

Health-related quality of life among patients after mastectomy: assessment using the EORTC QLQ-C30 and QLQ-BR23

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Abstract

Introduction: Breast cancer is the most common malignancy among women worldwide. Mastectomy remains a frequently applied treatment method; however, it may considerably affect physical, emotional, and social well-being. Assessing health-related quality of life (HRQoL) in this population is essential for planning supportive care.

Aim of the research: To assess the quality of life of women after mastectomy using standardized questionnaires (QLQ-C30 and QLQ-BR23).

Material and methods: The study included 263 women after mastectomy, recruited through Amazon Clubs and oncology centers in Poland. Data were collected using a proprietary questionnaire and the EORTC QLQ-C30 and QLQ-BR23 instruments. Spearman's rank correlation coefficients (ρ) were calculated. Statistical significance was set at $p < 0.05$.

Results: Women reported difficulties across physical, emotional, cognitive, and social domains. Emotional distress was significantly associated with poorer functioning and greater symptom severity in the QLQ-C30 and BR23 subscales. Older age and longer time since surgery showed statistically significant negative correlations with numerous functioning domains, indicating lower functioning and in these domains. Sexual functioning and interest in sexual life were among the lowest-rated areas.

Conclusions: Mastectomy is associated with poorer HRQoL in women, particularly in emotional, physical, and social functioning. Older age and longer time since surgery are associated with poorer functioning, highlighting the need for long-term supportive care. Psychological distress was associated with multiple HRQoL domains, emphasizing the importance of psycho-oncological support.

Introduction

Quality of life (QoL) is a multidimensional concept widely applied across psychology, sociology, economics, and medicine. It reflects an individual's subjective perception of well-being and life satisfaction, encompassing physical and mental health, social relationships, living conditions, education, occupational situation, access to services, and a sense of security [1]. Physical health, understood as the absence of disease and functional limitations, plays a crucial role in QoL. Equally important is mental health, including levels of stress, anxiety, and depressive symptoms, all of which significantly influence overall well-being. Social relationships and social support are additional determinants of QoL, contributing to emotional stability and improved daily functioning [2, 3].

Various definitions of QoL have been proposed in the literature. The World Health Organization defines QoL as an individual's perception of their position in life within the context of cultural and value systems, and in relation to personal goals and expectations [4]. Other authors emphasize subjective well-being arising from the balanced fulfilment of physical, emotional, social, and spiritual needs [5], or conceptualize QoL as the degree to which personal and societal conditions allow individuals to meet their needs and aspirations [6, 7]. Assessing QoL remains methodologically challenging due to its subjective nature and the influence of cultural, social, psychological, and economic factors.

Breast cancer is considered a chronic disease due to its potential for recurrence, the need for long-term treatment, and its substantial impact on health-relat-

ed quality of life (HRQoL) [8]. It is the most commonly diagnosed cancer among women worldwide and a leading cause of cancer-related mortality. Globally, more than 2.2 million new cases and nearly 700,000 deaths occur annually. In Poland, breast cancer remains the most frequently diagnosed malignancy in women, with 24,644 new cases reported in 2022, representing 24.2% of all female cancer diagnoses [9–11]. Despite improvements in screening and treatment, breast cancer continues to pose significant challenges to long-term survivors. QoL has therefore become an essential component of evaluating treatment outcomes and guiding clinical decision-making.

The choice of oncological treatment depends largely on the stage of disease at diagnosis. Management may include surgical procedures, radiotherapy, chemotherapy, hormone therapy, and immunotherapy [12]. Mastectomy – the complete removal of one or both breasts – is often a necessary component of treatment. Although it is a life-saving intervention, it may severely disrupt body image, self-esteem, femininity, and emotional well-being. Many women experience depression, anxiety, and difficulties accepting changes to their appearance [13].

The psychological and social consequences of mastectomy are multifaceted. Women may experience fear of social judgment, avoidance of social interactions, and withdrawal from public spaces due to altered body image, contributing to social isolation [14]. Uncertainty regarding appearance may negatively affect confidence, interpersonal relationships, and sexual intimacy [15]. Common emotional responses include sadness, anger, confusion, and grief related to the loss of a breast, while persistent anxiety concerning disease recurrence can further compromise daily functioning [9, 13]. After mastectomy, women may also face professional challenges, including reduced confidence in the workplace and fear of stigmatization.

The aim of this study was to assess the quality of life of women after mastectomy using the QLQ-C30 and QLQ-BR23 questionnaires. Based on this main objective, the following specific objectives were formulated:

1. To evaluate physical, emotional, cognitive, and social functioning among women after mastectomy.
2. To assess the severity of symptoms and treatment-related side effects in this group of patients.
3. To examine body image, sexual functioning, and breast- and arm-related symptoms.
4. To analyze the relationships between quality of life and selected sociodemographic variables (age, number of children, time elapsed since mastectomy).

Material and methods

Research design

The study was conducted among members of Amazon Clubs – organizations that provide psychological

and social support to women following mastectomy due to breast cancer – as well as patients of oncology outpatient clinics and surgical oncology departments in Poland who consented to participate.

A diagnostic survey method was employed, using a questionnaire technique. The research tool was a proprietary questionnaire containing 14 questions related to the functioning of patients after mastectomy. These included sociodemographic data and questions concerning functional disability and health status in cases of upper limb lymphedema. Additionally, standardized questionnaires were used to measure the quality of life of patients treated for cancer: the QLQ-C30 (Quality of Life Questionnaire) and the QLQ-BR23 module (Breast Cancer).

Research tools

QLQ-C30 questionnaire

The QLQ-C30 questionnaire is used to assess subjective health perception and evaluate functioning in physical, emotional, and social dimensions. It consists of 30 questions grouped into five functional subscales: physical functioning (5 questions), role functioning (2 questions), emotional functioning (4 questions), cognitive functioning (2 questions), and social functioning (2 questions).

It also includes three symptom scales assessing fatigue (3 questions), nausea and vomiting (2 questions), and pain (2 questions), as well as six single-item questions evaluating the severity of the following symptoms: dyspnea, insomnia, loss of appetite, constipation, diarrhea, and financial difficulties. The last two questions concern the global assessment of health status. The questionnaire responses are based on a four-point scale (1 – “never,” 2 – “sometimes,” 3 – “often,” 4 – “very often”), which assess the severity of the analyzed parameters [16].

QLQ-BR23 questionnaire

The QLQ-BR23 (Quality of Life Questionnaire for Breast Cancer) is an extension of the QLQ-C30 designed for women with breast cancer. It includes five scales, of which two assess functional status: body image (BI, 4 questions: 9–12) and sexual functioning (SEF, 2 questions: 14, 15).

Additionally, three scales evaluate the side effects of therapy: systemic therapy side effects (ST, 7 questions: 1–4, 6–8), breast symptoms (BS, 4 questions: 20–23), and arm symptoms (AS, 3 questions: 17–19). Furthermore, three individual questions address sexual satisfaction (SEE, 16), concerns about future health (FU, 13), and concerns about hair loss (HL, 5) [16].

Participants

A total of 263 women who had undergone mastectomy participated in the study. Paper versions

of the questionnaire were distributed to Amazon Clubs across Poland, requesting completion. Additionally, patients from the surgical oncology departments and oncology outpatient clinics of two clinical hospitals were asked to complete the questionnaire.

Out of 400 distributed questionnaires, 263 (65.5%) were correctly completed and included in the statistical analysis. The study was conducted at the turn of 2024 and 2025. The inclusion criteria required consent to participate, a breast cancer diagnosis, and a completed mastectomy procedure. The exclusion criterion was the lack of consent to participate in the study.

Statistical analysis

The study used correlation analysis to examine relationships between the variables under investigation.

The calculations were performed using IBM SPSS Statistics 29.0. The significance level was set at $p = 0.05$. Spearman's rank correlation coefficient (ρ) was used to assess the strength and direction of associations between variables. The coefficient ranges from -1 to 1 , where (-1) represents a perfect negative correlation and (1) represents a perfect positive correlation.

Ethical procedure

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (64th World Medical Association General Assembly, Fortaleza, Brazil, October 2013) and in compliance with applicable Polish regulations. The authors obtained approval for the study from the Bioethics Committee (approval no. 21/2024).

Results

The surveyed group consisted of 263 women after undergoing mastectomy. The study group was predominantly composed of women over the age of 55 (37.6%). Participants aged 46–55 constituted 20.8%, those aged 36–45 represented 16.8%, women aged 25–35 accounted for 14.9%, and the smallest subgroup included women younger than 25 years (9.9%). This age distribution indicates that the sample primarily consisted of middle-aged and older women. Most respondents lived in urban areas (67.3%), while the remaining 32.7% resided in rural settings. In terms of marital status, married women formed the largest proportion of the sample (49.5%). Divorced women accounted for 19.8%, widows for 18.8%, and single women for 11.9%. These data suggest that nearly half of the participants were in marital relationships. Regarding parenthood, the highest percentages were observed among women with two children (33.7%) or three children (34.7%). Additionally, 14.9% of participants reported having one child, 5.9% had more than three children, and 10.9% reported having no

children. With respect to the time elapsed since mastectomy, the largest subgroup comprised women who had undergone the procedure more than five years before the study (45.5%). Further groups included women 3–5 years post-mastectomy (22.8%), 1–2 years (17.8%), and less than one year after surgery (13.9%). Overall, 86.1% of participants had undergone mastectomy more than one year before the study.

Results of the proprietary questionnaire survey

The proprietary questionnaire assessed upper limb symptoms, psychological difficulties, and limitations in daily, professional, and social activities. Respondents rated each item on a 0–5 scale, where 0 indicated no complaints and 5 indicated very severe symptoms or limitations. Women most frequently reported upper limb symptoms such as arm heaviness (mean 2.69 ± 1.26), skin tightness (2.63 ± 1.37), stiffness (2.50 ± 1.36), tingling (2.30 ± 1.43), and weakness (3.22 ± 1.50). Pain (3.26 ± 1.61) and swelling (2.91 ± 1.77) were also noted.

Psychological difficulties were common, with sadness and stress rated the highest (3.86 ± 1.57), followed by depressive symptoms (3.56 ± 1.60) and reduced self-esteem (3.86 ± 1.65).

Daily functioning was affected to varying extents. The lowest difficulty was reported for computer work (2.22 ± 1.25), while lifting heavy objects (4.21 ± 1.33), working with raised arms (3.95 ± 1.43), driving (2.38 ± 1.42), and cycling (2.90 ± 1.44) posed greater challenges.

Professional activity was limited in many participants (2.89 ± 1.39). A smaller proportion worked part-time (2.97 ± 1.42), and only a few reported full-time employment (3.88 ± 1.58).

Social and recreational activity was also reduced. Meeting with friends was the most commonly maintained activity (2.33 ± 1.27). Engagement in other activities, such as recreational exercises (2.33 ± 1.29), walking for more than one hour daily (2.79 ± 1.31), or travelling (2.87 ± 1.35), was reported less frequently.

Results of the EORTC QLQ-BR23 questionnaire

Analyzing the mean values obtained from the EORTC QLQ-BR23 questionnaire, where 1 signifies “not at all,” 2 “a little,” 3 “quite a bit,” and 4 “very much,” it can be concluded that patients were most concerned about their future health (mean score: 3.66 ± 0.71), reported concerns about their current body image (3.27 ± 1.06), felt less feminine as a result of the disease or treatment (3.24 ± 1.05), and experienced difficulty in raising their arm upwards or sideways (3.09 ± 0.95).

The most prominent concerns among women who had undergone mastectomy were related to body image and worries about hair loss. Lower scores were ob-

Table 1. Functioning assessment based on the QLQ-C30 questionnaire ($N = 263$)

QLQ-C30 (0-100)	Mean	Median	Standard deviation	Min.	Max.
Physical functioning	44.29	53.33	17.58	0.00	66.67
Role functioning	44.55	50.00	22.37	0.00	83.33
Cognitive functioning	38.78	33.33	20.02	0.00	100.00
Emotional functioning	58.33	58.33	21.18	0.00	100.00
Social functioning	49.67	66.67	26.35	0.00	100.00
Financial difficulties	60.07	66.67	42.69	0.00	100.00
Shortness of breath	29.37	33.33	24.62	0.00	66.67
Pain	53.47	50.00	25.64	0.00	100.00
Fatigue	56.44	55.56	22.09	0.00	100.00
Insomnia	66.01	66.67	28.67	0.00	100.00
Loss of appetite	43.56	33.33	31.53	0.00	100.00
Nausea and vomiting	35.64	33.33	28.97	0.00	100.00
Constipation	38.61	33.33	29.71	0.00	100.00
Diarrhea	27.39	33.33	23.76	0.00	66.67
Poor health/quality of life assessment	51.73	50.00	17.01	0.00	83.33

served for treatment side effects, breast-related symptoms, and sexual functioning and interest in sexual life.

The table presents the functioning assessment of women after mastectomy, measured using the EORTC QLQ-BR23 questionnaire in a sample of 263 participants. Mean values, medians, standard deviations, and score ranges (minimum and maximum) are provided for each functional and symptom domain.

The highest scores were observed in the future outlook domain (mean 88.78; median 100.00), indicating a generally positive perception of the future among the participants. A high result was also noted for body image (mean 74.22; median 91.67), although the substantial variability ($SD = 33.62$) suggests notable individual differences in body image perception.

Lower scores were recorded in the area of sexuality. Both sexual functioning (mean 42.99; median 50.00) and interest in sexual life (mean 42.74; median 50.00) showed relatively low values, which may indicate reduced sexual satisfaction or limited interest in sexual activity after mastectomy.

Regarding treatment-related burden, moderate scores were observed for side effects of therapy (mean 45.62), as well as for breast symptoms (mean 56.27) and arm symptoms (mean 59.24). These results reflect common but variably experienced physical symptoms among the participants.

A high score was noted in the domain of worrying about hair loss (mean 71.78), suggesting that hair loss was a considerable source of concern for many women, despite the broad range of responses (0–100).

Results of the QLQ-C30 questionnaire

Analyzing the mean values obtained from the QLQ-C30 questionnaire, where 1 signifies “not at all,” 2 “a little,” 3 “quite a bit,” and 4 “very much,” it can be concluded that patients experience difficulties in all areas of functioning. However, they assess their overall quality of life positively.

The study results indicate that the most significant challenges for women after mastectomy occur in cognitive, emotional, social, and financial functioning. Commonly reported symptoms include pain, constipation, nausea and vomiting, loss of appetite, fatigue, and insomnia. Less frequent difficulties involve physical functioning and role fulfillment, as well as symptoms such as shortness of breath or diarrhea. The results are presented in Table 1.

A greater sense of sadness, depression, poor well-being, and stress is associated with lower quality of life scores in the QLQ-C30 and QLQ-BR23 questionnaires. All correlations are statistically significant ($p < 0.05$), with the most pronounced relationships observed between higher levels of emotional distress after surgery and poorer physical functioning, role fulfillment, emotional and social functioning, increased financial difficulties, greater perceived pain, loss of appetite, nausea and vomiting, poorer body image, more severe side effects of therapy, and breast-related symptoms (Table 2).

A number of statistically significant positive correlations ($p < 0.05$) were found between the QLQ-BR23 and QLQ-C30 scores, indicating that a lower quality of life in QLQ-BR23 is associated with a lower quality

Table 2. Correlations between the QLQ-C30 overall quality of life and the QLQ-BR23 module

Variables		I feel sad	I feel depressed	My self-esteem is lowered	I feel stressed	
Spearman's ρ	Physical functioning	Correlation coefficient	0.545	0.567	0.638	0.676
	Role functioning	Correlation coefficient	0.548	0.536	0.594	0.606
	Cognitive functioning	Correlation coefficient	0.279	0.293	0.253	0.325
	Emotional functioning	Correlation coefficient	0.666	0.691	0.667	0.698
	Social functioning	Correlation coefficient	0.599	0.627	0.689	0.660
	Financial difficulties	Correlation coefficient	0.538	0.541	0.642	0.588
	Shortness of breath	Correlation coefficient	0.336	0.384	0.432	0.417
	Pain	Correlation coefficient	0.560	0.596	0.631	0.653
	Fatigue	Correlation coefficient	0.512	0.511	0.466	0.514
	Insomnia	Correlation coefficient	0.447	0.452	0.481	0.477
	Loss of appetite	Correlation coefficient	0.625	0.622	0.578	0.606
	Nausea and vomiting	Correlation coefficient	0.686	0.661	0.677	0.651
	Constipation	Correlation coefficient	0.425	0.412	0.338	0.421
	Diarrhea	Correlation coefficient	0.322	0.382	0.414	0.451
	Poor health/quality of life assessment	Correlation coefficient	0.244	0.244	0.262	0.332
	Body image	Correlation coefficient	0.715	0.746	0.794	0.776
	Sexual functioning	Correlation coefficient	0.360	0.376	0.412	0.392
	Interest in sexual life	Correlation coefficient	0.252	0.275	0.362	0.325
	Future outlook	Correlation coefficient	0.453	0.501	0.523	0.516
	Side effects of therapy	Correlation coefficient	0.648	0.666	0.762	0.716
Breast symptoms	Correlation coefficient	0.575	0.615	0.709	0.694	
Arm symptoms	Correlation coefficient	0.447	0.505	0.616	0.526	
Worrying about hair loss	Correlation coefficient	0.453	0.518	0.590	0.543	

of life across various aspects measured by QLQ-C30. The strength of these relationships, as determined by Spearman's ρ coefficient, is generally substantial.

All QLQ-BR23 components show statistically significant correlations ($p < 0.05$) with physical functioning, role fulfillment, social functioning, financial difficulties, shortness of breath, and pain. In most other cases, significant correlations exist between QLQ-BR23 elements and QLQ-C30 quality of life aspects.

The only areas that do not exhibit statistically significant correlations are insomnia and poor self-assessment of health. Additionally, a longer time elapsed since surgery is associated with better functioning in most QLQ-C30 and QLQ-BR23 domains. These correlations are statistically significant ($p < 0.05$) and exhibit relatively strong relationships.

No statistically significant correlation ($p > 0.05$) was found between the number of children and the QLQ-C30 or QLQ-BR23 scores. The results are presented in Table 3.

Statistically significant correlations ($p < 0.05$) were identified between age, time since mastectomy, and numerous QLQ-C30 and QLQ-BR23 domains. Age demonstrated the strongest and most consistent associations, with all coefficients being negative, indicating that older participants reported lower levels of functioning and greater symptom severity. Notable negative correlations were found for physical functioning ($\rho = -0.385$), role functioning ($\rho = -0.308$), cognitive functioning ($\rho = -0.215$), emotional functioning ($\rho = -0.391$), and social functioning ($\rho = -0.400$). Age was also negatively associated with symptom intensity, including pain ($\rho = -0.383$), shortness of breath ($\rho = -0.345$), fatigue ($\rho = -0.266$), and insomnia ($\rho = -0.193$). Stronger correlations were observed in BR23 domains, particularly body image ($\rho = -0.511$) and breast symptoms ($\rho = -0.461$).

Similarly, time elapsed since mastectomy showed moderate negative correlations with several QLQ-C30 domains, indicating lower functioning scores among women further removed from surgery, whereas negative correlations with symptom scales indicated lower symptom scores. These relationships were observed for emotional functioning ($\rho = -0.471$), physical functioning ($\rho = -0.345$), pain ($\rho = -0.347$), breast symptoms ($\rho = -0.375$), and arm symptoms ($\rho = -0.295$). Longer postoperative duration was also associated with lower body-image scores ($\rho = -0.430$), reduced interest in sexual life ($\rho = -0.283$), and greater concern about hair loss ($\rho = -0.307$).

No statistically significant correlations ($p > 0.05$) were found between the number of children and any QLQ-C30 or QLQ-BR23 domains, indicating that this variable was not significantly associated with HRQoL in the studied population.

In summary, age and time since surgery were the two sociodemographic factors most strongly associated with HRQoL. Both variables correlated with

lower functioning and increased symptom burden, whereas the number of children showed no statistically significant associations.

Discussion

Breast cancer is the most commonly diagnosed malignancy and a leading cause of cancer mortality among women worldwide. Mastectomy, frequently applied in oncological treatment, significantly affects both physical and psychological functioning. Women after mastectomy often face challenges related not only to physical changes but also to emotional well-being, self-perception, and social functioning.

The aim of this study was to assess the quality of life of women after mastectomy using two standardized instruments: the QLQ-C30 and the QLQ-BR23. Previous research has demonstrated that women after mastectomy may experience difficulties related to body image, self-esteem, femininity, and social relationships. Studies have reported reduced physical functioning after surgery and have shown that body image is significantly associated with multiple dimensions of quality of life [17]. Women frequently experience anxiety related to disease progression, disability, body image, and future roles in family and society [18, 19]. The duration of the disease also appears to be associated with psychological well-being and quality of life [20].

Sexual functioning is an important aspect of quality of life after mastectomy. Kowalczyk *et al.* [21] reported greater sexual dysfunction among women following mastectomy compared with those treated with breast-conserving therapy, a finding consistent with the present study. Mastectomy has also been associated with difficulties in family and social relationships, reducing participation in social roles and everyday interactions.

Mental well-being is another essential component. Emotional tension, irritability, depressive symptoms, and excessive worry have all been documented among women after mastectomy [22]. Bylina [23] reported that quality of life is poorer in various domains due to both physical limitations and psychological distress, and that older age is associated with poorer physical, emotional, and social functioning. This aligns with our findings, which also indicate reduced functioning with increasing age.

Upper limb symptoms represent a significant source of discomfort and functional difficulty. González-Fernández *et al.* [24] identified lymphedema as a common postoperative complication associated with limitations in physical and social functioning, findings also reported by other studies [17, 25, 26]. Pain, arm weakness, and reduced shoulder mobility are described as persistent issues, particularly among women who undergo mastectomy rather than breast-conserving therapy [27, 28]. Our results indicate that arm heaviness, stiffness, skin tension, and limited mobility are frequent complaints.

Table 3. Correlations between overall QLQ-C30 quality of life and disease symptoms

Variable	Body image	Sexual functioning	Interest in sexual life	Future outlook	Side effects of therapy	Breast symptoms	Arm symptoms	Worrying about hair loss
Spearman's ρ								
Physical functioning	Correlation coefficient 0.633	0.344	0.361	0.420	0.634	0.761	0.680	0.541
Role functioning	Correlation coefficient 0.587	0.347	0.345	0.368	0.666	0.703	0.639	0.583
Cognitive functioning	Correlation coefficient 0.326	0.085	-0.042	0.324	0.328	0.341	0.198	0.304
Emotional functioning	Correlation coefficient 0.679	0.218	0.119	0.456	0.646	0.581	0.397	0.543
Social functioning	Correlation coefficient 0.675	0.271	0.274	0.442	0.620	0.695	0.522	0.595
Financial difficulties	Correlation coefficient 0.614	0.316	0.433	0.295	0.619	0.663	0.546	0.563
Shortness of breath	Correlation coefficient 0.451	0.242	0.310	0.216	0.546	0.629	0.512	0.434
Pain	Correlation coefficient 0.634	0.300	0.232	0.395	0.649	0.749	0.544	0.642
Fatigue	Correlation coefficient 0.472	0.188	-0.002	0.366	0.512	0.527	0.405	0.431
Insomnia	Correlation coefficient 0.391	0.148	0.132	0.194	0.492	0.439	0.403	0.364
Loss of appetite	Correlation coefficient 0.543	0.182	0.109	0.329	0.554	0.517	0.374	0.422
Nausea and vomiting	Correlation coefficient 0.575	0.308	0.113	0.401	0.660	0.614	0.426	0.601
Constipation	Correlation coefficient 0.363	0.186	0.056	0.309	0.378	0.395	0.251	0.352
Diarrhea	Correlation coefficient 0.448	0.177	0.237	0.284	0.463	0.467	0.379	0.347

Participants in the present study indicated that psychological, emotional, social, and financial difficulties constituted the most burdensome aspects of everyday life after mastectomy. Elevated distress levels were associated with poorer functioning and greater symptom burden – results which align with previous findings [29]. Abdelrahman *et al.* [30] reported that insufficient psychological preparation for mastectomy was associated with prolonged emotional burden, while breast reconstruction was associated with better psychological adjustment and self-confidence, leading to better quality of life outcomes.

In addition to the clinical and psychosocial factors associated with the quality of life of breast cancer patients, increasing attention is also being paid to molecular mechanisms associated with tumor development and progression. In recent years, particular emphasis has been placed on the role of microRNAs in the regulation of signaling pathways involving SMAD proteins, which participate in processes such as cancer cell proliferation, migration, metastasis formation, and response to treatment. These mechanisms may contribute to the biological heterogeneity of breast cancer and may influence prognosis as well as potential therapeutic strategies [31].

Limitations of the study

This study has several limitations. The sample included women differing in age and time elapsed since surgery, which may have influenced subjective quality-of-life assessments. Women further removed from surgery may have had more time to adapt psychologically, although our findings showed lower functioning scores among women with a longer time since surgery. Additionally, the study was conducted in selected centers, which may limit the generalizability of the findings. Future multicenter studies with more diverse populations are recommended.

Conclusions

Quality of life after mastectomy is associated with multiple interacting factors. Emotional distress is associated with physical, emotional, social, and cognitive functioning. Older age and longer time since surgery were associated with lower functioning scores in several domains and greater symptom severity. Financial difficulties and treatment-related symptoms (including pain, fatigue, nausea, and appetite loss) were also associated with poorer quality of life. Body image was an important concern for many participants.

Comprehensive long-term support – encompassing psychological counseling, physiotherapy, social support, and patient education – may help address the multidimensional needs of women after mastectomy and potentially support quality of life.

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Ethical approval

Approval number: 21/2024.

Conflict of interest

The authors declare no conflict of interest.

References

1. Teoli D, Bhardwaj A. Quality Of Life. 2023 Mar 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. PMID: 30725647.
2. Daundasekara SS, Arlinghaus KR, Johnston CA. Quality of life: the primary goal of lifestyle intervention. *Am J Lifestyle Med.* 2020; 14(3): 267-270.
3. Phyo AZZ, Freak-Poli R, Craig H, Gasevic D, Stocks NP, Gonzalez-Chica DA, Ryan J. Quality of life and mortality in the general population: a systematic review and meta-analysis. *BMC Public Health.* 2020; 20(1): 1596.
4. WHOQOL Group. The World Health Organisation quality of life assessment (WHOQOL): Position paper from the world health organisation. *Soc Sci Med.* 1995; 41: 1403.
5. Louis G, Petre B, Charlier N, Voz B, Guillaume M. La qualité de vie dans le champ médical. Bref aperçu de son origine, de sa sémantique, de ses instruments de mesure et de leur utilisation en clinique [Quality of life in the medical field: a brief overview of its origin, semantics, measuring instruments and clinical use]. *Rev Med Liege.* 2021; 76(9): 689-696.
6. Lopez-Ruiz VR, Huete-Alcocer N, Alfaro-Navarro JL, Nevado-Pena D. The relationship between happiness and quality of life: A model for Spanish society. *PLoS One.* 2021; 16(11): e0259528.
7. O'Donnell P, Moran L, Geelen S, O'Donovan D, van den Muijsenbergh M, Elmusharaf K. "There is people like us and there is people like them, and we are not like them." Understating social exclusion – a qualitative study. *PLoS One.* 2021; 16(6): e0253575.
8. Miret C, Orive M, Sala M, Garcia-Gutierrez S, Sarasqueta C, Legarreta MJ, Redondo M, Rivero A, Castells X, Quintana JM, Garin O, Ferrer M. REDISSEC-CaMISS Group. Reference values of EORTC QLQ-C30, EORTC QLQ-BR23, and EQ-5D-5L for women with non-metastatic breast cancer at diagnosis and 2 years after. *Qual Life Res.* 2023; 32(4): 989-1003. Erratum in: *Qual Life Res.* 2024; 33(5): 1433-1435.
9. Rashid AA, Mohammed Hussein RA, Hashim NW. Assessing the quality of life in breast cancer women: a cross sectional descriptive study. *Asian Pac J Cancer Prev.* 2022; 23(7): 2299-2307.
10. Hasanah U, Ahmad M, Prihantono P, Usman AN, Arsyad A, Agustin DI. The quality of life assessment of breast cancer patients. *Breast Dis.* 2024; 43(1): 173-185.
11. Konieczny M, Fal A. The influence of the surgical treatment method on the quality of life of women with breast cancer. *Eur J Breast Health.* 2023; 19(2): 121-127.

12. Pogoda K, Jagiełło-Gruszfeld A, Niwińska A, Nowecki ZI. Leczenie chorych na wczesnego raka piersi – podsumowanie aktualnych wytycznych St. Gallen i ESMO [Treatment of patients with early breast cancer – the summary of current St. Gallen International Consensus and ESMO guidelines]. *Onkol Prakt Klin Edu* 2020; 4: 281-289
13. Rybka M, Ziółkowska M. Quality of life of women after mastectomy. *Innow Pielęg Naukach Zdr.* 2020; 5(4): 25-37.
14. Janowski K, Tatała M, Jedynak T, Wałachowska K. Social support and psychosocial functioning in women after mastectomy. *Palliat Support Care.* 2020; 18(3): 314-321.
15. Alvarez-Pardo S, De Paz JA, Montserrat Romero-Perez E, Portilla-Cueto KM, Horta-Gim MA, Gonzalez-Bernal JJ, Fernández-Solana J, Mielgo-Ayuso J, García-Valverde A, González-Santos J. Factors associated with body image and self-esteem in mastectomized breast cancer survivors. *Int J Environ Res Public Health.* 2023; 20: 5154.
16. Zawisza K, Tobiasz-Adamczyk B, Nowak W, Kulig J, Jedrys J. Validity and reliability of the quality of life questionnaire (EORTC QLQ C30) and its breast cancer module (EORTC QLQ BR23). *Ginek Pol.* 2010; 81: 262-267.
17. Herbert SL, Flock F, Felberbaum R, Janni W, Lob S, Kiesel M, Schlaif T, Diessner J, Curtaz C, Joukhadar R, Dayan D, Schwentner L, Singer S, Wöckel A; BRENDA Study Group. Predictors of decreased quality of life in breast cancer survivors five years after diagnosis. *J Breast Cancer.* 2023; 26(3): 243-253.
18. Ettridge K, Scharling-Gamba K, Miller C, Roder D, Prichard I. Body image and quality of life in women with breast cancer: Appreciating the body and its functionality. *Body Image.* 2022; 40: 92-102.
19. Kim J, Cho J, Lee SK, Choi EK, Kim IR, Lee JE, Kim SW, Nam SJ. Surgical impact on anxiety of patients with breast cancer: 12-month follow-up prospective longitudinal study. *Ann Surg Treat Res.* 2020; 98(5): 215-223.
20. Deshpande VP, Shinde RK, Deo D, Hippargekar P, Venurkar SV. Assessment of quality of life in patients of mastectomy with chemotherapy. *Cureus.* 2022; 14(8): e27703.
21. Kowalczyk R, Nowosielski K, Cedrych I, Krzysztanek M, Glogowska I, Streb J, Kucharz J, Lew-Starowicz Z. Factors affecting sexual function and body image of early-stage breast cancer survivors in Poland: a short-term observation. *Clin Breast Cancer.* 2019 Feb;19(1):e30-e39.
22. Oei SL, Thronick A, Grieb G, Schad F, Gross J. Evaluation of quality of life in breast cancer patients who underwent breast-conserving surgery or mastectomy using real-world data. *Breast Cancer.* 2023; 30(6): 1008-1017.
23. Bylina D. Influence of age on life quality in women after mastectomy. *Soc Dissert* 2022; 16: 205-221.
24. Gonzalez-Fernandez L, Romero-Morales C, Martinez-Pascual B, Rio-Gonzalez A, Cerezo-Tellez E, Lopez-Martin I. Breast cancer survivors suffering from lymphedema: What really do affect to corporeality/body image? A qualitative study. *Breast Cancer Res.* 2024; 26(1): 47..
25. De Vrieze T, Vos L, Gebruers N, De Groef A, Dams L, Van der Gucht E, Nevelsteen I, Devoogdt N. Revision of the Lymphedema Functioning, Disability and Health Questionnaire for Upper Limb Lymphedema (Lymph-ICF-UL): reliability and validity. *Lymphat Res Biol.* 2019; 17(3): 347-355.
26. Meilani E, Zanudin A, Nordin NAM. Psychometric evaluation of the Bahasa Malaysia version of the Lymphedema Functioning, Disability, and Health Questionnaire for Upper Limb Lymphedema in Patients with Breast Cancer-Related Lymphedema. *Lymphat Res Biol.* 2024; 22(3): 210-220.
27. John DO, Amaeze A, Ransome OP, John JN, Okezue OC, Iyare O, Ugwu NI. Upper limb disabilities and associated factors among breast cancer survivors: a quantitative cross-sectional study. *SAGE Open Med.* 2024; 12: 20503121241283341.
28. Macdonald ER, Amorim NML, Hagstrom AD, Markovic K, Simar D, Ward RE, Clifford BK. Evaluating the effect of upper-body morbidity on quality of life following primary breast cancer treatment: a systematic review and meta-analysis. *J Cancer Surviv.* 2024; 18: 1517-1547.
29. Pacaric S, Kristek J, Mirat J, Kondža G, Turk T, Farčić N, Orkić Ž, Nemčić A. The quality of life of Croatian women after mastectomy: a cross-sectional single-center study. *BMC Public Health* 2018; 18: 999.
30. Abdelrahman SM, Ibraheem MH, Allam H, Sewram V. Factors affecting quality of life in women post mastectomy for breast cancer in Baheya Foundation (Egypt): 'A retrospective cohort study'. *BMC Womens Health.* 2025; 25(1): 43.
31. Sirek T, Sirek A, Borawski P, Zmarzły N, Sułkowska J, Król-Jatręga K, Opławski M, Boroń D, Chalcarz M, Ossowski P, Dziobek K, Strojny D, Boroń K, Janiszewska-Bił D, Grabarek BO. miRNAs in signal transduction of SMAD proteins in breast cancer. *Int J Mol Sci.* 2024; 25(18): 10088.

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