Derna Academy Journal for Applied Sciences

E-ISSN: 3006-3159

DAJAS

Clinical Characteristics and Admission Patterns of Hospitalized Children in a Pediatric Department at Tobruk Medical Center: Retrospective Study

Salem Zaed[1], Asfiedeen Saleh[2], Sara Ali [3], Mawada Dbdel Salam [4,] Asmaa Idris [5], Danya Saeed [6,] Nawal Misbah [7].

[1, 2,] Department of Laboratory Medicine, College of Health Sciences, University of Tobruk, Tobruk, Libya
[3 - 7] Department of Laboratory Medicine, Faculty of Medical and Health Sciences, Alsslam International University, Tobruk, Libya

Correspondence to: Salem Zaed, salem.zaed@tu.edu.ly

Volume: 6 **Issue: 2** **Page Number: 15 - 21**

Key Word: Pediatric Admissions, Neonatal Conditions, Respiratory Diseases.

Received: 12\02\2026
Accepted: 03\03\2026
Published: 04\03\2026

https://doi.org/10.71147/akjebc47

ABSTRACT

Background: The neonatal period is the most vulnerable stage of life. Although the perinatal and neonatal phases are short, they represent some of the most critical moments in human development. **Objectives:** The goal of this study is to determine the patterns of pediatric hospital admissions, identify the types of illnesses and their distribution across different age groups at Tobruk Medical Center. **Methods:** A descriptive retrospective study was conducted in the Pediatric Department of Tobruk Medical Center from January to April 2025, including children aged 1 month to 15 years. Data analysis was performed using SPSS to assess relationships between variables**. Results:** Respiratory diseases were the most common reason for admission (25.2%), followed by central nervous system disorders (17.5%), with neonatal sepsis (13.7%) and neonatal jaundice (11.1%) identified as the leading individual diagnoses. Admission patterns differed significantly across age groups, demonstrating a strong association between age and diagnostic category ($\chi^2 = 210.816$, df = 36, $p < 0.001$; Cramér's V = 0.410), which reflects distinct age-related clinical profiles. **Conclusion:** Admissions were mainly among infants and young children, with respiratory and neonatal conditions predominating, and most patients presenting directly to the hospital. These findings underscore the need for effective assessment and referral systems to manage pediatric admissions efficiently.

1. INTRODUCTION

Monitoring the trends in epidemiological data related to pediatric hospital admissions, such as patterns of disease occurrence and death rates, is crucial for making informed healthcare plans and allocating resources effectively (Chalmers et al., 2009). Examining hospital admission data offers important insights into the impact of childhood diseases within communities and helps in setting priorities and planning interventions based on solid evidence (Census of India, 2011).

Pediatric hospital admissions make up a large part of overall healthcare usage and reflect both the nature of childhood illnesses and the efficiency of healthcare systems (Chalmers et al., 2010). Respiratory tract infections and gastrointestinal diseases are among the primary reasons for pediatric admission, and acute respiratory infections and diarrheal diseases remain the leading causes of death in children under five years of age (Eck et al., 2006). The patterns of pediatric admissions vary depending on the referral process, such as referrals from primary care, transfers from other hospitals, and direct referrals to tertiary care centers, with an ongoing rise in the need for inpatient pediatric services (Gupta et al., 2022). In developing countries experiencing changes in disease patterns, infectious diseases still play a significant role in health burdens; however, neonatal conditions have become major contributors to pediatric admissions and deaths, especially in tertiary care hospitals that have neonatal intensive care units (Bassat et al., 2023). Globally, neonatal complications, pneumonia, and diarrheal diseases account for a large proportion of deaths among children under five, particularly in developing nations, with preventable factors playing a major role. Pneumonia and diarrhea are especially fatal among the youngest and poorest children, often in association with malnutrition (Seifu et al., 2022). Hospital admission rates continue to rise annually worldwide. This increase reflects greater parental awareness and is also attributed to increased demand from public and primary healthcare teams, as well as advances in medical technology (Agbesanwa et al., 2023). Therefore, determining the pattern of diseases on admission among children at Tobruk Medical Center across various disease categories and between sexes will help identify existing gaps and provide proxy information on the community disease burden. This will contribute to improving care provision at the institutional and national levels.

2. METHOD

Study Design and Data Collection:

A descriptive retrospective study was conducted in the Pediatric Department of Tobruk Medical Center. Data obtained from the hospital files of these children included age, sex, admission reasons, and diagnosis. All children between the ages of 1 months and 15 years admitted in pediatric department from January to April 2025 were retrospectively reviewed. All pediatric patients admitted during the study period were eligible for inclusion. Complete admission records containing demographic information, diagnosis, and hematological results were included, while records with missing or incomplete laboratory data and patients with known chronic hematological disorders were excluded.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS software. Descriptive statistics were summarized as frequencies and percentages, and the association between age groups and admission diagnosis categories was assessed using the Chi-square test of independence with Cramér's V. A p-value of less than 0.05 was considered statistically significant.

3. ETHIC APPROVAL

Ethical approval was obtained by contacting public and private entities to secure their consent before distributing the questionnaire to the study participants, and these entities agreed to cooperate in this regard.

4. RESULT

Table 1 presents the demographic characteristics of the pediatric sample (N = 314). The majority of the patients were infants aged 1–6 months (55.7%), followed by children aged 2–5 years (21.0%), while the smallest proportion was observed in the 6–9 years age group (3.5%).

Table1: Demographic Characteristics of patients admitted in pediatric department from January to April 2025 (n=314)

Variable	Category	Frequency	Percentage (%)
Age	1–6 months	175	55.7
	7 months–1 year	37	11.8
	2–5 years	66	21.0
	6–9 years	11	3.5
	10–15 years	25	8.0
	Total	314	100
Gender	Male	166	52.9
	Female	148	47.1
	Total	314	100

Diagnosis Category

Table 2 summarizes the distribution of admission diagnoses among the pediatric sample. Respiratory conditions were the most frequent reason for hospitalization, accounting for 25.2% of cases, followed by central nervous system (CNS) disorders at 17.5%. Infectious diseases represented 13.7% of admissions, while neonatal conditions accounted for 11.1%. Less common diagnoses included hematological (6.1%), gastrointestinal (5.7%), endocrine (2.9%), cardiovascular (2.5%), and renal conditions (2.2%). The otherscategory constituted 13.1% of admissions.

Table 2: Diagnosis Category of patients admitted in pediatric department from January to April 2025 (n=314)

Diagnosis Category	Frequency	Percentage (%)
Central Nervous System	55	17.5
Respiratory	79	25.2
Infectious Diseases	43	13.7
Others	41	13.1
Hematological	19	6.1
Gastrointestinal	18	5.7
Neonatal Conditions	35	11.1
Endocrine	9	2.9
Cardiovascular	8	2.5
Renal	7	2.2
Total	314	100

Table 3 presents a detailed overview of the specific reasons for pediatric admissions. Neonatal sepsis (13.7%) and neonatal jaundice (11.1%) were the most frequent single admission reasons. Febrile convulsions (8.9%) and bronchopneumonia (6.4%) were also relatively common, indicating the burden of both neurological and respiratory issues in this population. Acute bronchiolitis (4.1%) and anemia (4.8%) were additional notable causes.

Other reasons, including respiratory distress, pneumonia, drug or toxic ingestions, congenital heart disease, gastroenteritis, and various less common conditions (each ≤3.5%), collectively demonstrate the wide spectrum of pediatric clinical presentations.

Rare but critical cases such as hydrocephalus, cerebellitis, organophosphate ingestion, and congenital adrenal hyperplasia were also observed, highlighting the heterogeneity of hospital admissions.

Table 3: Admission Reasons of patients admitted in pediatric department from January to April 2025 (n=314)

Admission Reason	Frequency	Percentage	Admission Reason	Frequency	Percentage
Vasovagal syncope	1	0.3	Pertussis	9	2.9
Severe headache	1	0.3	Fever	10	3.2
Respiratory distress	10	3.2	Encephalopathy	1	0.3
Pneumonia	9	2.9	Meningitis	2	0.6
Neonatal sepsis	43	13.7	Urinary tract infection (UTI)	6	1.9
Neonatal jaundice	35	11.1	Vomiting	3	1.0
Lymphoma (Hodgkin)	1	0.3	Pertussis	9	2.9
Shunt-related hydrocephalus	1	0.3	Liver cirrhosis	1	0.3
Fall from bed	1	0.3	Skin rash	1	0.3
Febrile convulsion	28	8.9	Urticaria	1	0.3
Drug ingestion	11	3.5	Glycogen storage disease	1	0.3
Diabetes mellitus	6	1.9	Essential oil poisoning	3	1.0
Dehydration	4	1.3	Aspiration pneumonia	4	1.3
Congenital heart disease	4	1.3	Kerosene ingestion	3	1.0
Bronchopneumonia	20	6.4	Visceral myopathy	1	0.3
Anemia	15	4.8	Nasal congestion and rhinorrhea	2	0.6
Acute gastroenteritis	6	1.9	Recurrent choking with cyanosis	1	0.3
Acute bronchiolitis	13	4.1	Organophosphate ingestion	1	0.3
Abdominal trauma	1	0.3	Hematemesis	2	0.6
Scorpion sting	1	0.3	Cerebellitis	2	0.6
Cannabis ingestion	5	1.6	Urinary retention	1	0.3
Epilepsy	4	1.3	Seizure disorders	10	3.2
Convulsion	3	1.0	Rectal bleeding	1	0.3
Gastroenteritis (AGE)	2	0.6	Congenitaladrenal hyperplasia (CAH)	1	0.3
Immune thrombocytopenic purpura (ITP)	2	0.6	Convulsion&cyanosis	2	0.6
Croup	2	0.6	Apnea	2	0.6
Bloody diarrhea	2	0.6	Hydrocephalus	1	0.3
G6PD deficiency	1	0.3	Asthma	4	1.3
Bronchopneumonia (recurrent)	5	1.6	Osteomyelitis	1	0.3
Total		**Frequency 314**		**Percent (%) =100%**	

Table 4 presents the distribution of admission diagnoses across different age groups and compares the patterns between male and female patients. Respiratory conditions were most prevalent among infants aged 1–6 months, accounting for 31.4% of admissions in this group, followed by infectious diseases (23.4%) and neonatal conditions (18.3%).

In the 7–12-month age group, respiratory diagnoses remained dominant (37.8%), while central nervous system (CNS) and others categories also contributed significantly. Among older children (2–5 years), CNS disorders (36.4%) and others diagnose (34.8%) were more frequent, suggesting a shift in clinical patterns with age. In school-aged children (6–9 years), CNS conditions (36.4%) and renal and cardiovascular cases, though infrequent, emerged, reflecting more diverse clinical presentations. Adolescents (10–15 years) had a higher proportion of endocrine (24%) and hematological (24%) conditions, as well as CNS and neonatal issues, indicating increasing complexity in older pediatric patients. The Chi-square test revealed a statistically significant association between age groups and diagnosis categories (χ^2 = 210.816, df = 36, $p < 0.001$), and Cramér's V (0.410) indicated a moderate to strong relationship.

Table 4: **Association between Diagnosis category with age groups of patients admitted in pediatric department from January to April 2025 (n=314)**

Age Group	CNS	Respiratory	Infectious	Others	Hematologica	GIT	Neonatal	Endocrine	Cardiovascular	Renal	Total
1–6 mo	13 (7.4%)	55 (31.4%)	41 (23.4%)	7 (4.0%)	7 (4.0%)	11 (6.3%)	32 (18.3%)	1 (0.6%)	4 (2.3%)	4 (2.3%)	175 (100%)
7 mo–1 y	9 (24.3%)	14 (37.8%)	0 (0.0%)	7 (18.9%)	1 (2.7%)	3 (8.1%)	0 (0.0%)	1 (2.7%)	2 (5.4%)	0 (0.0%)	37 (100%)
2–5 y	24 (36.4%)	9 (13.6%)	0 (0.0%)	23 (34.8%)	4 (6.1%)	4 (6.1%)	0 (0.0%)	1 (1.5%)	0 (0.0%)	1 (1.5%)	66 (100%)
6–9 y	4 (36.4%)	0 (0.0%)	0 (0.0%)	3 (27.3%)	1 (9.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (9.1%)	2 (18.2%)	11 (100%)
10–15 y	5 (20.0%)	1 (4.0%)	2 (8.0%)	1 (4.0%)	6 (24.0%)	0 (0.0%)	3 (12.0%)	6 (24.0%)	1 (4.0%)	0 (0.0%)	25 (100%)
Total	55 (17.5%)	79 (25.2%)	43 (13.7%)	41 (13.1%)	19 (6.1%)	18 (5.7%)	35 (11.1%)	9 (2.9%)	8 (2.5%)	7 (2.2%)	314 (100%)

Measure	Value	df	p-value
Chi-Square	210.816	36	<0.001
Cramér's V	0.410	--	<0.001

5. DISCUSSION

The present study sheds light on pediatric admission patterns by examining the clinical profiles and demographic characteristics of hospitalized children, including the distribution of admission diagnoses, age-specific hospitalization patterns, and sex-based differences in admission diagnoses. In our study, 76.7% of admitted children were ≤5 years old, predominantly within the infancy and early childhood age groups, which has also been reported in other studies (Okoronkwo et al., 2018; Pranab et al., 2021; Chiabi et al., 2025). A slight male predominance was observed (52.9% males vs. 47.1% females), which is consistent with findings from previous studies (Chiabi et al., 2025; Chiabi et al., 2002; Seifu et al., 2022; Agbesanwa et al., 2023).

Throughout the study, respiratory conditions were the most frequent cause of hospitalization, accounting for 25.2% of cases, followed by central nervous system (CNS) disorders at 17.5%. This finding aligns closely with patterns observed in prior investigations, which consistently identify respiratory conditions as the most common diagnosis category among children and infants presenting to pediatric departments (Abhulimhen-Iyoha et al., 2014).

Across pediatric and neonatal cohorts, neonatal conditions accounted for a substantial proportion of admissions, with neonatal sepsis (13.7%) and neonatal jaundice (11.1%) being the most frequent individual causes, highlighting the vulnerability of neonates to infectious and metabolic disorders. Similar findings were reported by Pranab et al. (2021), who identified neonatal jaundice, sepsis, and perinatal asphyxia as leading indications for admission.

The present study demonstrated a statistically significant association between age groups and diagnosis categories (χ^2 = 210.816, df = 36, $p < 0.001$), with Cramér's V (0.410) indicating a moderate to strong relationship.

Admission patterns varied by age group, with respiratory conditions predominating in infants (1–12 months), while a shift toward central nervous system and other non-infectious conditions was observed in older children. School-aged children exhibited more diverse clinical presentations, including CNS, renal, and cardiovascular disorders, whereas adolescents showed a higher burden of endocrine and hematological conditions, reflecting increasing clinical complexity with age. These findings are consistent with previous studies indicating that younger children, particularly those under five years, experience higher rates of respiratory infection-related hospitalizations, while older pediatric groups present with a broader range of clinical conditions (Gresh & Othman, 2018; Al-Momani, 2020).

A key strength of this study is the homogeneity of the sample, which included only pediatric patients aged 1 month to 14 years, thereby enhancing the representativeness of the findings. Nevertheless, the main limitation of this study is its retrospective design. Diagnoses were obtained from medical records and were made by the treating physicians; therefore, their accuracy could not be independently verified.

6. CONCLUSION

This study Contributes to our understanding of the epidemiology of pediatric infectious diseases and provides valuable insights for clinical decision-making and public health planning. Respiratory illnesses and central nervous system disorders were the leading causes of pediatric admissions, while neonatal sepsis and neonatal jaundice were the most common reasons for neonatal hospitalization. The findings highlight significant age-related variations in admission patterns and offer an evidence base for targeted interventions to strengthen pediatric and neonatal healthcare systems. Furthermore, the results emphasize the need to expand community-based services and short-stay facilities for the management of preventable conditions.

7. REFERENCES

Abhulimhen-Iyoha, B. I., Pooboni, S. K., & Vuppali, N. K. K. (2014). Morbidity pattern and outcome of patients admitted into a pediatric intensive care unit in India. Indian Journal of Clinical Medicine, 5, 1–5.

Agbesanwa, T. A., Babatola, A. O., Fatunla, O. A., et al. (2023). Pattern of admissions and outcomes in the children emergency department of a tertiary health institution in Southwestern Nigeria: A four-year review. African Journal of Emergency Medicine, 13, 45–51.

Al-Momani, M. M. (2020). Admission patterns and risk factors linked with neonatal mortality: A hospital-based retrospective study. Pakistan Journal of Medical Sciences, 36(6), 1371–1376. https://doi.org/10.12669/pjms.36.6.2281

Bassat, Q., Blau, D. M., Ogbuanu, I. U., et al., & Child Health and Mortality Prevention Surveillance Network. (2023). Causes of death among infants and children in the CHAMPS Network. JAMA Network Open, 6(7), e2322494. https://doi.org/10.1001/jamanetworkopen.2023.22494

Chalmers, J., Leigh-Brown, A., & Tait, J. (2009). Childhood hospital admissions & mortality: Statistical publication notice. Author.

Chalmers, J., Leigh-Brown, A., & Tait, J. (2010). Childhood hospital admissions & mortality: Statistical publication notice. Author.

Chiabi, A., Kan, K., Massom, A., et al. (2025). Patterns of admissions and outcomes in the general pediatric unit of a regional hospital in Cameroon. Pediatric Oncall Journal, 22, 131–135. https://doi.org/10.7199/ped.oncall.2025.32

Chiabi, A., Tchokoteu, P. F., Mboka, F., et al. (2002). Morbidity and mortality trends in children in the East Province of Cameroon: A hospital-based experience at Bertoua Provincial Hospital. Bulletin de Liaison et de Documentation de l'OCEAC, 35(3).

Census of India. (2011). Population enumeration data. Office of the Registrar General & Census Commissioner, India.

Eck, C., Pierre, R. B., & Hambleton, I. R. (2006). Medical pediatric admission patterns at the University Hospital of the West Indies: Issues for future planning. West Indian Medical Journal.

Gresh, H., & Othman, R. (2018). Admission patterns and outcome in a pediatric intensive care unit at Tobruk Hospital. Al-Mukhtar Journal of Sciences, 33(4), 298–305. https://doi.org/10.54172/mjsc.v33i4.293

Gupta, N., Krishnamurthy, V., Majumder, N., Sampath, S., & Senthilnathan, S. (2022). Changing spectrum of pediatric admissions to a tertiary care hospital in South India: A longitudinal study. Indian Journal of Pediatrics, 89(4), 324–330. https://doi.org/10.1007/s12098-021-03866-7

Okoronkwo, N. C., Onyearugha, C. N., & Ohanenye, C. A. (2018). Pattern and outcomes of paediatric medical admissions at the Living Word Mission Hospital, Aba, South East Nigeria. Pan African Medical Journal, 30, 202.

Pranab, K. D., Arindam, G., Sunil, K. H., et al. (2021). Morbidity pattern, treatment outcomes, and predictors of mortality of children admitted to a pediatric intensive care unit in a peripheral medical college in India. Indian Journal of Pediatrics, 59(8), 482–490. ProQuest

Seifu, A., Eshetu, O., Tafesse, D., & Hailu, S. (2022). Admission pattern, treatment outcomes, and associated factors for children admitted to the pediatric intensive care unit of Tikur Anbessa Specialized Hospital: A retrospective cross-sectional study. BMC Anesthesiology, 22, 13.

Sharma, R., Agarwal, P., & Kumar, V. (2023). Neonatal admissions to tertiary care hospitals: Patterns, outcomes, and healthcare implications in Northern India. Indian Journal of Neonatology, 12(2), 45–52. https://doi.org/10.7860/IJNM/2023/58934.2456