86)	p^*
Satisfaction with EBP	Mean ± SD	8.62 ± 1.43	6.93 ± 2.63	$p = 0.001$
	Median	9	7	
	Quartiles	8–10	5–9	
Weight of EBP	Just right	24 (61.54%)	31 (36.05%)	$p = 0.015^*$
	Too light	4 (10.26%)	8 (9.30%)	
	Too heavy	11 (28.21%)	47 (54.65%)	
Size of EBP	Just right	27 (69.23%)	63 (73.26%)	$p = 0.371$
	Too small	7 (17.95%)	8 (9.30%)	
	Too large	5 (12.82%)	15 (17.44%)	

p – Kruskal–Wallis test for satisfaction; chi-squared or Fisher's exact test for weight and size; EBP – external breast prosthesis.

* Statistically significant ($p < 0.05$); SD – Standard Deviation.

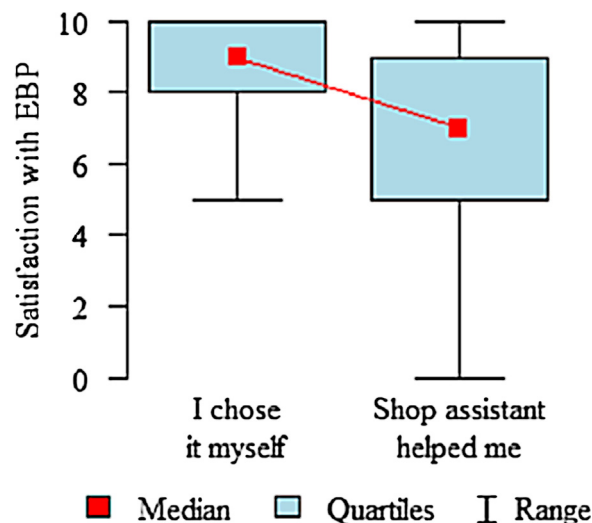


Fig. 1. Satisfaction with EBP in relation to the way of choosing EBP by post-mastectomy women.

activity in the study group, there were no significant relationships with the general assessment of breast prostheses (in both aspects: size and weight) (Table 6). I did not observe any significant correlations between daily physical activity and the women's age or time after mastectomy. Those results are presented in Table 7.

5. Discussion

The study concerns the issue of daily functioning and activity in post-mastectomy women who use EBP, with particular focus on the weight of the prosthesis. This external device plays an important role for body image or quality of life for women who have undergone mastectomy.^{4,14–16} Post-mastectomy women in our study rated the quality of their EBP higher when they had chosen it themselves than when EBP had been chosen by a shop assistant. This result correlated with time after mastectomy but did not correlate with the patients' age. This might stem from a better experience the women gained over time after mastectomy and their higher self-esteem. In this study women who chose EBP independently constituted the majority of breast cancer survivors in the period of over four years after mastectomy.

Next, the breast cancer women studied received their first EBP about half a year after surgical treatment. This is the time when they finished additional oncological treatment such as radiotherapy or chemotherapy. Most of them changed EBP every two years, which is related to the way the Polish health insurance system functions. The present study does not indicate that this change was related to the weight of EBP, as there were no correlations between the weight

Table 4
Age of study participants in relation to satisfaction with EBP, its weight and size.

		Up to 55 years (N=40)	56–65 years (N=53)	Over 65 years (N=32)	p*
Satisfaction with EBP	Mean ± SD	7.08 ± 2.15	7.74 ± 2.57	7.47 ± 2.6	p = 0.161
	Median	8	8	8	
	Quartiles	6–9	6–10	6–10	
Weight of EBP	Just right	16 (40.00%)	27 (50.94%)	12 (37.50%)	p = 0.655
	Too light	3 (7.50%)	5 (9.43%)	4 (12.50%)	
	Too heavy	21 (52.50%)	21 (39.62%)	16 (50.00%)	
Size of EBP	Just right	26 (65.00%)	37 (69.81%)	27 (84.38%)	p = 0.265
	Too small	7 (17.50%)	5 (9.43%)	3 (9.38%)	
	Too large	7 (17.50%)	11 (20.75%)	2 (6.25%)	

p – Kruskal–Wallis test for satisfaction; chi-squared or Fisher's exact test for weight and size; EBP – external breast prosthesis; * statistically significant (p < 0.05); SD – Standard Deviation.

Table 5
Time since mastectomy in relation to satisfaction with EBP in the study group.

		Up to 3 years (N=55)	4–5 years (N=33)	Over 5 years (N=37)	p*
Satisfaction with EBP	Mean ± SD	6.95 ± 2.71	7.73 ± 2.4	7.97 ± 1.94	p = 0.177
	Median	8	8	8	
	Quartiles	5–9	6–10	6–10	
Weight of EBP	Just right	23 (41.82%)	16 (48.48%)	16 (43.24%)	p = 0.06
	Too light	2 (3.64%)	2 (6.06%)	8 (21.62%)	
	Too heavy	30 (54.55%)	15 (45.45%)	13 (35.14%)	
Size of EBP	Just right	33 (60.00%)	27 (81.82%)	30 (81.08%)	p = 0.041*
	Too small	7 (12.73%)	3 (9.09%)	5 (13.51%)	
	Too large	15 (27.27%)	3 (9.09%)	2 (5.41%)	
Help with EBP choice	I chose it myself	11 (20%)	12 (36.36%)	16 (43.24%)	p = 0.083
	Shop assistant helped me	44 (80%)	21 (63.64%)	21 (56.76%)	

p – Kruskal–Wallis test for satisfaction; chi-squared or Fisher's exact test for weight and size; EBP – external breast prosthesis. * statistically significant (p < 0.05); SD – Standard Deviation.

Table 6
Daily physical activity (time per week) in relation to satisfaction of EBP in the study group.

		Up to 3 times/week (N=51)	4–5 times/week (N=34)	Over 5 times/week (N=40)	p*
Satisfaction with EBP	Mean ± SD	7.12 ± 2.15	7.85 ± 1.76	7.55 ± 3.19	p = 0.132
	Median	7	8	9	
	Quartiles	6–9	7–9	6–10	
Weight of EBP	Just right	25 (49.02%)	11 (32.35%)	19 (47.50%)	p = 0.462
	Too light	3 (5.88%)	5 (14.71%)	4 (10.00%)	
	Too heavy	23 (45.10%)	18 (52.94%)	17 (42.50%)	
Size of EBP	Just right	42 (82.35%)	23 (67.65%)	25 (62.50%)	p = 0.198
	Too small	3 (5.88%)	6 (17.65%)	6 (15.00%)	
	Too large	6 (11.76%)	5 (14.71%)	9 (22.50%)	

p – Kruskal–Wallis test for satisfaction; chi-squared or Fisher's exact test for weight and size; EBP – external breast prosthesis. * statistically significant (p < 0.05); SD – Standard Deviation.

Table 7
Correlation between age or time since mastectomy and daily physical activity in the study group.

Parameter	Correlation with physical activity	
	Spearman's correlation coefficient	p
Age	–0.074	p = 0.415
Time since mastectomy (years)	0.023	p = 0.797

of EBP and the participants' level of satisfaction with the prosthesis. Yet previous studies have shown that women after mastectomy are still not satisfied with light EBP (e.g. cotton EBP) because it does not provide symmetry.^{16,20}

On the other hand, the results of my study corroborate the findings by Jetha et al.² who concluded that a “good” external breast prosthesis can help women after mastectomy to improve their body image and body posture. Similar findings were reported earlier by Glaus and Carlson,¹⁵ namely that the satisfaction of women increased when they wore EBP for a long time, as compared to those women who wore it intermittently. As regards the evaluation of the frequency of daily physical activity in the study group

presented, there were no significant relationships with the general assessment of EBP in both aspects: size and weight. In another study, which I conducted with other researchers, we analyzed gait parameters in post-mastectomy women using EBP.²¹ This device provided breast cancer women studied with more psychological support by enhancing their self-confidence and improving their body image, which had a positive influence on gait parameters. Other studies on body balance and weight distribution in women after mastectomy yielded inconsistent results. Karczewska et al.²² who studied women using a balance platform showed that body weight shifted to the right side of the body. In another study, Rachwal et al.²³ observed women who had undergone mastectomy using tensometric platforms and showed that this group of women displayed better postural stability than healthy subjects and that their balance was less dependent on vision than that of the control group. Results of our earlier studies^{24,25} showed that unilateral mastectomy and the weight of EBP did not influence posture or change the balance of the body and weight distribution on the supporting surface despite radiotherapy and its consequences. As the existing body of research shows, there is no strong evidence about a “good” standard of EBP in the aspect of weight.

As for high self-esteem of women wearing EBP, our study as well as those by other authors^{2,4,15} indicate that this is an important aspect of well-being and quality of life in this group of breast cancer women. Clinical nurse instructors should plan in-service sessions to educate clinical staff about the importance of EBP for the rehabilitation of mastectomy patients, especially in psychological aspects. This device should first of all be comfortable to use, give a feeling of improved image and be affordable for patients. Physical activity is very important for this group of patients^{26,27} and EBP should play a positive role for them rather than limit their daily activity. Fitch et al.¹⁷ showed that post-mastectomy women spoke about difficulties obtaining information regarding available EBP options, the awkwardness of being measured and fitted for a prosthesis, challenges in wearing EBP as well as about how a prosthesis can foster increased confidence, enhanced body image, self-esteem, and a sense of normalcy. Most breast cancer women must make an individual decision about wearing EBP and emphasize how important it is to have information about options early in the cancer care. The results of the present study have shown that women who underwent mastectomy 4–5 years before had good experience with regard to EBP quality and fitting, and that the first time of having EBP after mastectomy is very important in terms of providing post-mastectomy breast cancer patients with advice about EBP. These findings are an integral part of the development of standards of practice in the fitting and supply of EBP in post-mastectomy care. The oncology team should have a breast cancer support group, which will allow post-mastectomy patients to share their experiences more openly and learn from the experience of other patients. Hospitals must have facilities for those patients who have medical reimbursement for their health coverage; this could be added to their bill, by considering it as a part of the total treatment.

This study was limited by some factors related to the methodological design, all of which introduced bias into the results. Because the study took place only in one provincial cancer hospital-center setting, it has a highly self-selected convenience sample. In addition, as this was a feasibility study, a priori sample size determination was not performed.

6. Conclusions

External breast prosthesis plays an important role in the satisfaction with daily functioning and activity of breast cancer women who have undergone unilateral mastectomy. Despite the fact that the weight of EBP is not an important factor in an objective analysis of body motions in many studies in this group of patients, EBP is a key factor in enhancing breast cancer survivors' self-esteem and quality of life.

Conflict of interest

None declared.

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None declared.

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