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Research Article/Araştırma Makalesi

Care Dependency and Quality of Life of Patients Receiving Outpatient Chemotherapy and the Burden of Caregivers

Ayaktan Kemoterapi Alan Hastaların Bakım Bağımlılığı ve Yaşam Kalitesi ile Bakım Verenlerin Yükü

Ece Devrim [a] Sibel Sevinç [b*]

[a] Nurse, İskenderun State Hospital, Oncology Department, İskenderun Hatay, Türkiye
[b] Prof. Dr., Hatay Mustafa Kemal University, Faculty of Health Science, Nursing Department, Hatay, Türkiye

ABSTRACT

Background/ Objective: Cancer is a disease that impacts quality of life, and over time, people with cancer can become dependent on care. Aim to examine the relationship between care dependency and quality of life of outpatient chemotherapy patients and the burden of their caregivers.

Material and Methods: The sample of the study was treated at State Hospital Outpatient Chemotherapy Unit; the study group consisted of 116 patients and 116 caregivers. The research is conducted as a cross-sectional and descriptive type of relationship-seeking study. Data were collected by the researcher; Using the Patient Information Form, Patient Caregiver Information Form, European Cancer Treatment and Organization Committee Quality of Life Scale (EORTC QLQ-C30), Care Dependency Scale (CDS) and Zarit Caregiving Burden Scale (ZCBS). It was collected through face-to-face interviews with written permission.

Results: It was determined that there was a statistically significant relationship between the CDS score and the general quality of life score from the EORTC QLQ-C30 subscale (r= 0.531; p<0.001), ZCBS score (r=-0.411; p<0.001). A statistically significant relationship was found between the general quality of life score from the EORTC QLQ-C30 QLS subscale and the ZBVYS score (r=-0.453; p<0.001).

Conclusion: Increasing patients' dependency on care and decreasing quality of life also increased the burden of care.

Keywords: Care dependency; quality of life; chemotherapy; caregiver burden.

ÖZ

Giriş/Amaç: Kanser, yaşam kalitesini etkileyen bir hastalıktır ve zamanla kanser hastaları bakıma bağımlı hale gelebilir. Bu çalışmanın amacı, ayakta tedavi gören kemoterapi hastalarının bakıma bağımlılığı ile yaşam kalitesi ve bakım verenlerin yükü arasındaki ilişkiyi incelemektir.

Gereç ve Yöntem: Çalışmanın örneklemi, Devlet Hastanesi Poliklinik Kemoterapi Ünitesinde tedavi gören hastalardan oluşmuştur; çalışma grubu 116 hasta ve 116 bakım verenden oluşmuştur. Araştırma, kesitsel ve tanımlayıcı bir ilişki arama çalışması olarak yürütülmüştür. Veriler araştırmacı tarafından toplanmıştır; Hasta Bilgi Formu, Hasta Bakıcı Bilgi Formu, Avrupa Kanser Tedavi ve Organizasyon Komitesi Yaşam Kalitesi Ölçeği (EORTC QLQ-C30), Bakım Bağımlılığı Ölçeği (CDS) ve Zarit Bakım Yükü Ölçeği (ZCBS) kullanılarak, yazılı izin alınarak yüz yüze görüşmeler yoluyla toplanmıştır.

Bulgular: CDS puanı ile EORTC QLQ-C30 alt ölçeğinden elde edilen genel yaşam kalitesi puanı (r= 0,531; p<0,001) ve ZCBS puanı (r=-0,411; p<0,001) arasında istatistiksel olarak anlamlı bir ilişki olduğu belirlenmiştir. EORTC QLQ-C30 QLS alt ölçeğinden elde edilen genel yaşam kalitesi puanı ile ZBVYS puanı arasında istatistiksel olarak anlamlı bir ilişki bulunmuştur (r=-0.453; p<0.001).

Sonuç: Hastaların bakıma bağımlılığının artması ve yaşam kalitesinin düşmesi, bakım yükünü de artırmıştır.

Anahtar Kelimeler: Bakım bağımlılığı; yaşam kalitesi; kemoterapi; bakım yükü.

***Corresponding Author:** Sibel Sevinç

E-mail: sibelsevis@gmail.com

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1. Introduction

The World Health Organization reports that approximately one in five people worldwide will experience cancer in their lifetime and that there will be approximately twenty million new cancer cases and 9.7 million deaths by 2022 (The International Agency for Research on Cancer [IARC], 2024; The World Health Organization [WHO], 2024). In Türkiye, the most common types of cancer are larynx and trachea/bronchi/lung, colon, lymphoid and hematopoietic cancers (Türkiye İstatistik Kurumu [TÜİK], 2025; Türkiye Cumhuriyeti Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü [HSGM], 2020).

People with cancer can become care-dependent and have low quality of life. Patients and their families are aware of the symptoms that may develop during the cancer disease process and how to manage them, and the patient is involved in the treatment process. Communication, positive attitudes, and caregiver support are important in improving the quality of life of patients (Tamayo et al., 2020; Wittenberg et al., 2017). Thus, it is expected that patients who become care-dependent during the disease process will improve their quality of life with this cognitive and secure state (Bilgiç & Pehlivan, 2023; Alaca et al., 2024).

Care dependency, a concept affected by both the individual and their environment, is defined as a decrease in the ability to meet individual care needs and their need for expert support (Durgun et al., 2022; Nursiswati et al., 2022). Caregivers may be affected by this process in various ways depending on the patient's care dependency. While the caregiving situation brings many difficulties to the caregiver in terms of economic, physical, mental, freedom, and social relations, the patient also experiences benefits such as developing close relationships, increased emotional bonds, personal development, and personal satisfaction (Bilgehan & İnkaya, 2021; Thomas Hebdon et al., 2023; Malki et al., 2025).

In Türkiye, those who care for cancer patients and meet their material and spiritual needs are generally the closest family members. Having a low level of education, being female, living with the patient, spending more time on care are risk factors for caregiver burden. Caregivers of cancer patients experience problems such as quitting work, inability to plan their own activities, spending less time with their family, interrupted education, headaches, fatigue, anger, decreased life satisfaction, and communication issues due to the care burden (Rezaei et al., 2024). Some studies have shown that the care burden increases as the patient's functional status worsens (Semere et al., 2021) and caregivers whose basic needs are not met perceive care as more burdensome (Kol & Karabulutlu, 2021).

This study examined the relationship between care dependency, quality of life, and caregiver burden in patients receiving outpatient chemotherapy treatment in the oncology clinic. This is thought to be important in terms of obtaining data that will improve the quality of life of patients, support caregivers in identifying and reducing their burden, and develop oncology nursing.

2. Methods

Patients and Settings

This research was conducted as a descriptive study with a relationship-seeking nature. The study population consisted of adult patients diagnosed with cancer who received outpatient chemotherapy treatment in a state hospital outpatient chemotherapy unit and their caregivers. The study was conducted between August 2022 and January 2024. It included patients diagnosed with cancer for at least six months, without any comorbidities that would affect their quality of life. Caregivers who had been providing care for at least six months, without any comorbidities that would affect their care burden, were also included. Participants who gave informed consent were included in the study. To determine the minimum sample size for this study, a power analysis was performed using the G*Power 3.1 program, considering appropriate tests and a 95% confidence interval, yielding 116 patients and 116 caregivers (Faul et al., 2007).

Instruments

Demographic and Clinical Characteristics

Patient Information Form

The eight items on the information form, created by the researchers through a literature review, consisted of patient characteristics such as education level, gender, age, income level, marital status, individuals living together, employment status, and occupation. The next eight items included disease characteristics such as primary cancer diagnosis, cancer stage, presence of metastasis, time of first cancer diagnosis, time of first chemotherapy, presence of another chronic disease, presence of a family member with cancer, and chemotherapy side effects (Menekli et al., 2020).

Caregiver Information Form

The form, created by the researchers through a literature review, contained a total of 14 multiple-choice questions about the caregivers' gender, age, marital status, individuals they live with, educational

status, profession, employment status, presence of another person they care for, degree of closeness to the patient, duration of care, presence of another caregiver, previous patient care experience and duration (if any), physical health status, and psychological status (Lafcı et al., 2020).

EORTC-QLQ-C30 Quality of Life Scale

It is a cancer-specific scale created by the European Organization for Research and Treatment of Cancer [EORTC] (Aaronson et al., 1993). Its validity and reliability in Turkish cancer patients was evaluated by Cankurtaran et al. (2008). The scale's sub-dimensions include functional scale (physical, role, cognitive, emotional, and social), symptom scale (fatigue, pain, and nausea/vomiting), and global health/quality of life (QoL) scale. The first 28 of the 30 items are four-point Likert type questions and are scored as follows: not at all: 1–-a lot: 4. A high score on global health status questions indicated a high quality of life, a high score on functional scales indicated a healthy functional level, and a high score on symptom scales indicated intense symptoms and a high level of problems (Cankurtaran et al., 2008; Giesinger et al., 2020). The 29th question asked the patient to evaluate their health, and the 30th question asked the patient to evaluate their overall quality of life on a scale of 1 to 7 (1: very poor and 7: excellent). The scale does not have a total score, so all the sub-dimension scores were converted to a 0–100 score, to be analyzed with the same system (Cankurtaran et al., 2008). The Cronbach's alpha coefficient value of the scale, which typically ranges from 0.56 to 0.85, was between 0.80 and 0.90 in this study.

Care Dependency Scale (CDS)

The scale was developed by Dijkstra in 1998 based on Virginia Henderson's human needs (Dijkstra et al., 1998). The validity and reliability study in Türkiye was conducted by Hakverdioğlu Yönt et al. (2010). The scale, which has no sub-dimensions and consists of 17 items to determine individuals' addiction levels, is rated as follows: 1: I am completely dependent–5: I am not dependent. The lowest score that can be obtained from the scale is 17 and the highest score is 85. A high score indicated that the patient was independent in meeting their care needs, while a low score indicated that the patient was dependent on others in meeting their care needs. The Cronbach's alpha coefficient value is 0.91 (Yönt et al., 2010). The Cronbach's alpha value found in this study was 0.94.

Zarit Caregiving Burden Scale (ZCBS)

It is a scale developed by Zarit, Reever, and Bach-Peterson in 1980 (Zarit & Bach-Peterson, 1980). The Turkish validity and reliability study of the scale was conducted by İnci and Erdem (2008). It consists of 22 items that determine the impact of caregiving on the caregiver's life. The scale is Likert-type, ranging from 0 to 4. The minimum score on the scale is 0, and the maximum score is 88. Higher scores indicated a higher care burden experienced by caregivers. Cronbach's alpha coefficient value is 0.95 (İnci & Erdem, 2008). The Cronbach's alpha value found in this study was 0.90.

Study Procedures

Before starting the research, ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of a University (decision no: 18, decision date: June 16, 2022), and permission was obtained from the relevant institution where the study was conducted, with a board decision dated July 21, 2022. This study was conducted in accordance with the principles of the Declaration of Helsinki.

To collect data, the researcher asked the questions in the scales via face-to-face interviews, and after voluntary consent was obtained from the patients and caregivers, approximately 15-20 minutes were allocated to each individual to complete each form.

Data Analysis

Statistical Package for Social Sciences (SPSS) v26 statistical software was used to analyze the data. Numbers and percentages were used for descriptive questions about patients and caregivers. The reliability of the data was checked using Cronbach's alpha value, and their suitability for normal distribution was checked by examining skewness and kurtosis values. During the analysis process, Pearson's correlation analysis was used to investigate a possible linear relationship between two or more quantitative variables. In statistical analyses, results with $p < 0.05$ were considered significant.

3. Result

Findings of patients

The mean age of the patients included in the study was 60.01 ± 13.10, with a minimum age of 26 and a maximum age of 92. Other socio-demographic data are shown in Table 1.

When the patients' primary diagnoses were examined, the three diagnoses with the highest rates were breast cancer (31.9%), lung cancer (19%), and colon cancer (17.2%), respectively. Other variables are shown in Table 1.

Table 1. Sample Scores for Patients Receiving Chemotherapy and Disease Characteristics (n=116)

Variable	Group	n	%
Age	26-44 years	19	16.4
	45-59 years	30	25.8
	More than 60 years	67	57.8
	Mean ± SD		60,01 ± 13,10
	(Range)		(26-92)
Gender	Female	67	57.8
	Male	49	42.2
Marital status	Single	10	8.6
	Married	106	91.4
Individuals living together	Single	18	15.5
	Family	98	84.5
Education	Literate	22	19
	Elementary/Junior high	57	60.3
	Senior high/ University and above	24	20.6
Working status	Working	8	6.9
	Not working	88	75.9
	Leaving due to illness	20	17.2
Occupation/Sector	Public	5	4.3
	Private sector	23	20.7
	Retired	43	37.1
	Housewife	45	37.9
Income	Income less than expenses	63	54.3
	Income equals expenses	53	45.7
Primer diagnosis	Breast cancer	37	31.9
	Lung cancer	22	19.0
	Pancreatic cancer	8	6.9
	Colon cancer	20	17.2
	Rectum kanseri	2	1.7
	Liver cancer	1	0.9
	Stomach cancer	2	1.7
	Endometrial cancer	1	0.9
	Kidney cancer	2	1.7
	Skin/Soft tissue cancer	3	2.6
	Leukemia	1	0.9
	Lymphoma	2	1.7
	Prostate cancer	7	6.0
	Testicular cancer	2	1.7
	Ovarian cancer	2	1.7
	Small intestine cancer	1	0.9
	Thyroid cancer	3	2.6
Diagnosis period	6-12 months	50	43.1
	13-24 months	18	15.5
	25 months and above	48	41.4
Cancer stage	1. stage	11	9.5
	2. stage	19	16.4
	3. stage	24	20.7
	4. stage	62	53.4

Metastasis area (n=138) *(*multiple answers)*	No	55	47.4
	Breast	3	2.6
	Respiratory system	15	12.9
	Digestive system	24	20.7
	Neurological system	4	3.4
	Blood and Circulatory system	4	3.4
	Lymphatic system	13	11.2
	Musculoskeletal system	15	12.9
	Head and Neck system	4	3.4
	Excretory system	1	0.9
Chemotherapy period	6-12 months	66	56.9
	13-24 months	19	16.4
	25 months and above	31	26.7
Chemotherapy side effects (n=160) **(****multiple answers***)**	No	29	25.0
	GIS** symptoms-weakness	70	60.3
	Anemia-tiredness	31	26.7
	Alopecia	16	13.8
	Pain-PPE***	14	12.1
Cancer in the family	Yes	56	48.3
	No	60	51.7
Chronic disease (n=140) ***(*multiple answers)***	No	65	56.0
	Diabetes Mellitus	25	21.6
	Hypertension	34	29.3
	Circulatory System Disorder	6	5.2
	Sickle Cell Anemia (Portör)	1	0.9
	Respiratory System Disease (Asthma /Bronchitis /COPD ****)	4	3.4
	Neurological disease	3	2.6
	Hypothyroidism	2	1.7
	Total	116	100.0

**GIS: Gastrointestinal; ***PPE: Palmar-Plantar Erthrodysesthezia (hand and foot syndrome); ****COPD: Chronic Obstructive Pulmonary Disease

Findings of Caregivers

The average age of the patient caregivers was 45.87 ± 13.21, with a minimum age of 18 and a maximum age of 70. Other socio-demographic variables are shown in Table 2.

36.2% of the caregivers were patients' relatives , 45.7% had been providing care for 1–12 months, 67.2% did not receive anyone's help in caregiving, 70.7% were inexperienced in caregiving, 29.3% did not experience any physical problems during caregiving, while fatigue with 64.7% was the most common physical problem. Other findings are shown in Table 2.

Table 2. Sample Scores for Patient Caregivers and the Care Process (n=116)

Variable	Group	n	%
Age	18-29 years	13	11.2
	30-39 years	24	20.7
	40-49 years	30	25.9
	50-59 years	25	21.6
	60-70 years	24	20.7
	Mean ± SD (Range)	45.87 ± 13.1 (18-70)	
Gender	Female	78	67.2
	Male	38	32.8
Marital status	Single	23	19.8
	Married	93	80.2

Having someone to depend on	Yes	78	67.2
	No	38	32.8
Education	Literate	6	5.2
	Elementary	44	37.9
	Junior high	12	10.3
	Senior high	19	16.4
	University and above	35	30.2
Working status	Working	41	35.3
	Not working	75	64.7
Occupation/Sector	Student	7	6.0
	Public	18	15.5
	Private sector	27	23.3
	Retired	16	13.8
	Housewife	48	41.4
Income	Income less than expenses	50	43.1
	Income equals expenses	66	56.9
Relationship to the patient	Children	36	31.0
	Partner	38	32.8
	Relative	42	36.2
Patient care duration	6-12 months	53	45.7
	13-24 months	16	13.8
	25 months and above	47	40.5
Presence of someone helping with care	Yes	38	32.8
	No	78	67.2
Experiencing physical problems while providing care *(* multiple answers)*	No	34	29.3
	Tiredness	75	64.7
	Change in appetite	22	19.0
	Sleep / Attention shift	54	46.6
	Change in self-care	17	14.7
Experiencing psychological problems while providing care *(* multiple answers)*	No	38	32.8
	Laugh /Cry state	40	34.5
	Not wanting to talk /	17	14.7
	Excessive desire to talk/	58	50.0
	Distress / Weakness / Hopelessness/ Fear	49	42.2
Changes in social life during caregiving (n=134) *(* multiple answers)*	No	55	47.4
	Change in current events tracking	19	16.4
	Decrease in Relationships with People Around and Neighborhood	60	51.7
Experiencing financial problems while providing Care	Yes	69	59.5
	No	47	40.5
Changes in family relationships due to caregiving	No	89	76.7
	Positive change	5	4.3
	Negative change	22	19.0
	Total	116	100.0

EORTC QLQ-C30 Quality of Life Scale, Care Dependency Scale, and Zarit Caregiver Burden Scale Scores and Their Relationship Findings

Findings regarding the sub-dimensions and total scores of the CDS, ZCBS, and EORTC QLQ-C30 are presented in Table 3.

Table 3. Care Dependency Scale (CDS), Zarit Caregiving Burden Scale (ZCBS) ve EORTC-QLQ-C30 Quality of Life Scale's (EORTC-QLQ-C30 QoL) Sub-dimensions and Findings Regarding Total Scores (n=116)

Scale	Sub-dimension	Mean	SD	Range	Number of scale questions
EORTC QLQ-C30 QoL	**Functional scales**	51.398	24,551	4.44-97.78	
	Physical functioning	49.912	23,938	0-89.74	1, 2, 3, 4, 5
	Role functioning	46.983	24,973	0-100	6, 7
	Social functioning	42.069	26,875	0-100	26, 27
	Emotional functioning	46.480	35,613	0-100	21, 22, 23, 24
	Social functioning	67.098	33,003	0-100	20, 25
	Symptom scales	46.696	35,659	0-100	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 28
	Global health status	71.839	28,353	0-100	29, 30
CDS	**-**	73.379	15,930	21	1-17
ZCBS	**-**	41.595	19,001	6	1-22

n: Sample

The relationship between the scales was analyzed using Pearson correlation analysis.

A statistically significant, positive correlation was found between the CDS total score and the functional status score from the EORTC QLQ-C30 subscale ($r = 0.545$; $p < 0.001$). A statistically significant, negative correlation was found between the symptom subscale scores ($r = -485$; $p < 0.001$). A statistically significant, positive correlation was found between the general quality of life subscale ($r = 0.531$; $p < 0.001$) (Table 4).

A statistically significant, negative correlation was found between the CDS total score and the ZCBS total score ($r = -0.411$; $p < 0.001$) (Table 4).

A statistically significant, negative correlation was found between the ZCBS total score and the EORTC QLQ-C30 functional status subscale score ($r = -0.588$; $p < 0.001$); a statistically significant, positive correlation was found between the symptoms subscale ($r = 0.540$; $p < 0.001$); and a statistically significant, negative correlation was found between the general quality of life subscale ($r = -0.453$; $p < 0.001$) (Table 4).

Table 4. Correlations between EORTC-QLQ-C30 Quality of Life Scale, Care Dependency Scale and Zarit Caregiving Burden Scale Scores

Pearson Correlation		**EORTC QLQ-C30 QoL**			**CDS**
		Functional scales	Symptom scales	Global health statü	
CDS	r	0.545	-0.485	0.531	1.000
	p	**<0.001**	**<0.001**	**<0.001**	
ZCBS	r	-0.588	0.540	-0.453	-0.411
	p	**<0.001**	**<0.001**	**<0.001**	**<0.001**

r: Pearson Correlation coefficient, p: Significance level

4. Discussion

In this study examining care dependency, quality of life, and caregiver burden in cancer patients, patients' functional health status was found to be moderate. They exhibited moderate symptoms, and their general quality of life was good.

Patients experience various side effects, most notably fatigue and GI symptoms. This is thought to be related to the disease, pain, and fatigue experienced during treatment. In their study, Yıldırım et al. (2025) mentioned practices to reduce symptoms, increase independence, and improve the quality of life in cancer patients (Yıldırım et al., 2025).

The low dependency level seen in patients indicated less reliance on others for care and vital needs. The fact that their caregivers also experienced moderate levels of difficulty may be considered a parallel finding. As the functional status of patients undergoing outpatient chemotherapy improved, their care dependency decreased. This finding demonstrates that they can independently perform activities of daily living and maintain good functional status without needing assistance.

As patients experienced more symptoms, their care dependency increased. Patients who can independently perform activities of daily living may be considered to have fewer symptoms. While reviewing the literature on symptoms and quality of life reported by patients, Berry (2011) mentioned that evaluating disease-related symptoms and treatment-related side effects in cancer patients and controlling symptoms effectively is crucial for improving quality of life in these patients (Berry, 2011). The increase in care dependency may be attributed to the increase in symptoms experienced by the patient.

It has been found that patients' quality of life increases as their care dependency decreases. One study found that care dependency and overall quality of life are interrelated factors. Support from nurses or caregivers who interact with patients receiving treatment can help patients focus on their daily activities (dressing, eating, bathing, etc.), while improving their overall quality of life (Hakverdioğlu Yönt, 2023).

As study participants' care dependency increased, their caregiver burden also increased. Studies have also determined that care dependency affects both patients and caregivers (Burucu et al., 2023). In their study, Morgan et al. (2022) stated that advanced cancer patients face increasing challenges in their daily living as disease progresses, and their caregivers may lose self-worth and personal values and also postpone their physical, emotional, and social needs (Morgan et al., 2022).

Cancer disease can lead to increased psychosocial distress and decreased health-related quality of life in caregivers (Kusi et al., 2023). In their study with patients registered in a home health unit and their primary caregivers, Taşdelen and Ateş (2012) found that as patients became more care dependent, the time caregivers spend on them increased, resulting in a time burden on caregivers (Taşdelen & Ateş, 2012). As a patient's functional status worsened, a caregiver's burden increased in terms of daily caregiving hours and intensity (Unsar et al., 2021). It is expected that patients will depend on others for vital issues such as nutrition, body hygiene, mobility, sleep, dressing, avoiding dangers, and communication, resulting in a material and moral burden on the caregiver. In Liou and Huang's (2023) study of colorectal cancer patients and their caregivers, family caregivers of patients with higher resourcefulness experienced less impact on their health than those with lower resourcefulness (Liou & Huang, 2023). It is recommended that caregivers choose appropriate coping methods when facing caregiving difficulties based on their own characteristics and the difficulty of the situation (Yan et al., 2024).

As patients improve their functional status and quality of life, their caregiver burden decreases. As patients' symptoms increase, the care burden increases. It can be argued that the symptoms associated with chronic illness lead to prolonged caregiving and increase caregiver burden. Effective management of symptoms improves patients' quality of life and enables them to live more active, safe and comfortable daily lives (Şahin & Özhanlı, 2025). Along with perceived burden, caregivers may experience depression and anxiety symptoms that may affect their capacity to provide care (Thana et al., 2021). Fellia et al. (2023) found that increased burden was associated with caregivers' stress (Fellia et al., 2023). It is possible that increased patient burden creates stress in caregivers and causes the burden to increase.

Limitations

The study was limited by the fact that it was conducted using a single research method, with outpatient chemotherapy patients and their caregivers participating at a state hospital in the district.

5. Conclusions

It was found that patients receiving outpatient chemotherapy had a moderate functional health status, experienced moderate symptoms, and had a good quality of life.

Patients' care dependency was low, and caregivers' care burden was moderate.

It was found that care dependency increased as symptoms increased and decreased as functional status and quality of life improved.

Nurses, as health professionals, are recommended to determine patients' quality of life, care dependency, and caregiver burden in cancer management and plan nursing interventions based on the results.

For caregivers to cope with the physical, psychological, social, and economic difficulties they experience, counseling services should be provided and public policies supporting caregivers should be developed.

The burden on caregivers should also be taken into consideration in the education of patients and oncology nurses.

It is recommended that caregivers of patients with high care dependency and low quality of life be given more support.

Conflict of Interest

The authors have no competing interests to declare that are relevant to the content of this article.

Author Contributions

All authors contributed to the conceptualization, design, literature review, analysis, writing, and editing of this study. Material preparation and data collection were performed by [ED]. Critical review and editing were performed by [SS]. All authors have read and approved the final text.

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