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Original Article

Evaluation of the effect of accompanying lymphedema on the quality of life and anxiety level of caregivers of patients with breast and genitourinary system cancers

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ABSTRACT

Objectives: This study aims to determine the effect of accompanying lymphedema in patients with breast or genitourinary system cancer on the quality of life and anxiety levels of caregivers of these patients.

Patients and methods: Sixty-three caregivers (37 males, 26 females; mean age: 47.5±14.4 years; range, 20 to 80 years) of patients with breast or genitourinary system cancer and lymphedema, 40 caregivers (21 males, 19 females; mean age: 43.9±15.6 years; range, 18 to 75 years) of patients with breast or genitourinary system cancer without lymphedema, and 52 healthy volunteers (15 males, 37 females; mean age: 37.0±10.8 years; range, 23 to 68 years) as the control group were included in the cross-sectional study between May 10, 2022 and August 10, 2022. Sociodemographic information of the caregivers and information about the cancer diagnosis of the patients were recorded. The anxiety level of the caregivers was assessed with the Beck Anxiety Inventory (BAI), hopelessness level with the Beck Hopelessness Scale (BHS), and quality of life with the Caregiver Quality of Life Index-Cancer (CQOL-C).

Results: There was no statistically meaningful difference between the caregivers of patients with and without lymphedema and the control group regarding anxiety (p=0.818). The hopelessness level was higher in caregivers of patients with lymphedema compared to healthy controls (p=0.011). No statistically meaningful difference was found in CQOL-C burden, disruptiveness, positive adaptation, or financial concerns subscales in caregivers of patients with and without lymphedema (p=0.697, p=0.209, p=0.823, p=0.855, and p=0.257, respectively). Continuous caregiving was negatively associated with the total CQOL-C score in caregivers of patients with lymphedema (p=0.031). Complex decongestive therapy was negatively associated with high BAI and BHS scores (p=0.038 and p=0.034, respectively).

Conclusion: Lymphedema has a negative impact on hopelessness, while complex decongestive therapy has positive effects on anxiety and depression. Continuous caregiving may be considered a risk factor for high total CQOL-C scores.

Keywords: Anxiety, cancer, caregiver, lymphedema, quality of life.

Cancer is a global health problem and one of the leading causes of death.[1] The most common cancer that causes death in females is breast cancer.[2] Gynecological cancers, such as ovarian, endometrial, and cervical cancer, and cancers of the genitourinary system account for a significant proportion of the global cancer burden.[3,4] Cancer negatively affects the quality of life (QoL) in patients and is a significant cause of morbidity and mortality. A review of breast cancer patients highlighted that the assessment of the health-related QoL was as important as medical treatments in the course and prognosis of the disease.[5]

Cancer significantly affects the lives of patients and their caregivers. The care of patients with cancer is usually provided by family members or relatives.[6] Caregivers may experience problems in areas such as the disease process, hospital procedures, economic inadequacies, and access to health services. They

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may require assistance, which in turn affects their QoL.[7]

Various treatment-related complications may arise in breast and genitourinary system cancers in addition to the clinical pictures of the disease, as in other types of cancers. One of these complications is the development of secondary lymphedema along the extremity on the affected side as the result of obstruction of lymph drainage due to surgical removal of the lymph nodes in the affected extremity or destruction due to radiotherapy during breast or genitourinary cancer treatment.[8,9] Secondary lymphedema is an important health problem that adversely affects the patient's physical, psychological, and social life and, thus, the QoL.[9] There are studies in the literature that evaluate the QoL of patients with lymphedema due to breast and genitourinary system cancer and their caregivers. This study aimed to evaluate the effect of lymphedema on the QoL and anxiety level of caregivers of patients with breast and genitourinary system cancer.

PATIENTS AND METHODS

Sixty-three caregivers (37 males, 26 females; mean age: 47.5±14.4 years; range, 20 to 80 years) of patients with breast or genitourinary system cancer and lymphedema, 40 caregivers (21 males, 19 females; mean age: 43.9±15.6 years; range, 18 to 75 years) of patients with breast or genitourinary system cancer without lymphedema, and 52 healthy volunteers (15 males, 37 females; mean age: 37.0±10.8 years; range, 23 to 68 years) as the control group were included in the cross-sectional study conducted at the Yozgat City Hospital between May 10, 2022 and August 10, 2022. Demographic information of the caregivers (age, marital status, sex, education level, occupation, presence of chronic disease, and degree of relationship with the patient), clinical data about the cancer of the patients (date of diagnosis, duration, stage, and presence of metastasis), history of operations and oncological treatments they have received (date of operation, type of operation, chemotherapy, radiotherapy, and hormone therapy), information about lymphedema (date of onset, location, stage, and whether treatment was received), mobilization status of the patient, duration and period of care by the caregiver, and whether the care was provided in the hospital or at home were recorded. Caregivers with psychiatric illness, mental and cognitive disorders, those unable to communicate and cooperate, and those not between 18-65 years of age were excluded from the study. A written informed consent was obtained from each participants. The study protocol was approved by the Ankara City Hospital Clinical Research Ethics Committee (date: 27.10.2021, no: E2-21-978). The study was conducted in accordance with the principles of the Declaration of Helsinki. Beck Anxiety Inventory (BAI) and Beck Hopelessness Scales (BHS) were used to determine the anxiety level of caregivers. The BAI is a self-assessment scale developed to detect anxiety levels.[10] The scale consists of 21 items. It is a Likert-type scale scored between 0 and 3. The Turkish validity and reliability study was done by Ulusoy et al.[11] The BHS scale was developed by Beck et al.[12] The scale determines the negative expectations of the person about the future. It is a scale comprising 20 items and scored between 0 and 1. It is assumed that the individual has high hopelessness if the scores are high. The Turkish validity and reliability study was conducted by Seber et al.[13]

The staging system of the International Society of Lymphology was applied for the staging of lymphedema. Stage 0 (subclinical stage) was considered if the lymph transfer was impaired, but no measurable swelling or edema was observed. Stage 1 (spontaneously reversible stage) was identified if measurable swelling was present, pitting test was positive, and swelling could regress with elevation and compression dressings. Stage 2 (spontaneously irreversible stage) was identified if there was a marked accumulation of fatty tissue and protein-rich fluid, with tissue stiffness and positive Stemmer's sign. Stage 3 (lymphostatic elephantiasis stage) was recognized in the presence of severe swelling, excessive accumulation of adipose tissue, and fibrosis with marked skin thickening.[14]

Caregiver Quality of Life Index-Cancer (CQOL-C) was used to determine QoL. This scale assesses the QoL and the physical, emotional, family, and social functioning of caregivers. The scale consists of 35 questions with a 5-point Likert scale (0=not at all, 1=a little bit, 2=somewhat, 3=quite a bit, 4=very much). In the evaluation, the statements numbered 4, 10, 12, 16, 22, 23, 27, 28, and 34 on the scale are scored straight; the remaining items are scored inversely. The raw score for each subscale is multiplied by 35, divided by the number of items answered, and the score of the subscales is determined. The total score of the scale is obtained by summing and then multiplying by 35 of all items answered and dividing this obtained score by the number of items answered. As a result of this calculation, the score of each subscale and the total score of the scale varies between 0 and 140. Higher

TABLE 1
Demographic and clinical features of the participants

	Cancer with lymphedema (Group 1) (n=63)					Cancer without lymphedema (Group 2) (n=40)					Control group (Group 3) (n=52)					
	n	%	Mean±SD	Median	IQR	n	%	Mean±SD	Median	IQR	n	%	Mean±SD	Median	IQR	*p*
Age (year)			47.5±14.4					43.9±15.6					37.0±10.8			**<0.001**[a]
Sex																0.138[b]
Male	26	41.3				21	52.5				15	28.8				
Female	37	58.7				19	47.5				37	71.2				
Occupation																
Housewife	15	23.8				13	32.5				7	13.5				
Officer (public or private)	15	23.8				4	10.0				19	36.5				
Worker	11	17.5				8	20.0				3	5.8				
Retired	15	23.8				8	20.0				2	3.8				
Self-employment	3	4.8				10	25.0				4	7.7				
Student	4	6.3				3	7.5				1	1.9				
Unemployed	-	-				2	5.0				1	1.9				
Nurse	-	-				-	-				13	25.0				
Doctor	-	-				-	-				2	3.8				
Educational status																**<0.001**[b]
Illiterate	1	1.6				1	2.5				-	-				
Literate	-	-				1	2.5				2	3.8				
Primary school	12	19.0				10	25.0				6	11.5				
Secondary school	9	14.3				3	7.5				3	5.8				
High school	16	25.4				13	32.59				4	7.7				
University	25	39.7				12	30.0				37	71.1				
Marital status																0.138[b]
Married	54	85.7				28	70.0				39	75.0				
Single	9	14.3				12	40.0				13	25.0				
Annual income				45000	0-60000				70500	12600-90000				100000	36500-150000	**<0.001**[c]
Systemic diseases																0.558[b]
None	50	79.4				35	87.5				42	80.8				
HT	6	8.5				1	2.5				7	13.5				
DM	5	8.0				1	2.5				3	5.7				
Asthma	3	4.8				1	2.5				-	-				
CAD	-	-				2	5.0				-	-				
Hypothyroidism	1	1.6									1	1.9				
Rheumatic disease	-	-				1	2.5				2	3.8				

SD: Standard deviation; IQR: Interquartile range; HT: Hypertension; DM: Diabetes mellitus; CAD: Coronary artery disease; [a] One-way analysis of variance with post hoc Tukey test; [b] Chi-square test; [c] Kruskal- Wallis with post hoc Dunn test.

scores reflect a better QoL.[15] The Turkish validity and reliability study was done by Yakar and Pınar.[6]

Statistical analysis

All analyses were conducted with IBM SPSS version 25.0 software (IBM Corp., Armonk, NY, USA). Normality analysis was carried out using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The findings of the study were expressed as frequency and percentages. The variables without normal distribution were presented as median and interquartile range. Categorical variables were compared using the chi-square test, and according to expected frequencies, the Pearson chi-square test or Fisher exact test was used. For comparison of the numeric variables with normal distribution between more than two groups, one-way analysis of variance with post hoc Tukey test was performed. Numeric variables without normal distribution were compared with the Mann-Whitney U and Kruskal-Wallis tests, with the post hoc Dunn test between two or more groups, respectively. A *p*-value <0.05 was considered statistically significant.

RESULTS

The median age was higher in the groups of cancer patients with lymphedema (p<0.001) and without lymphedema (p=0.027) than in the control group (p≤0.01); therefore, no differences were found between the cancer groups (p=0.227). Groups were similar in terms of sex (p=0.138). The graduation rate from university was higher in the control group (p=0.138). Annual income was lower in the control group than in other groups (for both comparisons, p<0.001); however, annual income was similar between cancer patients with and without lymphedema (p=0.938). Groups were similar regarding the absence of systemic disease. Due to the low number of systemic diseases, no comparisons were made for each systemic disease. Demographic and clinical features of the participants are presented in Table 1.

Groups were similar in the rate of breast, ovarian, and endometrium cancer (p=0.117). The cancer stage of patients was similar in the groups (p=0.118). The mean rank of the number of surgeries for the groups was not different (p=0.148). The rate of chemotherapy and hormonal therapy were similar between groups (p>0.05), but the rate of radiotherapy was significantly higher in the group of patients with lymphedema. The median duration of lymphedema was 12 (7-36) months. Nearly 80% of the patients with cancer and lymphedema had stage 0 or 1 lymphedema. Only nine (14.3%) patients with lymphedema had received complex decongestive therapy (CDT).

The frequency of mobilization with or without support was similar in groups (p=275). The duration of receiving caregiving was similar for the groups (p=0.069). The group, including patients without lymphedema, had a significantly higher rate of continuous caregiving. There was no meaningful difference between groups regarding caregiving at home or hospital (p=0.167). Almost half of the caregivers were the spouses of the patients, and the ratio of a spouse as a caregiver was similar between the groups (p=0.691, Table 2).

The three groups were compared in terms of BAI and BHS. There was no meaningful difference between groups for BAI. Beck Hopelessness Scale scores were significantly different between groups (p=0.028). Post hoc analysis showed that the BHS score was significantly higher in the caregivers of patients with lymphedema group than the control group (p=0.011), but no significant differences were found in other pairwise comparisons (p=0.076 for caregivers of patients with and without lymphedema comparison; p=0.467 for caregivers of patients without lymphedema and the control group; Table 3).

Caregivers of cancer patients with and without lymphedema were compared in terms of CQOL-C scores. No statistically significant difference was found in CQOL-C burden, disruptiveness, positive adaptation, and financial concerns subscales in caregivers of patients with and without lymphedema (p=0.697, p=0.209, p=0.823, p=0.855, and p=0.257, respectively; Table 4).

Continuous caregiving was negatively associated with the total CQOL-C score in caregivers of patients with lymphedema (p=0.031). Age, sex, annual income of the patient, stage of lymphedema, duration of lymphedema, presence of metastasis, history of radiotherapy and chemotherapy, CDT history, status of mobilization, duration of caregiving, and caregiving in home or hospital were not associated with the total CQOL-C score in cancer patients with lymphedema (p>0.05). Complex decongestive therapy history was a negative predictive factor for high BAI and BHS scores (p=0.038 and p=0.034). Age, sex, annual income of the patient, stage of lymphedema, duration of lymphedema, presence of metastasis, history of radiotherapy and chemotherapy, status of mobilization, intermittent or continuous caregiving, duration of caregiving, and caregiving in home or hospital were not associated with BAI and BHS scores (p>0.05).

TABLE 2
Clinical features of the patients with cancer with or without lymphedema

	Cancer with lymphedema (Group 1)(n=63)				Cancer without lymphedema (Group 2) (n=40)				
	n	%	Median	IQR	n	%	Median	IQR	*p*
Diagnosis									0.117[a]
Breast cancer	34	54.0			32	80.0			
Ovarian cancer	14	22.2			5	32.5			
Endometrium cancer	12	19.0			3	7.5			
Prostate cancer	1	1.6			-	-			
Urinary bladder cancer	2	3.2			-	-			
Stage of cancer									0.118[a]
Stage 1	11	17.5			9	22.5			
Stage 2	33	52.4			14	35.0			
Stage 3	15	23.8			9	22.5			
Stage 4	4	6.3			8	20.0			
Metastasis									0.152[b]
Yes	11	17.5			12	30.0			
No	52	82.5			28	70.0			
History of surgery									**0.015[a]**
Yes	60	95.2			32	80.0			
No	3	4.8			8	20.0			
Number of surgeries									0.480[a]
1	53	84.1			27	67.5			
2	6	9.5			5	12.5			
3	1	1.69			-	-			
History of chemotherapy									0.167[a]
Yes	57	90.5			39	97.5			
No	6	9.5			1	2.5			
History of radiotherapy									**<0.001[b]**
Yes	56	88.9			12	30.0			
No	7	11.1			28	70.0			
History of hormonal therapy									0.441[b]
Yes	10	15.9			9	22.5			
No	53	84.1			31	37.5			
Duration of lymphedema (month)			12.0	7.0-36.0			-	-	
Stage of lymphedema									
Stage 0	20	31.7			-	-			
Stage 1	29	46.0			-	-			
Stage 2	13	20.6			-	-			
Stage 3	1	1.6			-	-			
History of CDT									
Yes	9	14.3			-				
No	54	85.7			-				
Mobilization									0.275[a]
Ambulation with support	11	17.5			5	12.5			
Independent ambulation	52	82.5			35	87.5			
Duration of taking caregiving			8.0	1.0-16.0			11.0	3.0-36.0	0.069[c]
Type of caregiving									**<0.001[b]**
Continuous	11	17.5			24	60.0			
Intermittent	52	82.5			16	40.0			
Place of taking caregiving									0.167[a]
Hospital	6	9.5			1	2.5			
Home	57	90.5			39	37.5			
Relationship of the caregiver									0.691[a]
Daughter	18	28.6			13	32.5			
Son	9	14.3			5	12.5			
Spouse	31	49.2			18	45.0			
Sister/brother	2	3.2			2	5.0			
Grandchild	3	4.8			-	-			
Bride	-	-			1	2.5			
Cousin	-	-			1	2.5			

IQR: Interquartile range; CDT: Complex decongestive therapy; [a] Pearson chi-square test; [b] Fisher's exact test; [c] Mann-Whitney U test.

TABLE 3
Comparison of BAI and BHS between groups

	Cancer with lymphedema (Group 1) (n=63)		Cancer without lymphedema (Group 2) (n=40)		Control group (Group 3) (n=52)		
	Median	IQR	Median	IQR	Median	IQR	*p*
BAI	10.0	3.0-20.0	8.0	3.26-16.75	8.0	3.75-19.0	0.818[a]
BHS	5.0	3.0-9.0	4.0	3.0-6.0	3.5	1.07.0	**0.028**[a]
Pairwise comparison of BHS between groups							
p (Group 1 and 2)							0.076[b]
p (Group 1 and 3)							**0.011**[b]
p (Group 2 and 3)							0.467[b]

BAI: Beck Anxiety Inventory; BHS: Beck Hopelessness Scale; IQR: Interquartile range; [a] Kruskal-Wallis with post hoc Dunn test; [b] Dunn test.

TABLE 4
Comparison of the CQOL-C in patients with cancer with or without lymphedema

	Cancer with lymphedema (Group 1) (n=63)		Cancer without lymphedema (Group 2) (n=40)		
	Median	IQR	Median	IQR	*p**
CQOLC					
Burden	73.5	45.5-94.5	76.0	56.87-96.25	0.697
Disruptiveness	105.0	80.0-130.0	117.50	100.00-130.00	0.209
Positive adaptation	85.0	75.0-105.0	87.50	70.00-113.75	0.823
Financial concerns	81.66	58.33-116.60	81.60	58.30-116.60	0.855
Total score	86.0	69.0-102.0	88.64	75.76-102.17	0.257

CQOLC: Caregiver Quality of Life Index-Cancer; IQR: Interquartile range; * Mann-Whitney U test.

DISCUSSION

Although there are studies in the literature examining the QoL and anxiety levels of caregivers of patients with cancer, no study has investigated the effect of accompanying lymphedema on the QoL of caregivers. In our study, no difference was found between the caregivers of cancer patients with accompanying lymphedema and those without lymphedema regarding demographic data and comorbid chronic diseases. Age was significantly lower in the control group. Most caregivers in both groups were middle-aged, unemployed, married, and had no comorbid chronic diseases. Most of the caregivers were spouses or children of the patients in both groups. In a study examining the sociodemographic characteristics of caregivers of cancer patients in our country, the mean age of caregivers was found to be 45±11.6, similar to our study.[16] In this study, 20.6% of the caregivers were children of the patients, and 70.6% lived with the patient. In our country, patient care is mostly provided by spouses or children, as patient care is seen as the responsibility of family members.[17]

The most common cancer observed in the patients of the caregivers was breast cancer. Breast cancer was present in 54% of the caregivers' patients, while this rate was 80% in patients with lymphedema. The other most common cancers in both groups were ovarian and endometrial cancer (22.2% and 32.5%, respectively). Surgery or radiotherapy for breast cancer can lead to the development of lymphedema, which can cause swelling of the arms, hands, chest, or chest wall for the rest of patients' lives.[18] In our study, the most frequent lymphedema development was following breast cancer. After gynecological cancers, urological cancers, melanoma, and sarcomas, secondary lymphedema may develop in the lower extremities.[19] In our study, lymphedema was most common in ovarian and endometrial cancer patients after breast cancer. While the history of cancer operation, hormone therapy, and chemotherapy were similar in both groups, the history of radiotherapy treatment was statistically higher in the group with lymphedema. This is an expected result since radiotherapy increases the risk of developing lymphedema by destroying lymph nodes.[20]

The mean duration of lymphedema in the patient group with lymphedema was 12 months. The patients mostly had stage 0 lymphedema (46%), and 85.7% had not received CDT for lymphedema. A study showed that lymphedema affects the patient's QoL, and this has been correlated with the patient's comorbidity, pain level, and clinical severity of the disease. It has been emphasized that early diagnosis and treatment of lymphedema are important to increase the QoL of patients.[21] Most of the patients in both groups were independently mobilized (82.5% in the group without lymphedema and 87.5% in the group with lymphedema). Independent ambulation rates were similar in both groups. In our study, no statistically meaningful difference was found between the anxiety levels of caregivers in the control group and the group with or without lymphedema. There was mild anxiety in all three groups. The BHS score was significantly higher in the caregivers of patients with lymphedema than in the control group. A study has revealed that caregivers of cancer patients have more psychological problems and a lower QoL than patients.[22] It has been shown that the risk of developing depression is higher in caregivers compared to the normal population. In one study, it was shown that the probability of developing anxiety in caregivers of cancer patients in the last year before the death of the patient increased to 46%, and the risk of developing depression increased to a significant level of 39%.[23] In this study, mild anxiety was found in caregivers, but contrary to the studies in the literature, there was no meaningful difference between the groups. When the QoL of caregivers was evaluated, it was found that QoL was negatively affected in both groups, but there was no statistical difference between the groups. Two studies have shown that lymphedema negatively affects the QoL in cancer patients.[18,24] In this study, we found that lymphedema accompanying cancer had no change in the QoL of caregivers compared to caregivers of cancer patients without lymphedema. In another study examining the QoL of caregivers, it was concluded that male caregivers experienced less stress than female caregivers, and male children attending for their parents experienced less stress than female children.[25] This study was conducted in a larger patient population than our study. In our study, it was observed that QoL and hopelessness scales were affected in caregivers, but no relationship was found between these scales with the characteristics of caregivers and clinical characteristics of cancer patients. However, the presence of lymphedema has a negative impact on hopelessness in a negative manner. More comprehensive studies with a larger patient population are needed to evaluate the QoL of caregivers of cancer patients. The studies to be conducted on this subject are important to provide suggestions about the level of anxiety and hopelessness of caregivers and their QoL. In a review of 1,115 caregivers in which psychosocial interventions were examined to improve the QoL of caregivers of cancer patients, it was concluded that interventions targeting role changes, problem-solving, and communication skills about patient care could improve the QoL of caregivers.[26]

The limitations of the study include the differences in the age of the patient group and control group, the relatively low number of patients, and the nonhomogenous distribution of the stages of lymphedema. Being the first study to evaluate the effect of the presence of lymphedema on the QoL of caregivers is a strong aspect of the study.

In conclusion, the QoL of caregivers of breast and genitourinary tract cancer patients with or without lymphedema is similarly affected in terms of anxiety, burden, disruption, positive adjustment, and financial concerns. However, the presence of lymphedema has a negative impact on hopelessness in a negative manner. Additionally, CDT has a positive effect on BAI and BHI. More comprehensive studies in larger populations are still needed to determine the effects of lymphedema on caregivers' QoL.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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