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Impact of post-treatment symptoms on supportive care needs among breast cancer survivors in South Korea

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ABSTRACT

Objective: The aim of this study is to investigate the factors influencing the supportive care needs of survivors of breast cancer who have completed major treatment.

Methods: A total of 121 survivors of breast cancer from an online community in South Korea participated in this study. The study variables were supportive care needs, physical symptoms, anxiety, and depression. Independent *t*-tests, one-way Analysis of Variance (ANOVA), Pearson's correlation, and hierarchical regression analyses were performed.

Results: The highest rankings of supportive care needs of survivors of breast cancer were medical system and information needs, patient care and support needs, psychological needs, sexual needs, and physical and daily life needs. Hierarchical regression analysis revealed that the participants' supportive care needs were explained by physical symptoms ($P < 0.001$) and anxiety ($P < 0.001$), accounting for 52.1% of the variance.

Conclusions: Supportive care needs of survivors of breast cancer have a high level of medical system and information needs, and posttreatment conditions are related to high physical symptoms and anxiety. In the future, it will be necessary to identify supportive care needs and apply interventions to reduce their physical symptoms and anxiety.

Introduction

Due to advancements in early screening, detection, and treatment, there has been a significant increase in the number of breast cancer survivors, resulting in extended survival for patients and a greater demand for long-term social adaptation care.¹ In Korea, breast cancer ranked first among female cancer cases in 2018, with 23,547 out of 115,080 cases (20.5%).² While the most common age group for breast cancer in the United States is between 55 and 64, in Korea, the incidence is higher in the 40s.³ Additionally, the 5-year relative survival rate for breast cancer patients has increased from 83.6% (1996–2000) to 93.3% (2014–2018).⁴ Therefore, providing physical and emotional support for breast cancer survivors is crucial to helping them return to daily life after treatment and improving long-term survival.⁵

Complications associated with breast cancer treatment can persist or occur immediately following treatment.⁶ A study conducted on breast cancer survivors between 6 months and 5 years after treatment found that 88% of survivors experienced at least one physical or psychological symptom.⁷ Physical complications following breast cancer treatment include pain,⁸ lymphedema,⁹ numbness in hands and feet,⁹ sleep

disorders,⁸ menopausal symptoms,⁸ and fatigue.⁹ Psychological complications include anxiety,¹⁰ depression,⁸ fear,⁸ and anger.¹⁰ These symptoms can negatively impact the lives of breast cancer survivors following treatment.¹¹

Supportive care needs for patients with cancer encompass various requirements that arise during the process of adapting to the disease experience. These needs include support for physical and psychological symptoms, social care, information, and spiritual support.¹² Failure to meet these supportive care needs significantly hinders the successful transition from the early stages to long-term survival for patients with breast cancer.⁷ Breast cancer survivors often require more extensive treatment than individuals with other types of cancer.¹³ After treatment, they desire to resume their daily lives but often experience intense anxiety about recurrence and metastasis.¹⁴ Physical and psychological challenges interfere with their daily activities and ability to work, thereby negatively impacting their relationships with family members.¹⁵

Survivors of cancer who have completed treatment often only visit the hospital during regular check-ups, which makes it difficult for them to discuss their care needs with medical staff, further complicating the process of meeting those needs.¹⁶ In a study conducted on breast cancer

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survivors, it was found that the younger the survivors, the higher their need for care, especially among those who underwent hormone therapy.^{17,18} Breast cancer survivors with multiple symptoms exhibit a high demand for comprehensive treatment and supportive care.¹⁹ A study measuring the supportive care needs of breast cancer patients following surgery revealed that patients within one year of surgery had the highest supportive care needs, particularly related to depression.²⁰ Additionally, breast cancer patients with high levels of depressive symptoms expressed more unmet information needs.¹⁹ Supportive care needs were also evident in patients with breast cancer who experienced anxiety,⁷ and anxiety influenced the demand for supportive treatment and the need for care, particularly regarding fear of cancer recurrence.^{7,19} Therefore, it is crucial to identify the factors that affect supportive care needs, including physical symptoms, anxiety, and depression, as major variables.

Patients with cancer have varying care needs depending on the stage of their illness. However, there have been numerous studies focusing on the care needs of patients with cancer undergoing treatment in Korea, while studies on survivors of cancer posttreatment remain insufficient^{21–23}. Therefore, the purpose of this study was to identify the factors that influence the supportive care needs of breast cancer survivors, with the aim of providing a foundation for developing appropriate education programs tailored to their needs. The specific research objectives of this study were as follows: (1) to identify the physical symptoms, anxiety, depression, and supportive care needs of breast cancer survivors; (2) to determine any variations in supportive care needs based on the general and disease-related characteristics of breast cancer survivors; and (3) to investigate the factors influencing the supportive care needs of breast cancer survivors.

Methods

Sample and setting

The subjects of this study were patients who had been diagnosed with breast cancer and had completed major treatments such as surgery, chemotherapy, and radiation therapy. The inclusion criteria for the study were females aged > 19 years who were diagnosed with breast cancer, patients with stage I to III breast cancer, and patients who were within 5 years of completing their major treatments for breast cancer. The exclusion criteria included patients diagnosed with secondary cancers unrelated to breast cancer, patients with recurrent breast cancer, and patients with terminal breast cancer at stage 4 (secondary cancer means if there is cancer in an area that is entirely different from the cancer that was first diagnosed). The cancer survival stages were classified as acute survival (< 2 years following cancer diagnosis), early survival (2–5 years), and long-term survival (over 5 years).²⁴ The probability of recurrence is significantly low after 5 years following a cancer diagnosis,²⁵ as evidenced by the cancer survival rate determined based on national cancer registration statistics using the 5-year relative survival rate.²⁶ While studies on cancer survivors typically focus on the time of cancer diagnosis, this study defined breast cancer survivors as “patients within 5 years following treatment completion” in order to identify symptoms and care needs of patients in the early survival stage who have completed major treatments (surgery, chemotherapy, and radiation).

The sample size for the study was calculated using the G*Power 3.1.9.7 program, based on Cohen's sample size formula.²⁷ The sample size calculation used an effect size (f^2) of 0.15, a significance level (α) of 0.05, a power ($1-\beta$) of 0.95, three tested predictors, and a total of eight predictors for hierarchical regression analysis. A total of 119 subjects were determined to be suitable for the hierarchical regression analysis, and data collected from 121 subjects were used for the analysis.

Instruments

Demographic characteristics

Descriptive data included the participants' age, marital status, religion, education, number of children, occupation, economic status, menopause

status, and primary caregivers. Disease-related characteristics were investigated based on the period following major treatment, breast cancer diagnosis, stage, presence of chronic disease, hormone therapy, and specific breast cancer treatments.

Supportive care needs

The supportive care needs of breast cancer survivors were measured using the Supportive Care Needs Survey-Short Form 34 (SCNS-SF34), which was developed by Boyes et al.,¹⁴ translated by Ham,²⁸ and revised by Bae.²⁹ The SCNS-SF34 consists of a total of 34 questions and is divided into five areas: psychological needs (10 items), health systems and information needs (11 items), physical and daily needs (5 items), patient care and support needs (5 items), and sexuality-related needs (3 items). Respondents used a 5-point scale ranging from ‘not necessary-not applicable’ to ‘high need’ to indicate their level of agreement with each question. The scores were calculated to obtain a Likert scale for each area, and the total score for each participant ranged from 0 to 100 points, with higher scores indicating a higher need for care. During its development by Boyes et al.,¹³ the reliability of the SCNS-SF34 subdomains was measured with Cronbach's $\alpha = 0.88$ – 0.96 , and in this study, the overall tool reliability was Cronbach's $\alpha = 0.96$, with subdomain reliabilities ranging from Cronbach's $\alpha = 0.84$ – 0.95 .

Physical symptoms

The physical symptoms of breast cancer survivors were measured using the Memorial Symptom Assessment Scale-Short Form (MSAS-SF), which was developed by Chang et al.³⁰ and translated by Nho et al.³¹ The tool consists of a total of 32 questions and utilizes a 5-point Likert scale. Each question is rated from 0 points (‘not at all’) to 4 points (‘very much’), with higher scores indicating more severe pain or symptom experience. The physical symptom area includes 26 questions, along with four questions related to psychological symptoms and two questions regarding other symptoms. A score range of 0 to 112 is used for the physical symptom area, and scores were calculated by summing the responses. In the study by Chang et al.³⁰ the reliability of the tool was measured with Cronbach's $\alpha = 0.87$. Similarly, Nho et al.³¹ reported an overall reliability of Cronbach's $\alpha = 0.91$ for the questionnaire. In a study by Park et al.³² physical symptoms were measured by excluding the four psychological questions, resulting in a Cronbach's α of 0.93. In this study, the reliability of the physical symptoms questionnaire was Cronbach's $\alpha = 0.87$.

Anxiety and depression

Anxiety and depression were measured using the Hospital Anxiety Depression Scale (HADS), which was developed by Zigmond and Snaith³³ and translated by Oh et al.³⁴ The HADS consists of 14 questions, seven of which assess anxiety and seven of which assess depression. Each question is answered on a 4-point Likert scale, ranging from 0 (‘none’) to 3 (‘severe’). The total possible score ranges from 0 to 21, with higher scores indicating higher levels of anxiety and depression. The scores for anxiety and depression can be categorized into three groups based on severity. Scores of 0 to 7 points indicate no anxiety or depression, 8 to 10 points indicate mild anxiety or depression, and 11 to 21 points indicate moderate anxiety or depression. A score of eight or more on each tool indicates clinically significant anxiety or depression.³⁵ The reliability of the tool was measured by Cronbach's α , and at the time of this study, Oh et al.³⁴ reported a Cronbach's α of 0.89 for anxiety and 0.86 for depression. In a study of patients diagnosed with breast cancer within 3 months to 2 years, the reliability of anxiety and depression measures was Cronbach's α 0.95 and 0.86, respectively.³⁶ In this study, the Cronbach's α for anxiety and depression was 0.87 and 0.78, respectively.

Data collection procedure

The data collection period was from February 11 to March 15, 2022. After obtaining permission to write recruitment posts from the online

community, including research titles, research objectives, inclusion/exclusion criteria, study period and methods, study participation links, and quick-response (QR) codes, a notice was posted to recruit the study subjects. QR codes linked to the online survey site were provided, and subjects who read the explanation and agreed to participate were asked to fill out the questionnaire. The time spent filling out the questionnaire was about 15 to 20 min.

Data analysis

The collected data were analyzed using SPSS program version 22.0. Physical symptoms, anxiety, depression, and care needs of the participants were analyzed using means and standard deviations. Differences in care needs based on participant characteristics were assessed using an independent t-test and a one-way ANOVA. The relationship between physical symptoms, anxiety, depression, and care needs was examined using the Pearson correlation coefficient. Furthermore, factors influencing the care needs of the subjects were identified through hierarchical regression analysis.

The Durbin–Watson statistic was calculated to assess autocorrelation for the regression analysis, yielding a value of 2.035, which is close to the expected value of 2. This indicates that there were no issues with the assumption of independence for residuals. Additionally, the variance inflation factor (VIF) ranged from 1.021 to 1.922, which is below the threshold of 10, indicating no significant multicollinearity. Regarding the cancer survival stage classification, individuals with less than 2 years post-cancer diagnosis were classified as being in the acute survival stage, while those with 2–5 years post-diagnosis were categorized as being in the initial survival stage, consistent with previous studies.²⁴ For the post-treatment period, a 2-year timeframe was used based on prior research.⁷

Table 1
Supportive care needs according to characteristics of breast cancer survivors (N = 121).

Variables	Categories	n	%	Mean ± SD	t/F(P)
Age (years)	< 39	22	18.2	46.50 ± 18.11	1.22 (0.305)
	40–49	58	47.9	45.20 ± 19.97	
	50–59	34	28.1	39.44 ± 17.05	
	≥ 60	7	5.8	51.57 ± 22.85	
Marital status	Single	15	12.4	42.67 ± 14.23	2.08 (0.130)
	Married	97	80.2	42.86 ± 19.57	
	Divorced/widowed	9	7.4	56.11 ± 17.97	
Religion	Yes	67	55.4	43.94 ± 20.26	−0.16 (0.873)
	No	54	44.6	44.50 ± 17.69	
Education status	Below college graduated	22	18.2	47.86 ± 15.62	1.00 (0.320)
	Above college graduation	99	81.8	43.37 ± 19.74	
Children	Yes	96	79.3	44.43 ± 20.00	0.27 (0.790)
	No	25	20.7	43.28 ± 15.29	
Current employment	Employed	46	38.0	44.04 ± 16.65	0.09 (0.948)
	Unemployed	75	62.0	44.28 ± 20.53	
Household monthly income (dollars)	< 3000	33	27.3	48.09 ± 18.54	1.38 (0.169)
	≥ 3000	88	72.7	42.73 ± 19.17	
Menopause status	Postmenopausal	74	61.2	45.73 ± 19.52	1.12 (0.267)
	Premenopausal	47	38.8	41.77 ± 18.31	
Primary caregiver	Partner	91	75.2	43.10 ± 19.80	−1.10 (0.275)
	Others	30	24.8	47.50 ± 16.55	
Time since completion of treatment (months)	< 24	89	73.6	46.04 ± 18.57	1.80 (0.074)
	≥ 24–60	32	26.4	39.03 ± 19.81	
Breast cancer stage	I	46	38.0	41.54 ± 19.46	1.85 (0.162)
	II	53	43.8	43.70 ± 19.41	
	III	22	18.2	50.91 ± 16.48	
Comorbidity	Yes	40	33.1	47.18 ± 18.66	−1.21 (0.228)
	No	81	66.9	42.72 ± 19.22	
Hormone therapy	Yes	79	65.3	44.04 ± 18.54	0.83 (0.905)
	No	42	34.7	44.48 ± 20.28	
Treatment ^a	Surgery	12	9.9	43.33 ± 9.61	1.08 (0.360)
	Surgery + Chemotherapy	11	9.1	52.45 ± 22.45	
	Surgery + Radiation	24	19.8	40.04 ± 19.72	
	Surgery + Chemotherapy + Radiation	74	61.2	44.45 ± 19.41	

Comorbidity: hypertension, diabetes, obesity, hyperlipidemia, hyperthyroidism, hypothyroidism, uterus myoma, osteoporosis, etc.

^a Multiple response. SD, Standard deviation.

Ethical considerations

The Institutional Review Board (IRB No. MC21QISI0143) approved the contents and methods of this study. All participants provided online informed consent. After checking the recruitment notice posted on the online community, the study participants went to the survey page. The notice included an explanation that the subject may decide to stop participating in the study if they want to and that anonymity and the survey content were not used for research purposes. The online questionnaire files were encrypted, placed on a Universal Serial Bus (USB) drive, and stored in a locked cabinet in the researcher's private lab. After 3 years, at the end of the storage period, it was permanently deleted.

Results

General and disease-related characteristics of the subjects

A total of 121 participants were included in the study, with a mean age of 46 years (SD = 7.57, range = 28–69). Among them, 47.9% were in their 40s, 80.2% were married, 55.4% identified as religious, and 81.8% had an educational background beyond college graduation. Additionally, 79.3% of the participants had children, 62.0% were unemployed, and 27.3% had an average monthly household income below \$3000. Postmenopausal subjects accounted for 61.2% of the sample, and approximately two-thirds of the participants' spouses served as the primary guardians (75.2%). On average, participants had a time lapse of 16.69 ± 13.00 months since receiving major treatment for breast cancer. Among the cases, 43.8% were diagnosed at stage II, and 33.1% had underlying or chronic diseases. Hormone therapy was received by 65.3% of the patients, while 34.7% did not receive it. Regarding the treatments related to

breast cancer diagnosis, 61.2% underwent all three treatments, 19.8% received surgery and radiation, 9.9% had surgery alone, and 9.1% underwent surgery and chemotherapy. Analyzing the differences in care needs based on the general and disease-related characteristics of the subjects, no significant differences were found (Table 1).

Supportive care needs, physical symptoms, anxiety, and depression

The results for supportive care needs, physical symptoms, anxiety, and depression are presented in Table 2. The average score for supportive care needs was 44.19 ± 19.08 out of 100. Among the different domains, medical system and information needs scored 57.64 ± 24.66 points, patient support needs scored 46.45 ± 24.77 points, psychological needs scored 36.45 ± 23.45 points, sexual needs scored 34.70 ± 28.44 points, and physical and daily life needs scored 33.68 ± 20.23 points (Table 3).

Participants reported an average score of 15.45 ± 12.13 points for physical symptoms out of a total of 112 points (corresponding to an

average of 0.55 points for each question). The average number of physical symptoms with a score of 1 or higher (indicating very slight symptoms) was 8.15 ± 5.11. Among the specific symptoms, sleep disorders had the highest average score of 1.45 points (out of 4), followed by lack of energy with an average score of 1.25 points (out of 4), and dull sensation/sleepiness of hands and feet with an average score of 1.12 points (out of 4).

For anxiety, the average score was 8.02 ± 4.42 points out of 21 (corresponding to an average of 1.15 points for each question). Similarly, the average score for depression was 7.84 ± 4.03 points out of 21 (an average of 1.12 points for each question).

Correlation between supportive care needs, physical symptoms, anxiety, and depression

Correlations between care needs, physical symptoms, anxiety, and depression are presented in Table 4. Significant positive correlations

Table 2
Levels of supportive care needs, physical symptoms and psychological symptoms of breast cancer survivors (N = 121).

Category	Mean (sum score)	SD	Possible range	Mean (mean of items)
Supportive care needs	44.19	19.08	0–100	2.67
Health system and information needs	57.64	24.66	0–100	3.31
Patient care and support needs	46.45	24.77	0–100	2.86
Psychological needs	36.45	23.45	0–100	2.45
Sexuality needs	34.70	28.44	0–100	2.39
Physical and daily living needs	33.68	20.23	0–100	2.35
Physical symptoms	15.45	12.13	0–112	0.55
Anxiety	8.02	4.42	0–21	1.15
Depression	7.84	4.03	0–21	1.12

Table 3
Highly reported supportive care needs in participants with breast cancer survivors (N = 121).

Domain	Supportive care needs	Score (1–5)
HSI	29. Being informed about things you can do to help yourself get well	3.55
HSI	34. Having one member of hospital staff with whom you can talk about all aspects of your condition, treatment, and follow-up	3.52
HSI	27. Being informed about your test results as soon as feasible	3.50
HSI	26. Being adequately informed about the benefits and side effects of treatments before you choose to have them	3.43
HSI	23. Being given written information about the important aspects of your care	3.34
HSI	24. Being given information (written, diagrams, drawings) about aspects of managing your illness and side effects at home	3.33
HSI	25. Being given explanations of those tests for which you would like explanations	3.31
HSI	28. Being informed about cancer that is under control or diminishing (that is, remission)	3.29
HSI	30. Having access to professional counseling (eg, psychologist, social worker, counselor, nurse specialist) if you, your family, or friends need it	3.20
PCS	22. Hospital staff acknowledging and showing sensitivity to your feelings and emotional needs	3.17
PCS	20. Reassurance by medical staff that the way you feel is normal	3.05
PSY	9. Fears about the cancer spreading	3.00
HIS	33. Being treated in a hospital or clinic that is as physically pleasant as possible	2.99
HIS	32. Being treated like a person, not just another case	2.90
PCS	21. Hospital staff attending promptly to your physical needs	2.85
Average of total items		2.77

HSI, Health systems and information needs; PCS, Patient care and support needs; PSY, Psychological needs.

Table 4
Correlations between the supportive care needs and the related variables (N = 121).

	1	1–1	1–2	1–3	1–4	1–5	2	3	4
1. Supportive care needs	1								
1-1. Health system and information needs	0.86**	1							
1-2. Patient care and support needs	0.87**	0.76**	1						
1-3. Psychological needs	0.83**	0.50**	0.64**	1					
1-4. Sexuality needs	0.57**	0.41**	0.46**	0.39**	1				
1-5. Physical and daily living needs	0.64**	0.40**	0.46**	0.57**	0.23*	1			
2. Physical symptoms	0.58***	0.37**	0.41**	0.57**	0.30**	0.63**	1		
3. Anxiety	0.62***	0.36**	0.46**	0.74**	0.31**	0.47**	0.49**	1	
4. Depression	0.51***	0.32**	0.41**	0.55**	0.29**	0.43**	0.49**	0.65**	1

Pearson's correlation coefficient, r(P).
*P < 0.05, **P < 0.01, ***P < 0.001.

Table 5
Factors influencing supportive care needs (N = 121).

Variable	Model 1						Model 2					
	B	S.E.	β	t	P	VIF	B	S.E.	β	t	P	VIF
(Constant)	36.65	11.08		3.31	0.001		5.82	8.37		0.70	0.488	
Age	0.16	0.23	0.06	0.69	0.493	1.021	0.30	0.16	0.12	1.87	0.064	1.040
Marital status (Yes = ref.)												
No	7.50	4.36	0.16	1.72	0.088	1.037	2.70	3.10	0.06	0.87	0.386	1.062
Time since completion of treatment (months)	-0.18	0.14	-0.12	-1.28	0.204	1.092	-0.24	0.10	-0.17	-2.52	0.013	1.101
Stage (Stage I = ref.)												
Stage II	0.31	3.91	0.01	0.08	0.936	1.292	2.03	2.77	0.05	0.73	0.466	1.314
Stage III	8.89	4.98	0.18	1.79	0.077	1.266	7.73	3.53	0.16	2.19	0.030	1.285
Physical symptoms							0.52	0.12	0.33	4.35	< 0.001	1.430
Anxiety							1.82	0.38	0.42	4.80	< 0.001	1.922
Depression							0.39	0.41	0.08	0.96	0.339	1.889
F	1.766 (P = 0.125)						17.339 (P < 0.001)					
R ²	0.071						0.553					
R ² _{Adj}	0.031						0.521					

Durbin-Watson = 2.035. VIF, variance inflation factor.

were found between care needs and physical symptoms ($r = 0.58, P < 0.001$), anxiety ($r = 0.62, P < 0.001$), and depression ($r = 0.51, P < 0.001$).

Factors influencing supportive care needs

Despite the absence of differences in supportive care needs based on general and disease-related characteristics, a hierarchical regression analysis was conducted to examine the impact of physical symptoms, anxiety, and depression on supportive care needs. This analysis controlled for age, marital status, post-treatment period, and cancer stage, considering previous studies and factors with a $P < 0.15$ (Table 5). Dummy variables were created for cancer stage and marital status and included in the analysis.

In the first-stage model, no variables were found to have a significant effect on care needs. However, in the second-stage model where physical symptoms, anxiety, and depression were added, the overall adjusted R square increased by 3.1 to 52.1 ($R^2_{Adj} = 0.521$). The two-stage model revealed that physical symptoms ($B = 0.52, P < 0.001$) and anxiety ($B = 1.82, P < 0.001$) had a significant effect on supportive care needs. Among these factors, anxiety ($\beta = 0.42$) had the highest influence, followed by physical symptoms ($\beta = 0.33$).

Discussion

This study aimed to identify physical symptoms, anxiety, and depression in breast cancer survivors after completing treatment and examine the factors influencing their supportive care needs. The findings revealed that physical symptoms and anxiety significantly influenced the care needs of breast cancer survivors.

The study included participants with an average age of 46, with half of them in their 40s and approximately 30% in their 50s. The average duration of breast cancer treatment was 16.7 years, and more than one-third of the participants had been treated for less than 24 months. The distribution of breast cancer stages was as follows: 38.0% for stage I, 43.8% for stage II, and 18.2% for stage III. Data were collected from subjects using online communities, which resulted in a relatively young participant group, including many patients who had been treated for less than 24 months and actively sought information.

The results of this study revealed that the average supportive care needs of breast cancer survivors were 44.19 ± 19.08 out of a total of 100. Comparing these findings to previous studies that used the same measurement tool for assessing care needs in cancer patients, it was found that the level of supportive care needs in breast cancer patients falls higher than that of gynecological or colorectal cancer patients,³⁷ but lower than that of patients with esophageal or head and neck cancer.³⁸ In

a study by Han focusing on breast cancer patients in Korea who expressed a desire to return to work after treatment, the average score for supportive care needs was 56.25 points,³⁹ indicating a higher level of care needs compared to this study. However, it is important to note that Han's study included 28.1% of stage 4 breast cancer patients, making direct comparison challenging since this study did not include stage 4 breast cancer patients. Survivors who expressed a willingness to return to work reported experiencing fear, atrophy, social prejudice, discrimination, and a higher psychological need compared to other survivors.⁴⁰

This study revealed that the highest sub-item of supportive care needs among breast cancer survivors was the demand for medical systems and information. The findings align with previous research that also identified a high demand for medical systems and information among breast cancer patients.⁴¹⁻⁴⁴ A recent review investigating the supportive care needs of breast cancer patients further supports these results, highlighting the significant need for medical systems and information.⁴⁵ Survivors of breast cancer often face challenges in personally communicating with medical staff and seeking information online or through other media sources. The vast amount of medical knowledge available makes it difficult for them to select relevant information. Therefore, it is crucial to develop diverse educational resources that cater to the specific timelines and needs of patients.⁴⁶ Notably, the need for medical systems and information may vary across countries. In Singapore, where information accessibility is high, telemedicine services incorporating cancer and chronic diseases are conducted by nurses, resulting in lower demand for medical systems and information.⁴⁷ On the other hand, in Korea, counseling and education are predominantly provided at the beginning of cancer treatment, and it is often unclear if there is a dedicated department for educating cancer patients in hospitals.⁴⁴ Hence, understanding care needs should consider the specific medical information system of each country.

In this study, sleep disorders ranked highest among the reported physical symptoms, with an average score of 1.45 out of 4 points per question. This was followed by a score of 1.25 for lack of energy and 1.12 for dull sensations or sleepiness in the hands and feet. Additionally, 96% of the patients reported experiencing at least one physical symptom, with an average of 8.15 out of 28 physical symptoms reported. A previous study focusing on survivors of breast cancer between 6 months and 5 years posttreatment⁷ reported lower scores for physical symptoms. For instance, the average scores per question were 0.82 for lack of energy, 0.82 for dull sensation or numbness in hands and feet, and 0.61 for pain. In that study, 88% of patients reported experiencing at least one symptom. It was expected that the physical symptom scores in this study would be higher since we included patients who had just completed their treatments compared to previous studies.⁷ Furthermore, previous studies⁷ found that patients with high physical symptom scores had significantly higher scores on all items except for the sub-item of sexual

needs in the supportive care needs assessment. The results of this study showed that sexual needs were similar to psychological needs. Similar to this study,⁷ previous studies were conducted on Asians, but there are differences in survey methods and age of subjects, so further investigations will be needed. In this study, a positive correlation was observed between higher physical symptom scores and higher scores for supportive care needs. The greater the need for care, the more significant the impact on quality of life and the challenges of returning to society.³⁹ Therefore, the management and education of breast cancer survivors are crucial to addressing their care needs.

As a result of this study, anxiety was identified as a variable that significantly affects the supportive care needs of breast cancer survivors. The anxiety experienced by these survivors was characterized as mild but clinically meaningful, with scores exceeding eight points. In a study conducted in Switzerland⁴⁸ with breast cancer patients undergoing treatment, the average anxiety score was 5.13 out of 21, and the depression score was 3.29. These results indicate that anxiety is a factor that impacts the supportive care needs of breast cancer survivors. This finding aligns with a previous study,⁴⁹ which reported that breast cancer patients with clinically significant anxiety (eight points or more) had three times higher supportive care needs compared to those without such anxiety. Although direct comparisons are challenging due to variations in the targeted patient groups, cancer types, and countries of study, breast cancer survivors generally tend to score higher on anxiety and depression measures compared to other cancer types. When breast cancer survivors with psychological challenges seek follow-up care, it is important to provide appropriate medication and psychological counseling⁵⁰ to those in need of intervention. Conducting surveys to identify symptoms of depression and anxiety can help identify patients who require such support. Furthermore, from a long-term perspective, it is crucial to encourage breast cancer survivors to actively engage in programs that address anxiety and depression such as group support programs⁵¹ and expressive writing through diary entries.⁵² Local communities and hospitals should strive to develop and expand these programs specifically designed for breast cancer survivors.

Breast cancer, due to its various treatment modalities, including surgery, radiation treatment, chemotherapy, targeted treatment, and hormone treatment, can lead to several long-term and late complications and comorbidities, distinguishing it from other types of cancer survivorship. However, despite the need for diverse educational and rehabilitation services, these needs often go unmet.¹ In response to these demands, the Korean government launched the Cancer Survivor Integrated Support Project in 2017, aligned with the National Comprehensive Cancer Management Plan.⁵³ This initiative expanded the existing policy, which previously focused only on treatment-oriented cancer patients, to include the post-treatment lives of cancer survivors.⁵⁴ The government has established a legal framework to support the social adaptation and reintegration of cancer survivors and is conducting a nationwide study to establish an integrated support service delivery system for them.⁵⁵ Providing social support for cancer survivors not only promotes psychosocial adaptation and health promotion behavior but also has a positive effect on increasing survival rates.⁵⁶ In the case of breast cancer survivors, it is crucial to identify their supportive care needs in order to facilitate health promotion and successful reintegration into society. Physical symptoms and anxiety emerged as significant factors affecting the supportive care needs of breast cancer survivors. Therefore, it is necessary to identify these needs and develop interventions that address physical symptoms, alleviate anxiety, and provide appropriate information to effectively support breast cancer survivors in the future.

Limitations

This study has several limitations. Firstly, it focused on a specific group of breast cancer survivors in various posttreatment conditions within an online community, which limits the generalizability of the findings due to the cross-sectional nature of the study. Secondly, the

survey was conducted online, potentially biasing the sample towards individuals who are active in online communities and excluding those who prefer traditional paper questionnaires, especially considering the impact of COVID-19.

Conclusions

The assessment of supportive care needs is a crucial step in developing appropriate and effective interventions to enhance the quality of life for breast cancer survivors. This study has highlighted the significant medical system and information needs of breast cancer survivors, providing valuable data for the development of intervention programs aimed at managing symptoms and improving their quality of life. Future research should include larger sample sizes and diverse geographical locations to ensure the generalizability of the findings. Additionally, it would be beneficial to conduct studies that examine specific subgroups based on cancer stage and time of diagnosis, as well as delve deeper into survivors' supportive care needs and their experiences of returning to work. Comparative and analytical studies, including interviews and qualitative research, would contribute to a more comprehensive understanding of the topic.

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CRedit author statement

Unhee Kim: Conceptualization, Methodology, Data collection, Data curation, Formal analysis, Writing – Original draft preparation. **Ju-Young Lee:** Conceptualization, Methodology, Writing – Revised draft preparation. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Declaration of competing interest

All authors have none to declare.

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Ethics statement

The study was approved by the Institutional Review Board of the Catholic University of Korea (IRB No. MC21QISI0143). All participants provided written informed consent.

Data availability statement

The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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