



## Evaluation of Demographic, Clinical Characteristics and Laboratory Values of Pediatric Patients Followed in Palliative Care

Palyatif Bakımda Takip Edilen Pediatrik Hastaların Demografik, Klinik Özellikleri ve Laboratuvar Bulgularının Değerlendirilmesi

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### ABSTRACT

**Aims:** The importance of pediatric palliative care centers, which we think is insufficient both in the world and in our country, is increasing. The aim of this study is to reveal the demographic, clinical and laboratory characteristics of pediatric patients followed in a palliative care center.

**Material and Method:** In this retrospective study, demographic data (age, gender), laboratory findings (platelet, mean platelet volume, lymphocyte, neutrophil counts, glucose, sodium, potassium, urea) of pediatric patients followed up in an adult palliative care center between 18.10.2018 and 15.01.2023, creatinine, albumin and the C-reactive protein, CRP/albumin ratio, platelet/lymphocyte ratio and neutrophil/lymphocyte ratio) and clinical features (length of stay in PCU and survival) were evaluated.

**Results:** It was determined that 61 pediatric patients between the ages of 2-17 were followed up in the palliative care center between 18 October 2018 and 15 January 2023. 65.6% of the patients were male and 6.6% were Syrian citizens. The duration of stay in the palliative care center was between 1-64 days. While 16.4% of the patients had tracheostomy, 14.8% needed home mechanical ventilator. Only 3 (4.9%) patients received parenteral nutrition. The diagnosis of admission to the palliative care center of 47 (77.0%) patients included in the study had neurological sequelae after head trauma. The mortality rate was 1.6%.

**Conclusion:** It is obvious that the centers are insufficient in the face of the increasing need for pediatric palliative care. Although adult palliative care centers are compensating for this deficiency at this stage, it is clearly seen that the number of pediatric palliative care centers should be increased in the future.

**Keywords:** Palliative Care, pediatric, laboratory values.

### ÖZ

**Amaç:** Hem dünyada hem de ülkemizde sayısı yetersiz olduğunu düşündüğümüz pediatrik palyatif bakım merkezlerinin önemi giderek artmaktadır. Bu çalışmanın amacı, palyatif bakım merkezinde takip edilen çocuk hastaların demografik, klinik ve laboratuvar özelliklerini ortaya koymaktır.

**Gereç ve Yöntem:** Bu retrospektif çalışmada 18.10.2018-15.01.2023 tarihleri arasında bir erişkin palyatif bakım merkezinde takip edilen çocuk hastaların demografik verileri (yaş, cinsiyet), laboratuvar bulguları (trombosit, ortalama trombosit hacmi, lenfosit, nötrofil sayısı, glikoz, sodyum, potasyum, üre, kreatinin, albümin ve C-reaktif protein, CRP/albumin oranı, trombosit/lenfosit oranı ve nötrofil/lenfosit oranı) ve klinik özellikleri (palyatif bakım merkezinde kalış süresi ve mortalite) değerlendirilmiştir.

**Bulgular:** 18 Ocak 2018 and 15 Ocak 2023 tarihleri arasında 2-17 yaşları arasında 61 pediatrik hastanın palyatif bakım merkezinde takip edildiği tespit edilmiştir. Hastaların %65,6'sı erkek, %6,6'sı Suriye vatandaşıydı. Palyatif bakım merkezinde kalış süresi 1-64 gün arasındaydı. Hastaların %16,4'ünde trakeostomi mevcutken %14,8'inin home mekanik ventilatöre gereksinimi mevcuttu. Sadece 3 (%4,9) hasta parenteral beslenme almaktaydı. Çalışmaya dahil edilen 47 (%77,0) hastanın palyatif bakım merkezine kabul tanısı kafa travması sonrası nörolojik sekeldi. Mortalite %1.6 olarak gerçekleşmiştir.

**Sonuç:** Pediatrik palyatif bakım ihtiyacının giderek artışı karşısında merkezlerin yetersiz olduğu aşırıdır. Şu aşamada erişkin palyatif bakım merkezleri bu yetersizliği kompanse ediyor olsa da ilerleyen zamanlarda pediatrik palyatif bakım merkezlerinin sayılarının artırılması gerekliliği açıkça görülmektedir.

**Anahtar Kelimeler:** Palyatif Bakım, pediatrik, laboratuvar değerleri.

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**Başvuru Tarihi/Received:** 29.04.2023

**Kabul Tarihi/Accepted:** 08.07.2023





## INTRODUCTION

The World Health Organization (WHO) recommends that everyone with life-threatening diseases should receive palliative care and that this care should be started early according to the course of the disease. The interest and need for palliative care is increasing worldwide. However, pediatric palliative care emerges as a newly developing scientific field that has not yet been standardized. Palliative care is defined by WHO as the prevention and alleviation of adult and pediatric patients and their families from facing problems associated with life-threatening diseases (1). The effects of the developing and changing world have led to an increase in the number of individuals with chronic diseases, along with the prolongation of life expectancy. This change not only causes an increase in life expectancy, but also a significant increase in the number of children and families with chronic, life-threatening or life-limiting diseases (2-4). The life expectancy of patients with genetic diseases, events resulting in neurological sequelae, congenital anomalies, neurometabolic diseases and cancer is prolonged. As a result of all these, the need for pediatric palliative care centers is increasing day by day. However, as in the whole world, pediatric palliative care centers are still new in our country, and as a result, the number of pediatric palliative care centers and clinical experience are limited. Therefore, we believe that it is important to reveal the demographic, clinical and laboratory characteristics of patients in palliative care centers.

The aim of the present study is to reveal demographic, clinical and laboratory characteristics of pediatric patients hospitalized in a palliative care center.

## MATERIAL AND METHOD

The present retrospective study was approved by the ethics committee of Selçuk University Medical Faculty (Approval date and number: 31.01.2023 and 2023/69) and the medical records of the hospitalized patients in Selçuk University Medical Faculty Hospital palliative care unit between 18.10.2018-15.01.2023 were reviewed. The present study was conducted in accordance with the principles of the Declaration of Helsinki. Patients older than 18 years of age were excluded from the study. In addition, patients with more than one admission were also excluded from the study. The following variables evaluated at admission to PCU were obtained from medical records: Age, gender, platelet, mean platelet volume (MPV), lymphocyte, neutrophil counts, glucose, sodium, potassium, urea, creatinine, albumin and the C-reactive protein (CRP). CRP/albumin ratio, platelet/lymphocyte ratio (PLR) and neutrophil/lymphocyte ratio (NLR) were calculated from the data obtained from medical records. Apart from these data, length of stay in PCU and survival were also obtained from medical records. The starting point for survival was evaluated for the date of first admission to the PCU and continuing for three months.

## Statistical Analysis

Statistical analysis was performed using the SPSS Version 22.0 (IBM, Chicago, IL, USA). Evaluation of data in terms of normality was performed with Shapiro–Wilk and Kolmogorov–Smirnov tests. Categorical data were expressed as number (percentages). The numerical data resulting from the descriptive statistics were expressed as the median [interquartile range (IQR)].

## RESULTS

In the medical records of the palliative care center, it was determined that 61 children received palliative care services between 18 October 2018 and 15 January 2023. The general characteristics of these pediatric patients in the palliative care center are presented in Table 1. The laboratory values at admission to the palliative care center of pediatric patients are presented in Table 2.

**Table 1. General Characteristics of Patients**

Variable	Total Patients (n=61) Median (IQR), n (%)
Age, year	12 (9-16)
Gender, (M/F) n (%)	40 (65.6) / 21 (34.4)
Nationality, n (%)	
Turkey	57 (93.4)
Syria	4 (6.6)
Length of Stay, day	5 (2-9)
Tracheostomy presence, n (%)	10 (16.4)
Home mechanical ventilator requirement, n (%)	9 (14.8)
Nutritional status, n (%)	
Enteral nutrition	58 (95.1)
Parenteral nutrition	3 (4.9)
Admission diagnosis, n (%)	
Neurological sequelae after head trauma, after intensive care	47 (77.0)
Chronic disease terminal stage	12 (19.7)
Other (Drowning in water, intoxication after intensive care)	2 (3.3)
Mortality, n (%)	1 (1.6)

IQR: Inter Quantile Range, M: Male, F: Female.

**Table 2. Laboratory Values of Patients.**

Variable	Total Patients (n= 61) Median (IQR), n (%)
Blood Glucose, mg/dL	103.00 (89.00-120.00)
Blood Urea, mg/dL	24.00 (18.00-33.00)
Blood Creatinine, mg/dL	0.37 (0.27-0.49)
Blood Sodium, mEq/L	138.00 (136.00-141.00)
Blood Potassium, mmol/L	4.12 (3.80-4.35)
Neutrophil count, (109 /L)	6.25 (4.67-9.23)
Lymphocyte count, (109 /L)	1.83 (1.23-2.32)
Platelet count, (109 /L)	286000 (231000-400000)
Mean Platelet Volume, fl	8.15 (7.60-9.50)
Neutrophil to lymphocyte ratio	3.46 (1.98-6.25)
Platelet to lymphocyte ratio	164.75 (123.52-254.75)
C-reactive protein, mg/L	20.00 (5.86-67.45)
Albumin, g/dL	3.50 (3.10-3.90)
C-reactive protein/Albumin Ratio	5.52 (1.62-19.42)

IQR: Inter Quantile Range.

The age range of the patients included in the study was between 2-17 yrs and the median (IQR) age was 12 (9-16) yrs. In the present study, 65.6% of all patients in the palliative care center were male. While 57 (93.4%) of the 61 patients were Turkish citizens, 4 (6.6%) of them were Syrian citizens. While the minimum length of stay in the palliative care center was 1 day, the maximum length of stay was 64 days. In the present study, 16.4% of pediatric patients in the palliative care center had tracheostomy. The number of patients who needed a home mechanical ventilator was 9 (14.8 %). While 95.1% of all patients received enteral nutrition, only 3 (4.9%) patients received parenteral nutrition. Hospitalization diagnosis of 47 (77.0%) patients included in the study was neurological sequelae after head trauma. These patients consisted of patients who needed palliative care after intensive care treatment was completed. Twelve patients were admitted to the palliative care center with a diagnosis of chronic disease terminal stage.

Only 1 of the 61 patients died during the study follow-up period. The patient were male, 17 yrs, and nationality was Turkey. Admission diagnosis of the patient was neurological sequelae after head trauma and length of stay of this patient is 64 days. The patient had tracheostomy, needed a home mechanical ventilator and was receiving enteral nutrition. The abnormal laboratory values of our only patient who died during the follow-up period were as follows: Albumin 2.4 g/dL, CRP; 37.7 mg/L, Lymphocyte count; 0.8 (109 /L), Neutrophil to lymphocyte ratio; 6.25.

## DISCUSSION

In this retrospective study, demographic, clinical characteristics and laboratory findings of pediatric patients followed up in an adult palliative care center between 18.10.2018 and 15.01.2023 were evaluated.

Infant and child mortality rates have gradually decreased in the last century due to many factors such as developments in intensive care and surgery, advances in treatment methods, and increase in the number and quality of staff. However, as a result of the increase in the survival rate, the number of children living with chronic diseases is also increasing rapidly. The increase in the number of children living with chronic diseases has led to an increase in the need for pediatric palliative care centers in our country as well as all over the world. Although a few pediatric palliative care centers have been opened in Turkey since 2015, the number of pediatric palliative care centers and clinical experience is still less than expected and the need is expected to increase over time (5). Although the palliative care center including the pediatric patients evaluated in this study is an adult palliative care center, patients are admitted to this center because there is no pediatric palliative care center in the province.

Turkey-based pediatric palliative care reports are limited. In one of these studies, a total of 145 patients from 2 centers were evaluated, and in the other, the data of 98 patients in a single center were reported (6,7). The ages of the patients in these two studies were younger than the present study, and we think that the reason for this is that the palliative care center in the present study was essentially an adult palliative care center. While 67.2% of the pediatric patients in the present study were over the age of 10, 26.1% of the patients in the study of Ayar et al. were over the age of 10 (6). In 2 studies from the USA, the rate of patients over the age of 10 was relatively higher (36%, and 45.5%, respectively) (8,9), although not as much as in the present study.

In the present study, it was determined that 65.6% of the pediatric patients followed in the palliative care center were male. In many studies in the literature, it has been stated that the male/female ratio is almost equal or very close to each other (6,8). We believe that the reason for this difference in the present study is that most of the palliative care patients followed due to the need for palliative care after posttraumatic processes.

As the effects of Turkey's immigration after the Syrian war, it is seen that 6.6% of the patients in our study are Syrian citizens. In the studies of Ayar et al., it was stated that 9.7% of the patients were Syrian (6). It was stated that the number of applications to the emergency service of Syrian refugees in Turkey increased by 8% in 2015 compared to 2010 (10). It is obvious that the increase in emergency service applications will also have a counterpart in intensive care units (11).

In the literature, the length of stay of pediatric patients in palliative care centers varies (6-8).

It was observed that 14.8% of our patients needed a home type mechanical ventilator. There are different results in the literature on this issue. In publications from Turkey and other countries, the need for mechanical ventilators has been stated in a wide range of 8-77% (6,7,12,13).

Adequate and balanced nutrition is an important element that increases the quality of life in palliative care patients (14). Only 4.9% of our patients were receiving parenteral nutrition, which was considerably lower than the rates of parenteral nutrition reported in palliative care (15).

Although pediatric palliative care first came to the fore in oncological patients, it is now applied in a wide variety of diseases. In the present study, the majority of our patients consisted of patients admitted after intensive care. In the literature, 20% of oncological patients are reported (16,17). It is obvious that oncology patients are incompatible with the literature, since the palliative care center where this study was conducted was originally an adult palliative center.



The limitations of our study are that it is a retrospective study, the use of data obtained from an adult palliative care center and the small number of cases. However, it should be noted that many cities in Turkey do not have pediatric palliative care centers.

## CONCLUSION

Today, the need for pediatric palliative care centers is increasing day by day. Although the number of adult palliative care centers has gradually increased in our country, it cannot be said that this situation is also valid for pediatric palliative care centers.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** This study was conducted by ethics committee approval obtained from Selçuk University Faculty of Medicine (Approval number:2023/69).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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