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Pattern of Admissions, Length of Stay (LOS), and Outcomes in the Pediatric Ward at Ain Al-Khaleej Hospital: A Retrospective Study

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Abstract

Background: This research aims to investigate the patterns of admission, length of stay (LoS), and clinical outcomes among pediatric patients admitted to the Pediatric Ward at Ain Al-Khaleej Hospital in the UAE. Understanding these factors is essential for optimizing resource allocation, improving patient care, and reducing hospitalization durations without compromising treatment efficacy.

Objectives: Describe the demographic and clinical characteristics of hospitalized children aged 1 month to 16 years, examine admission sources, diagnoses, outcomes, and seasonal patterns to identify key trends, and offer insights to enhance resource allocation and support evidence-based pediatric care.

Methodology: The study is a retrospective cross-sectional design, analyzing the medical records of pediatric patients (ages 1 month to 16 years) admitted over a specified period, from January 1, 2024, to December 31, 2024. Data on demographic characteristics, admission diagnoses, LoS, and discharge outcomes (recovery, referral, or mortality) was collected and analyzed using Microsoft® Excel® for Microsoft 365 MSO. Factors influencing LoS and outcomes, such as age, diagnosis, and comorbidities, were examined.

Results: In 2024, a total of 2,510 patients were admitted, with males (54%) slightly outnumbering females (46%). Most admissions (68%) came from clinics, with similar patterns across both sexes. The average patient age was 5.49 years, and the mean hospital stay was 1.98 days. October saw the highest admissions (13.3%), while August had the lowest (5.2%). Respiratory & gastrointestinal illnesses were the most prevalent, accounting for 68.8% and 28.2% respectively. Influenza B was the most common flu strain, and rotavirus was a leading cause of gastroenteritis. Nearly all patients (97.25%) were discharged in stable condition.

Conclusion: The data highlights a strong seasonal influence on hospital admissions, with respiratory and gastrointestinal illnesses being the predominant cause. Overall, most patients were effectively treated and discharged, reflecting efficient clinical management.

Keywords: *Pattern of admission, Length of Stay (LoS), Clinical outcomes.*

Introduction

Understanding epidemiological trends in hospital admissions, including disease patterns and mortality rates, is crucial for effective healthcare planning, resource allocation, and enhancing existing service facilities. Many of the leading causes of morbidity and mortality in pediatric patients, particularly those under five and neonates, are preventable through proper antenatal and perinatal care, as well as early detection and management [1].

Globally, respiratory infections, gastrointestinal disorders, and neonatal conditions are among the leading causes of pediatric hospitalizations [2]. The viral epidemiology of children in the UAE highlights the high prevalence and seasonal fluctuations of viral infections. Recognizing these trends can reduce unnecessary streptococcal testing and prevent antibiotic overuse. Furthermore, understanding these seasonal patterns is essential for optimizing prophylactic interventions and vaccination strategies for RSV and influenza, especially for high-risk infants and children [3]. Overall, all these measures can decrease the rate of hospital admission, which will help in minimizing the economic and social burden on the health provider and the community.

Most pediatric hospitalizations are for short stays and necessitate programs focused on acute conditions that can be managed in primary care. Interventions like care coordination, personalized care models, and improved outpatient/community treatment programs for high-risk groups can help shorten length of stay (LoS) and enhance children's health and well-being [4].

Understanding the patterns of childhood morbidity and mortality in private health institutions provides valuable information that can support health policy development and intervention strategies [5]. However, regional studies on admission patterns and LoS remain limited, particularly in private hospitals such as Ain Al-Khaleej Hospital.

This study aims to analyze the admission patterns, LoS, and clinical outcomes in the pediatric ward of Ain Al-Khaleej Hospital, UAE. By identifying common diagnoses, factors influencing hospitalization duration, and treatment outcomes, this research will contribute to better-informed clinical and administrative decision-making in pediatric healthcare settings.

Methodology

This retrospective cross-sectional study was conducted at Ain Al Khaleej Hospital, a secondary care institution providing both surgical and non-surgical medical services to children and adults. The study included pediatric patients admitted to the hospital's pediatric department, which manages a wide range of acute and chronic conditions, including neonatal cases, between January 1, 2024, and December 31, 2024.

Objectives:

Analyze the profiles, admission patterns, and outcomes of hospitalized children aged 1 month to 16 years. Identify seasonal trends to improve patient care, resource use, and evidence-based pediatric decision-making

Inclusion Criteria:

- Children aged 1 month to 16 years admitted to the pediatric medical department during the study period.
- Cases labelled as "diarrhea" in the clinical records were categorized as acute gastroenteritis (AGE) unless a distinct diagnosis (e.g., chronic diarrhea, dysentery, or parasitic infection) was documented.
- Cases labeled as "vomiting" in the clinical records were classified as acute gastritis, unless accompanied by non-gastrointestinal symptoms.
- Overlapping diagnoses: Coexisting conditions such as pneumonia alongside bronchial asthma during an acute exacerbation or Influenza B infection presenting with concurrent gastrointestinal symptoms, including vomiting or diarrhea

Exclusion Criteria:

- Neonates (**<1 month old**) and surgical admissions.

Data Collection:

- **Source**: Anonymized data obtained from the hospital's electronic medical records (EMR) system.
- **Variables**:
    - Demographics: Age (in months/years), sex.
    - Admission details: Date of admission, source (pediatric clinic/UCC), primary diagnosis (ICD-10 coded).
    - Outcomes: Length of hospital stay (days), discharge status (discharged, transferred, or deceased).
- **Tool**: A structured data collection form ensured standardized extraction.

Sample Size: Out of 3000 total pediatric admissions, 2510 (83.6%) met the inclusion criteria and were included in the final analysis.

Statistical Analysis:

- **Descriptive statistics**:
    - Categorical variables were summarized as frequencies and percentages (illustrated with bar, tables, and pie charts).
    - Continuous variables were presented as medians where appropriate.
    - Software: Analyses and visualizations were conducted using Microsoft® Excel® for Microsoft 365 MSO (Version 2507, Build 16.0.19029.20136, 64-bit).

Ethical Considerations:

- Approval: The study protocol was reviewed and approved by the Institutional Research Ethics Committee.
- Consent: Waived due to the retrospective study design.
- Confidentiality: All data were anonymized, and no identifiable information was retained.

Results

In 2024, a total of 2,510 patients were admitted to the hospital. Admissions were stratified by sex and source of admission, either through the Urgent Care Center (UCC) or pediatric outpatient clinics. Most patients (68%, n=1,707) were admitted from clinics, while 32% (n=806) came through the UCC. Males accounted for 54% of all admissions and females for 46%, with both groups showing similar admission patterns: 69% of males and 67% of females were admitted from clinics, compared to 31% and 33%, respectively, from the UCC. This indicates that clinics served as the main admission route for most patients, with only minor gender-related differences (Table1).

Monthly admission trends demonstrated distinct fluctuations. The highest admission rate occurred in October (334 cases, 13.3%), followed by November (298, 11.9%) and September (250, 10%), suggesting a marked increase in patient load during early autumn. In contrast, the lowest admissions were recorded in August (131, 5.2%), with relatively lower counts also seen in April (138, 5.5%) and February (168, 6.7%). Admissions began to rise from May (8.8%), remained high through June (9.3%) and July (7.1%), and stabilized at a moderate level in December (198, 7.9%) (Figure 1).

Analysis of disease distribution revealed that respiratory infections were the most common, accounting for 68.8% of cases—significantly higher than gastrointestinal (GIT) conditions, which made up 30.2%. A small proportion (1%) of admissions were due to other conditions, such as urinary tract infections (UTIs) and lymphadenitis (Figure 2).

Table 1. Pediatric Admissions by Gender and Source (UCC vs. Clinic) – 2024.

SEX	Admission from UCC	Admission from Clinic	Grand Total	Percentage
Male	421	927	1348	54%
Female	384	778	1162	46%
Grand total	806	1707	2510	100%
Percentage	32%	68%	100%	100%

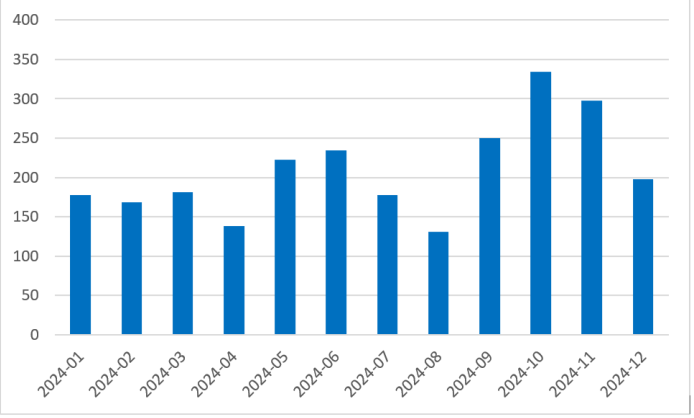

Figure 1. Monthly Proportional Distribution of Pediatric Diseases – 2024.

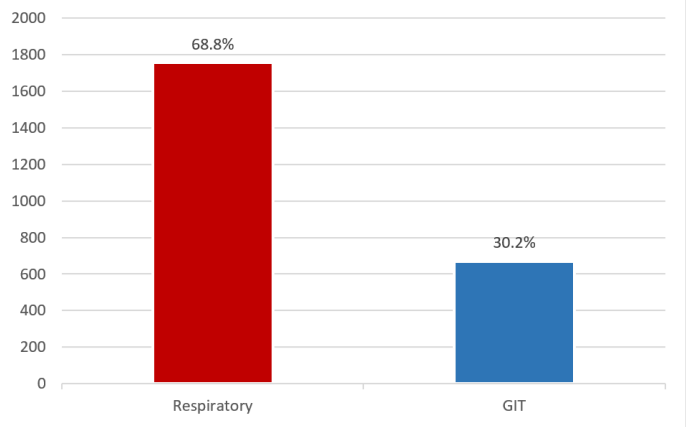

Figure 2. Distribution of Respiratory vs. GIT Diagnoses in Pediatric Admissions (2024).

Seasonal patterns were observed across various conditions. Influenza cases peaked during the winter months (January, February, and December), while acute upper respiratory tract infections (URTIs) occurred throughout the year, with a slight increase in December. Infectious gastroenteritis showed a marked rise in September and October, aligning with seasonal trends. Bronchial asthma cases were more frequent in February and April, whereas constipation showed a gradual increase over the year, peaking in December (Figure 3).

Among influenza cases, Influenza B was the most prevalent (n = 179), followed by unidentified strains (n = 131) and Novel Influenza A (n = 129). Streptococcal infections were primarily due to tonsillitis (58 cases), pharyngitis (50), and scarlet fever (31) (Figure 4 & 5).

For infectious gastroenteritis, the leading causes were unspecified pathogens (77 cases) and rotavirus (72 cases). Parasitic infections, including amebic dysentery (33 cases) and cryptosporidiosis (21), were also notable, while bacterial causes such as salmonella were relatively rare (4 cases) (Fig. 6).

Patient outcomes were largely favorable. The majority, 97.25% (n=2,441), were discharged with medical approval. A small proportion, 2.6% (n=66), left against medical advice (LAMA), indicating potential challenges in treatment adherence. Only 0.11% (n=3) required transfer to non-acute facilities, reflecting limited demand for long-term or specialized care outside the acute setting (Table 2).

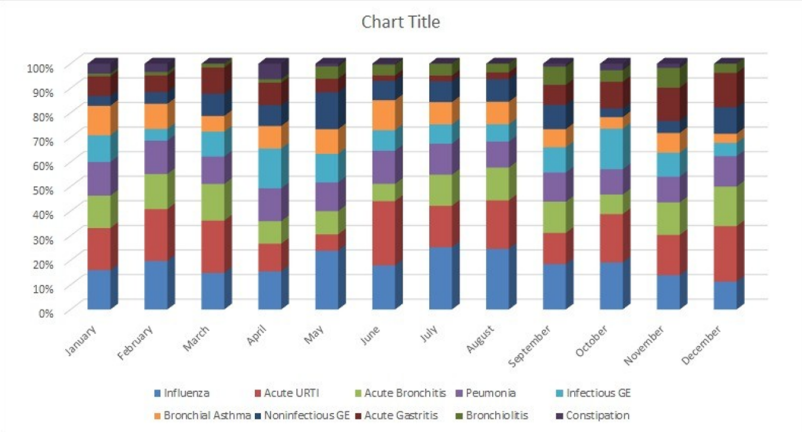

Figure 3. Monthly Proportional Distribution of Pediatric Diseases in 2024.

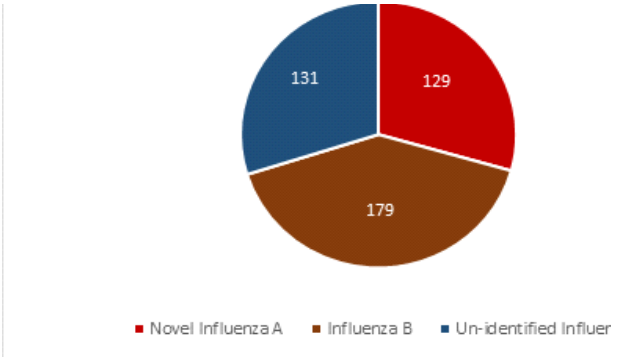

Figure 4. Distribution of Influenza Types Among Pediatric Patients (2024).

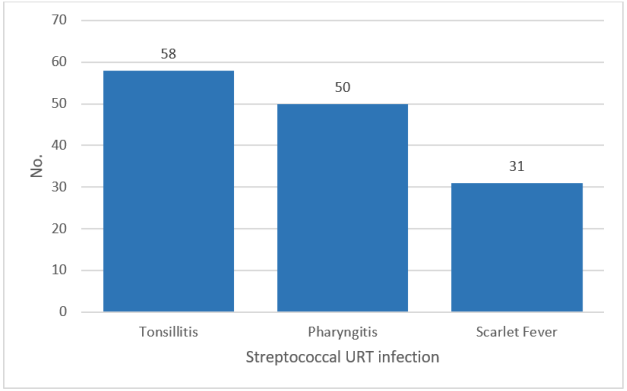

Figure 5. Number of Streptococcal Upper Respiratory Tract Infections in Pediatric Patients.

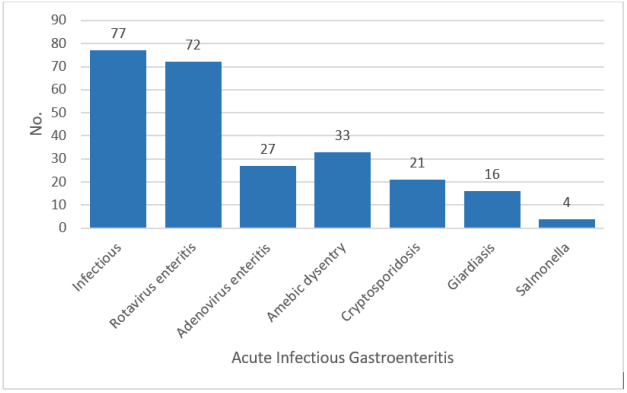

Figure 6. Etiology of Acute Infectious Gastroenteritis in Pediatric Patients.

Table 2. Distribution of Patient Discharge Outcomes.

OUTCOME	SUM OF COUNT OF OUTCOME	PERCENTAGE
Approved Discharge	2441	97,25%
left againest medical advice	66	2.60%
Transfer to Non-Acute Care	3	0.11%
Grand Total	**2510**	**99.96%**

Discussion

This study presents a detailed analysis of pediatric admissions, seasonal disease trends, and patient outcomes in Ain Al Khaleej Hospital, pediatric ward during 2024. The findings provide critical insights into healthcare utilization patterns, disease burden, and resource allocation in a hospital setting.

Demographic and Admission Trends:

A 2024 cohort study of 2,510 pediatric admissions revealed a gender distribution favoring males (54%), aligning with established global trends of higher hospitalization rates among male children. This pattern is in line with regional studies demonstrating comparable male predominance: (Sabir et al. from UAE) reported 56.7% male admissions [3], Al Qahtani et al. from KSA documented 55.4% versus 44.6% female distribution [6], and Shehabuddin et al. From Bangladesh observed similar gender disparities in pediatric hospitalizations [1].

The majority of patients were aged 1 month to 5 years, with a mean age of 5.49 years, consistent with the well-documented vulnerability of young children to common pediatric illnesses infections (7, 8] particularly respiratory and gastrointestinal diseases. Most admissions (68%) originated from outpatient clinics rather than urgent care centers (32%) may be this is because the pediatric clinic works 24/7 throughout the year.

Temporal and Seasonal Patterns:

Admissions peaked during autumn and early winter, with October showing the highest rate (13.3%), followed by November and September. The lowest admissions occurred in August (5.2%), likely due to the seasonal surge in respiratory infections such as influenza and bronchiolitis during colder months [1,9]; However, broader seasonal trends reported in Nepal indicated the highest overall admissions in summer (29%), followed by spring (27.4%), winter (23.7%), and the lowest in autumn (19.9%) [10].

Mid-year (May–July) also saw increased admissions, possibly linked to school-term exposures or environmental allergens exacerbating respiratory conditions. Stable admission rates in January, July, and December suggest a baseline pediatric disease burden unaffected by seasonal fluctuations.

Disease Burden and Etiological Distribution:

Respiratory infections were the most common cause of pediatric admissions, accounting for 68.8%, significantly outnumbering gastrointestinal (GIT) cases at 28.7%. This aligns with the global data indicating that acute respiratory infections are responsible for 70% of childhood hospitalizations in developing countries [11]

Influenza infections exhibited a typical winter pattern, with Influenza B accounting for 58% of the typed cases. In contrast, data from China indicate that Influenza A infections are generally more prevalent than Influenza B. Flu A typically peaks during the winter and early spring months (December through March of the following year), while Flu B often peaks later, sometimes emerging at the end of winter or in early spring [12].

Other respiratory illnesses displayed expected seasonal trends: bronchiolitis peaked during December and January, mirroring RSV activity [13], while asthma exacerbations showed a bimodal distribution, with peaks in spring and fall, likely linked to allergen exposure [14].

Notably, maternal vaccinations have proven effective in reducing RSV-related lower respiratory tract infections and influenza in infants. Protection against influenza was strongest at 2 months of age and gradually declined by 6 months, highlighting the critical role of maternal immunization in protecting young infants during their most vulnerable early months [15, 16]. Streptococcal pharyngitis/tonsillitis comprised 12% of respiratory cases, predominantly affecting ages 5-15 years - consistent with known epidemiological patterns of Group A Streptococcus transmission in school settings [17].

Gastrointestinal admissions peaked between September and October, with the predominant diagnoses being infectious and non-infectious gastroenteritis. Infectious gastroenteritis accounted for 69.3% of cases, while non-infectious forms made up 30.7%, highlighting the limitations of conventional diagnostic methods, which can miss 20–40% of viral etiologies [18]. Rotavirus enteritis was the second most common diagnosis, with 72 cases, indicating a substantial viral burden. This occurred despite a high vaccination coverage of 89%, raising concerns about possible vaccine escape variants or waning immunity [19, 20]. Other notable infections included amebic dysentery (33 cases), adenovirus enteritis (27 cases), cryptosporidiosis (21 cases), and giardiasis (16 cases), suggesting a moderate presence of parasitic pathogens. Salmonella enteritis was rare, with only 4 cases reported.

Length of Stay and Patient Outcomes:

The average hospital stay was 1.98 days, indicating efficient management of acute pediatric conditions. Most patients (97.25%) were discharged with medical approval, while discharges against medical advice (DAMA) were relatively low at 2.6%. These results compare favorably with regional data, though variations exist, for instance, an Omani study reported a lower DAMA rate (0.32%) but lacked documentation for 57.9% of cases [21].

Key factors contributing to DAMA included parental misconceptions about the child's recovery (43.8%), dissatisfaction with care (16.2%), and challenges related to caring for other children at home (7.7%). Notably, children discharged against medical advice had significantly higher 30-day readmission rates (28.5% vs. 11.5%) according to study from KSA [22], emphasizing the importance of addressing DAMA through targeted interventions. Additionally, readmitted children tend to have twice the length of hospital stay and higher healthcare costs, particularly when admitted to a different facility. Therefore, in addition to monitoring readmission rates, incorporating total length of stay and associated costs offers a more comprehensive evaluation of healthcare outcomes [23].

The low DAMA rate observed in this setting may reflect robust clinical protocols and effective provider-family communication strategies, which could serve as a model for quality improvement initiatives regionally. Additionally, only 0.11% of patients required transfer to non-acute care, further underscoring the overall effectiveness of inpatient care provided.

Study Limitations:

1. Single-center scope limits generalizability to wider populations due to local variations in healthcare and epidemiology.

2. A study period limited to one year may not capture long-term trends or infrequent outbreaks. As such, the findings might not accurately represent typical patterns due to natural variations that occur from year to year.

3. Retrospective design risks incomplete/missing data (e.g., unspecified gastroenteritis cases).

4. No post-discharge follow-up obscures long-term outcomes, especially for patients leaving against advice.

5. Potential coding errors in records may affect diagnosis accuracy.

6. Unmeasured external factors (e.g., vaccination rates, pollution) could influence admission patterns.

Conclusion

The data underscores a strong seasonal pattern in pediatric hospital admissions, with respiratory and gastrointestinal illnesses emerging as the leading causes. These trends reflect distinct seasonal disease burdens and demographic characteristics. Most patients responded well to treatment and were successfully discharged, indicating effective clinical management. While the findings offer valuable insights for guiding resource allocation and informing preventive strategies, the study's single-center design and limited timeframe call for cautious interpretation. Broader, multi-center studies with extended observation periods are recommended to validate these patterns and improve their generalizability.

Key Recommendations Include:

1. Enhancing seasonal prevention through influenza and RSV vaccinations, for both mothers and childrens, can significantly reduce pediatric hospitalizations. Public health campaigns should support timely immunization and awareness during high-risk periods.
2. Enhancing diagnostic protocols for gastrointestinal pathogens to reduce unspecified cases.
3. Improving follow-up care for patients who leave against medical advice, possibly via telemed.
4. Addressing environmental factors (e.g., indoor air quality, asthma management) to reduce respiratory admissions.
5. Transition clinics for chronic conditions (e.g., asthma action plans)

Conflict of Interest

Nothing to declare.

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