ORIGINAL ARTICLE

European Archives of Medical Research

DOI: 10.14744/eamr.2025.79653
Eur Arch Med Res 2025;41(1):15–23

General Characteristics and Mortality Risk Factors in Critically Ill Pediatric Patients in a Pediatric Intensive Care Unit

Samet Ates,[1] Abdulrahman Ozel,[2] Servet Yuce,[3] Ulkem Kocoglu Barlas,[4] Nurettin Onur Kutlu,[2] Meltem Erol[1]

[1]Department of Pediatrics, Bağcılar Training and Research Hospital, Health Sciences University, Istanbul, Türkiye
[2]Department of Pediatrics, Pediatric Intensive Care Unit, Bağcılar Training and Research Hospital, University of Health Sciences, Istanbul, Türkiye
[3]Department of Public Health, Istanbul University, Istanbul Faculty of Medicine, Istanbul, Türkiye
[4]Department of Pediatrics, Pediatric Intensive Care Unit, Istanbul Medeniyet University, Göztepe Prof Dr Süleyman Yalçın City Hospital, Istanbul, Türkiye

ABSTRACT

Objective: This study aims to evaluate the general characteristics of critically ill pediatric patients treated and monitored in our pediatric intensive care unit (PICU) and to examine the factors influencing mortality.

Materials and Methods: We included all critically ill pediatric patients treated and monitored in our PICU from January 2020 to November 2023. Patients were categorized into two groups: Survivors and non-survivors, with various comparisons made between these groups.

Results: The study included 1,035 patients, with a male predominance (56%). The median age was 37 months. The average PICU stay was 10.6±28.1 days. Mortality was 6.8%, with non-survivors having significantly higher Pediatric Risk of Mortality III (PRISM-III) scores (19 vs. 1, $p<0.001$) and longer PICU stays (13 vs. 4 days, $p<0.001$). Mortality increased with the number of affected systems ($p<0.001$). Tracheostomy and central vein catheter placement rates were higher among non-survivors ($p=0.006$ and $p<0.001$, respectively). Inotropic support and blood transfusions were significantly higher in non-survivors ($p<0.001$ and $p<0.001$). The PRISM-III score had a sensitivity of 82.6% and a specificity of 88.9% for predicting mortality at a cutoff of 10. Regression analysis showed that an increased number of affected systems ($p<0.001$), need for tracheostomy ($p=0.023$), inotropic support ($p=0.043$), and higher PRISM-III scores ($p=0.025$) were significant mortality predictors.

Conclusion: The need for tracheostomy, initiation of inotropic therapy, and the number of failing organ systems were identified as factors influencing mortality in critically ill pediatric patients. In addition, the PRISM-III score proved effective in predicting mortality in this cohort.

Keywords: Healthcare, Mortality, Pediatric intensive care units, Quality indicators

Cite this article as: Ates S, Ozel A, Yuce S, Kocoglu Barlas U, Kutlu NO, Erol M. General Characteristics and Mortality Risk Factors in Critically Ill Pediatric Patients in a Pediatric Intensive Care Unit. Eur Arch Med Res 2025;41(1):15–23.

Address for correspondence: Abdulrahman Ozel. Department of Pediatrics, Pediatric Intensive Care Unit, Bağcılar Training and Research Hospital, University of Health Sciences, Istanbul, Türkiye

E-mail: dr.abdulrahman.ozel@gmail.com **ORCID ID:** 0000-0001-8947-420X

Submitted: 20.09.2024 **Revised:** 02.12.2024 **Accepted:** 30.01.2025 **Available Online:** 14.03.2025

European Archives of Medical Research – Available online at www.eurarchmedres.org

INTRODUCTION

Pediatric intensive care units (PICUs) are specialized units where critically ill pediatric patients with one or more organ failures receive care and treatment from a multidisciplinary team of doctors, nurses, and intensive care health professionals.[1] Accurate prediction of the course of acute illnesses in these patients is crucial for guiding treatment decisions.[2] Mortality prediction models play a vital role in managing critically ill patients, enabling clinicians to anticipate potential adverse outcomes.[3]

Critically ill pediatric patients in PICUs often require monitoring due to severe acute illnesses or acute exacerbations of existing chronic conditions.[4] These patients present unique challenges due to factors such as age and underlying medical conditions, which can significantly affect their clinical management.[5] Furthermore, the use of complex invasive and non-invasive treatments, high-risk medications, and life-saving technology also influences mortality rates.[6]

To improve care quality and reduce mortality in PICUs, the application of validated scoring systems during the early stages of care and throughout the follow-up period has become increasingly important.[7] At present, the pediatric index of mortality and the Pediatric Risk of Mortality III (PRISM-III) are commonly used mortality prediction models in PICUs.[2] The Pediatric Risk of Mortality was first developed by Pollack et al.[8] in 1988 and was updated to the PRISM-III score in 1996.

This study aims to contribute to the literature by examining the clinical and demographic characteristics of critically ill pediatric patients admitted to our unit, assessing the impact of invasive treatment needs on mortality, and evaluating the effectiveness of PRISM-III scores, calculated within the first 24 h, in predicting mortality.

MATERIALS AND METHODS

This retrospective, observational single-center study was conducted at the PICU of the University of Health Sciences Türkiye, Bağcılar Training and Research Hospital, between January 2020 and November 2023. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and approved by the non-interventional clinical studies ethics board of Bağcılar Training and Research Hospital (Date: April 28, 2024, Decision Number: 2024/04/05/042). Informed consent was obtained from the guardians of all patients.

Our unit is an 8-bed tertiary care center. During working hours, the unit is staffed by one general pediatrician, three pediatric residents, and six PICU nurses. For 2 years of the study period, a pediatric intensive care specialist was also present, and for 1 year, an intensive care professor was involved. During night and weekend shifts, the unit was staffed by a pediatric resident, a senior resident overseeing all pediatric units and intensive care units, and a general pediatrician without specific PICU experience. All ancillary services, including radiology, pediatric surgery, orthopedics, and neurosurgery, operate 24/7; with the exception of pediatric surgery, all other clinics function as training facilities similar to ours.

Patients who were admitted to the PICU for <24 h or whose records could not be fully accessed from our hospital's automation system were excluded from the study. The following data were recorded: Demographic information (age, gender), number of organ systems with acute organ dysfunction, acute and chronic diagnoses, length of PICU stay, need for invasive mechanical ventilation (IMV), non-invasive ventilation (NIV), high-flow nasal oxygen (HFNO), central venous catheter (CVC) placement, extracorporeal treatments, requirement for blood and blood products (including erythrocyte suspension, platelets, fresh frozen plasma, albumin, and intravenous immunoglobulin), presence of nosocomial sepsis, need for total parenteral nutrition (TPN), time to initiate enteral feeding, PRISM-III score, and the outcome of the patient's follow-up. The PRISM-III score was calculated using the worst values obtained within the first 24 h of the patient's admission. Sepsis occurring more than 48 h after admission (including bloodstream infections, ventilator-associated pneumonia, and urinary tract infections) was classified as nosocomial sepsis.

The number of dysfunctional organ systems within the first 24 h following the initial PICU admission was determined using the pediatric organ dysfunction information update mandate criteria. Accordingly, a total of six systems were evaluated, including cardiovascular, respiratory, neurological, renal, hepatic, and hematologic systems.[9]

Patients were categorized into two groups based on the outcome of their PICU stay: Survivors and non-survivors.

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences software version 29.0. Descriptive statistics summarized demographic and clinical characteristics. The Mann-Whitney U test and Pearson's Chi-square test were used to assess differences between survivors and non-survivors. The Mann-Whitney U test compared non-normally distributed continuous variables, while Pearson's chi-square test evaluated relationships between categorical variables. Receiver operating characteristic (ROC) curve analysis was performed to determine the predictive power of the PRISM-III score for mortality. Logistic regression analysis identified independent factors predicting mortality, and linear regression analysis assessed the impact of continuous variables on mortality. All tests were two-tailed, with a $p<0.05$ considered statistically significant.

RESULTS

A total of 1,035 patients were included in the study, with 56% (580/1,035) being male. The median age was 37 months (3 years and 1 month), with no significant difference between groups (p=0.945). Admissions peaked during winter, but this difference was not statistically significant (p=0.951).

The mortality rate was 6.8% (70/1,035). The average PRISM-III score was 4.6±7.2, significantly higher in non-survivors compared to survivors (19 vs. 1, p<0.001). Non-survivors also had a longer intensive care unit (ICU) stay (13 vs. 4 days, p<0.001).

Most patients were transferred from external centers (35.1%) or the pediatric emergency department (32.2%). Among non-survivors, at least two organ systems were affected within the first 24 h, with 78.6% having four dysfunctional systems. Mortality rates significantly increased with the number of affected organ systems (p<0.001).

The tracheostomy rate was 1.7% overall but significantly higher in non-survivors (5.7% vs. 1.3%, p=0.006). CVC placement was performed in 45.2% of patients, with a higher rate in non-survivors (88.6% vs. 42.1%, p<0.001). CRRT and TPE were more common among non-survivors (34.4% vs. 1.6%, p<0.001, and 17.1% vs. 2.2%, p<0.001, respectively). IMV was required by all non-survivors (100% vs. 25%, p<0.001), while NIV was significantly more frequent in non-survivors (17.1% vs. 7.4%, p=0.004). HFNO use did not differ significantly between groups (p=0.107). Inotropic support and blood product transfusions were also higher in non-survivors (97.1% vs. 6.1%, p<0.001, and 77.1% vs. 21.6%, p<0.001). TPN was needed by 10% of non-survivors compared to 2.7% of survivors (p<0.001). Enteral feeding was initiated in 84.5% of patients, with a higher rate in survivors (86.8% vs. 52.9%, p<0.001).

Nosocomial sepsis occurred in 11.3% of patients, significantly more in non-survivors (38.6% vs. 9.3%, p<0.001). Prolonged hospitalization due to social reasons was rare and did not differ significantly (p=0.884) (Table 1).

Pneumonia was more common in non-survivors (41.4% vs. 21.9%, p<0.001). Post-operative ICU admission and post-cardiopulmonary resuscitation cases were also more frequent in non-survivors (15.0% vs. 2.9%, p=0.005, and 17.1% vs. 1.2%, p<0.001). Central nervous system infections and other medical issues were observed more in non-survivors (7.1% vs. 1.8%, p=0.003, and 11.4% vs. 4.5%, p=0.009). Chronic conditions included neurological diseases (31%), genetic disorders (8.7%), and other categories with no significant differences between groups. Acute and chronic diagnoses are detailed in Table 2.

The PRISM-III score had an area under the curve (AUC) of 0.936, with a sensitivity of 82.6% and specificity of 88.9% at a cut-off of 10 (Fig. 1).

Regression analysis identified significant predictors of mortality: Each additional affected organ system within the first 24 h increased the odds of mortality by 17.8 times (p<0.001), tracheostomy by 15.5 times (p=0.023), and inotropic support by 12.7 times (p=0.043). Higher PRISM-III scores were also associated with increased mortality risk (p=0.025) (Table 3).

DISCUSSION

This study analyzed factors influencing mortality in critically ill pediatric patients in the PICU and evaluated the predictive power of the PRISM-III score. The ROC analysis demonstrated strong performance for the PRISM-III score (AUC: 0.936). An increase in the number of affected organ systems, the need for tracheostomy placement, and the requirement for inotropic support were associated with a higher risk of mortality.

Our study's mortality rate was 6.8% (70/1,035). This rate is comparable to other studies but varies across different regions. For instance, a multicenter study in Türkiye reported an 8.2% mortality rate, while studies in Argentina and China found rates of 8% and 8.9%, respectively.[2,10,11] Mortality rates reported by Karakaya et al.,[12] Gündoğan et al.,[13] and Durak et al.[14] were 8.96%, 8.6%, and 6.1%, respectively. While our mortality rate is lower than those reported in PICUs in developing countries and Türkiye, it is higher than the rates observed in European and American PICUs (1.85–5.8%).[15] These variations can be attributed to differences in patient profiles, treatment protocols, and care quality. Notably, the absence of pediatric hematology and oncology, as well as pediatric cardiovascular surgery in our clinic during the study period, likely influenced the lower mortality rate observed in our unit, as patients requiring these specialized treatments were not admitted to our PICU.

The use of mortality prediction models, such as PRISM-III, is crucial for enhancing the quality of care in PICUs.[7,16] The PRISM-III score assesses the risks and potential outcomes for pediatric patients in intensive care, with higher scores reflecting increased mortality risk.[8] Our study demonstrated that the PRISM-III score is a reliable tool for predicting mortality, achieving a sensitivity of 82.6%, specificity of 88.9%, and an AUC of 0.936. We identified a PRISM-III score cut-off value of >10 as the most effective threshold for predicting mortality. Our regression analysis further confirmed the PRISM-III score as an independent predictor of mortality (p<0.001). Consistent with the literature, which shows PRISM-III's predictive ability with AUC values ≥0.70,[2,8,11,17] our findings affirm its

Table 1. General characteristics and comparison of treatments in patients

Parameter	Total (n=1035)	Survivor	Non-survivor	p
Age, months, median (25–75p)	37 (10–124)	37 (11–103)	39 (10–124)	0.945
PICU length of stay, days, median (25–75p)	5 (3–23)	4 (3–9)	13 (3–23)	**<0.001***
PRISM-III score, median (25–75p)	2 (0–31)	1 (0–5)	19 (10–31)	**<0.001***
Sex, n (%)				
Male	580 (56.0)	539 (55.9)	41 (58.6)	0.658
Female	455 (44.0)	426 (44.1)	29 (41.4)	
Admission Season, n (%)				
Summer	266 (25.7)	250 (25.9)	16 (22.9)	0.951
Autumn	250 (24.2)	233 (24.1)	17 (24.3)	
Winter	280 (27.1)	260 (26.9)	20 (28.6)	
Spring	239 (23.1)	222 (23.0)	17 (24.3)	
Referring Department, n (%)				
Pediatric Emergency Department	333 (32.2)	305 (31.6)	28 (40.0)	**0.023**
Pediatric Surgery Department	48 (4.6)	48 (5.0)	0 (0.0)	
Pediatrics Department	61 (5.9)	52 (5.4)	9 (12.9)	
External Center	363 (35.1)	342 (35.4)	21 (30.0)	
In-Hospital other departments	208 (20.1)	198 (20.5)	10 (14.3)	
In-Hospital other ICUs	22 (2.1)	20 (2.1)	2 (2.9)	
Number of organ systems with acute organ dysfunctio (within the first 24 h), n (%)				
1	556 (53.7)	556 (57.6)	0 (0.0)	**<0.001**
2	278 (26.9)	276 (28.6)	2 (2.9)	
3	121 (11.7)	109 (11.3)	12 (17.1)	
4	78 (7.5)	23 (2.4)	55 (78.6)	
5	2 (0.2)	1 (0.1)	1 (1.4)	
Tracheostomy performed, n (%)	17 (1.6)	13 (1.3)	4 (5.7)	**0.006**
Central venous catheter required, n (%)	468 (45.2)	406 (42.1)	62 (88.6)	**<0.001**
CRRT, n (%)	39 (3.8)	15 (1.6)	24 (34.3)	**<0.001**
Therapeutic plasma exchange, n (%)	33 (3.2)	21 (2.2)	12 (17.1)	**<0.001**
IMV, n (%)	311 (30.1)	241 (25.0)	70 (100.0)	**<0.001**
NIV, n (%)	83 (8.0)	71 (7.4)	12 (17.1)	**0.004**
HFNO, n (%)	158 (15.3)	152 (15.8)	6 (8.6)	0.107
Inotropic support, n (%)	127 (12.3)	59 (6.1)	68 (97.1)	**<0.001**
Blood product, n (%)	262 (25.3)	208 (21.6)	54 (77.1)	**<0.001**
TPN requirement, n (%)	33 (3.2)	26 (2.7)	7 (10.0)	**<0.001**
Enteral feeding within the first 24 h, n (%)	875 (84.5)	838 (86.8)	37 (52.9)	**<0.001**
Nosocomial sepsis, n (%)	117 (11.3)	90 (9.3)	27 (38.6)	**<0.001**
Prolonged stay due to social reasons, n (%)	17 (1.6)	16 (1.7)	1 (1.4)	0.884

CRRT: Continuous renal replacement therapy; HFNO: High-flow nasal cannula oxygen therapy; ICU: Intensive care unit; IMV: Invasive mechanical ventilation; NIV: Non-invasive ventilation; PICU: Pediatric intensive care unit; PRISM-III: Pediatric risk of mortality III; TPN: Total parenteral nutrition. Statistical Tests Used: Pearson Chi-square test and *Mann-Whitney U test. Statistically significant p-values are indicated in bold.

Table 2. Comparison of acute and chronic diagnoses between survivors and non-survivors

Diagnosis	Total (n=1035) n (%)	Survivors (n=965) n (%)	Non-survivors (n=70) n (%)	p
Acute diseases				
Pneumonia	240 (23.2)	211 (21.9)	29 (41.4)	**<0.001**
Trauma	168 (16.2)	159 (16.5)	9 (12.9)	0.428
Bronchiolitis	137 (13.2)	131 (13.6)	6 (8.6)	0.233
Post-surgery (non-cardiac)	147 (14.2)	145 (15.0)	2 (2.9)	**0.005**
Status Epilepticus	94 (9.1)	90 (9.3)	4 (5.7)	0.589
Sepsis and septic shock	70 (6.8)	62 (6.4)	8 (11.4)	0.107
Poisoning	59 (5.7)	57 (5.9)	2 (2.9)	0.288
Diabetic ketoacidosis	58 (5.6)	57 (5.9)	1 (1.4)	0.116
Post-CPR	24 (2.3)	12 (1.2)	12 (17.1)	**<0.001**
CNS infection	22 (2.1)	17 (1.8)	5 (7.1)	**0.003**
Others (autoimmune, hematologic, oncologic, and renal diseases)	49 (4.7)	48 (5.0)	1 (1.4)	0.177
Chronic diseases				
Neurological diseases	321 (31.0)	292 (30.3)	29 (41.4)	0.051
Genetic diseases	90 (8.7)	80 (8.3)	10 (14.3)	0.086
Cardiological diseases	83 (8.0)	77 (8.0)	6 (8.6)	0.86
Endocrinological diseases	55 (5.3)	51 (5.3)	4 (5.7)	0.953
Metabolic diseases	45 (4.3)	39 (4.0)	6 (8.6)	0.073
Respiratory diseases	35 (3.4)	34 (3.5)	1 (1.4)	0.349
Gastrointestinal diseases	26 (2.5)	24 (2.5)	2 (2.9)	0.848
Others (autoimmune, hematologic, oncologic, and renal diseases)	51 (4.9)	43 (4.5)	8 (11.4)	**0.009**

Pearson Chi-square test was used. Statistically significant p-values are indicated in bold. CNS: Central Nervous system infections, CPR: Cardiopulmonary resuscitation.

utility in providing accurate prognostic information for PICU patients.

In our study, the number of affected organ systems emerged as a significant independent risk factor for mortality, with each additional affected system increasing the risk by 17.85 times. Notably, all non-surviving patients have involvement of at least two organ systems. As is well known, dysfunction in at least two organ systems is defined as multiple organ dysfunction (MOD). In our study, all patients who did not survive developed MOD within the first 24 h. Overall, the mortality rate among patients with MOD during our study period was 14.6%, a figure consistent with the literature, where rates range from 5% to 80%.[18] While many studies rely on organ failure scoring systems, there is a limited direct examination of the relationship between the number of affected systems and mortality. Ekinci et al.[2] reported that 34% of deceased patients had multi-organ dysfunction syndrome. Similarly, Umegaki et al.[19] found that in adults with sepsis, the risk of mortality increased by 2.2 times for each additional affected organ system.

Respiratory support therapies are critical in the management of critically ill pediatric patients in PICUs.[20] These therapies are essential for various conditions, including respiratory problems, comatose states, post-operative recovery, and chronic neurological issues. In our study, all patients in the non-survivor group received IMV, and 17.1% received NIV, both of which were significantly higher compared to survivors (p<0.001 and p=0.004, respectively). However, neither IMV nor NIV was identified as an independent predictor of mortality. Botan et al.[21] reported similar findings, with 76.8% of non-survivors initially

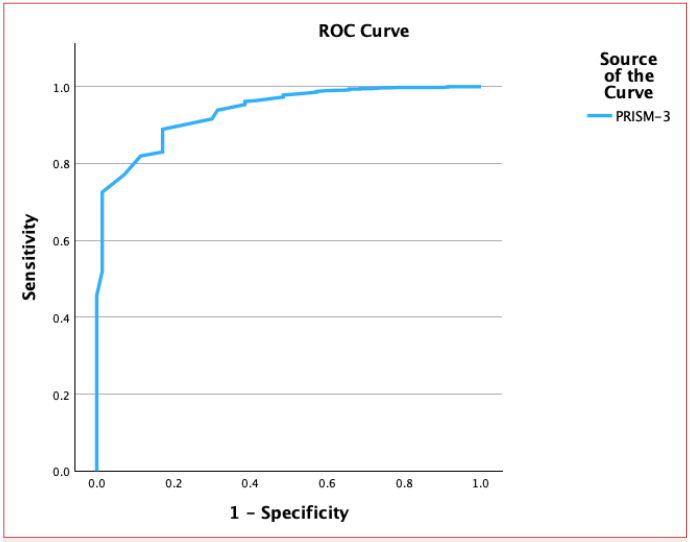

Figure 1. Receiver operating characteristic curve for the predictive power of the pediatric risk of mortality III score on mortality.

receiving IMV and 23.2% receiving NIV. HFNO is another respiratory support method, used in acute respiratory failure. In our study, HFNO was administered to 15.3% of patients, with no significant difference between survivors and non-survivors (p=0.107), consistent with other studies comparing its effectiveness to NIV.[14,20]

In our study, tracheostomy was performed in 5.7% of the non-survivor group, a rate that was statistically significantly higher compared to survivors (p=0.006). Moreover, in the regression model for mortality risk, the need for tracheostomy emerged as an independent risk factor (p=0.023). At present, tracheostomy in PICUs is primarily indicated for prolonged mechanical ventilation, upper airway anomalies, neurological disorders, and chronic lung diseases.[22] Considering these indications, we believe that the association between mortality and tracheostomy is more likely related to the underlying chronic conditions rather than the tracheostomy procedure itself.

Acute kidney injury remains a significant concern in critically ill patients, despite advances in PICU technology and renal replacement therapies.[23] CRRT has become a preferred choice in PICUs due to its advantages over peritoneal dialysis and intermittent hemodialysis.[24] Our study found a significantly higher proportion of non-survivors undergoing CRRT (34.4%, p<0.001), which aligns with findings from Botan et al.[21] (26.4% of non-survivors) and Durak et al.[14] (40% of non-survivors). A multicenter study also reported CRRT in 17.9% of non-survivors.[25]

TPE is an extracorporeal blood purification technique used in critical pediatric illness, though most data come from adult studies.[26] In our study, TPE was administered to 33 patients, with 17.1% of non-survivors requiring it, significantly higher compared to survivors (p<0.001). This finding is consistent with other studies, which report TPE needs in deceased PICU patients ranging from 5% to 26.2%.[12,14,21]

Nosocomial sepsis is a significant concern in intensive care units, associated with prolonged ICU stays, increased mortality, and morbidity. Many PICU studies have linked nosocomial

Table 3. Logistic regression analysis for predictors of mortality in patients

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
Tracheostomy	2.743	1.21	5.14	1	**0.023***	**15.536**
Continuous renal replacement therapy	0.267	0.856	0.098	1	0.755	1.306
Non-invasive mechanical ventilation	0.197	0.853	0.053	1	0.817	1.218
Invasive mechanical ventilation	-14.025	1243.7	0	1	0.991	0
Inotropic infusion	2.54	1.252	4.113	1	**0.043***	**12.682**
Blood product transfusion	1.745	0.957	3.324	1	0.068	5.725
Healthcare-associated infections	1.396	0.823	2.875	1	0.090	4.038
Total parenteral nutrition	0.513	1.093	0.221	1	0.639	1.671
Number of organ systems with dysfunction (within the first 24 h)	2.882	0.543	28.201	1	**<0.001***	**17.851**
Enteral feeding initiation within 24 h	0.669	0.728	0.844	1	0.358	1.952
PRISM-III score	0.074	0.03	5.018	1	**0.025***	**1.077**
Constant	-15.029	3.066	24.021	1	**<0.001***	0

PRISM-III: Pediatric risk of mortality III.

sepsis to higher mortality rates.[21,27,28] Reported nosocomial sepsis rates in deceased PICU patients range from 21.3% to 55.5%.[21,27] In our study, the nosocomial sepsis rate was 11.3% (117/1035), significantly higher in the non-survivor group (38.6% vs. 9.3%, p<0.001). The increased infection risk in critically ill pediatric patients in intensive care is due to their underlying chronic diseases, compromised immunity from acute illnesses, and disrupted natural defense barriers from invasive procedures.[27]

Enteral nutrition is critical for the monitoring and treatment of critically ill children in PICUs.[29] It is recommended to start enteral feeding as soon as possible after ICU admission and stabilization of vital signs, provided there are no contraindications such as decompensated shock, ischemic bowel, or critical bowel stenosis.[30] A multicenter study in Türkiye found that critically ill pediatric patients who started early enteral feeding had lower mortality risk, shorter ICU stays, and shorter mechanical ventilation duration.[31] In our study, the rate of enteral feeding within the first 24 h was significantly higher in the survivor group (86.8%) compared to non-survivors (52.9%) (p<0.001). However, initiating feeding within the first 24 h was not identified as an independent risk factor for mortality. One limitation of our study is that we did not account for the time to reach enteral nutrition goals or examine the reasons preventing early enteral feeding. Therefore, our results cannot be generalized, and with only the information on initiating feeding within the first 24 h, it is difficult to comment on the overall relationship with mortality.

Respiratory system diseases were the most common acute diagnoses for PICU admission, accounting for 36.4% (pneumonia 23.2% and bronchiolitis 13.2%), followed by pediatric trauma patients at 16.2% and patients requiring post-operative monitoring at 14.2%. Numerous studies have identified respiratory diseases as the most frequent reason for PICU admissions, although subsequent diagnoses vary.[2,10,11,13,14] These differences may be due to variations in hospital capacities, the diversity of pediatric specialties, and regional differences in patient populations. During our study period, the absence of certain pediatric specialties (hematology, neurology, and cardiovascular surgery) at our hospital affected the diversity of patients admitted to our unit, influencing both the range of critical and accompanying chronic conditions.

In our study, 31% of patients with acute illnesses had neurological disorders, 8.7% had genetic disorders, and 8% had cardiological disorders. While existing literature indicates that accompanying chronic conditions impact mortality, our findings showed similar proportions of chronic conditions in both survivor and non-survivor groups.[2,14] Despite variations in reported proportions, neurological, metabolic, and cardiological disorders consistently rank among the top three. These differences may result from variations in specialization across centers and geographical factors.[10,12-14,21]

Our study also revealed that patients, with a median age of 37 months, most commonly presented during the winter season. The seasonal distribution of admissions showed that 27.1% occurred in winter, 25.7% in summer, 24.2% in autumn, and 23.1% in spring. The higher admission rate in winter may be linked to seasonal illnesses such as lower respiratory tract infections. A limitation of our study is the lack of analysis on the relationship between acute diagnoses and seasonal variations, leading to interpretations based on assumptions.

Our study has several limitations. First, being a retrospective study, the accuracy and completeness of the data rely entirely on hospital records, which may introduce risks of missing or erroneous information. Second, the study was conducted at a single center, which limits the generalizability of the results. In addition, the study population is restricted to patients admitted during a specific period, excluding variables outside of this timeframe. For instance, during the COVID-19 pandemic, our hospital functioned as a pandemic facility, leading to a decrease in admissions for non-respiratory conditions. In addition, our study was designed as a general examination of factors influencing mortality in critically ill pediatric patients, focusing on the number of dysfunctional organ systems. However, it did not analyze which specific organ systems were dysfunctional or their individual contributions to mortality, representing another limitation of the study.

CONCLUSION

PICUs are critical centers where children with severe illnesses receive multidisciplinary care through both invasive and non-invasive treatments. Accurate prediction of mortality risk in critically ill patients offers clinicians the opportunity for timely interventions, with the potential to improve patient outcomes. Our study provides valuable insights into factors affecting mortality in critically ill pediatric patients and highlights the strong predictive performance of the PRISM-III score in this context. Furthermore, we identified that mechanical ventilation, extracorporeal therapies, blood product requirements, and inotropic treatments were more frequently utilized in the non-survivor group. Importantly, we demonstrated that an increase in the number of dysfunctional organ systems significantly impacts mortality risk. These findings contribute to optimizing patient management strategies and improving prognosis in PICUs.

DECLARATIONS

Ethics Committee Approval: The study was approved by Bağcılar Training and Research Hospital Ethics Committee (No: 2024/04/05/042, Date: 28/04/2024).

Author Contributions: Concept – S.A., A.O., U.K.B., N.O.K.; Design – S.A., A.O., O.K.B., N.O.K., M.E.; Supervision – A.O., U.K.B., N.O.K., M.E.; Fundings – S.A., A.O.; Mterials – S.A., A.O., S.Y.; Data collection &/or processing – S.A., A.O., U.K.B.; Analysis and/or interpretation – S.A., A.O., S.Y.; Literature search – S.A., A.O.; Writing – S.A., A.O., S.Y.; Critical review – A.O., U.K.B., N.O.K., M.E.

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

Use of AI for Writing Assistance: Not declared.

Financial Disclosure: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Informed Consent: Informed consent was obtained from the guardians of all patients.

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