

# Physical Activity of Women After Radical Unilateral Mastectomy and Its Impact on Overall Quality of Life

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## Abstract

Radical unilateral mastectomy is an acknowledged source of traumatic experience for women, adversely affecting their behavioral and emotional paradigm. The present study aimed to assess the quality of life in physically active and inactive postmastectomy women. Population sample involved 100 women, aged 50 to 60 years, having undergone radical unilateral mastectomy, allocated into 2 groups, upon assumption of undertaking physical activity. The abbreviated version of WHOQOL-BREF questionnaire was a research tool of choice. The data were analyzed with the aid of  $\chi^2$  test, Kruskal-Wallis test, and Mann-Whitney *U* test. Statistically significant dependence was established between physical activity actually pursued and self-assessment of overall quality of life ( $P = .014$ ) and overall the self-rated perception of health ( $P < .001$ ). In the group of physically inactive women, physical health was a variable dependent upon individual level of education ( $P = .031$ ). The highest scores in this domain were noted in the women boasting secondary education, whereas the lowest in the ones with vocational education. Social domain was the highest rated aspect of quality of life in both the physically active and inactive postmastectomy women, while the physical health domain was rated the lowest. Both in the case of physically active and inactive postmastectomy women, the quality of life in the respective domains, as listed in the WHOQOL-BREF questionnaire, was found independent of the living environment.

## Keywords

postmastectomy women, radical unilateral mastectomy, quality of life, WHOQOL-BREF questionnaire, physical activity

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## Introduction

Breast amputation is deemed an appreciable source of traumatic experiences for women. The loss of a breast, a commonly acknowledged attribute of femininity, gravely impacts women's behavioral and emotional paradigm. Postmastectomy women often feel quite anxious about their own health status, and life at large. Their anxiety is usually underpinned by trauma-ridden memories of long-lasting, often onerous fight against the disease, existing potential for metastases, relapse, and ultimately death. They feel crippled, physically unattractive, and generally suffer from very low self-esteem. Changes in bodily symmetry, in conjunction with a lymph edema, consequently reduce individual functional capacity. Much eroded sense of self-esteem, when confronted with inherent challenges posed by an immediate social environment, especially in the

case of younger women, appreciably weaken the existing interpersonal relationships and usually prompt a withdrawal from social life altogether and, often enough, also from active family

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life.<sup>1-7</sup> Depressed mood, apathy, anxiety, excessive sense of fatigue, and abandonment of previously pursued passions and hobbies may well bring about deep depression and, in extreme cases, suicidal thoughts.<sup>8-10</sup>

Pursuit of psychological therapy in oncological diseases is a long-term and very complex process. Putting together a self-image against the background of one's own life and a subjective assessment of its quality requires that an adequate evaluation of one's own circumstances and immediate social environment be first acknowledged as a prerequisite condition. Effective reconciliation with one's own circumstances and developing the right attitude toward them affect the way overall quality of one's life may be enhanced, as well as appreciably project onto the actual outcome of any treatment management already in progress.

The World Health Organization, based on the WHO Quality of Life Group (WHOQOL), defined quality of life as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.<sup>11</sup> In modern oncology, overall quality of life is one of the main determinants of success in cancer treatment. Quality of life assessment also offers information on the impact of the disease and the effects of treatment on various areas of a person's life. In many cases, psychological help provided by specialists and by the next of kin is absolutely crucial, as well as bodes rather well for the chances of restoring a person's previous self-image.<sup>12-18</sup> Several authors have already taken up the issues related to overall quality of life in postmastectomy women. Zegarski et al<sup>19</sup> compared overall quality of life before and after mastectomy in 30 patients of the Oncology Center, based on the results of the EORTC QLQ-C 30 and QLQ-BR 23 survey questionnaires, concluding that the surgical procedure adversely affected women's quality of life, especially in the social and physical health domains. Respondents complained of somatic pain which proved an appreciable obstacle in their everyday activities. Surgical treatment accounted for problems in pursuing everyday work duties and social life. Breast amputation most strongly affected the self-perception of one's own body. Musial et al<sup>20</sup> making use of the self-designed survey questionnaire, in conjunction with the WHOQOL-BREF questionnaire, established that mastectomy treatment adversely affected the patients' psychological well-being. They often suffered from depression, were anxious about dying, were prone to sudden mood swings, and even felt hostility toward their immediate social environment.

The scope of activities pursued by various mutual support groups and clubs associating a large number of postmastectomy women also offers a diversity of possibilities for enhancing overall quality of life. Biskup et al<sup>21</sup> highlighted the importance of pursuing physical exercises when going through such a difficult life's patch. A period of illness and attendant treatment management allows, on the one hand, to focus one's mind on the pursuit of a series of specifically structured activities, while on the other, one's preoccupied mind would be granted a much welcome, if temporary, relief from a burden

of depressive thoughts centered around the diagnosis. Such an option seems particularly essential for women suffering from any cancer-related emotional disorders.

Studies indicate that after reaching the age of 50, the period of the so-called biological stabilization comes to an end. This is when, especially in the case of women, perceptible decrease in physical activity takes place. Then, after reaching 60 years of age, the aging process intensifies. In the sixth decade of life, the effects of involutionary changes become even more apparent, for example, drop in physical fitness, mental resilience, difficulties with concentration, and difficulties with learning any new tasks. This is why women in the 50 to 60 years range need to take good care of their physical activity, with a view to maintaining their functional abilities at an age optimal level, which in turn determines overall quality of life.<sup>22-24</sup> This is particularly essential for the postmastectomy women. Hence, recreation is an increasingly widespread form of spending leisure time by women who have undergone an invasive breast cancer surgery. It has widely been acknowledged that regularly pursued physical activity enhances overall effectiveness of physiotherapy through stimulating the skeletal, muscular, and respiratory systems, while also being appreciably beneficial to one's emotional and behavioral paradigm. Systematic exercises facilitate lymphatic drainage, thus effectively reducing edema (local swelling).<sup>25-27</sup> Postmastectomy women enjoy numerous opportunities to make use of multiple forms of physical activity, for example, general gymnastics, walking, Nordic walking, cycling, dancing, swimming, or aquatic gymnastics.

The present study aimed to assess the quality of life of physically active and inactive postmastectomy women in the 50 to 60 years age range, and in particular, to establish whether in postmastectomy women individual's overall perception of quality of life and individual's overall perception of quality of health might be dependent on undertaking physical activity. Comparison of quality of life in the key 4 areas (WHOQOL-BREF questionnaire, ie, physical health, psychological, social relationships, and environmental) was made in the group of active and inactive postmastectomy women, respectively, verifying whether there are any differences in the quality of life in the respective domains between the physically active and inactive women, as well as when stratified by education level and the living environment.

## Methods

### Study Population and Recruitment

Cross-sectional study pursued by the authors in 2018 involved women aged 50 to 60 years, after radical unilateral mastectomy, grouped in the "Amazon Women Association" clubs, operating in the *Podkarpackie* region, in southeastern Poland. Amazon Clubs are nonmedical, nongovernmental social organizations providing psychological support and practical help to postmastectomy women. The *Podkarpackie* region was randomly selected as a research location from among 16 administrative regions in Poland. The size of the study population

sample representative of the above-referenced postmastectomy women aged 50 to 60 years was estimated, while taking into account the 95% confidence level and an admissible calculation error at the level of 5%. The sample numbered 136 women. The initial eligibility of women to the study group was determined making use of the simple dependent randomization method. The selected group was then verified in terms of individual compliance with the inclusion/exclusion criteria assumed for the study protocol:

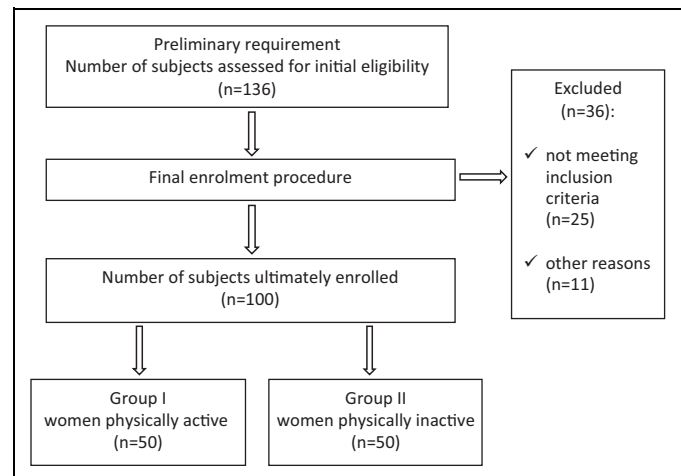
- Inclusion criteria: 50 to 60 years age range, unilateral mastectomy completed, time since mastectomy: minimum 2 years, radiotherapy completed, no complaints that might effectively preclude pursuit of physical activity, written consent for participation in the study protocol.
- Exclusion criteria: chemotherapy completed, medical conditions following reconstructive surgery.

Following completion of a comprehensive recruitment procedure, it was established that 36 women proved noneligible in terms of compliance with applicable inclusion/exclusion criteria. The remaining number of study participants was split up into two, 50-person strong groups, on the assumption of their members' willingness to undertake physical activity. Their allocation into the physically active and inactive ones was made against the criteria comprised in the short version of the International Physical Activity Questionnaire (IPAQ) adapted into the Polish language by Biernat et al.<sup>28</sup> The physically active women were construed the ones exhibiting sufficient level of physical activity, in line with the following prerequisite conditions:

- 3 or more days of intense physical effort, no less than 20 minutes a day;
- 5 or more days of moderate effort or walking, no less than 30 minutes a day;
- 5 or more days of any combination of physical activity (walking, moderate or intense physical effort) exceeding 600 MET-min/wk.

The ones allocated to the physically inactive group comprised women with insufficient level of physical activity, that is, total lack of physical activity, or physical activity that failed to meet the prerequisite condition of a moderate or vigorous effort.<sup>29</sup> Consecutive inclusion stages of the participants into the study protocol are presented in Figure 1.

In the group of physically active women, there were 4 respondents with vocational education and 23 with secondary and higher education, out of whom 28 lived in an urban environment and 22 came from a rural one. In the group of physically inactive ones, 16 respondents had vocational education, 25 declared secondary education, and 9 a higher one, out of whom 14 respondents represented an urban environment and 36 a rural one.



**Figure 1.** Flow of participants through the study.

### Study Design

The research was carried out with the aid of a diagnostic survey, following endorsement by the Bioethics Review Committee, University of Rzeszow (Approval Ref. No. 10/05/2018) and a written informed consent of all respondents. Sociodemographic and clinical data were collected through the self-designed questionnaire. The research tool of choice was a shortened version of the quality of life assessment survey—WHOQOL-BREF adapted into the Polish language by Wolowicka and Jaracz.<sup>30</sup> The questionnaire is comprised of 26 questions designed to assess the quality of life in the 4 key domains, that is, physical health, psychological, social relationships, and environmental. There are also 2 items assessed separately, that is, question 1 asks about an individual's overall perception of quality of his/her life, and question 2 asks about an individual's overall perception of his/her health. The responses are comprised in a 5-point scale (score ranging 1-5 points for each question). Respective domain scores are scaled in a positive direction (ie, the higher scores indicate the higher quality of life).

The research was carried out with the use of a direct probing method. The authors distributed the questionnaires among the respondents during the meetings in the “Amazon” clubs. All women were given specific instructions on how to fill in the questionnaires and returned them as soon as they had responded to all the questions. All procedures were carried out in full compliance with the Declaration of Helsinki.

### Analyses

Consistency of pertinent variables with reference values in normal distribution was verified by means of the Shapiro-Wilk test. The Pearson  $\chi^2$  test was used to assess the relationship between the type of responses given to the questions addressing the quality of life and the individual perception in relation to health, and belonging to a specific study group (a group of physically active or inactive women). The dependent

variables were the subjective evaluation of the quality of life and health, and the independent variables—physical activity or its lack.

The quality of life in 4 domains (physical health, psychological, social relationships, and environmental), within the group of physically active and inactive women, respectively, was compared using the analysis of variance (ANOVA) Kruskal-Wallis test. For each group, the dependent variable was the quality of life (measured by the results obtained for all 4 domains in total) and the independent variables (ie the grouping ones) were the individual domains. With regard to statistically significant differences, a post hoc test was completed for multiple comparisons.

In order to have the quality of life in 4 key domains compared between the physically active and inactive women, the Mann-Whitney *U* test was applied. Respective domains (physical health, psychological, social relationships, and environmental) were the dependent variables, whereas physical activity, or lack of it, was the independent variable.

The ANOVA Kruskal-Wallis test was applied to compare the quality of life in 4 key domains between women with vocational, secondary, and higher education, whereas the Mann-Whitney *U* test was used to compare the quality of life in women living in urban and rural environments, respectively. In both cases, the dependent variables were the respective domains, whereas the independent variable in the first case was education, and in latter one—living environment.

The results were considered statistically significant on the predetermined significance level  $\alpha = 0.05$ . The Stat Soft STATISTICA application (version 13.1) was used to process all test results.

## Results

Table 1 presents sociodemographic and clinical characteristics of the respondents. Table 2 provides the results of the participants' subjective assessment of the quality of their own lives and overall perception of their own health. There was a statistically significant dependence between undertaking physical activity and assessing overall perception of quality of life ( $P = .014$ ) and overall perception of health ( $P < .001$ ). Physically active women perceived overall quality of their life as a better one, as well as rated their own health much higher.

Physically inactive women rated it the highest in the social relationships domain ( $\bar{x} = 65.18 \pm 12.13$  points), then environmental ( $\bar{x} = 57.10 \pm 9.62$  points), and psychological ones ( $\bar{x} = 56.88 \pm 7.98$  points), whereas the physical health one scored the lowest ( $\bar{x} = 48.88 \pm 10.33$  points). The post hoc test showed statistically significant differences in the assessment of overall quality of one's life in the physical health domain in relation to the psychological ( $P = .004$ ), social relationships ( $P < .001$ ), and environmental ( $P = .005$ ) ones, as well as in the psychological domain in relation to the social relationships one ( $P = .005$ ), and in a social relationships one in relation to the environmental domain:  $P = .004$ ; (Table 3).

**Table 1.** Sociodemographic and Clinical Characteristics of the Respondents.

Variable	Physically Active	Physically Inactive
Age (years), $\bar{x} \pm SD$	55.21 $\pm$ 2.53	54.89 $\pm$ 2.62
Time since surgery (years), $\bar{x} \pm SD$	3.45 $\pm$ 1.02	3.40 $\pm$ 1.08
Level of education, n (%)		
Vocational	4 (8.0)	16 (32.0)
Secondary	23 (46.0)	25 (50.0)
Higher	23 (46.0)	9 (18.0)
Living environment, n (%)		
Urban	28 (56.0)	14 (28.0)
Rural	22 (44.0)	36 (72.0)
Marital status, n (%)		
Single	5 (10.0)	1 (2.0)
Married	26 (52.0)	28 (56.0)
Living as married	4 (8.0)	1 (2.0)
Separated	4 (8.0)	2 (4.0)
Divorced	7 (14)	11 (22.0)
Widowed	4 (8.0)	7 (14.0)
Mastectomy site, n (%)		
Unilateral	50 (100.0)	50 (100.0)
Bilateral	0 (0.0)	0 (0.0)
Management after mastectomy, n (%)		
Radiotherapy	50 (100.0)	50 (100.0)
Chemotherapy	0 (0.0)	0 (0.0)
Hormonal therapy	0 (0.0)	0 (0.0)
Breast reconstruction procedure, n (%)		
Yes	50 (100.0)	50 (100.0)
No	0 (0.0)	0 (0.0)

Abbreviation: SD, standard deviation.

Statistically significant intergroup diversity was encountered in a subjective assessments of quality of life in individual domains. Physically active women perceived it as a better one than the physically inactive peers (Table 4).

Data in Table 5 indicate that in the group of physically inactive women, physical health was a variable dependent upon individual level of education ( $P = .031$ ). The highest scores in this domain were noted in the women with secondary education, whereas the lowest in the ones with vocational education.

The data in Table 6 indicate that both in the group of physically active and inactive women, respectively, the results yielded in particular domains did not constitute the variables dependent upon the living environment.

## Discussion

The issues of overall medical condition of postmastectomy women and their attitude toward physical activity were taken up by a number of investigators. Fontes et al,<sup>31</sup> based on the results obtained with the aid of IPAQ, Stanford Health Assessment Questionnaire (HAQ-20), and Medical Outcomes Study 36-item Short-Form Health Survey (SF-36), demonstrated a lower level of physical activity and quality of life in postmastectomy women or women who had undergone breast-saving

**Table 2.** Individual's Overall Perception of Quality of Life and Health Based on the WHOQOL-BREF Questionnaire.

Value	Physically Active		Physically Inactive		Total	
	n	%	n	%	n	%
Individual's Overall Perception of Quality of Life						
Very poor	0	0.0	1	2.0	1	1.0
Poor	3	6.0	11	22.0	14	14.0
Neither poor nor good	18	36.0	24	48.0	42	42.0
Good	24	48.0	13	26.0	37	37.0
Very good	5	10.0	1	2.0	6	6.0
$\chi^2$ test	$\chi^2(4) = 12.36; P = .014^a$					
Individual's Overall Perception of Health						
Very dissatisfied	1	2.0	0	0.0	1	1.0
Dissatisfied	5	10.0	19	38.0	24	24.0
Neither satisfied nor dissatisfied	20	40.0	25	50.0	45	45.0
Satisfied	22	44.0	6	12.0	28	28.0
Very satisfied	2	4.0	0	0.0	2	2.0
$\chi^2$ test	$\chi^2(4)=20.86; P < .001^a$					

<sup>a</sup> $\alpha = 0.05$ .**Table 3.** Comparison of the Quality of Life in the Physically Active and Inactive Women in 4 Domains Based on the WHOQOL-BREF Questionnaire.

Domain	$\bar{x} \pm SD$	Max-Min	Q25	Me	Q75
	Physically Active				
Physical health	59.62 $\pm$ 8.11	81.00-44.00	56.00	59.50	63.00
Psychological	64.36 $\pm$ 8.54	81.00-44.00	56.00	69.00	69.00
Social relationships	77.00 $\pm$ 16.37	100.00-31.00	69.00	78.00	94.00
Environmental	61.64 $\pm$ 11.06	88.00-38.00	50.00	63.00	69.00
ANOVA Kruskal-Wallis test H = 45.64; P < .001 <sup>a</sup>					
Post hoc test	Physical Health	Psychological	Social Relationships	Environmental	
Physical health	-	0.148	<0.001 <sup>a</sup>	1.000	
Psychological	0.148	-	<0.001 <sup>a</sup>	1.000	
Social relationships	<0.001 <sup>a</sup>	<0.001 <sup>a</sup>	-	<0.001 <sup>a</sup>	
Environmental	1.000	1.000	<0.001 <sup>a</sup>	-	
Physically Inactive					
Physical health	48.88 $\pm$ 10.33	69.00-25.00	44.00	47.00	56.00
Psychological	56.88 $\pm$ 7.98	75.00-44.00	50.00	56.00	63.00
Social relationships	65.18 $\pm$ 12.31	100.00-31.00	56.00	69.00	69.00
Environmental	57.10 $\pm$ 9.62	81.00-38.00	50.00	56.00	63.00
ANOVA Kruskal-Wallis test H = 47.24; P < .001 <sup>a</sup>					
Post hoc test	Physical Health	Psychological	Social Relationships	Environmental	
Physical health	-	0.004 <sup>a</sup>	<0.001 <sup>a</sup>	0.005 <sup>a</sup>	
Psychological	0.004 <sup>a</sup>	-	0.005 <sup>a</sup>	1.000	
Social relationships	<0.001 <sup>a</sup>	0.005 <sup>a</sup>	-	0.004 <sup>a</sup>	
Environmental	0.005 <sup>a</sup>	1.000	0.004 <sup>a</sup>	-	

Abbreviation: ANOVA, analysis of variance; SD, standard deviation.

<sup>a</sup> $\alpha = 0.05$ .

**Table 4.** Comparison of the Quality of Life in 4 Domains of WHOQOL-BREF Questionnaire Between the Physically Active and Inactive Women.

Domain	Physically Active		Physically Inactive		Mann-Whitney <i>U</i> Test	
	$\bar{x} \pm SD$	Me	$\bar{x} \pm SD$	Me	Z	P
Physical health	59.62 $\pm$ 8.11	59.50	48.88 $\pm$ 10.33	47.00	4.92	<.001 <sup>a</sup>
Psychological	64.36 $\pm$ 8.54	69.00	56.88 $\pm$ 7.98	56.00	3.97	<.001 <sup>a</sup>
Social relationships	77.00 $\pm$ 16.37	78.00	65.18 $\pm$ 12.31	69.00	4.21	<.001 <sup>a</sup>
Environmental	61.64 $\pm$ 11.06	63.00	57.10 $\pm$ 9.62	56.00	2.10	.036 <sup>a</sup>

Abbreviation: SD, standard deviation.

<sup>a</sup> $\alpha = 0.05$ .**Table 5.** Comparison of the Quality of Life in 4 Domains, as Listed in the WHOQOL-BREF Questionnaire, Separately in the Physically Active and Inactive Women, Where the Independent Variable Was an Individual Level of Education.

Domain	Vocational Education		Secondary Education		Higher Education		ANOVA Kruskal-Wallis Test	
	$\bar{x} \pm SD$	Me	$\bar{x} \pm SD$	Me	$\bar{x} \pm SD$	Me	H	P
<b>Physically Active</b>								
Physical health	56.25 $\pm$ 10.21	56.00	59.70 $\pm$ 9.07	63.00	60.13 $\pm$ 6.90	56.00	0.69	.704
Psychological	61.00 $\pm$ 6.27	59.50	64.26 $\pm$ 7.48	69.00	65.04 $\pm$ 9.92	69.00	1.10	.575
Social relationships	72.00 $\pm$ 18.13	72.00	80.13 $\pm$ 16.00	81.00	74.74 $\pm$ 16.60	75.00	2.35	.308
Environmental	53.50 $\pm$ 10.97	53.50	62.35 $\pm$ 9.01	63.00	62.35 $\pm$ 12.71	63.00	2.45	.292
<b>Physically Inactive</b>								
Physical health	43.06 $\pm$ 10.32	44.00	52.16 $\pm$ 9.75	50.00	50.11 $\pm$ 8.13	50.00	6.90	.031 <sup>a</sup>
Psychological	57.06 $\pm$ 7.64	56.00	56.48 $\pm$ 8.00	56.00	57.67 $\pm$ 9.34	56.00	0.07	.964
Social relationships	63.69 $\pm$ 12.24	69.00	65.08 $\pm$ 11.87	69.00	68.11 $\pm$ 14.53	69.00	0.17	.917
Environmental	55.63 $\pm$ 9.18	50.00	58.52 $\pm$ 8.87	56.00	55.78 $\pm$ 12.63	56.00	1.31	.517

Abbreviations: ANOVA, analysis of variance; SD, standard deviation.

<sup>a</sup> $\alpha = 0.05$ .**Table 6.** Comparison of the Quality of Life in 4 Domains, as Listed in the WHOQOL-BREF Questionnaire, Separately in the Physically Active and Inactive Women, Where the Independent Variable Was the Living Environment.

Domain	Urban Environment		Rural Environment		Mann-Whitney <i>U</i> Test	
	$\bar{x} \pm SD$	Me	$\bar{x} \pm SD$	Me	Z	P
<b>Physically Active</b>						
Physical health	59.93 $\pm$ 7.61	59.50	59.23 $\pm$ 8.87	59.50	0.14	.888
Psychological	64.18 $\pm$ 9.74	69.00	64.59 $\pm$ 6.93	69.00	0.11	.911
Social relationships	77.68 $\pm$ 15.36	81.00	76.14 $\pm$ 17.90	75.00	0.26	.796
Environmental	61.71 $\pm$ 10.67	63.00	61.55 $\pm$ 11.78	63.00	-0.12	.905
<b>Physically Inactive</b>						
Physical health	52.36 $\pm$ 9.93	53.00	47.53 $\pm$ 10.30	44.00	1.22	.222
Psychological	59.43 $\pm$ 9.50	56.00	55.89 $\pm$ 7.21	56.00	1.12	.262
Social relationships	67.43 $\pm$ 12.84	69.00	64.31 $\pm$ 12.17	69.00	0.47	.639
Environmental	59.07 $\pm$ 10.33	59.50	56.33 $\pm$ 9.36	56.00	1.20	.229

Abbreviation: SD, standard deviation.

surgery, as compared to the ones who benefited from breast reconstruction. Sun et al,<sup>14</sup> based on the results of Rosenberg Self-Esteem Scale and Beck Depression Inventory, found that women after complete mastectomy, with no breast reconstruction, lower rated their performance in the emotional-social and physical domains, more frequently complained of financial problems, and had a worse self-perception of their own bodies

and lower self-esteem, as compared to the ones after breast-conserving surgery and the postmastectomy ones with a subsequent breast reconstruction. The results of the Satisfaction with Life Scale by Tasiemski et al<sup>32</sup>—with Satisfaction With Life Scale (measurement tool used in health promotion and psychology), as adapted by Juczynski, demonstrated that most women opted for passive ways of spending their leisure time,

for example, watching TV. The main factors determining overall satisfaction with life among the postmastectomy women were their sex life. Postmastectomy women regarded their professional pursuits as the least satisfying domain of life, which, following the surgery, decreased significantly and adversely affected their financial situation. Also the study by Sierko et al<sup>33</sup> revealed that the majority of postmastectomy women did not benefit from systematic physical activity, mainly due to physical adversities, for example, type of cancer treatment applied, secondary lymph edema, postsurgical pain, fear of somatic symptoms, depression and apathy, and nonavailability of specific information on the recommended scope of physical activity. Most of the respondents spent their leisure time passively, for example, watching TV, reading, or listening to the radio. The level of general physical activity decreased in the case of almost half of the respondents, and in approximately 30% of them, there was a change in the type and scope of physical activity pursued. Approximately 30% of the respondents from the rural areas and from the cities of up to 100 000 residents were physically active, while in the cities in excess of 100 000 residents, over 50% were physically active. A significant proportion of the respondents were willing to have their physical activity intensified, mainly through cycling, swimming, and Nordic walking. They were less willing to pursue their exercises with the aid of any sports/fitness equipment nor indeed any aerobics or yoga exercises. More than half of the respondents admitted that their prevalent mood mediated their physical activity. De Groef et al<sup>34</sup> concluded, based on a 2-year follow-up study involving 267 consecutive patients with breast cancer, treated in the Multidisciplinary Breast Center of the University Hospitals Leuven, that 2 years after breast cancer surgery, physical activity levels were still significantly lower, as compared to the preoperative values. Based on this limited recovery, it seems prudent to regularly monitor physical activity levels in patients with breast cancer, as well as keep them advised to stay physically active after surgery, with a view to returning to preoperative activity levels in the long term. This study indicates overall significance of long-term monitoring and subsequent patient coaching with regard to maintaining adequate levels of physical activity after breast cancer surgery. Bränström et al,<sup>35</sup> having assessed physical activity levels, self-rated health, and cancer-related symptoms, during the first 2 years after being diagnosed with breast cancer in the women under treatment at one of the 3 main hospitals in Stockholm, concluded that physical activity decreased after surgery, increased in the eighth month of the follow-up, and subsequently decreased slightly during the subsequent follow-up period. Their findings imply that being physically active even at a very low level (at least 60 minutes per day) increases the likelihood of good self-rated health and is associated with a lower risk of several common cancer-related symptoms such as pain, depression, and anxiety.

The present study was designed to assess the overall quality of life in the physically active and inactive postmastectomy women aged 50 to 60 years. The results indicated that individual's overall perception of the quality of life and overall self-

perception of own health in the postmastectomy women is dependent upon undertaking physical activity. Physically active women perceived overall quality of their life as a better one, as well as rated their own health much higher. Furthermore, some differences were noted with regard to the quality of life in the respective domains between the physically active and inactive women. The physically active, postmastectomy women rated their quality of life higher in each one of the 4 domains, as compared to the physically inactive ones. Our results provide strong evidence in support of postmastectomy women remaining physically active. They also fall well in line with some recent studies linking physical activity after a cancer diagnosis with the health outcomes. Landry et al<sup>36</sup> noted favorable impact of an adapted physical activity program on self-esteem, physical self-perception, quality of life, and global health status in patients with breast cancer. Sprod et al<sup>37</sup> assessed the impact of a 20-minute walk with the aid of a walking pole (twice a week, for 8 weeks) on the shoulder functionality and overall quality of life in breast cancer survivors. The participants showed appreciable improvement in the chest, back, and shoulder muscles strength, as well as the shoulder functionality, which consequently enhanced overall efficiency of daily living activities; this in turn directly translating onto overall quality of life. Szczepanska-Gieracha et al<sup>38</sup> assessed the impact of an 8-week Nordic walking training on a subjective assessment of overall quality of life in women, after breast cancer treatment. Mean age of the women under study was  $62.8 \pm 6.1$  years. The results of the Hospital Anxiety and Depression Scale and the WHOQOL-BREF survey questionnaire attested to a drop in anxiety level and depression, as well as to a statistically significant improvement in the psychological and environmental domain.

Szpurta<sup>39</sup> conducted research on overall quality of life in postmastectomy women in the oncology wards. The results yielded by the WHOQOL-BREF survey questionnaire gave grounds to believe that the assessment of overall quality of life was found directly proportional to an individual level of education in the postmastectomy women. No environmental determinants were established, though, as also corroborated by the results of our own research.

According to Rzonca and Fronczak,<sup>40</sup> mastectomy accounts for many negative changes in the woman's psyche, contributes to reducing individual physical fitness, may be instrumental in a number of health problems, and appreciable deterioration of interpersonal relationships. The authors noted the differences in this regard between the women living in an urban environment and those from the rural one. Women from the rural environment were far more concerned with breast amputation, as they feared outward stigmatization within their small, closely knit communities. In line with the findings of our own studies, both with regard to the physically active and inactive postmastectomy women, the quality of life in respective domains of the WHOQOL-BREF questionnaire was not dependent on the living environment. In the study by Rzonca and Forczak,<sup>40</sup> women with higher and secondary education rated overall quality of their life as the lowest and indicated a greater need for acceptance by their immediate social environment.

These data are inconsistent with the results of our own research, where physically inactive women with secondary education declared the highest quality of their life, while those with vocational education the lowest. No differences were found among the physically active women.

We established that, both in the group of physically active and inactive postmastectomy women, there were certain differences in the 4 life's areas, as listed in the WHOQOL-BREF questionnaire. Social domain was the highest rated aspect of quality of life in both the physically active and inactive postmastectomy women, while the physical health domain was rated the lowest. It would appear that a high rating in the social domain might well be related to their involvement in a scope of activities pursued in the "Amazon" club. Stadnicka et al<sup>41</sup> demonstrated the association between the individual rating of overall quality of life within the social domain and a more intense involvement of postmastectomy women in a number of social activities ("Amazon" club, voluntary work, or church organizations).

The main limitations of our study consisted in the fact that quality of life is dependent upon different factors, which makes it rather hard to select the specific variables that may impact quality of life independently; this being particularly difficult in the case of postmastectomy women. Consequently, each one of the variables not allowed for in the assessment may well become a confounding variable, which ultimately may impact the final conclusions. Despite these limitations, the results bring significant implications for the postmastectomy women.

Our research and reports from other authors suggest that physical activity has a positive effect on the quality of life of the women after mastectomy; therefore, it is an important element of the therapeutic procedure. Already at the hospital treatment stage, specific educational endeavors should be undertaken, particularly among older adults aged 50 years and over, with a view to educating the patients on the significance of physical activity in further treatment. This would actually help the patients to set themselves some brand-new priorities in life, like pursuing a healthy lifestyle, inclusive of a daily physical exercise routine, so that it would effectively become their second nature. In addition, it is worth highlighting the issue of increasing access to sports facilities, various forms of physical activity, and promoting physically active groups, such as the "Amazon" women. Such women groups, whose members share similar experiences, stand to offer effective motivation and much needed encouragement to others with regard to taking up and maintaining physical activity at an adequate level.

## Conclusions

1. Individual's overall perception of quality of life and quality of health in postmastectomy women was found dependent upon undertaking physical activity. Physically active women perceived overall quality of their life as a better one, as well as rated their own health much higher.
2. Both in the physically active and inactive postmastectomy women, there were certain differences with regard

to the 4 life's areas, as listed in the WHOQOL-BREF questionnaire. Social domain was the highest rated aspect of quality of life in both the physically active and inactive postmastectomy women, while the physical health domain was rated the lowest.

3. There were differences with regard to the quality of life in the respective domains between the physically active and inactive women. The physically active, postmastectomy women rated quality of life higher in each one of the 4 domains, as compared to the physically inactive ones.
4. In the case of the physically inactive postmastectomy women, the quality of life in the physical health domain was found dependent upon individual education level. The highest subjective assessment score was given by the women boasting secondary education and the lowest one by those with vocational education only. Both in the case of physically active and inactive postmastectomy women, the quality of life in the respective domains, as listed in the WHOQOL-BREF questionnaire, was found independent of the living environment.

## Authors' Note

The Bioethics Review Committee, University of Rzeszow, having assessed the study design, judged that ethics approval was not required under presently applicable Polish legislation, nevertheless it endorsed in principle the study protocol (Decision Ref. No. 10/05/2018). All participants were furnished with detailed information on the aims and methods to be used throughout the study and gave their written informed consent to participate. Ewa Puszczalowska-Lizis made substantial contributions to the conception and design of the study; acquisition, analysis, and interpretation of data for the work; drafting of the manuscript; final approval of the version to be published; and agreement to be held accountable for all key aspects of the work. Kinga Flak made substantial contributions to the conception and design of the study; acquisition, analysis, and interpretation of data for the work; critical contributions to the initial draft of the manuscript; final approval of the version to be published; and agreement to be held accountable for all key aspects of the work. Malgorzata Biskup made contributions to interpretation of data for the work; critical contributions to the initial draft of the manuscript; final approval of the version to be published; and agreement to be held accountable for all key aspects of the work. Marek Zak made substantial contributions to the conception and overall design of the study; analysis and interpretation of data; ultimate critical revision of the draft manuscript, with a view to determining its final version for submission; final approval of the version to be published; and agreement to be held accountable for all key aspects of the work.

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