

# Frequency of admission to prehospital emergency medical services and satisfaction level of prehospital emergency care during active chemotherapy

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## ABSTRACT

**Objective:** In this study, we aimed to investigate the frequency of admission to prehospital emergency medical services (PEMS) and the satisfaction level of prehospital medical care in cancer patients during the chemotherapy process.

**Material and Methods:** A total of 218 patients receiving active chemotherapy were included in the study. A personal information form and the 112 Emergency Health Services Patient Satisfaction Scale (EHSPSS) were used to collect data. Sociodemographic characteristics and data on admission to PEMS were compared,

**Results:** Among the patients, 162 (74.3%) had visited EMS in the previous three months. Ninety-eight (60.5%) patients had visited EMS as outpatients, and 64 (39.5%) patients had arrived via PEMS. The PEMS admission rate of patients who visit EMS from rural areas (71.9%) was significantly higher than that of patients who visit from urban areas ( $p < 0.001$ ). The total satisfaction score was determined to be  $89 \pm 18.1$  points. According to these scores, it could be interpreted that the satisfaction rate of the patients was high. Regarding the dimension scores, the ambulance staff and emergency call center staff scores were high, while the care provided in the venue and ambulance technical equipment scores were above moderate

**Conclusion:** Patients receiving active chemotherapy frequently visit EMS. Although these patients mostly visited EMS as outpatients, the rate of patients who visited EMS with PEMS was substantial. The PEMS patient satisfaction rate was found to be high among active chemotherapy patients. High patient satisfaction is a prominent patient-centered indicator in measuring the quality of care.

**Keywords:** prehospital emergency care, cancer, chemotherapy, satisfaction level

## INTRODUCTION

In 2020, approximately 19 million new cancer cases were diagnosed worldwide, and 10 million people died due to cancer (1). Estimated cancer patient numbers are expected to be 28 million in 2040 (1). Chemotherapy plays an important role in cancer treatment, and this role is expanding. Although advances in cancer treatments have provided survival benefits, these treatments have notable side effects and toxicities (2). Neutropenic fever, nausea, vomiting, diarrhea, bleeding, and thromboembolic events are chemotherapy-associated side effects (3). Because of these side effects, patients receiving cancer treatment often visit emergency medical services (2, 4).

The concept of prehospital emergency medical services (PEMS) encompasses many areas of emergency care, including the assessment, management, triage, and transport of patients from the event of an injury or illness to their arrival at an emergency care unit (5). Prehospital emergency medical care is provided by health professionals (doctors, nurses, paramedics, emergency medical technicians) with ambulances in Turkey and the emergency telephone number is 1-1-2. Patients need emergency medical services (EMS) in case of urgent health problems, regardless of their socioeconomic status. Emergency department visits are higher in cancer patients compared to the general population (2, 4).

However, data on cancer patients cared for by PEMS are limited. In this study, we aimed to investigate the frequency of admission to PEMS and the satisfaction level of prehospital medical care in cancer patients during the chemotherapy process.

## Research Article

Received 26-06-2022

Accepted 07-07-2022

Available Online: 08-07-2022

Published 30-07-2022

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## MATERIAL and METHODS

This cross-sectional study was conducted in the Oncology Department of Necmettin Erbakan University Meram Medical Faculty Hospital, between June and July 2022. Ethics committee approval was obtained for the study (Approval No: 2022/3841). A total of 218 patients receiving active chemotherapy were included in the study. A personal information form and the 112 Emergency Health Services Patient Satisfaction Scale (EHSPSS) were used to collect data. The validity and reliability of this scale in Turkish society have been established (Kaiser-Meyer Olkin=0,636, Cronbach alpha=0.907) (6).

The EHSPSS consists of 26 questions; the minimum total score is 26 points, and the maximum total score is 130 points. Moreover, the EHSPSS is divided into the following four dimensions: ambulance staff (12 questions, minimum 12 points, maximum 60 points), emergency call center staff (3 questions, minimum 3 points, maximum 15 points), care provided in venue (7 questions, minimum 7 points, maximum 35 points), and ambulance technical equipment (4 questions, minimum 4 points, maximum 20 points).

The personal information form included sociodemographic characteristics (age, gender, educational status, urban/rural, comorbidity), cancer type and stage, duration of chemotherapy received (0–3 months, 3–6 months, > 6 months), number of visits to the emergency service, type of admission to the emergency service, the reason for admission to 112 emergency health services, and the number of calls to 112 emergency health services. Sociodemographic characteristics and data on admission to PEMS were compared.

### Statistical analysis

The data were analyzed using the IBM SPSS V-20 program. Descriptive statistics were provided as numbers, percentages, and ratios. The chi-square test or Fisher exact test was used to compare categorical variables between groups.

The distribution of the study parameters was performed using the Kolmogorov–Smirnov test. Comparison of homogeneously distributed parameters was performed with an independent sample t-test and ANOVA. Comparison of non-homogeneous parameters was performed with the Mann–Whitney U test. The three groups (duration-of-chemotherapy groups) were compared using a post-hoc Tukey analysis. The significance level was accepted as  $p < 0.05$ .

## RESULTS

Two hundred and eighteen patients were included in the study. Of the patients, 106 (48.6%) were female, and 112 (51.4%) were male. The median age was 59.5 (31–85) years. Among the patients, 162 (74.3%) had visited EMS in the previous three months. Ninety-eight (60.5%) patients had visited EMS as outpatients, and 64 (39.5%) patients had arrived via PEMS. The most common reason for admission to EMS was deterioration in general condition (30.9%).

Of the patients admitted to EMS, 53.8% were hospitalized, and 90.5% were received by the oncology service. The sociodemographic characteristics of the patients are presented in **Table 1**.

The PEMS admission rate of patients who visit EMS from rural areas (71.9%) was significantly higher than that of patients who visit from urban areas ( $p < 0.001$ ). The hospitalization rate of patients admitted to EMS via PEMS was significantly higher than that of outpatients ( $p < 0.001$ ) (**Table 2**). There was no significant difference between the gender, education level, comorbidity, cancer stage, chemotherapy duration, or hospitalization service status between the outpatients and those who applied via PEMS ( $p > 0.05$  for all) (**Table 2**). There was no significant difference between the outpatients and those admitted via PEMS in terms of gender, educational status, comorbidity, cancer stage, duration of chemotherapy, or hospitalization service status ( $p > 0.05$  for all) (**Table 2**).

Table 3 presents the 112 EHSPSS total and dimension scores. The total satisfaction score was determined to be  $89 \pm 18.1$  points. The lowest score was 58, and the highest was 130. According to these scores, it could be interpreted that the satisfaction rate of the patients was high. Regarding the dimension scores, the ambulance and emergency call center staff scores were high, while the care provided in the venue and ambulance technical equipment scores were above moderate (**Table 3**). The emergency call center staff, care provided in venue, ambulance technical equipment, and total scores were significantly higher in the urban group than in the rural group ( $p = 0.002$ ,  $p = 0.004$ ,  $p < 0.001$ ,  $p = 0.006$ , respectively), but the ambulance staff scores were similar between these two groups ( $p = 0.14$ ).

The emergency call center staff score, care provided in venue score, and total scores were significantly higher in the non-comorbidity group than in the comorbidity group ( $p = 0.011$ ,  $p = 0.01$ ,  $p = 0.03$ , respectively), but there were no difference in the ambulance technical equipment and ambulance staff scores between these two groups ( $p = 0.08$ ,  $p = 0.16$ , respectively). The total score and all dimension scores were significantly different between the durations of chemotherapy received (**Table 4**).

The total score and all dimension scores were significantly higher in the 0–3 months chemotherapy received group than in the 3–6 months group ( $p < 0.05$  for all) (**Table 4**). The total score, ambulance staff score, emergency call center staff score, and ambulance technical equipment score were significantly higher in the 0–3 months chemotherapy received group than in > 6 months group, but there was no difference in the care provided in the venue score between these groups (**Table 4**). Also, there was no difference between the 3–6 months and > 6 months chemotherapy received groups ( $p > 0.05$  for all).

**Table 1:** General characteristics of the study population

Age (year)	Study population 59.5 (31-85)	
Gender (n)	Female (%)	106 (48.6)
	Male (%)	112 (51.4)
Area (n)	Urban (%)	134 (61.5)
	Rural (%)	84 (38.5)
Educational status (n)	Literate (%)	180 (82.6)
	Illiterate (%)	38 (17.4)
Comorbidity (n)	Yes (%)	108 (49.5)
	No (%)	110 (50.5)
Cancer type (n)	Lung (%)	34 (15.6)
	Gastrointestinal (%)	74 (33.9)
	Genitourinary (%)	34 (15.6)
	Breast (%)	56 (25.7)
	Others (%)	20 (9.2)
Visiting the emergency medical services in the previous 3 months (n)	Yes (%)	162 (74.3)
	No (%)	56 (25.7)
Number of admissions to medical emergency service in previous 3 months (n)	3 (1-8)	
Mode of arrival to the medical services (n)	Outpatient (%)	98 (60.5)
	Via ambulance (%)	64 (39.5)
Number of admissions to prehospital emergency service in previous 3 months (n)	1 (0-6)	
Reason for not calling 112 emergency service (n)	Faster transport than 112 emergency service (%)	50 (51)
	Good health status of patient (%)	48 (49)
Reason for visit to the emergency services (n)	Nausea-vomiting (%)	6 (3.7)
	Fever (%)	12 (7.4)
	Loss of consciousness (%)	8 (4.9)
	Shortness of breath (%)	31 (19.1)
	Pain (%)	43 (26.5)
	Deterioration of general condition (%)	50 (30.9)
	Oral intake deficiency (%)	12 (7.4)
Intervention of the 112-emergency service (n)	Medication (%)	4 (6.3)
	Transporting (%)	60 (93.7)
Intervention of the emergency service (n)	Medication (%)	72 (46.2)
	Hospitalization (%)	84 (53.8)
Hospitalization service (n)	Oncology service (%)	76 (90.5)
	Non-oncology service (%)	8 (9.5)

**Table 2:** Comparison of between sociodemographic data and type of admission the emergency services

Features		Mode of arrival to the medical services		p
		Outpatient (n)	Via ambulance (n)	
Gender (n)	Female (%)	50 (%51)	38 (%69.4)	0.33*
	Male (%)	48 (%49)	26 (%40.6)	
Residency (n)	Urban (%)	72 (%73.5)	18 (%28.1)	<0.001*
	Rural (%)	26 (%26.5)	46 (%71.9)	
Educational status (n)	Literate (%)	81 (%82.7)	47 (%73.4)	0.17*
	Illiterate (%)	17 (%17.3)	17 (%26.4)	
Comorbidity (n)	Yes (%)	56 (%57.1)	40 (%62.5)	0.51*
	No (%)	42 (%42.9)	24 (%37.5)	
Cancer stage (n)	Stage 2	10 (%10.2)	4 (%6.2)	0.27**
	Stage 3	12 (%12.2)	4 (%6.2)	
	Stage 4	76 (%77.6)	56 (%87.5)	
Duration of chemotherapy (n)	0-3 months	25 (%25.5)	11 (%17.2)	0.3*
	3-6 months	52 (%53.1)	34 (%53.1)	
	>6 months	21 (%21.4)	19 (%29.7)	
Intervention of the emergency service (n)	Medication (%)	67 (%69.8)	5 (%8.3)	<0.001*
	Hospitalization (%)	29 (%30.2)	55 (%91.7)	
Hospitalization service (n)	Oncology service (%)	28 (%96.6)	48 (%87.3)	0.25**
	Non-oncology service (%)	1 (%3.4)	7 (%12.7)	

\*Chi-square test. \*\*Fisher exact test

**Table 3:** The overall and sub-dimension satisfaction score of study participant for the prehospital emergency medical services (n = 82).

Sub-dimensions of scale	Score	
	Mean±St.d.	Min-max
Ambulance staff dimension	41.5±8.4	26-60
Emergency call center staff dimension	10.3±2.1	7-15
Care provided in venue dimension	23.5±5.4	16-35
Ambulance technical equipment dimension	13.6±3.2	7-20
Overall satisfaction	89±18.1	58-130

**Table 4.** Comparison of overall and sub-dimension satisfaction scores and population characteristic

Features		Ambulance staff score	Emergency call center staff score	Care provided in venue score	Ambulance technical equipment score	Overall satisfaction score
Gender	Female	42.1±6.4	10.1±1.8	23.1±4.8	13.3±2.7	88.8±15
	Male	40.6±10.6	10.4±2.5	23.9±6.2	14.1±3.8	89.1±21.5
	<i>p</i>	0.42	0.58	0.52	0.27	0.94
Residency	Urban	44.1±8.5	11.6±2	26.7±4.4	16.6±2.1	99.2±14.9
	Rural	40.7±8.3	9.9±2	22.6±5.3	12.8±3	86.1±18
	<i>p</i>	0.14	<b>0.002</b>	<b>0.004</b>	<b>&lt;0.001</b>	<b>0.006</b>
Educational status	Literate	40.4±9.3	10.2±2.3	23.4±5.9	13.5±3.6	87.6±19.9
	Illiterate	43.3±6.5	10.4±1.7	23.6±4.5	13.8±2.5	91.2±14.5
	<i>p</i>	0.14	0.7	0.85	0.66	0.39
Comorbidity	Yes	40.3±6.6	9.8±1.7	22.4±4.6	13.2±3.1	85.9±14.7
	No	43.7±11	11.1±2.6	25.6±6.2	14.3±3.4	94.9±22.4
	<i>p</i>	0.08	<b>0.011</b>	<b>0.01</b>	0.16	<b>0.03</b>
Duration of chemotherapy	0-3 months	48.3±8.4	12.5±2.3	27.5±5.2	16.3±2.2	104.6±16.9
	3-6 months	39.7±8.6	9.6±1	22.4±5.4	13±3.2	84.8±18.5
	>6 months	41.2±7.1	10.2±1.6	23.3±4.9	13.4±3.1	88.2±14.9
	<i>p</i>	<b>0.007</b>	<b>&lt;0.001</b>	<b>0.017</b>	<b>0.006</b>	<b>0.003</b>
	<i>p</i> *					
	0-3/3-6 months	<b>0.005</b>	<b>&lt;0.001</b>	<b>0.01</b>	<b>0.04</b>	<b>0.002</b>
	0-3/>6 months	<b>0.03</b>	<b>0.004</b>	0.6	<b>0.02</b>	<b>0.01</b>
	3-6/>6 months	0.7	0.4	0.7	0.8	0.6

\*Post Hoc test: Tukey SD

## DISCUSSION

To our knowledge, this is the first study to evaluate the PEMS satisfaction level among cancer patients receiving active chemotherapy. In our study, a high PEMS satisfaction level was detected among cancer patients receiving active chemotherapy. In addition, the study determined that 74% of the patients visited the EMS during the active chemotherapy process, and 39.5% of these patients visited the EMS via PEMS. There are a limited number of published studies on the satisfaction of patients admitted to prehospital emergency care, despite the large number of patients who benefit from this service every year (7). Overall, the rate of satisfaction with prehospital emergency services is high (7). However, there are studies that show contradictory results. In one study, prehospital emergency care for suspected hip fractures was found to be inadequate and unsatisfactory by the patients (8).

In our study, the EHSPSS satisfaction level among cancer patients was high. The scale care provided in the venue sub-dimension score was also high. Another study reported that patients with prehospital emergency problems were mostly satisfied with telephone care assessments (9). Our analysis also reported a high satisfaction rate among emergency call center staff. This satisfaction rate was higher in the urban and non-comorbid groups. Some studies have reported that the most common symptoms of cancer patients who visited the emergency department were pain, respiratory distress, and gastrointestinal problems (10-12). In our study, the most common reasons for admission to the emergency department were deterioration of the general condition, pain, and shortness of breath. It is not uncommon for patients receiving active chemotherapy to have constitutional symptoms, such as anorexia, weakness, and fatigue.



The most common cancer types in patients admitted to the emergency department were breast, lung, and gastrointestinal cancers (13). In our study, the most common cancer types in patients were gastrointestinal, breast, and lung cancers. Chen et al. found the rate of admission among patients brought to the hospital by ambulance to be 22%. (13).

In our study, the rate of admission among patients brought to the emergency department by ambulance was found to be 39.5%. The reason for this high rate could be the easy and widespread accessibility of health services in Turkey. It remains unclear whether the severity of patients' symptoms or the extent of disease is related to the mode of patient transportation to the emergency department. Many studies have shown that patient arrival by ambulance is associated with faster treatment time and shorter hospital stay compared to patients arriving by personal vehicle (14, 15).

A recent study determined that 29.9% of patients who visited EMS were discharged home. (13). In our study, the discharge rate of patients from the emergency room was 46.2%. Considering the use of prehospital emergency health services three months before the death of cancer patients, it was revealed that most of the patients transported by ambulance were hospitalized (10). In our study, the hospitalization rate of patients who received active chemotherapy and were transferred by ambulance was high. Irrespective of whether cancer patients were in the palliative or active chemotherapy period, hospitalization of those transferred by ambulance was higher than outpatients, suggesting that cancer patients' health problems are complex and need significant care.

There are some limitations in our study. Patients who died in the emergency department were not evaluated in this study. There may be a bias in the satisfaction score of patients who presented with unconsciousness since their families received immediate assistance from the medical staff.

## CONCLUSION

Patients receiving active chemotherapy frequently visit EMS. Although these patients mostly visited EMS as outpatients, the rate of patients who visited EMS with PEMS was substantial. The PEMS patient satisfaction rate was found to be high among active chemotherapy patients. High patient satisfaction is a prominent patient-centered indicator in measuring the quality of care.

**Acknowledgments:** None

**Conflict of interest:** The authors declare no competing interests.

**Author Contributions:** Design and initiate: **ZK and MZK**. Data collection: **ZK and MZK**. Analysis, literature review and writing: **ZK and MA**. Revision: **MA**

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with the institutional and/or national research committee's ethical standards and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. (Approval No: 2022/3841).

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