

Article

Supportive care needs and quality of life after breast cancer surgery

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CITATION

Vlahović A, Tomić SD, Kucurski L, et al. Supportive care needs and quality of life after breast cancer surgery. *Psycho-Oncologie*. 2026; 20(9): 6251.
<https://doi.org/10.18282/po6251>

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Abstract: Women recovering from breast cancer surgery may experience persistent supportive care needs and reduced health-related quality of life (HRQoL), yet locally relevant evidence to guide postoperative care remains limited. This cross-sectional descriptive-analytical study assessed supportive care needs, HRQoL, and their interrelationships among women treated surgically for breast cancer at the Institute of Oncology of Vojvodina, Sremska Kamenica, Serbia. A total of 101 adult women completed the EORTC QLQ-C30 and SCNS-SF34 questionnaires. Descriptive statistics, reliability testing, correlation analyses, and group comparisons with Bonferroni correction were performed. Both instruments demonstrated high internal consistency ($\alpha = 0.904$ and 0.902 , respectively). Overall supportive care needs were low to moderate ($M = 2.52$, $SD = 0.51$), with the greatest needs reported in the physical and daily living ($M = 3.22$, $SD = 0.82$) and psychological domains ($M = 3.02$, $SD = 0.73$). Mean Global Health Status was 67.33 ($SD = 20.64$). Physical and emotional functioning were among the most impaired functional domains, while fatigue and pain were the most prominent symptoms. Global Health Status was not significantly associated with overall supportive care needs ($p = 0.539$). However, poorer physical, role, emotional, cognitive, and social functioning was associated with greater supportive care needs, while higher fatigue, pain, and nausea/vomiting were associated with increased need for support ($p_{\text{adj.}} < 0.00056$). In this sample, younger women reported higher sexuality-related supportive care needs. These findings highlight the importance of multidimensional postoperative assessment and individualized supportive care, with particular attention to physical recovery, psychological well-being, symptom burden, and sexual health.

Keywords: women; breast-cancer surgery; postoperative assessment; supportive care; quality of life; nursing

1. Introduction

Breast cancer is the most commonly diagnosed form of cancer in women globally. Its burden extends beyond survival to long-term physical, emotional, social, and practical consequences. Improvements in early detection and treatment have increased survival, but they have also highlighted the need to address quality of life, supportive care needs, and long-term recovery among women affected by breast cancer. Therefore, within the domain of contemporary psycho-oncology, a strong emphasis is placed on supportive care and quality of life, not only surgical and/or medical treatments [1]. In Serbia, breast cancer remains the leading malignancy among women and continues to represent a significant burden despite recent improvements in prevention, diagnosis, and treatment. Maintaining and improving these outcomes requires an integrated approach that includes organized screening,

early diagnosis, adequate treatment, rehabilitation, and continuous psychosocial and nursing support. Such support is particularly important after surgical treatment, when women may experience physical limitations, emotional distress, changes in body image, and unmet informational and supportive care needs [2,3].

Nurses, as members of the multidisciplinary oncology team, have an important role in assessing symptoms, identifying unmet supportive care needs, providing education, and encouraging patients' active participation in the recovery process. Postoperative care after breast cancer surgery represents an essential phase of recovery, which varies considerably among patients and may include pain, fatigue, reduced arm mobility, limitations in daily activities, emotional distress, and difficulties in adapting to changes caused by treatments. For this reason, nursing care plans should be individualized, continuous, and focused not only on clinical recovery, but also on preserving quality of life [4–6]. Effective communication, empathy, and timely information are particularly important, as patients undergoing breast cancer treatment often experience fear, anxiety, uncertainty, and emotional vulnerability. Nursing care plans should focus on psychosocial support, actively involve patients and family members, promote self-care, and facilitate a prompt return to everyday activities [7–9].

In addition to physical and emotional consequences, breast cancer and its treatment may negatively affect sexuality and intimate relationships. Surgical treatment, changes in body image, scarring, mastectomy, fatigue, pain, menopausal symptoms, reduced libido, and emotional distress may all contribute to sexual difficulties and reduced sexual well-being. These issues are often insufficiently discussed in routine care, although sexual health is an important component of quality of life after breast cancer treatment. Patients may need clear information, sensitive communication, psychological support, and, when appropriate, referral to specialized counselling. Addressing sexual health within supportive care is therefore important for improving overall adjustment, partner relationships, and quality of life after breast cancer surgery [10–13].

Supportive care needs refer to the perceived need for assistance in coping with the consequences of cancer and its treatment. These needs include psychological distress, physical symptoms, limitations in daily activities, sexuality-related concerns, communication with healthcare professionals, and the need for timely and understandable information. If these needs remain unidentified or unmet, they may contribute to poorer adjustment, emotional distress, and impaired quality of life.

Health-related quality of life is therefore an essential outcome variable in measuring the overall success of breast cancer care, particularly after surgical treatment [8,13].

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) is widely used to evaluate global health status, functional domains, and symptom burden in patients with cancer, while the Short Form Supportive Care Needs Survey (SCNS-SF34) assesses unmet supportive care needs across psychological, physical and daily living, patient care and support, sexuality, and health system and information domains [14–17].

Assessing supportive care needs together with quality of life may provide detailed understanding of patients' postoperative recovery and psychosocial adjustment. This is particularly relevant in multidisciplinary oncology practice, which emphasizes the psychological, social, behavioral, and quality-of-life aspects of cancer across the disease trajectory. By examining the relationship between supportive care

needs and quality-of-life domains in women treated surgically for breast cancer, this study may help identify the areas in which patients require the greatest support. The findings may inform individualized nursing care, psycho-oncological counselling, rehabilitation planning, and the development of patient-centered interventions aimed at improving recovery and overall well-being after breast cancer surgery.

2. Materials and methods

2.1. Study design and setting

This study was designed as a descriptive-analytical cross-sectional study, and it was conducted at the Institute of Oncology of Vojvodina in Sremska Kamenica, Serbia. The study examined supportive care needs and health-related quality of life among female patients who had undergone surgical breast-cancer treatment.

2.2. Participants and recruitment

Participants were recruited using convenience sampling from among female patients who attended a postoperative follow-up, and/or received care at the Institute from December 2025 to April 2026. Participation was voluntary, and all eligible patients were informed about the purpose of the study, the anonymous and confidential nature of data collection, and their right to withdraw at any time without consequences for their treatment. The inclusion criteria were: female patients, age 18 years or older, diagnosis of breast cancer, previous surgical treatment for breast cancer, ability to understand and complete the questionnaires, and willingness to provide informed consent. The exclusion criteria were: inability to complete the questionnaire independently or with minimal assistance, severe cognitive impairment, severe acute clinical deterioration at the time of data collection, incomplete questionnaire data, and refusal to participate. A formal a priori sample-size calculation was not performed; the final sample size was determined by the number of eligible women who agreed to participate during the recruitment period and provided complete questionnaires suitable for analysis. The total number of eligible patients approached and the number who declined participation were not systematically recorded. Therefore, the response rate could not be calculated. The final analyzed sample included 101 female patients.

2.3. Data collection

Data were collected using a sociodemographic questionnaire and two standardized patient-reported outcome measures. The sociodemographic questionnaire included age, education, employment status, socioeconomic status, place of residence, relationship status, living arrangements, and experience of a stressful life event during the previous year. Clinical and treatment-related variables (e.g. cancer stage, type of breast surgery, axillary procedure...) were not systematically collected in the original dataset and were therefore not included in the analysis.

Health-related quality of life was assessed using the EORTC QLQ-C30, developed as a cancer-specific, multidimensional instrument for assessing quality of life in oncology clinical trials and research. The translated version developed and provided by the EORTC was used in this study. It consists of 30 items and includes five functional scales: physical, role, emotional, cognitive, and social functioning; three symptom scales: fatigue, pain, and nausea/vomiting; a global health status/quality-of-life scale; and single items assessing dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties. Scores were calculated according to the EORTC scoring manual and linearly transformed to a 0–100 scale. For the functional scales, the following formula was used: $S = [1 - (RS - 1) / \text{range}] \times 100$,

where a higher score indicates better functioning. For the symptom domains, the formula $S = [(RS - 1) / \text{range}] \times 100$ was applied, where a higher score indicates greater symptom burden. The same principle was applied to the global health status scale, with higher scores indicating better global health status [18,19].

Supportive care needs were assessed using the SCNS-SF34, a free, brief patient-reported instrument for assessing perceived supportive care needs among adult cancer patients. The questionnaire contains 34 items grouped into five domains: psychological needs, physical and daily living needs, patient care and support needs, sexuality-related needs, and health system and information needs. Participants rated each item on a five-point Likert scale, ranging from 1, indicating that the issue was not a problem, to 5, indicating a high need for additional support. Domain scores were calculated by summing the responses for the items within each domain and dividing the total by the number of items in that domain. The total SCNS-SF34 score was calculated as the mean of all included items. Scores were intentionally retained on the original 1–5 response scale to preserve the original metric and facilitate clinical interpretation, with higher scores indicating greater perceived supportive care needs [20,21].

2.4. Missing data handling

Questionnaires were checked for completeness before analysis. Cases with substantial missing data or missing values in key questionnaire domains were excluded from the final analysis.

2.5. Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics, version 27. Descriptive statistics were used to summarize sociodemographic characteristics and questionnaire scores. Categorical variables were presented as frequencies and percentages, while continuous variables were presented as means, standard deviations, medians, interquartile ranges, ranges, and 95% confidence intervals, where appropriate.

Statistical analyses included reliability analysis (Cronbach's α), descriptive analysis, Pearson's correlation analysis, independent-samples t-tests, and one-way analysis of variance (ANOVA), with post-hoc tests and Bonferroni correction when appropriate.

The internal consistency of the SCNS-SF34 and the EORTC QLQ-C30 was examined using Cronbach's alpha coefficient. Reliability values of $\alpha \geq 0.70$ were considered acceptable. For the EORTC QLQ-C30, Cronbach's alpha was calculated for multi-item scales and subscales only, while single-item symptom scales were not included in the reliability analysis. As the EORTC QLQ-C30 is a multidimensional instrument, reliability results were interpreted primarily at the level of its standard multi-item domains. Pearson's correlation test was used to examine potential associations between EORTC QLQ-C30 domains and SCNS-SF34 total and domain scores. Independent-samples t-tests were used to compare mean scores between two-category sociodemographic variables, while one-way ANOVA was used for variables with more than two categories. Assumptions were assessed prior to the group comparisons. Levene's test was used to assess equality of variances. When the assumption of homogeneity of variance was violated, Welch's correction was applied. When ANOVA indicated statistically significant differences, post-hoc comparisons were performed where appropriate. For the correlation matrix, the Bonferroni-adjusted significance level was set at $p \leq 0.00056$ because 90 correlations

were examined. For group comparisons, Bonferroni correction was also applied to reduce the risk of type I error, with the adjusted level of statistical significance set at $p < 0.0083$ for the relevant multiple comparisons. Age was categorized as < 40 and ≥ 40 years for exploratory group comparison. The cutoff of 40 years was selected to distinguish younger women, who may experience distinct concerns related to sexuality, fertility, body image, intimate relationships, family roles, and long-term psychosocial adjustment, and it also provided two relatively balanced age groups in the present sample. Because key clinical and treatment-related covariates were not available, multivariable analyses adjusted for disease and treatment characteristics could not be performed. All statistical tests were two-tailed.

2.6. Ethical considerations

Ethical approval for the study was obtained from the professional board, ethics committee, and director of the Institute of Oncology of Vojvodina in Sremska Kamenica, Novi Sad, Serbia, decision number 4/25/3-4535.

3. Results

3.1. Reliability analysis

Internal reliability of the questionnaires was assessed by calculating the Cronbach's " α " values. The results are presented in **Table 1**.

Table 1. Results of the reliability analysis for the SCNS- SF34, and EORTC QLQ-C30 scales (N = 101).

<i>SCALE</i>	<i>ITEM</i>	<i>α</i>
The Supportive Care Needs Survey- Short Form (<i>SCNS- SF34</i>)	34	0.902
<i>Psychological</i>	10	0.811
<i>Physical and Daily Living</i>	5	0.777
<i>Patient Care and Support</i>	5	0.725
<i>Sexuality</i>	3	0.777
<i>Health System and Information</i>	11	0.816
European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (<i>EORTC QLQ-C30</i>)	30	/
Functioning Scale:	15	0.892
<i>Physical</i>	5	0.859
<i>Role</i>	2	0.772
<i>Emotional</i>	4	0.748
<i>Cognitive</i>	2	0.743
<i>Social</i>	2	0.807
Symptoms Scale:	7	0.862
<i>Fatigue</i>	3	0.836
<i>Nausea and Vomiting</i>	2	0.759
<i>Pain</i>	2	0.811
Global Health Status/Quality of Life Scale:	2	0.773

The internal consistency of the study instruments was assessed using Cronbach's α coefficient. The SCNS-SF34 demonstrated excellent reliability for the total scale, with a Cronbach's alpha of 0.902. The reliability of the individual domains was also acceptable to good, ranging from 0.725 to 0.816. The highest internal consistency was observed for the Health System and Information domain ($\alpha = 0.816$), while the lowest value was found for the Patient Care and Support domain ($\alpha = 0.725$). For the EORTC QLQ-C30, reliability was evaluated for multi-item scales and subscales. The overall item set showed high internal consistency ($\alpha = 0.904$), but because the instrument is multidimensional, the domain-level results were considered most relevant for interpretation. The Functioning Scale demonstrated high reliability ($\alpha = 0.892$), while the Symptom Scale also showed good internal consistency ($\alpha = 0.862$). Among the functional subscales, Cronbach's α values ranged from 0.743 for Cognitive Functioning to 0.859 for Physical Functioning. The Global Health Status/Quality of Life scale showed acceptable reliability ($\alpha = 0.773$). For the multi-item symptom scales, reliability values ranged from 0.759 for Nausea and Vomiting to 0.836 for Fatigue. Cronbach's alpha was not calculated for single-item symptom scales, including dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties. Overall, both instruments demonstrated satisfactory reliability in the present sample.

3.2. Descriptive analysis

Descriptive analysis was performed on the sociodemographic variables with the results presented in **Table 2**.

Table 2. Sociodemographic characteristics of the sample (N = 101).

<i>Sociodemographic Variables</i>	<i>Category</i>	<i>n (%)</i>
Age	< 40	49(48.5)
	≥ 40	52(51.5)
Employment Status	Employed	35(34.7)
	Unemployed	32(31.7)
	Retired	34(33.6)
Place of Residence	Rural	21(20.8)
	Urban	80(79.2)
Socioeconomic Status	Low	32(31.7)
	Below Average	33(32.7)
	Average	36(35.6)
Relationship Status	Partnered	60(59.4)
	No	41(40.6)
	Alone	28(27.7)
Living Arrangements	With Partner	41(40.6)
	Shared Household	32(31.7)
Education	Secondary School	36(35.6)

Continuation Table:

<i>Sociodemographic Variables</i>	<i>Category</i>	<i>n (%)</i>
	Higher Education	31(30.7)
	University	34(33.7)
„In the past year, have you experienced a stressful life event? “	Yes	53(52.5)
	No	48(47.5)

n – category sample size; N – total sample size; % – percentage.

The study sample included 101 participants. According to age, 49 participants (48.5%) were younger than 40 years, while 52 participants (51.5%) were older. Regarding employment status, 35 participants (34.7%) were employed, 32 (31.7%) were unemployed, and 34 (33.6%) were retired. Most participants lived in an urban area ($n = 80$; 79.2%), while 21 participants (20.8%) lived in a rural area. In terms of the socioeconomic status, 32 participants (31.7%) reported low, 33 (32.7%) reported below-average, and 36 (35.6%) reported average socioeconomic status. More than half of the participants ($n = 60$) reported being in a relationship (59.4%), while 41 participants (40.6%) were without a partner. Regarding living arrangements, 41 participants (40.6%) lived with a partner, 28 (27.7%) lived alone, and 32 (31.7%) lived in a shared household. The educational structure of the sample was relatively balanced: 36 participants (35.6%) had completed secondary school, 31 (30.7%) had completed higher/vocational education, and 34 (33.7%) had a university degree. When asked whether they had experienced a stressful life event during the previous year, 53 participants (52.5%) answered affirmatively, while 48 participants (47.5%) reported no such experience. Overall, the sample was relatively balanced in terms of age, employment status, socioeconomic status, and education. However, most participants lived in urban areas and slightly more than half were in a partner relationship and had experienced a stressful life event in the previous year.

Descriptive analyses were performed for responses to the SCNS-SF34, and EORTC QLQ-C30 questionnaires, with mean total and domain scores presented in **Table 3**.

Table 3. Results of the descriptive analysis for the “supportive care needs survey – short form 34” and “EORTC QLQ-C30” scales ($N = 101$).

<i>Scale</i>	<i>M(SD)</i>	<i>CI (95%)</i>		<i>Mdn(IQR)</i>	<i>Min–Max</i>
		<i>lb</i>	<i>ub</i>		
SCNS-SF34	2.52 (0.51)	2.42–2.62		2.58(0.7)	1.2–4
<i>Psychological</i>	3.02 (0.73)	2.87–3.16		3 (1.1)	1.2–4.9
<i>Physical and Daily Living</i>	3.22 (0.82)	3.06–3.38		3.4 (1.2)	1.4–4.6
<i>Patient Care and Support</i>	2.9 (0.85)	2.74–3.1		3 (1.4)	1–4.6
<i>Sexuality</i>	2.64 (1.11)	2.42–2.86		2.67 (2)	1–5
<i>Health System and Information</i>	2.68 (0.67)	2.55–2.81		2.73 (0.73)	1–4.36

Continuation Table:

Scale	M(SD)	CI (95%)		Mdn(IQR)	Min–Max
		lb	ub		
<i>EORTC QLQ-C30</i>					
Global Health	67.33(20.64)	63.25–71.4		66.67(33.3)	16.67–100
Functioning Scale:	55.39(19.14)	51.61–59.16		56(26.67)	1.33–93.33
Physical	51.68(25.71)	46.61–56.76		53.33 (46.67)	6.67–100.00
Role	53.14 (26.11)	47.98–58.29		50.00 (33.33)	0.00–100.00
Emotional	52.81 (23.37)	48.19–57.42		58.33 (25.00)	0.00–100.00
Cognitive	59.24 (27.64)	53.79–64.70		66.67 (50.00)	0.00–100.00
Social	60.07 (27.39)	54.66–65.47		66.67 (50.00)	0.00–100.00
Symptom Scale:	35.78 (17.96)	32.23–39.32		35.19 (31.48)	1.24–87.04
Fatigue	51.05 (25.30)	46.05–56.04		55.56 (33.33)	0.00–100.00
Nausea and Vomiting	29.21 (27.63)	23.75–34.66		16.67 (50.00)	0.00–83.33
Pain	47.03 (28.42)	41.42–52.64		50.00 (33.33)	0.00–100.00
Single Items:					
Dyspnea	25.08 (31.06)	18.95–31.21		0.00 (33.33)	0.00–100.00
Insomnia	45.88 (34.91)	38.98–52.77		33.33 (66.67)	0.00–100.00
Loss of Appetite	34.32 (29.61)	28.48–40.17		33.33 (66.67)	0.00–100.00
Constipation	29.37 (28.79)	23.69–35.06		33.33 (66.67)	0.00–100.00
Diarrhea	16.89 (21.92)	12.50–21.16		0.00 (33.33)	0.00–100.00
Financial Difficulties	43.23 (34.50)	36.43–50.04		33.33 (66.67)	0.00–100.00

M – mean; *SD* – standard deviation; *CI* – confidence interval; *lb* – lower bound; *ub* – upper bound; *Mdn* – median; *IQR* – interquartile range; *Min* – minimum value; *Max* – maximum value; *SCNS-SF34* – Short Form Supportive Care Needs Survey.

EORTC QLQ-C30 – European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30.

The mean total SCNS-SF34 score was 2.52 (SD = 0.51; 95% CI: 2.42–2.62), indicating low to moderate supportive care needs in the overall sample. Among the five domains, the highest mean scores were observed for Physical and Daily Living Needs (M = 3.22, SD = 0.82; 95% CI: 3.06–3.38) and Psychological Needs (M = 3.02, SD = 0.73; 95% CI: 2.87–3.16), suggesting that participants most frequently reported needs related to physical functioning, and daily activities. Lower mean scores were found for Sexuality Needs (M = 2.64, SD = 1.11; 95% CI: 2.42–2.86), as well as Health System and Information Needs (M = 2.68, SD = 0.67; 95% CI: 2.55–2.81). Overall, the findings indicate that postoperative patients with breast cancer reported the greatest supportive care needs in physical/daily living and psychological domains.

The mean Global Health Status score was 67.33 (SD = 20.64; 95% CI: 63.25–71.40), indicating a moderate to relatively good overall perception of health

and quality of life among the participants. The mean score for the Functional Scale was 55.39 (SD = 19.14; 95% CI: 51.61–59.16), suggesting moderate limitations in functioning. Among the functional domains, the highest mean scores were observed for Social (M = 60.07, SD = 27.39; 95% CI: 54.66–65.47) and Cognitive Functioning (M = 59.24, SD = 27.64; 95% CI: 53.79–64.70), while the lowest score was observed for Physical functioning (M = 51.68, SD = 25.71; 95% CI: 46.61 - 56.76). These findings suggest that physical functioning was the most affected quality-of-life domain in the sample. The mean Symptom Scale score was 35.78 (SD = 17.96; 95% CI: 32.23–39.32), indicating a moderate symptom burden. The most prominent symptoms were Fatigue (M = 51.05, SD = 25.3; 95% CI: 46.05–56.04), and Pain (M = 47.03, SD = 28.42; 95% CI: 41.42–52.64). Diarrhea showed the lowest mean score (M = 16.89, SD = 21.92; 95% CI: 12.50–21.16). Overall, participants reported moderate global quality of life, with the greatest functional impairment observed in physical functioning and symptom burden mainly related to fatigue and pain.

3.3. Inferential analysis

Pearson's correlation test was used to evaluate unadjusted associations between health-related quality-of-life domains assessed using the EORTC QLQ-C30 and supportive care needs assessed using the SCNS-SF34. The results are presented in **Table 4**.

Table 4. Correlation analysis between EORTC QLQ-C30 quality-of-life domains and SCNS-SF34 supportive care needs.

	<i>SCNS-SF34</i>	<i>Psychological Needs</i>	<i>Physical and Daily Living</i>	<i>Patient Care and Support</i>	<i>Sexuality</i>	<i>Health System and Information</i>
<i>Global Health</i>	−0.062	−0.096	−0.173	0.070	0.201*	−0.107
<i>Physical</i>	−0.514***	−0.394***	−0.393***	−0.486***	−0.387***	−0.310**
<i>Role</i>	−0.473***	−0.369***	−0.314**	−0.405***	−0.217*	−0.398***
<i>Emotional</i>	−0.574***	−0.563***	−0.387***	−0.522***	−0.339***	−0.343***
<i>Cognitive</i>	−0.511***	−0.377***	−0.281**	−0.503***	−0.345***	−0.348**
<i>Social</i>	−0.412***	−0.355***	−0.330**	−0.207*	−0.249*	−0.351**
<i>Fatigue</i>	0.472***	0.409***	0.443***	0.379***	0.249*	0.283**
<i>Nausea & Vomiting</i>	0.483***	0.401***	0.366***	0.543***	0.389***	0.196*
<i>Pain</i>	0.593***	0.451***	0.423***	0.545***	0.347***	0.376***
<i>Dyspnea</i>	0.454***	0.447***	0.307**	0.453***	0.440***	0.155
<i>Insomnia</i>	0.334*	0.347***	0.135	0.323**	0.289***	0.190
<i>Loss of Appetite</i>	0.357***	0.379***	0.314**	0.413***	0.218*	0.114
<i>Constipation</i>	0.292**	0.160	0.127	0.414***	0.325**	0.154
<i>Diarrhea</i>	0.254*	0.234*	0.203*	0.245*	0.163	0.152
<i>Financial Difficulties</i>	0.417***	0.344**	0.280**	0.314**	0.379***	0.242*

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.00056$ after Bonferroni correction.

Note. All values are presented as Pearson's Correlation Coefficient.

After applying Bonferroni correction for the correlation matrix, several

statistically significant associations remained between quality-of-life impairment and supportive care needs. Global Health Status was not significantly associated with the total SCNS-SF34 score or with most supportive care need domains. In contrast, the functional domains of the EORTC QLQ-C30 showed significant negative correlations with supportive care needs. Lower physical, role, emotional, cognitive, and social functioning were associated with greater overall supportive care needs. The strongest associations with total supportive care needs were observed for emotional functioning ($r = -0.574$), physical functioning ($r = -0.514$), cognitive functioning ($r = -0.511$), and role functioning ($r = -0.473$). Symptom burden was positively associated with supportive care needs. Higher levels of pain, nausea and vomiting, fatigue, dyspnea, appetite loss, and financial difficulties were related to greater overall supportive care needs. Pain showed the strongest correlation with total supportive care needs ($r = 0.593$), followed by nausea and vomiting ($r = 0.483$), fatigue ($r = 0.472$), and dyspnea ($r = 0.454$). These findings indicate that patients with more pronounced symptoms also reported greater need for support. Overall, poorer functioning and greater symptom burden were associated with higher supportive care needs in patients treated for breast cancer; however, these results represent unadjusted associations and should be interpreted cautiously because clinical and treatment-related covariates were not available.

Independent-samples t-tests and one-way ANOVA were performed to examine differences in supportive care needs among sociodemographic groups. Levene's test was used to assess the assumption of equality of variances, and Welch's correction was applied where this assumption was violated. Bonferroni correction for multiple comparisons was also implemented, with the adjusted significance threshold of $p < 0.0083$. Under this criterion, only the difference in sexuality-related needs between the age groups remained statistically significant. Participants younger than 40 years reported higher sexuality-related supportive care needs than participants aged 40 years or older (Welch's $t(96.90) = 3.11$, $p = 0.002$, mean difference = 0.65, 95% CI [0.24, 1.07]). This finding should be interpreted as an exploratory association.

4. Discussion

This study examined supportive care needs and health-related quality of life in female patients who had undergone surgical treatment for breast cancer. Three principal findings were identified. First, overall supportive care needs were low to moderate, with the highest needs observed in the physical and daily living domain and the psychological domain. Second, health-related quality of life was moderately impaired, particularly in physical functioning, while fatigue and pain were the most prominent symptoms. Third, poorer functioning and greater symptom burden were associated with higher supportive care needs. These findings support the importance of multidimensional postoperative assessment and individualized supportive care after breast cancer surgery [4,5,10,12,22–25].

4.1. Supportive care needs after breast cancer surgery

The predominance of physical and daily living needs in the present study is clinically expected. Surgical treatment for breast cancer may be followed by pain, fatigue, reduced arm mobility, limitations in household activities, and difficulties returning to previous social and family roles. These problems may persist beyond the immediate postoperative period and can interfere with independence and daily functioning. Similar findings have been reported in recent reviews of breast cancer survivors, where daily activity, physical needs, psychological/emotional needs, and

information needs were among the most frequently identified supportive care needs [5,8,22–25].

Psychological needs were also highly expressed in the present study and were strongly related to poorer emotional functioning. This finding is consistent with the wider survivorship literature, where psychological and emotional needs, including fear of recurrence, anxiety, uncertainty, and need for reassurance, are repeatedly identified as central concerns among breast cancer survivors. The relationship between poorer emotional functioning and higher psychological supportive care needs indicates that routine postoperative follow-up should include screening for emotional distress and timely referral to psycho-oncology services when needed. Therefore, the present findings support the need for structured postoperative assessment that goes beyond wound healing and includes daily functioning, rehabilitation needs, symptom burden, and self-care capacity [6,8,13,25–27]. Although the total SCNS-SF34 score in this study indicated low to moderate supportive care needs, this should not be interpreted as absence of clinically important needs. Previous longitudinal research has shown that many cancer survivors report few unmet needs overall, while a smaller but important subgroup experiences persistent or newly emerging needs over time [26,27]. This is relevant for the present study because mean scores may mask individual vulnerability. Some patients may require more intensive support, particularly those with greater physical symptoms, poorer emotional functioning, or sexuality-related concerns.

Although health-system and information needs were not the highest domain in the present sample, previous mixed-methods and prospective studies suggest that information, continuity of care, and self-management support remain essential during survivorship. Patients may report moderate overall needs while still requiring specific guidance regarding rehabilitation, side effects, follow-up, lifestyle, household activities, and access to appropriate professionals such as physiotherapists, psychologists, or specialist nurses. Therefore, lower average information scores should not be interpreted as absence of informational need, but rather as an indication that information should be individualized and delivered according to each patient's current recovery phase [4,11,27,29].

Sexuality-related needs also require attention, but the present finding should be interpreted cautiously. In this sample, women younger than 40 years reported higher sexuality-related supportive care needs than women aged 40 years or older. This association may reflect age-related differences in concerns related to body image, fertility, intimate relationships, family roles, and long-term psychosocial adjustment.

However, because the sample size was moderate, multiple comparisons were performed, and clinical variables were not available for adjustment, this result should be regarded as exploratory rather than definitive. Healthcare professionals should nevertheless create opportunities for sensitive, patient-centered communication about sexual health and referral to counseling or specialized support when appropriate [9,10,12,28].

4.2. Quality of life and symptom burden after breast cancer surgery

Although the overall perception of health was relatively preserved, several functional domains showed impairment. This is largely in line with reports from the literature, and indicates that postoperative recovery after breast cancer surgery should not be evaluated only through clinical or surgical outcomes, but also through patient-reported functioning, symptom burden, and ability to return to daily activities [13–15].

Physical functioning was among the most affected quality-of-life domains in

the present sample. This finding is clinically understandable because breast cancer surgery and adjuvant treatment may lead to pain, reduced arm mobility, fatigue, decreased strength, and limitations in household, work-related, and social activities [8,13,29,30]. The observed impairment in physical functioning is also consistent with the finding that physical and daily living needs were the highest supportive care need domain in this study. Together, these results suggest that patients with poorer physical functioning may require more structured postoperative rehabilitation, education about safe activity, symptom management, and support in returning to daily routines.

Fatigue and pain were among the most prominent symptoms in the present study. These symptoms are particularly important because they may affect several aspects of quality of life, including physical functioning, emotional well-being, sleep, social participation, and perceived need for support. Previous systematic reviews and meta-analyses have shown that physical activity and exercise interventions can improve global health-related quality of life in women with breast cancer and may also contribute to better physical fitness, reduced fatigue, and improved functioning [5,8,13,29–31]. Therefore, postoperative care should include assessment of fatigue and pain, as well as individualized advice regarding physical activity and rehabilitation when clinically appropriate.

4.3. Relationship between supportive care needs and quality-of-life domains

The combined use of EORTC QLQ-C30 and SCNS-SF34 provided complementary information. EORTC QLQ-C30 identified impaired functioning and symptom burden, while SCNS-SF34 identified patients' perceived need for support [18–21]. The finding that Global Health Status was not significantly associated with supportive care needs, despite significant associations across several functional and symptom domains, may be explained by the broad and subjective nature of the Global Health Status scale. Previous research suggests that global quality-of-life ratings may be less sensitive to specific changes across individual EORTC QLQ-C30 domains and may be influenced by response shift or recalibration processes [32,33]. Some women may perceive their overall health as relatively preserved despite experiencing specific limitations in physical, role, emotional, cognitive, or social functioning. This may reflect psychological adaptation, resilience, recalibration of expectations after cancer treatment, or the influence of social and family support [31,33]. Therefore, Global Health Status may be less sensitive to specific unmet supportive care needs than individual functional and symptom domains. This finding suggests that postoperative assessment should not rely only on a global quality-of-life indicator, but should also include detailed evaluation of functional impairment, symptom burden, and supportive care needs.

Taken together, these findings suggest that postoperative supportive care needs may not be fully reflected by patients' overall perception of health. Instead, difficulties in specific areas of functioning and greater symptom burden appear to be more closely related to the need for additional support. In particular, poorer physical, emotional, cognitive, role, and social functioning, together with symptoms such as pain and fatigue, were associated with greater supportive care needs. These findings support a multidimensional approach to postoperative assessment, in which functional limitations, symptom burden, and psychosocial concerns are evaluated alongside global quality of life to better identify patients who may benefit from individualized supportive care.

5. Conclusion

This single-center cross-sectional study found that women who had undergone surgical treatment for breast cancer reported low to moderate supportive care needs, with the highest needs observed in the physical and daily living and psychological domains. Health-related quality of life was moderately impaired, particularly in physical functioning, while fatigue and pain were the most prominent symptoms. Poorer functioning and greater symptom burden were associated with higher supportive care needs; however, these findings represent unadjusted associations and should be interpreted in light of the convenience sample, moderate sample size, absence of important clinical and treatment-related variables, and inability to calculate the response rate. The observed association between younger age and higher sexuality-related needs should also be interpreted cautiously. Despite these limitations, the combined use of SCNS-SF34 and EORTC QLQ-C30 may help healthcare professionals identify patients who require targeted symptom management, rehabilitation, psychological support, information provision, and sensitive counseling related to sexuality and intimate relationships. Future multicenter studies with larger samples and detailed clinical covariates are needed to confirm and extend these findings.

6. Strengths and limitations

This study has several notable strengths. First, the simultaneous use of two standardized and widely used instruments, the SCNS-SF34 and the EORTC QLQ-C30, enabled a comprehensive assessment of both supportive care needs and health-related quality of life in women following surgical treatment for breast cancer. By combining these two instruments, it was possible to evaluate not only functional status and symptom burden, but also patients' self-reported need for additional support. Another strength is the study's focus on the postoperative period, which is highly relevant to long-term recovery but is often assessed in clinical practice primarily in terms of surgical and somatic outcomes. The inclusion of patient-reported outcomes allowed aspects of recovery to be captured that may not always be identified through routine clinical assessment. Finally, the study provides data from a local clinical setting, where evidence regarding supportive care needs and quality of life among women following breast cancer surgery remains limited. The findings may therefore provide a useful basis for future multicenter and longitudinal studies, as well as for the development of more structured approaches to the assessment and support of patients after breast cancer surgery.

Several limitations should also be considered. First, the cross-sectional design does not allow conclusions about causality or changes in supportive care needs and quality of life over time. Second, the study was conducted in a single oncology institution using convenience sampling, which limits the generalizability of the findings to other healthcare settings and populations. Third, a formal *a priori* sample-size calculation was not performed, the number of eligible patients approached, number of patients who declined participation, and number of questionnaires excluded because of missing data were not systematically recorded; therefore, the response rate could not be calculated. Fourth, data were collected using self-report questionnaires, which may be influenced by recall bias, response bias, social desirability bias, or reluctance to report sensitive concerns such as sexuality-related needs. Fifth, important clinical and treatment-related variables were not included in the analysis. This limited the interpretation of the findings and prevented multivariable adjustment

for potential clinical confounders. Finally, cultural determinants of patient-reported outcomes should be considered. Cultural norms may influence how women report psychological distress, sexuality-related concerns, unmet needs, and perceived quality of life, which may limit the international generalizability of the results.

Author contributions: Conceptualization, A.V., S.D.T. and S.V.T.; methodology, A.V., S.D.T. and S.V.T.; formal analysis, A.V. and F.D.; investigation, A.V., A.R. and F.D.; data curation, A.V. and L.K.; writing—original draft preparation, A.V.; writing—review and editing, S.D.T., L.K., A.R., F.D. and S.V.T.; supervision, S.D.T. All authors have read and agreed to the published version of the manuscript.

Funding: None.

Ethical approval: The study was approved by the Professional Board, Ethics Committee, and Director of the Institute of Oncology of Vojvodina in Sremska Kamenica, Novi Sad, Serbia, decision number 4/25/3-4535. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Informed consent statement: Written informed consent was obtained from all participants prior to their inclusion in the study. Participation was voluntary, and participants were informed about the aims of the study and their right to withdraw at any time.

Data availability statement: The datasets generated and analyzed during the current study are not publicly available due to participant confidentiality and ethical considerations, but are available from the corresponding author upon reasonable request.

Conflict of interest: The authors declare that they have no conflicts of interest to report regarding the present study.

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