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Investigation of Symptoms and Independence in Activities of Daily Living Among Cancer Patients

Abstract

This study aimed to examine the symptoms experienced by cancer patients and their levels of independence in daily living activities. This descriptive and correlational study was conducted with 421 cancer patients at a city hospital in eastern Türkiye. Data were collected using a Patient Information Form, the Edmonton Symptom Assessment Scale, and the Katz Index of Independence in Activities of Daily Living. The patients' mean Edmonton Symptom Assessment Scale score was 4.17 ± 1.72 , while the mean Katz Index of Independence in Activities of Daily Living score was 0.77 ± 0.32 . Increased symptom burden and older age were associated with reduced independence in daily living activities among cancer patients. These findings suggest that symptom burden is a significant predictor of loss of independence in the Katz Index of Independence in Activities of Daily Living.

Keywords: Activities of daily living, cancer, independence, symptoms.



Kanser Hastalarında Semptomların ve Günlük Yaşam Aktivitelerinde Bağımsızlığın İncelenmesi Öz

Bu çalışma, kanser hastalarının yaşadıkları belirtileri ve günlük yaşam aktivitelerindeki bağımsızlık düzeylerini incelemeyi amaçlamıştır. Tanımlayıcı ve ilişki arayıcı nitelikteki araştırma, Türkiye'nin doğusunda yer alan bir şehir hastanesinde tedavi görmekte olan 421 kanser hastası ile yürütülmüştür. Veriler; Hasta Bilgi Formu, Edmonton Semptom Değerlendirme Ölçeği ve Katz Günlük Yaşam Aktivitelerinde Bağımsızlık İndeksi kullanılarak toplanmıştır. Hastaların Edmonton Semptom Değerlendirme Ölçeği ortalama puanı 4.17 ± 1.72 , Katz Günlük Yaşam Aktivitelerinde Bağımsızlık İndeksi ortalama puanı ise 0.77 ± 0.32 olarak belirlenmiştir. Artan semptom yükü ve ileri yaşın, kanser hastalarının günlük yaşam aktivitelerindeki bağımsızlığı azalttığı görülmüştür. Bulgular, semptom yükünün Katz Günlük Yaşam Aktivitelerinde Bağımsızlık İndeksine göre bağımsızlık kaybının önemli bir yordayıcısı olduğunu göstermektedir.

Anahtar kelimeler: Günlük yaşam aktiviteleri, kanser, bağımsızlık, semptomlar.



Introduction

Cancer is one of the leading disease groups worldwide, characterized by high morbidity and mortality, with its incidence increasing each year.¹⁻⁴ In 2022, cancer accounted for approximately 1.9 million deaths, making it the second leading cause of death globally.⁴ In addition to its high mortality rates, cancer often causes patients to experience numerous symptoms due to both the disease prognosis and the toxicities associated with treatment.⁵

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Cancer patients frequently encounter a wide range of physical and psychosocial symptoms, including fatigue, oral sores or bleeding, nausea and vomiting, weight loss, pain, fever, constipation, sadness, anxiety, dyspnea, changes in skin and nails, and numbness in the hands.⁶ These symptoms, which vary based on individual and disease characteristics, significantly affect patients' psychological well-being, work and social life, family roles, and spiritual health.⁷⁻¹²

Furthermore, these symptoms negatively influence patients' ability to carry out activities of daily living (ADLs). Cancer patients may struggle to independently perform essential daily tasks such as bathing, dressing, toileting, and maintaining personal hygiene, house cleaning, grocery shopping, eating, walking, and transferring.^{13,14} As symptom burden increases, patients' independence in performing ADLs tends to decline.¹⁵

Loss of functional capacity and increased disability in ADLs can lead to more frequent hospital admissions, a greater need for emergency care, prolonged long-term care requirements, and decreased survival.¹⁶ The symptoms experienced by cancer patients and their level of independence in ADLs can influence both the treatment process and the course of the disease. Therefore, assessing the symptom burden and independence in daily living activities among cancer patients is crucial.^{13,17}

This study demonstrates that the symptoms experienced by cancer patients constitute an important determinant of loss of independence in ADLs. The findings provide evidence-based information for prioritization in nursing care, individualized care planning, and early rehabilitation strategies. Accordingly, it is considered that adopting a multidisciplinary perspective in nursing care may contribute to strengthening care practices. In line with this, the present study aimed to investigate the symptoms experienced by cancer patients and their levels of independence in ADLs.

Study Questions

1. What symptoms do cancer patients experience?
2. What are the levels of dependence/independence of cancer patients in ADLs?
3. What is the relationship between the symptoms experienced by cancer patients and their levels of dependence/independence in ADLs?

Materials and Methods

Study Type and Design

This descriptive and correlational study was conducted between January and May 2024 at a city hospital located in eastern Türkiye, in accordance with the STROBE guidelines.¹⁸

Study Population

In 2023, a total of 469 cancer patients were admitted to the hospital and constituted the study population. Post hoc power analysis was performed to determine the adequacy of the sample size of the study. Using power analysis, the sample size was determined to be $n = 356$, with an effect size of 0.40, a power of 99%, and a margin of error of 0.05. (Correlation $H_1 = 0.68$, lower critical $r = -0.103$, Upper Critical $r = 0.103$, power 0.99). The study was completed with 421 participants. These values indicated that the sample size is at the desired level.¹⁹

Inclusion Criteria

Participants were cancer patients aged 18 years and older, who had received at least one cycle of cancer treatment (chemotherapy, radiotherapy, or targeted therapy), were able to communicate, and voluntarily agreed to participate in the study.

Exclusion Criteria

Patients who did not fulfill the inclusion criteria, and who expressed a desire to withdraw at any stage of the study, were excluded from the research.

Data Collection

Data were collected using the Patient Information Form, the Edmonton Symptom Assessment Scale (ESAS), and the Katz Index of Independence in ADLs. Interviews were conducted face-to-face and lasted approximately 10–15 minutes. Ethical approval was obtained from the University Ethics Committee, and written permission was granted by the hospital. Additionally, all participants included in the study provided written informed consent and voluntarily agreed to take part in the research.

Data Collection Tools

Patient Information Form

This form consists of a total of ten items concerning patients' age, gender, marital status, educational level, employment status, and economic situation, type of cancer, duration of disease, cancer stage, and type of treatment-related characteristics.²⁰⁻²³

Edmonton Symptom Assessment Scale (ESAS)

The instrument was originally developed in 1991 by Bruera et al.²⁰ The scale evaluates symptoms such as pain, fatigue, nausea, depression, anxiety, insomnia, appetite loss, general well-being, shortness of breath, changes in skin and nails, mouth sores, and numbness in the hands. Symptom severity is rated from 0 to 10, where 0 indicates the absence of a symptom and 10 represents the most severe level.²¹ In this study, the Cronbach's alpha of the scale was 0.80.

Katz Index of Independence in Activities of Daily Living (KATZ ADL)

The instrument was originally developed in 1963 by Katz et al.²² The index assesses individuals' independence in basic daily living activities (bathing, dressing, toileting, transferring, continence, and feeding). A score of "1" is given if the person is independent in an activity, and "0" if dependent. A total score of 6 indicates full independence, 4 indicates moderate dependence, and 2 or lower indicates high dependence.²³ In this study, the Cronbach's alpha was 0.89.

Data Analysis

The study data were analyzed using the licensed IBM SPSS Statistics 22.0 software (IBM Corp., Armonk, NY, USA). Descriptive statistics (number, percentage, mean, standard deviation, median, percentiles, maximum, and minimum), One-Way ANOVA, Pearson correlation coefficient, and independent samples t-tests were used. Results were evaluated at a 95% confidence interval with a significance level of $p < 0.05$. The data were determined to meet the assumption of normal distribution based on the results of normality tests. The normality of the data was evaluated using skewness and kurtosis values. Distributions with skewness and kurtosis values between -2 and +2 were considered approximately normal.

Results

A total of 421 cancer patients were included in the study. The mean ESAS score was 4.17 ± 1.72 , while the mean Katz ADL score was 0.77 ± 0.32 . The most frequently experienced symptom was anxiety, whereas the least common was oral mucositis. The highest level of independence was observed in toileting, while the lowest was in bladder and bowel control (Table 1).

Table 1. Distribution of participants' scores from scales (n=421)

	Min.	Max.	Mean $\pm$ SD	Median
ESAS Total Score	0.83	9.17	4.17 ± 1.72	47
Pain	0	10	4.99 ± 3.21	5
Fatigue	0	10	6.15 ± 2.83	6
Nausea	0	10	3.45 ± 3.26	3
Sadness	0	10	5.08 ± 3.11	5
Anxiety	0	10	6.76 ± 2.65	7
Insomnia	0	10	4.49 ± 3.33	5
Anorexia	0	10	4.42 ± 3.35	4
Feeling Good	0	10	4.85 ± 2.59	5
Shortness of breath	0	10	2.71 ± 3.13	2
Changes in Skin and Nails	0	10	2.67 ± 3.27	0
Mouth- Wound	0	10	1.86 ± 2.82	0
Numbness in Hands	0	10	2.63 ± 3.26	1
Katz ADL Total Score	0	1	0.77 ± 0.32	5
Bathing	0	1	0.80 ± 0.39	1
Dressing	0	1	0.80 ± 0.39	1
Toileting	0	1	0.82 ± 0.37	1
Transferring	0	1	0.83 ± 0.37	1
Continence (Bladder and Bowel Control)	0	1	0.52 ± 0.49	1
Feeding	0	1	0.81 ± 0.38	1

ESAS: Edmonton Symptom Assessment Scale, KATZ ADL: Katz Activities of Daily Living, SD: Standard Deviation, Min: Minimum, Max: Maximum.

Regarding demographic characteristics, 53.4% of the patients were female, 79.1% were married, and 38.5% had completed primary education. Additionally, 74.8% were unemployed, 53.2% had balanced income and expenses, 41.1% were diagnosed with gastrointestinal system (GIS) cancers, and 58.2% had

been diagnosed within the past six months. Furthermore, 37.8% were at stage 2, 77.4% were receiving chemotherapy, and the mean age was 55.23 ± 13.20 years (Table 2).

Advanced statistical analysis revealed that female patients had significantly higher ESAS scores than male patients. Patients who had been diagnosed more than one year ago had higher ESAS scores compared to those diagnosed less than six months ago. Similarly, patients in stages 3 and 4 had higher ESAS scores than those in stages 1 and 2. Patients receiving combined chemotherapy and radiotherapy had significantly higher scores than those receiving chemotherapy alone ($p < 0.05$, Table 2).

In terms of Katz ADL scores, patients with a high school education had significantly higher levels of independence compared to illiterate patients. Likewise, patients with breast cancer showed higher independence compared to those with urogenital cancers, and stage 2 patients had higher independence than those at stage 4 ($p < 0.05$, Table 2).

Table 2. Characteristics of the Patients, and Comparison of the Total Scores of ESAS, and Katz ADL According to the Characteristics of the Patients (n=421)

Descriptive Characteristics	n	%	ESAS Mean $\pm$ SD	Katz ADL Mean $\pm$ SD
Gender				
Female	225	53.4	4.38 ± 1.66	0.79 ± 0.29
Male	196	46.6	3.93 ± 1.77	0.74 ± 0.36
Test and Significance			t=2.707 p=0.007	t=1.713 p=0.087
Marital Status				
Married	333	79.1	4.22 ± 1.72	0.78 ± 0.31
Single	88	20.9	3.99 ± 1.75	0.72 ± 0.36
Test and Significance			t=1.094 p=0.275	t=1.311 p=0.191
Education Level				
None	50	11.9	4.57 ± 1.79	0.60 ± 0.39
Self- thought literate	65	15.4	4.03 ± 1.58	0.79 ± 0.34
Primary school	162	38.5	4.09 ± 1.70	0.77 ± 0.32
Middle school	58	13.8	4.48 ± 1.69	0.79 ± 0.28
High school	59	14.0	4.12 ± 1.94	0.83 ± 0.26
Undergraduate and above	27	6.4	3.72 ± 1.57	0.78 ± 0.32
Test and Significance			F= 1.420 p=0.216	F= 3.262 p=0.007
Employment status				
Yes	106	25.2	4.25 ± 1.98	0.78 ± 0.31
No	315	74.8	4.14 ± 1.63	0.76 ± 0.33
Test and Significance			t=0.506 p=0.576	t=0.699 p=0.485
Economic Situation				
Balanced economic income	224	53.2	4.28 ± 1.70	0.74 ± 0.33
High economic income	68	16.2	4.19 ± 1.79	0.76 ± 0.32
Low economic income	129	30.6	3.97 ± 1.72	0.81 ± 0.31
Test and Significance			F= 1.361 p=0.258	F= 1.522 p=0.220
Type of Cancer				
Breast cancer	94	22.3	4.26 ± 1.64	0.85 ± 0.22
GI cancer	173	41.1	4.03 ± 1.63	0.77 ± 0.33
Lung Cancer	78	18.5	4.32 ± 1.93	0.74 ± 0.35
Urogenital cancer	39	9.3	4.60 ± 1.90	0.65 ± 0.39
Hematological cancers	15	3.6	3.25 ± 1.38	0.74 ± 0.31
Head and neck cancer	3	0.7	4.75 ± 1.90	0.94 ± 0.09
Other cancer	19	4.5	4.21 ± 1.79	0.64 ± 0.36
Test and Significance			F= 1.512 p=0.173	F= 2.589 p=0.018
Duration of disease				
0-6 months	245	58.2	3.86 ± 1.58	0.77 ± 0.33
7 months -1 year	52	12.4	4.30 ± 1.82	0.77 ± 0.33

>1 year	124	29.5	4.74 ± 1.82	0.75 ± 0.33
Test and Significance			F= 11.548 p <0.001	F= 0.092 p=0.912
Cancer Stage				
Stage 1	103	24.5	3.44 ± 1.53	0.77 ± 0.32
Stage 2	159	37.8	3.70 ± 1.48	0.81 ± 0.31
Stage 3	104	24.7	4.93 ± 1.54	0.74 ± 0.32
Stage 4	55	13.1	5.46 ± 1.83	0.66 ± 0.36
Test and Significance			F= 33.008 p <0.001	F= 3.435 p=0.017
Type of Treatment				
Chemotherapy	326	77.4	4.02 ± 1.65	0.77 ± 0.32
Radiotherapy	16	3.8	4.29 ± 1.89	0.80 ± 0.31
Chemotherapy+ radiotherapy	79	18.8	4.77 ± 1.88	0.74 ± 0.35
Test and Significance			F= 6.213 p=0.002	F= 0.339 p=0.712
Age	Min.	Max.	Mean ± SD	
	18	87	55.23 ± 13.20	

ESAS: Edmonton Symptom Assessment Scale, Katz ADL: Katz Index of Independence in Activities of Daily Living Scale, SD: Standard Deviation, Min: Minimum, Max: Maximum, GI: Gastrointestinal, t: Independent Samples t-test, F: One-way Analysis of Variance

Correlation analysis revealed a negative correlation between ESAS scores and Katz ADL scores, as well as between age and Katz ADL scores ($p < 0.05$, Table 3).

Table 3. Correlation between ESAS, Katz ADL, Age, and Duration of Disease (n=421)

		ESAS	Katz ADL
Katz ADL	r	-0.204**	-
	p	<0.001	-
Age	r	-0.017	-0.419**
	p	0.724	<0.001
Duration of Disease	r	0.236	-0.15
	p	<0.001	0.753

* $p < 0.05$, ** $p < 0.01$, r: Pearson correlation coefficient

Correlation analysis indicated weak negative correlations between ESAS scores and Katz ADL scores, and a moderate negative correlation between age and Katz ADL, a weak positive correlation between duration of disease and ESAS scores (Table 3).

Discussion

In this study, it was found that the symptom burden of cancer patients was low. Bubis et al. reported a moderate level of symptom burden among cancer patients.²⁴ The discrepancy in symptom burden may be attributed to differences in patients' clinical characteristics, such as cancer type, disease stage, and duration of illness, as well as their sociodemographic characteristics; however, as treatment-related variables and symptom management strategies were not assessed in this study, no direct inferences can be made regarding their potential impact on symptom burden.

The current study identified anxiety as the most frequently experienced symptom and oral mucositis as the least common. It has been reported that cancer patients experience anxiety most frequently²⁵, while mouth sores are the least commonly experienced symptom.²⁶ Other studies have found pain and anxiety to be the most prevalent symptoms, with numbness in the hands and oral sores being the least frequent.^{6,27} The uncertainties related to cancer and its treatment, as well as the challenges patients face in assuming new roles and responsibilities, can lead to high stress levels and the emergence of various symptoms. Furthermore, differences in cancer types and treatment modalities may contribute to the diversity of symptoms experienced by patients.

This study found a high level of independence in ADL among cancer patients. Komendarek-Kowalska similarly reported that cancer patients generally maintain good physical functioning in daily activities.²⁸ Abbasian et al. also found high levels of independence in ADLs among their patient group.²⁹ The type and stage of cancer, patients' individual characteristics, support systems, and use of alternative

therapies may enhance patients' motivation and physical functioning, contributing to the maintenance of independence.

In the present study, the highest independence was observed in toileting, while the lowest was in bladder and bowel control. Horick et al. found that urinary control was among the least problematic areas for cancer patients.³⁰ Blackwood et al. similarly reported that independence was highest in feeding and lowest in bladder and bowel control among cancer patients.¹³ Other studies indicated that bathing and dressing were the most adversely affected activities.^{15,31} Cheong et al. found that chemotherapy-treated patients showed the greatest dependency in bladder and bowel control.³² The high prevalence of gastrointestinal cancers, advanced metastases, and pelvic radiotherapy in the current sample may directly affect bladder and bowel functions.

The study also found that female patients experienced a higher symptom burden than males. Similar findings have been reported elsewhere.^{28,30} However, literature also includes studies reporting no gender differences or higher symptom burden among male cancer patients.^{33,34} In traditional societies like Türkiye, women's multiple roles and responsibilities in work, home, and family life may increase their symptom experience during illness.

Patients diagnosed more than one year ago had a higher symptom burden compared to those diagnosed less than six months prior. Bubis et al. reported peak symptom burden between the 2nd and 7th months after diagnosis, with symptoms such as anxiety, depression, pain, dyspnea, anorexia, and malaise gradually decreasing, while nausea, fatigue, and drowsiness increased around the 6th month.²⁴ Vogt et al. found the highest symptom burden at diagnosis, with gradual decreases over 3, 6, and 12-month follow-ups.³⁵ Van Beek et al. also reported the highest symptom severity before treatment, declining over 6 and 12 months.³⁶ These varying results suggest other factors beyond time since diagnosis influence symptom burden.

Consistent with previous research^{37,38}, this study found that patients at stages 3 and 4 had higher symptom burden than those at stages 1 and 2. Advanced-stage patients often experience more severe symptoms due to greater tumor burden and treatment intensity.³⁹

Patients receiving combined chemotherapy and radiotherapy had higher symptom burden than those receiving chemotherapy alone. While Horick et al. found chemotherapy-only patients at higher risk for muscle pain and paresthesia, symptom burden did not differ in patients receiving both radiotherapy and surgery.³⁰ Van Beek et al. also reported worse symptom burden and functionality in chemotherapy patients compared to radiotherapy recipients.³⁶ However, some studies found no toxicity differences between combined therapies.⁴⁰ Combined chemo radiotherapy, often preferred for improving survival³⁹, may increase symptom burden due to overlapping systemic and local toxicities.

In this study, it was found that patients with a high school education demonstrated greater independence in ADLs compared to illiterate patients. Similarly, Abbasian et al. reported that patients with higher levels of education were more independent in performing ADLs.²⁹ Another study also found that patients with lower education levels were more dependent in their ADLs.⁴¹ However, there is also evidence in the literature suggesting that educational status does not have a significant effect on independence in ADLs.⁴² A higher level of education may facilitate better access to information and healthcare services, thereby enabling individuals to more effectively address challenges related to their daily activities.

Breast cancer patients had higher ADL independence than those with urogenital cancers. Studies on ovarian cancer report high symptom prevalence affecting abdominal swelling and bowel habits³⁹, while cervical cancer patients show the lowest ADL independence.¹³ Different cancer types impose varying impacts on ADLs due to symptom profiles, underscoring the importance of cancer-specific treatment and care plans.

Stage 2 patients showed higher ADL independence than stage 4 patients. Cancer and its treatment bring numerous life changes.⁴³ Blackwood et al. reported the lowest ADL independence in stage 4 patients, supported by Fettes et al. who found greater dependency in advanced stages.^{13,15} Severe symptoms and treatment side effects likely reduce physical function and complicate the performance of daily activities in late-stage patients.

Symptom burden increased as ADL performance decreased in this study. Symptoms negatively affect many physical, sensory, and functional parameters in cancer patients⁴³, with higher symptom burden worsening physical functionality and overall health.⁴⁴ Similar findings were reported by Fettes et al. and Cheong et al. who observed increased dependency in daily activities with rising symptom burden during chemotherapy.^{15,32}

Increasing age was associated with decreased ADL independence. Some studies link advancing age to increased symptom burden in cancer patients³³ and reduced physical functioning after 50 years of age.⁴⁴

Blackwood et al. found the highest ADL independence among patients aged 85 and older.¹³ Age-related physical, cognitive, and health declines may negatively impact daily activity independence.

Lastly, in the present study, it was determined that symptom burden increased as the duration of the disease lengthened. Similarly, Verkissen et al. reported comparable findings.⁴⁵ Furthermore, Hirpara et al. indicated that symptom severity remained considerably high during the first year following diagnosis in cancer patients.³⁷ This finding may be explained by the progressive nature of the disease, accompanied by the cumulative increase in treatment-related adverse effects over time.

The primary limitation of this study is that the sample consisted of cancer patients receiving treatment at a single city hospital; therefore, the findings cannot be generalized to the wider population. The main strength of the study is the large sample size of 421 cancer patients, which increases the statistical power of the findings and allows the results to be interpreted more reliably from a clinical perspective.

Conclusion

This study yielded significant findings regarding the symptom burden and ADLs in cancer patients. Anxiety was identified as the most commonly experienced symptom, while oral mucositis was the least frequent. Regarding ADLs, the highest level of independence was observed in toileting, whereas bladder and bowel control showed the lowest independence. Female patients, those with advanced-stage cancer, longer duration since diagnosis, and those receiving combined therapy (chemotherapy + radiotherapy) exhibited higher symptom burden. Conversely, patients with a high school education, those diagnosed with breast cancer, and patients at stage 2 demonstrated greater independence in daily living activities. Additionally, symptom burden was negatively associated with independence in ADLs, and increasing age was found to adversely affect daily functioning. These findings underscore the importance of considering individual patient characteristics and disease-specific factors in both symptom management and the preservation of functional independence. Accordingly, the development of patient-tailored symptom management strategies and nursing interventions aimed at supporting daily living activities are recommended.



Reviewer: External, Independent.

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Declaration:

1. Originality Statement: This study is original and has not been published elsewhere before. This study was not derived from any thesis.

2. Author Contributions: Conceptualization: ŞK, Idea: ŞK; Literature Review: ŞK; Data Collection: ŞK, GÖ, EA; Data Processing: ŞK, GÖ, EA; Analysis: ŞK; Writing – Original Draft: ŞK; Writing – Review & Editing: ŞK, EYK.

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5. Conflict of Interest: The authors declare that there is no conflict of interest.

6. Generative Artificial Intelligence Statement: No artificial intelligence tools were used at any stage of the study.

7. Sustainable Development Goals: This study is related to the following United Nations Sustainable Development Goals





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