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**Original Research**

# Clinical outcomes determinants among Community-Acquired Pneumonia (CAP) Paediatric patients admitted to tertiary hospital UAE

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**Abstract**

**Background:** Community-Acquired Pneumonia (CAP) represents one of the most important causes of paediatric admissions and deaths globally, with an exceptionally high impact, particularly on children under the age of five years of age. **Objective:** The purpose of this study was to describe the clinical manifestations, severity scores and outcomes of paediatric patients with CAP and evaluate the usability of the PIRO score as an indicator of outcomes. **Methods:** This observational retrospective cohort study involved 177 confirmed paediatric CAP patients admitted from 1/1/2021 to 31/12/2023. Data on sociodemographic status and clinical characteristics were obtained, and results were stratified according to the inclusion and exclusion criteria. **Results:** Among the clinical outcomes, 53 children (72%) and 35 infants (21.3%) were discharged with no complications, while 51 children (49.5%), 18 infants (31.7%) and 2 neonates (9.7%), were discharged with antibiotics. The clinical outcome data in relation to the PIRO score shows a significant association between illness severity and patient outcomes ($p < 0.001$). Among patients with a low PIRO score (n=175), 40.5% (71 patients) were discharged with antibiotics, 50.8% (89 patients) were discharged with no complications, and 6.2% (11 patients) were discharged with minor complications. Only 2.5% (4 patients) with low PIRO scores required transfer to the NICU/ICU, and there were no deaths reported in this group. **Conclusion:** The PIRO score was found to have internal construct validity in predicting illness severity and clinical outcomes. Patients with significant PIRO scores had significantly longer hospital durations, more frequent ICU transfers and more complications.

**Keywords:** Infectious Disease, Clinical outcomes, Antibiotic Outcomes, paediatric patients.

## INTRODUCTION

CAP is the single most common cause of childhood bacterial infections, hospitalization and mortality from infectious diseases[1]. It primarily occurs in preschool children, particularly children below age six, and the most common viral cause is RSV. However, in children over five, bacterial pathogens lead to CAP, with Streptococcus pneumoniae being the most frequently isolated[2]. Fever, cough, anorexia and hypoxemia are some of the common clinical presentations in pediatric patients suffering from CAP, which usually reduces a child's health and well-being[3].

Diagnostic imaging like chest radiographs is common among hospitalized children with CAP to help identify disease causes and future clinical outcomes[4]. Because of the criticality of guidelines for the best practices in the administration of CAP, the pharmacists have a central part to play in the pursuit of antibiotic stewardship as well as appropriate isolation measures and preventive measures against the complications of CAP in improving patient outcomes[5].

WHO also estimates that 226 million children under the age of five years suffer from pneumonia every year, leading to more than 740,000 deaths[6]. This acute illness of the lungs that is contracted through social contact poses a great deal of a challenge to public health. While improvements in prevention and control measures have decreased mortality rates for pneumonia in high-income countries, children receiving immunosuppressive therapy and patients with comorbidities such as congenital heart disease or chronic lung disease remain at a high risk of death[7].

Global concern is warranted as CAP affects millions of people annually. CAP remains a frequent disease whose prevalence rate depends on the country, health care availability, and economic development level[8]. It should be noted that based on the analysis, CAP influences patients of all ages. Still, the most vulnerable populations are children under the age of five years of age as well as persons of pensionable age. According to statistics, modern infants aged less than five years and older adults aged over 65 years are most prone to be hospitalized or die from pneumonia and thus rank as one of the biggest causes of death from infectious diseases[9]. Like with any disease, mortality depends on factors including the pathogen, patient age, overall health, and quality of care received; hence, mild cases have mortality below one percent, while severe cases have mortality above thirty percent[10].

This is a disease that was previously known as the "forgotten

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killer of children" and is estimated to be the cause of 1.1 to 1.4 million deaths in children per year, or 17–19% of all child deaths. Most of the deaths take place in LMIC, where access to health care services is still a challenge. The rigorous analysis indicates that children in these areas get pneumonia attacks at a mean rate of 0.22 per year, and close to one-eighth of the affected children develop severe consequences[11].

The primary risk factors contributing to pediatric pneumonia development in the UAE also differ across age groups. Bacterial pneumonia is more common in children older than five, whereas viral infections are more common in infants and children five years and below. It is essential not to use antibiotics in viral pneumonia, especially in cases of par pneumonia that usually present initially with flu-like symptoms, lower gradual onset, bilateral rales, and nontoxic appearances[12]. Among bacterial pathogens, Streptococcus pneumoniae remains the most prevalent pathogen in "typical" pneumonia in all pediatric age groups. Symptoms of bacterial pneumonia in preschool-aged children are more severe, rapid in onset and moderate to severe respiratory difficulty requiring admission[13].

Current research activities have been directed at identifying pre-endemic clinical risk predictors of pediatric CAP patients[14]. One such study assessed a cohort of children admitted to hospitals who were below the age of 15 years for ten years and used a pediatric modification of an adult-developed PIRO scale for the assessment of predisposing factors, the incidence or nature of the 'hit,' the body's response and organ dysfunction. This scoring system measures several clinical variables, including pneumonia severity and organ dysfunction, by awarding points according to compliance with predefined criteria, covering a score between 0 and 8[15-16]. The aim of this study was to Assess the therapy outcomes and re-admission rates of these pediatric patients treated and to explore the relationship between clinical outcomes (therapy results and re-admissions) and factors such as PIRO score, age, presence of comorbidities, severity of symptoms on admission and antibiotic used.

## MATERIAL AND METHODS

### Study Design

This research was designed as a retrospective cohort study.

### Study Period

Descriptive data was gathered for all children who were admitted to the hospital between January 2021 and April 2023, following age inclusion and exclusion criteria. Data collection lasted almost four months, and all pediatric patients admitted to MTRH during the study period (January 2021 – December 2023) were included. In this case, information was manually obtained from different patients' records.

### Study Location

The study occurred in a teaching hospital offering third-level care in the emirate of Ajman, United Arab Emirates. Infectious diseases were used as an entry point, and pediatric patients who met inclusion and exclusion criteria were enrolled. The locations comprised the general pediatric ward, pediatric intensive care unit (PICU), and emergency department.

### Study Population

The target participants included children up to the age of 18 years with diagnosed CAP who presented at the hospital from January 2021 to December 2023.

### Participants Criteria

**Inclusion Criteria:** Children and young adults from newborns up to 18 years of age. A definitive clinical diagnosis of CAP, according to clinical signs and symptoms, techniques (e.g., chest x-rays), and investigations (e.g., laboratory results). Targeted only the CAP subset to examine this cohort of patients' treatment response and clinical status.

**Exclusion Criteria:** Patients affected by pneumonia that developed in hospitals or obtained via a healthcare-connected location. Patients who have comorbidities include severe immunosuppression or severe physical disabilities that affect the patients' outcomes. Subjects needed to provide adequate information about the prospective predictors (e.g., PIRO score, antibiotic therapy options, subsequent clinical course).

### Sample Size Calculation

This study involved all patients who met the inclusion criteria and received admission from January 2021 to December 2023. To increase coverage, convenience sampling was used to identify all eligible patients during the study period.

### Ethical Approval

The study received approval from the Institutional Review Board (IRB) of the tertiary care hospital. The ethical approval was obtained from IRB-Gulf Medical University, Ajman, UAE (number **IRB-COP-STD-62-NOV-2023).**

### Data Collection

Therefore, the researcher designed the hospital's modified Data Abstraction Tool to collect data from the patient medical record relative to the Hospital Information Management System at the nursing station. Data obtained in the study included age, weight, body surface area, gender, and race of the patients admitted, their diagnosis, and medication history. Additional information gathered included length of hospital stay, antibiotic administration dosages, frequency, antibiotic de-escalation hours, length of therapy, side effects encountered and 30-day readmission rates. Data collection and cleaning were done in Excel, and monthly investigator meetings were held to ensure data validity.

### Data Confidentiality

Precaution was exercised to maintain the details provided, which were very secretive. Firstly, identifying information such as the patient's names was replaced by hospital numbers only. Proper identification numbers were provided so the researcher could access the files and data to ensure they did not fall into the wrong hands. The data was collected using a Google Form for security purposes and then transferred to Excel for analysis.

Although the data required for education or publications may be requested by the Ministry of Health and Prevention (MOHAP) or partner hospitals, the patient's identity will not be released to a third party. The research outcomes of the current study will be presented at a professional conference and in a discipline-appropriate refereed journal.

**Statistical Analysis**

Structured data obtained from Excel was analyzed using the IBM SPSS Statistics (Version 22.0). The analyzed data is kept with principal investigator for five years. Data will be described and analyzed as proportions and means ± standard deviation and medians and ranges, as appropriate. Numerical variables were compared with analysis of variance (ANOVA), while association tests were done with chi-square tests. A P-value of < 0.05 was used to determine the statistical significance between the researched factors.

## RESULTS AND FINDINGS

**Demographic Information of the participants**

The Table 1 data represents a demographic and clinical overview of 177 participants, where 53.1% were male and 46.9% were female. The average age of the group was 4.8 years, with a standard deviation of 2.96 years. This indicates that most individuals' ages were within the range of approximately 1.84 to 7.76 years, showing moderate variability around the mean age.

The data provides a comparison of new community-acquired pneumonia (CAP) cases over two years (2022 and 2023). According to the demographic information:

- 2022 accounted for 54.32% of cases.
- 2023 accounted for 45.68% of cases.

This breakdown indicates that there was actually a slight decrease in new CAP cases from 2022 to 2023, with approximately an 8.64% drop in cases rather than an increase. This change could be influenced by various factors, such as seasonal variations, public health, Nationality distribution was diverse, with the highest percentage of participants from India (34.46%), followed by Yemen (16.38%), Pakistan (12.43%), and the UAE (7.91%). Smaller groups came from countries such as Bangladesh (4.52%), Egypt (5.08%), Sudan (2.82%), and Syria (1.69%), with several other countries contributing under 2% each. In terms of the year of participation, 54.32% were from 2022 and 45.68% from 2023. A large majority, 95%, had no Central Nervous System (CNS) involvement, while 5% did. All participants (100%) received intravenous (IV) treatment, with varying durations: 44% were treated for 2 days, 25.9% for 3 days, and 18.6% for 1 day. Longer treatment durations, such as 4, 5, or 7 days, were less common, affecting less than 6% of participants each.

The Mean ± S.D of hospital stay was 2.45 ± 1.3 days. This means that the typical length of stay was around 2.45 days, with a standard deviation of 1.3 days. Most patients stayed between approximately 1.15 days (2.45 - 1.3) and 3.75 days (2.45 + 1.3) this the range of the mean and standard deviation, indicating moderate variability in hospital stay durations. The majority of patients experienced short stays, with the mean showing a tendency toward a stay of around 2-3 days.

**Table 1.** Epidemiological trends and sociodemographic of study population

| **Demographic Information** | **N(%)** |
|---|---|
| **Gender** | |
| Male | 94 (53.1%) |
| Female | 83 (46.9%) |
| **Age** (mean ± SD) | 4.8 ± 2.96 |
| Min. | 10 days |
| Max. | 12 years |
| **Nationality** | |
| Australia | 1(0.56%) |
| Bangladesh | 8(4.52%) |
| Egypt | 9(5.08%) |
| Ethiopia | 2(1.13%) |
| India | 61(34.46%) |
| Iran | 4(2.26%) |
| Iraq | 1(0.56%) |
| Jordan | 4(2.26%) |
| Kenya | 1(0.56%) |
| Mauritania | 1(0.56%) |
| Morocco | 1(0.56%) |
| Pakistan | 22(12.43%) |
| Palestine | 4(2.26%) |
| Philippines | 2(1.13%) |
| Somalia | 2(1.13%) |
| South Sudan | 1(0.56%) |
| Sri Lanka | 2(1.13%) |
| Sudan | 5(2.82%) |
| Syria | 3(1.69%) |
| UAE | 14(7.91%) |
| Yemen | 29(16.38%) |
| **Year** | |
| 2022 | 96(54.32%) |
| 2023 | 81(45.68%) |
| **CNS** | |
| Yes | 9(5%) |
| No | 168(95%) |
| **Route** IV | 177(100%) |
| **Duration (days) Mean±S.D** | 2.45±1.3 |

**The clinical characteristics based on age category**

The clinical characteristics data reveals significant differences across age groups regarding Mycoplasma infection and CNS involvement, as well as the prescribed medications. Mycoplasma

infection was more prevalent in children (57.2%) and infants (51.8%) compared to neonates (25%) ($p < 0.001$). In contrast, CNS involvement was significantly higher in neonates (50%) than in infants (5.35%) and children (3.4%) ($p < 0.001$). Regarding the CNS organism Group A Streptococcus, it was identified in 50% of neonates, compared to only 1.69% of both infants and children ($p < 0.001$) (Table 2).

**Distribution of organism among participants**

Following is the graphical representation of CNS organism cases. The majority, 94%, of cases fall under the "No CNS" category, while 4% are classified as "Negative" for CNS organisms. Only 1% of cases are "Positive" for CNS organisms, and 1% are due to Group A Streptococcus. This illustrates that CNS involvement is relatively rare, with most participants having no CNS infection (Figure 1).

**Distribution of Case Severity Based on PIRO Scoring System**

Following is the graphical representation of PIRO score. The vast majority of cases, 99%, are classified as having low severity. A very small percentage of cases are classified as high severity and very high severity, each accounting for 1% of the total. This suggests that most participants have a low severity level based on the PIRO scoring system (Figure 2).

**PIRO Score Distribution and Clinical Severity Levels**

The table 3 summarizes the PIRO score distribution and severity levels among participants. The Mean  SD PIRO score is 1.0226 ± 0.91051, indicating a relatively low average severity. Most participants, 98.87%, fall into the low severity category, while none are classified as having mild severity. A very small number of participants are categorized as having high severity (0.56%) and very high severity (0.56%). This confirms that nearly all cases involve low clinical severity.

**Prevalence of Clinical Conditions and Comorbidities**

The table 4 provide information about the clinical conditions and presence. Only 2.3% had comorbidities, while the vast majority (97.7%) did not. Bacteraemia and acute renal failure were rare, each affecting just 0.56% of participants, while 99.44% had no such issues. Multilobe opacities on chest radiographs were seen in 37.3% of participants, while 62.7% had no opacities. Shock was present in 1.13% of cases, with 98.87% unaffected. Severe hypoxemia occurred in 3.39% of participants, but most (96.61%) did not experience this condition. A significant portion of participants, 58.8%, had acute respiratory distress syndrome (ARDS).

**Correlation Between PIRO Score and Hospital Stay Duration**

The table 5 provides details information about the relationship

**Table 2.** Clinical characteristics based on age category

| Clinical characteristics | Age Category | | | P value |
|---|---|---|---|---|
| | Neonate | Infants | Children | |
| | < 2 months | 2m -2years | 2-11 years | |
| | (n=4) | (n=56( | (n=117) | |
| **Mycoplasma** | | | | <0.001 |
| (positive) | 1(25%) | 29(51.8%) | 67(57.2%) | |
| (negative) | 3(75%) | 27(48.2%) | 55(47%) | |
| **CNS** | | | | <0.001 |
| (Yes) | 2(50%) | 3(5.35%) | 4(3.4%) | |
| (No) | 2(50%) | 53(94.65%) | 113(96.6%) | |
| **CNS organism** | | | | <0.029 |
| (negative) | 2(50%) | 3(1.69%) | 3(1.69%) | |
| (positive) | | | | |
| Group A Streptococcus | 0 | 0 | 1(0.56%) | |
| **Drug Prescribed** | | | | <0.001 |
| Ceftriaxone | 1(25%) | 35(62.50%) | 113(96.58%) | |
| Azithromycin | 0 | 1(1.79%) | 0 | |
| Clarithromycin | 0 | 0 | 0 | |
| Meropenem | 1(25%) | 0 | 0 | |
| Vancomycin | 1(25%) | 0 | 0 | |
| Gentamicin | 0 | 0 | 1(0.85%) | |
| Ceftriaxone/Clarithromycin | 1(25%) | 0 | 0 | |
| Ceftriaxone/Azithromycin | | 13(23.21%) | 2(1.71%) | |
| No Medication | 0 | 7(12.50%) | 0 | |

**Table 3**. Severity based on PIRO score

| **Severity based on PIRO score** | |
|---|---|
| PIRO Score (Mean ± SD) | 1.0226 ± 0.91051 |
| Low | 175 (98.87%) |
| Mild | 0 (0%) |
| High | 1 (0.56%) |
| Very High | 1 (0.56%) |

**Table 4.** Frequency of Clinical Conditions and Comorbidities in PIRO Score Sub-Domains

| **Sub-domains of PIRO score** | **Yes** | **No** |
|---|---|---|
| Comorbidities | 4 (2.3%) | 173 (97.7%) |
| Bacteremia | 1 (0.56%) | 176 (99.44%) |
| Multilobe opacities in chest radiograph | 66 (37.3%) | 111 (62.7%) |
| Shock | 2 (1.13%) | 175 (98.87%) |
| Severe hypoxemia | 6 (3.39%) | 171 (96.61%) |
| Acute renal failure | 1 (0.56%) | 176 (99.44%) |
| Acute respiratory distress syndrome | 104 (58.8%) | 73 (41.2%) |

**Table 5.** Impact of PIRO score on the Length of stay

| **PIRO Score** | **Hospital Stay** | **Frequency** | **Mean** |
|---|---|---|---|
| **Low** | 1 | 33(18.6%) | 2.39 |
| | 2 | 78(44.07%) | +1.18 |
| | 3 | 46(25.05%) | |
| | 4 | 8(4.52%) | |
| | 5 | 9(6.08%) | |
| | 6 | 1(0.56%) | |
| **High** | 7 | 1(0.56%) | 7 |
| **Very High** | 8 | 1(0.56%) | 8 |

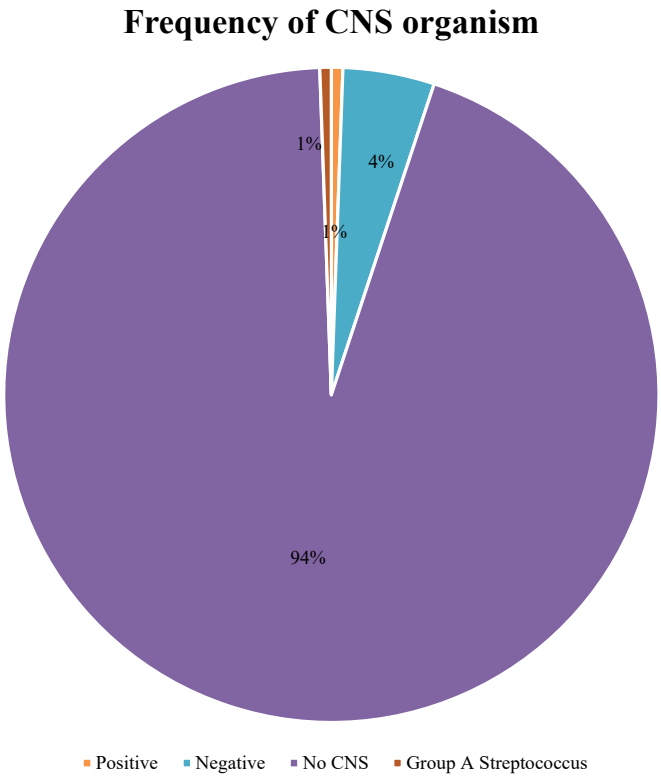


**Figure 1.** Percentage Distribution of organism among paediatrics


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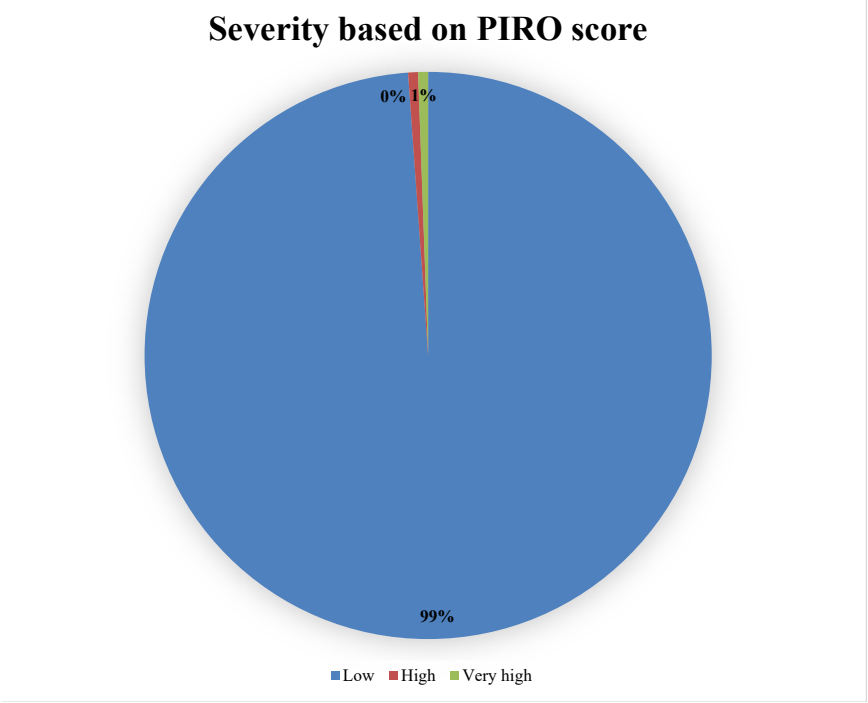


**Figure 2.** Percentage Distribution of PIRO score severity among pediatrics

between PIRO score, hospital stay duration, and frequency of cases. For participants with a low PIRO score, the MeanSD hospital stay was 2.39 ± 1.18 days, with most patients staying between 1 and 3 days: 33 stayed for 1 day, 78 for 2 days, 46 for 3 days, and a smaller number stayed longer (5 for 4 days, 9 for 5 days, and 1 for 6 days). Participants with high and very high PIRO scores had longer hospital stays of 7 and 8 days, respectively, though both groups had only 1 case each (0.56%).

**Analysis of Clinical Outcomes**

The majority of patients were discharged with no complications, accounting for 50.28% of the cases. A substantial proportion, 40.11%, were discharged with antibiotics, indicating a significant portion of patients required ongoing treatment post-discharge. Minor complications or other infections were noted in 6.21% of cases, reflecting a smaller but notable risk of additional health issues. Transfers to NICU/ICU were necessary for 2.26% of patients, highlighting a critical need for intensive care in these instances. Importantly, there were no recorded deaths, underscoring a positive outcome in terms of survival across the cohort (Table 6).

**Rare of readmission**

There were no cases of readmission across all participants, indicating a 0% readmission rate. This suggests that the treatments provided were effective, with no patients requiring further hospitalization after discharge.

**Age-Based Clinical Outcomes and PIRO Score Correlation in Pediatric Patients**

Among the clinical outcomes, 53 children (72%) and 35 infants (21.3%) were discharged with no complications, while 51 children (49.5%), 18 infants (31.7%) and 2 neonates (9.7%), were discharged with antibiotics. Additionally, 7 children (53.8%), 4 infants (30.8%), and 1 neonate (23%) were discharged with minor complications, and only 6 children (100%) required transfer to NICU/ICU, with no deaths reported across any age group.

**Table 6.** Percentage of discharge outcome among participants

| Clinical Outcome | Percentage |
|---|---|
| D/C with antibiotics | 71 (40.11%) |
| D/C with no complications | 89 |
| | -50.28% |
| D/C with other infection or minor complications | 11 (6.21%) |
| Transfer to NICU/ICU | 6 (2.26%) |
| Death | 0 |

A smaller percentage, 3.95% of children, 2.25% of infants, and 1.69% of neonates, were discharged with other infections or minor complications, and 3.38% of children required transfer to the NICU/ICU, with no deaths reported. The p-value of less than 0.001 indicates that the differences in clinical outcomes based on age and PIRO scores are statistically significant, underscoring that age and illness severity (reflected in the PIRO score) are important factors influencing patient recovery and discharge status (Table 7).

**Analysis of Clinical Outcomes and PIRO Score**

The crosstab shows clinical outcomes by age category. For

children, 17 were admitted to ICU, while most (91) were discharged with complications or after antibiotics. Infants had more minor complications (D/C), and neonates had only 4 cases, primarily discharged with antibiotics. Only one child was alive after transfer to ICU/NICU, and total cases equal 194.

The clinical outcome data in relation to the PIRO score shows a significant association between illness severity and patient outcomes ($p < 0.001$). Among patients with a low PIRO score (n=175), 40.5% (71 patients) were discharged with antibiotics, 50.8% (89 patients) were discharged with no complications, and 6.2% (11 patients) were discharged with minor complications. Only 2.5% (4 patients) with low PIRO scores required transfer to the NICU/ICU, and there were no deaths reported in this group.

In contrast, both patients with high (n=1) and very high (n=1) PIRO scores were transferred to the NICU/ICU (100%), and none of them were discharged with antibiotics or without complications. The p-value of $< 0.001$ confirms that the differences in outcomes based on PIRO scores are statistically significant, with worse outcomes associated with higher PIRO scores.

Following is the results obtain from the analysis performed on the provide data set. The data shows that patients with low PIRO scores (n=175) had a higher likelihood of being discharged without complications (50.8%) or with antibiotics (40.5%). Minor complications occurred in 6.2% of low PIRO cases. No patients with low PIRO scores were transferred to NICU/ICU or died. However, both high and very high PIRO score patients (n=1 each) had a 100% rate of ICU transfer, with no discharges without complications. The p-value ($< 0.001$) indicates a statistically significant difference in clinical outcomes based on the PIRO score (Table 8).

**Impact of Clinical Conditions on Discharge Outcomes**

The analysis reveals that all 71 patients discharged with antibiotics had no bacteremia, multilobe opacities, shock, severe hypoxemia, or acute renal failure, with 50.7% of those with acute respiratory distress syndrome (ARDS) also receiving antibiotics. Discharge without complications was rare, occurring in only 1.1% of patients with bacteremia, 71.9% with multilobe opacities, and 4.5% with severe hypoxemia, while 66.3% of ARDS patients were discharged without complications. Eleven patients without significant conditions were discharged with minor complications. Transfers to NICU/ICU were more common among patients with severe conditions, including 16.7% with bacteremia and 50% for both ARDS and non-ARDS patients. Overall, the findings highlight that conditions like ARDS and multilobe opacities are linked to more complex outcomes and a higher likelihood of ICU transfers (Table 9).

## DISCUSSION

The findings of the present work offer helpful information regarding the epidemiologic profile, clinical presentation, and prognosis of children with CAP who are admitted to a tertiary care center in Ajman, UAE[17]. The study involved 177 participants, and the sample did various investigations on gender, age, nationality, clinical signs, severity levels according to the PIRO score, and effects of the treatment protocol. At the end of this discussion, the author will summarize the findings, their applications to practice, and directions for future research[18].

**Table 7**. Impact of age on the clinical outcomes

| Category | | Clinical Outcomes | | | | Total |
|---|---|---|---|---|---|---|
| | | D/C with antibiotics | D/C with no complications | D/C with other infection or minor complications | Transfer to NICU/ICU | |
| Age | | | | | | |
| | Children | 51 | 53 | 7 | 6 | 117 |
| | Infants | 18 | 35 | 3 | 0 | 56 |
| | Neonate | 2 | 1 | 1 | 0 | 4 |
| Total | | 71 | 89 | 11 | 6 | 177 |

**Table 8.** Impact of PIRO score on the clinical outcomes

| Clinical Outcome | PIRO Score | | | P Value |
|---|---|---|---|---|
| | Low | High | Very High | |
| | (n=175) | (n=1) | (n=1) | |
| D/C with antibiotics | 71 (40.5%) | 0 (0%) | 0 (0%) | < 0.001 |
| D/C with no complications | 89 (50.8%) | 0 (0%) | 0 (0%) | |
| D/C with other infection or minor complications | 11 (6.2%) | 0 (0%) | 0 (0%) | |
| Transfer to NICU/ICU | 4 (2.5%) | 1 (100%) | 1 (100%) | |
| Death | 0 (0%) | 0 (0%) | 0 (0%) | |

**Table 9.** Clinical outcomes upon discharge and PIRO sub-Domain

| Clinical Outcome | Bacteremia | | Multilobe opacities in chest radiograph | | Shock | | Severe hypoxemia | | Acute renal failure | | Acute respiratory distress syndrome | | P Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | |
| D/C with antibiotics | 0 | 71 | 0 | 71 | 0 | 71 | 0 | 71 | 0 | 71 | 36 | 35 | < 0.0032 |
| D/C with no complications | 1 | 89 | 64 | 25 | 0 | 89 | 4 | 85 | 1 | 88 | 59 | 30 | |
| D/C with other infection or minor complications | 0 | 11 | 0 | 11 | 0 | 11 | 0 | 11 | 0 | 11 | 6 | 5 | |
| Transfer to NICU/ICU | 1 | 5 | 4 | 2 | 2 | 4 | 2 | 4 | 0 | 6 | 3 | 3 | |

**Demographic Overview**

The study population also included slightly more male children at 53.1%, while female children were 46.9%; evidence shows that boys are more vulnerable to respiratory infections than girls in childhood[19]. The participants' mean age was 4.8 years, demonstrating that CAP is most common in young children, especially those between the ages of 2 and 11 years, as represented by most of the participants. The present study emphasizes the need to direct more attention to this age group since effective prevention and management intervention for CAP is still relevant today, given that childhood CAP continues to be one of the leading causes of admission in children worldwide[20].

Nationality distribution of the children was also diverse, and more than one-third of the children were of Indian nationality (34.46%), while the rest comprised Yemeni (16.38%), Pakistani (12.43%), and Emirati children (7.91%). This is due to the multinational population of the UAE, which highlights the importance of culturally appropriate etiquette that should be followed in healthcare institutions for each group/ethnicity[21]. The study was conducted in 2022 and 2023, which enabled the investigation of an up-to-date situation concerning CAP in the population of interest[22].

**Possible Clinical Features or Symptoms**

There were no differences in clinical symptoms of CAP between genders; however, the most common symptoms were cough, fever and poor intake[23]. Cough was rated as the most severe symptom by both the male and female participants and thus was found to be the most important symptom of CAP[24]. Fever was also prevalent in 96.39% of female participants and 100% of male participants. These findings are consistent with the baseline clinical characteristics of CAP in pediatric age groups[25].

Vomiting was higher in female respondents at 61.45%, while in male respondents at 58.51% (26). Easy breathing was higher in female respondents, at 36.14%, compared to male respondents, at 13.83%. These sex differences could be due to differences in immune response or self-reporting of symptoms[27]. Notably, the intent CNS involvement was low (5%), meaning serious neurological complications were uncommon among this group. This finding indicates that although CAP is a life-threatening condition, CNS complications were not reported to be frequent and may be caused by early medical management. Clinical scale differences in older patients result in different primary structures of care than for middle-aged and young patients[28].

They also pointed out enormous differences between age groups in CAP's clinical features and prognosis[29]. For instance, Mycoplasma infection was more prevalent in older children (57.2%; 95 CI 46.3-68.1 among children aged 2-11 years) than in neonates (25%; 95 CI 12.8-37.2). On the other hand, neonates presented higher rates of CNS involvement; 50% had Group A Streptococcus as the most common organism[30]. Based on these results, one can reinforce the conviction that the determinants of CAP, including its etiological agents and clinical complications, depend on the patient's age, thus requiring the development of differentiated diagnostic and therapeutic strategies[31].

The prescribed treatments also varied with the age of the patients, and those compiled as this work's findings show below indicate that they varied significantly with the age of the patients[32]. Ceftriaxone was a favorite antibiotic deserving special attention as it was used more often in older children (96.58%) and infants (62.5%), in contrast to neonates who received mostly vancomycin or meropenem, each 25%[33]. Thus, the analysis of the variability of drug prescriptions proves that treatment should be highly individualized depending on the patient's age and clinical status[34]. This outcome, 0% readmission rate suggests that treatments were effective, as no patients required hospitalization after discharge. A multicenter study conducted in the United States showed that approximately 7 percent of pediatric CAP cases required rehospitalization within 30 days, often as a result of unresolved or secondary infections. In contrast, studies on pediatric CAP frequently show readmission rates ranging from 5% to 10% within 30 days, especially in cases with comorbidities or severe initial infections. According to best practices in pediatric CAP care, the low readmission rate in this study would indicate efficient initial treatment methods and discharge planning that minimize the need for rehospitalization[9,35].

**Severity Assessment by using the PIRO Score**

The PIRO score was used to evaluate the severity of participants' illness; therefore, 98,87% of cases were classified as having low severity[35]. This finding correlates with favorable clinical outcomes, as nearly all patients had short hospital stays (mean: 2. For the study period, 45 ± 1.3 days mean hospital stay and a zero percent readmission rate[36]. The lack of deaths also reinforces the effectiveness of the treatment regimes utilized in

cases of COVID-19. This proves that if proper and accurate early intercessions are made, recovery from the disease is possible[37].

Patients in the high and very high severity PIRO groups stayed for 7 and 8 days, respectively, and were transferred to the NICU/ICU. These results re-endorsed the tie between high PIRO scores and unfavorable clinical outcomes, thereby re-establishing the usefulness of PIRO scores as an imperative tool for clinicians in the management of pediatric CAP[38].

**Health Management Relationships and Clinical Results**

Intravenous antibiotics were given to all subjects, and the average duration of treatment was two days(44%) and three days (25.9%). The mean duration of hospital stay was estimated at 2.45, showing that hospitalization periods did result from the intervention offered, where most were short. However, a minority of the patients (6.21%) experienced minor complications, and 2.26% needed to be transferred to the NICU/ICU; thus, more monitoring and management in a few specific high-risk cases are required.

Many patients (40.11%) were discharged with antibiotics, implying that many patients require and continue with antibiotics after discharge[39]. The large proportion of patients discharged without any complications (50.28%) indicates the effectiveness of the treatment regimens in the hospital. Hence, the lack of mortality among all the study participants is surprising, and it can be argued that the applied management approaches were timely and efficient[40].

A significant indication of successful early treatment and management methods is the study's finding showing 50.28% of pediatric CAP patients were released without having any problems. However, comparable research has shown that up to 30% of patients experience complications, with common problems include secondary infections and persistent symptoms requiring additional follow-up care.

Neonates had significantly higher rates of antibiotic use as well as complications than older children[41]. Therefore, age emerged as a significant predictor of clinical outcomes. For example, neonates were discharged with antibiotics in 31.7%; however, children were 28.8%, and infants were 5.64%[42]. That is another suggestion that makes younger patients more susceptible to complications and requires additional efforts to prevent delayed healing and maximize a patient's quality of life following rheumatic disease treatment[43]. Further, all instances of transfer to NICU/ICU included children, which called for early assessment and intervention of severe cases to prevent escalation[44,45].

## CONCLUSION

The study concluded that early antibiotic administration and the application of severity-confirming scales (PIRO score) in the management of paediatric CAP will enhance patient outcomes, particularly about the duration of hospital stay and length of intravenous antibiotics and help formulate better clinical decisions.

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