

**Epidemiological Assessment of Pediatric Emergency Admissions in a Tertiary Care Center**Akhilesh Kumar Ram<sup>1</sup>, Anil Kumar<sup>2</sup>, Kumar Saurabh<sup>3</sup><sup>1</sup>Senior Resident, Department of Pediatrics, Government Medical College and Hospital, Bettiah, Bihar, India<sup>2</sup>Professor and HOD, Department of Pediatrics, Government Medical College and Hospital, Bettiah, Bihar, India<sup>3</sup>Associate Professor, Department of Pediatrics, Government Medical College and Hospital, Bettiah, Bihar, India

Received: 14-12-2025 / Revised: 22-01-2026 / Accepted: 21-02-2026

Corresponding Author: Dr. Akhilesh Kumar Ram

Conflict of interest: Nil

**Abstract:****Background:** Pediatric emergency admissions reflect the burden of acute childhood illnesses and the efficiency of healthcare systems, especially in tertiary care settings.**Aim:** To assess the epidemiological profile and clinical pattern of pediatric emergency admissions in a tertiary care hospital.**Methodology:** A hospital-based cross-sectional observational study was conducted in the Department of Pediatrics, Government Medical College and Hospital, Bettiah, Bihar, over 8 months. A total of 90 pediatric patients (0–12 years) admitted through the emergency department were included using consecutive sampling. Data were analyzed using SPSS 27.0.**Results:** The majority of admissions were among children aged 1–5 years (37.8%) and infants (31.1%). Males (57.8%) and rural residents (67.8%) predominated. Respiratory diseases (28.9%) were the leading cause, followed by infectious (22.2%) and gastrointestinal diseases (20%). Most patients were discharged (75.6%), while 13.3% were referred and 11.1% died.**Conclusion:** Pediatric emergency admissions are mainly driven by preventable communicable diseases, with higher vulnerability among young children and rural populations. Strengthening primary care, early diagnosis, and referral systems is essential to improve outcomes.**Keywords:** Pediatric Emergency, Epidemiology, Tertiary Care, Respiratory Diseases, Rural Population, Child Morbidity.**DOI:** 10.25258/ijpqa.17.2.36

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

**Introduction**

Pediatric hospitalizations represent a significant portion of health care use across the world, and are an invaluable source of information on the burden of childhood disease and how health care delivery systems operate. Pediatric admission patterns of different ages are necessary to be analyzed in order to plan and allocate resources to the healthcare effectively in India, where almost 27 percent of the population is below 15 years of age [1]. Patients in pediatric emergency rooms, especially, are representative of acute health statuses needing prompt medical treatment and are important markers of the disease burden, health accessibility, and responsiveness of the system. Hospitals that serve as referral centers to complex and severe cases, or tertiary care hospitals, are well equipped with modern diagnostics and treatment facilities, thus providing a suitable

environment to investigate epidemiological trends in pediatric emergency hospitalization.

An epidemiological transition, which is characterized by a change in disease patterns is occurring in India, as in many developing nations. Communicable diseases are an important cause of morbidity and mortality in children; however, the non-communicable conditions and the complications of survival of high-risk neonates are becoming increasingly important [2]. In spite of the modern healthcare practice, neonatal illnesses are the major cause of admission and death in children, especially in tertiary care units where there are specialized neonatal intensive care units. The prevalence of preventable and treatable diseases is reflected by the fact that, according to the World Health Organization, neonatal conditions, respiratory infections, and diarrheal diseases

collectively cause over half of all child deaths under five years old in India.

Neonatal admissions stand as an essential element that defines pediatric emergency medical treatment. Premature birth, neonatal sepsis, birth asphyxia, respiratory distress syndrome, and congenital anomalies serve as the main reasons for hospital admissions. The healthcare system faces substantial challenges because these medical conditions need special treatments, their patients need continuous observation, and they require extended hospital stays. The neonatal morbidity burden shows regional differences because resource-scarce areas experience higher morbidity rates than other locations. The combination of inadequate antenatal care with insufficient skilled birth attendance and poor referral systems and delays in emergency obstetric care access results in higher neonatal complications and mortality rates [3].

The pattern of pediatric emergency admissions shows regional and seasonal variations according to study [4]. The combination of socio-economic conditions and environmental factors together with healthcare service accessibility determines how diseases will spread. Studies have shown that while neonatal conditions are predominant across all regions, respiratory infections are more common in northern India among post-neonatal children, whereas gastrointestinal diseases are more prevalent in southern regions. Seasonal trends create different admission patterns because respiratory illnesses reach their highest point during winter months and gastrointestinal infections occur more frequently during the monsoon season because of inadequate sanitation and polluted water sources. These variations demonstrate the necessity for healthcare organizations to develop emergency response plans that address specific regional needs.

Current tendencies point to a growing sophistication of pediatric emergency visits. Despite the prevailing infectious diseases, cases associated with complications in the neonatal, allergic, and developmental delays have increased. Neonatal care has improved leading to high survival rates of preterm and low-birth-weight babies most of whom need repeated hospital admissions because of their continued health complications [5]. This trend is changing, which underscores the twofold nature of addressing traditional infectious diseases and emerging chronic and developmental issues in pediatric patients.

Besides the clinical issues, pediatric emergency admissions have a significant social-economic cost to the family. In-patient treatment, especially the intensive care unit, can result in considerable out-of-pocket spending. It has been indicated that close to 30 percent of households incur catastrophic medical spending in connection to pediatric hospitalization and neonatal hospitalization incurs a significant

share of medical spending due to the high levels of hospital stay and intensive care [6]. This economic cost is particularly high in low- and middle-income environments where health insurance coverage is low.

Moreover, rural-urban differences have a major impact on healthcare use and healthcare outcomes. Rural children tend to report late to tertiary care centers because of poor accessibility to primary and secondary healthcare services, communication and poor transportation, and lack of awareness [7]. As a result, these children may show more advanced disease conditions, which causes more morbidity and mortality. These rural-urban inequalities highlight the importance of enhancing healthcare facilities, enhancing referral services, and promoting fair access to good pediatric care services.

In this context, an epidemiological assessment of pediatric emergency admissions in a tertiary care setting is essential to understand disease patterns, identify risk factors, and evaluate healthcare gaps. The studies deliver vital evidence which helps to enhance emergency care services, improve resource distribution, and create specific programs that aim to decrease preventable child health complications and deaths. The pattern of pediatric emergency admissions will provide essential knowledge which helps to improve child health results and build a stronger healthcare system.

### Methodology

**Study Design:** This study was designed as a hospital-based, cross-sectional observational study aimed at evaluating the epidemiological profile and pattern of pediatric emergency admissions in a tertiary care setting.

**Study Area:** The study was conducted in the Department of Pediatrics, Government Medical College and Hospital, Bettiah, Bihar, India.

**Study Duration:** The study was carried out over a period of 8 months from April 2025 to November 2025.

### Study Participants

#### Inclusion Criteria

- All pediatric patients aged 0–12 years admitted through the emergency department.
- Patients admitted to pediatric wards, NICU, or PICU during the study period.
- Both inborn and outborn patients referred from other healthcare facilities.
- Patients with complete and accessible medical records.

#### Exclusion Criteria

- Patients brought dead to the emergency department.

- Patients admitted for less than 24 hours for observation only.
- Cases with incomplete or missing medical records.
- Patients discharged against medical advice before adequate evaluation.

**Sample Size:** A total of 90 pediatric patients were included in the study. The sample size was determined based on feasibility, patient inflow, and study duration using consecutive sampling techniques.

**Procedure:** All eligible pediatric patients admitted through the emergency department during the study period were enrolled using a consecutive sampling method. Data were collected using a pre-designed, structured proforma developed specifically for the study. The proforma was validated by subject experts and pre-tested to ensure clarity and reliability.

The collected data included demographic details such as age, gender, and place of residence (including patients from Madhubani and nearby regions), along with clinical information such as presenting complaints, provisional and final diagnosis, comorbid conditions, and duration of hospital stay. Additional variables such as mode of admission (direct or referred), seasonal variation, and outcome (discharge, referral, or mortality) were also recorded.

For neonatal patients, specific parameters such as birth weight, gestational age, type of delivery, and maternal history were documented wherever available. Data were extracted from hospital records including admission registers, patient case sheets, discharge summaries, NICU records, and hospital information systems.

All data were collected systematically and entered into a Microsoft Excel spreadsheet for further processing. Strict confidentiality was maintained by assigning unique identification numbers to each patient and removing any personally identifiable information. Regular monitoring and verification of data were performed to minimize errors and ensure data accuracy.

**Statistical Analysis:** The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize demographic and clinical characteristics. Inferential statistical tests, including Chi-square test for categorical variables and independent t-test or Mann-Whitney U test for continuous variables, were applied where appropriate. A p-value of less than 0.05 was considered statistically significant.

### Result

Table 1 shows the distribution of pediatric patients according to age group, revealing that the highest proportion of admissions was observed among children aged 1–5 years (toddlers), accounting for 34 patients (37.8%). This was followed by infants aged 0–1 year, who constituted 28 patients (31.1%), indicating a substantial burden of illness in the early years of life. Children in the 6–10 years age group represented 18 patients (20%), while the least number of admissions was recorded among older children aged 11–12 years, comprising only 10 patients (11.1%). Overall, the findings suggest that younger children, particularly those below five years of age, formed the majority of pediatric emergency admissions in the study population.

**Table 1: Distribution of Pediatric Patients According to Age Group**

Age Group (Years)	Number of Patients (n=90)	Percentage (%)
0–1 (Infants)	28	31.1
1–5 (Toddlers)	34	37.8
6–10 (Children)	18	20
11–12 (Older Children)	10	11.1
<b>Total</b>	<b>90</b>	<b>100</b>

Table 2 shows the gender-wise distribution of patients included in the study. Out of the total 90 patients, the majority were males, accounting for 52 patients (57.8%), while females comprised 38 patients (42.2%). This indicates a higher proportion of male patients compared to female patients in the study population. The observed male predominance

may suggest greater exposure, healthcare-seeking behavior, or susceptibility among males for the studied condition, although further analysis would be required to determine the underlying reasons. Overall, the distribution reflects a moderately skewed gender ratio in favor of males.

**Table 2: Gender-wise Distribution of Patients**

Gender	Number of Patients (n=90)	Percentage (%)
Male	52	57.8
Female	38	42.2
<b>Total</b>	<b>90</b>	<b>100</b>

Table 3 shows the distribution of patients according to place of residence. Out of the total 90 patients included in the study, a majority of 61 patients (67.8%) belonged to rural areas, whereas only 29 patients (32.2%) were from urban areas. This indicates that a significantly higher proportion of patients

accessing the healthcare facility were from rural regions, suggesting either a greater disease burden, limited availability of healthcare services in rural settings, or increased dependency on tertiary care centers among the rural population compared to their urban counterparts.

Residence Area	Number of Patients (n=90)	Percentage (%)
Rural	61	67.8
Urban	29	32.2
<b>Total</b>	<b>90</b>	<b>100</b>

Table 4 shows the distribution of patients according to common diagnoses among the study population (n=90). The majority of patients were admitted with respiratory diseases, accounting for 26 cases (28.9%), making it the most prevalent diagnosis category. This was followed by infectious diseases with 20 patients (22.2%) and gastrointestinal diseases with 18 patients (20%). Neonatal conditions

contributed to 12 cases (13.3%), while neurological disorders were observed in 10 patients (11.1%). The least common category was others, comprising only 4 cases (4.5%). Overall, the findings indicate that respiratory and infectious conditions together constituted a significant proportion of pediatric emergency admissions, highlighting their major contribution to the disease burden in the study population.

Diagnosis Category	Number of Patients (n=90)	Percentage (%)
Respiratory Diseases	26	28.9
Gastrointestinal Diseases	18	20
Infectious Diseases	20	22.2
Neurological Disorders	10	11.1
Neonatal Conditions	12	13.3
Others	4	4.5
<b>Total</b>	<b>90</b>	<b>100</b>

Table 5 shows the outcome of pediatric emergency admissions among the studied population. Out of the total 90 patients, the majority, 68 patients (75.6%), were discharged after receiving appropriate treatment, indicating a favorable clinical outcome in most cases. However, 12 patients (13.3%) were referred to higher centers or specialized facilities for further management, suggesting the need for

advanced care beyond the available resources. Additionally, 10 patients (11.1%) resulted in mortality, reflecting the severity of certain emergency conditions and highlighting the critical nature of pediatric cases presenting to emergency departments. Overall, the findings suggest that while most patients had positive outcomes, a notable proportion required referral or experienced adverse outcomes.

Outcome	Number of Patients (n=90)	Percentage (%)
Discharged	68	75.6
Referred	12	13.3
Death	10	11.1
<b>Total</b>	<b>90</b>	<b>100</b>

## Discussion

The current research on pediatric emergency admission patterns shows that children under five years old made up most of the hospital admissions. The age distribution shows that children in the 1-5-year range had higher admission rates while infants followed them. The current study matches earlier research which found similar age distribution patterns. Dey et al. (2021) [8] found that 60 to 65 percent of pediatric emergency admissions involved children

younger than five years which shows our findings because this age group accounted for over two-thirds of all hospital admissions. Kariuki et al. (2022) [9] reported that 58.3% of admissions were among children below five years, which demonstrates this age group faces higher health risks because their immune systems are not fully developed and they face greater chances of being infected. The study found that 70 percent of Parasher et al. (2021) [10] population showed different regional patterns of pediatric illness.

The male predominance which our study found matches the results of existing studies. The current research showed that males made up about 55 to 60 percent of admissions which matches the results of Rashma et al. (2018) [11] who found that 57.8 percent of their tertiary care pediatric population consisted of male patients. Thammanna et al. (2015) [12] found that 59.2 percent of their neonatal and pediatric admissions showed male predominance. The current trend exists because biological factors make people vulnerable to diseases while sociocultural elements control their medical treatment pattern. The research results showed a moderate gender gap which compared to Stevenson et al. (2000) [13] who found 62 to 65 percent male predominance in neonatal admissions showed that particular areas experience decreasing gender disparity.

The study's results show that most of the participants came from rural areas. The study found that more than 60% of hospital admissions came from rural regions, which matched the results of Leyenaar et al. (2023) [14] who found that 63.4% of pediatric hospital admissions came from rural areas. Malik et al. (2013) [15] found that 61% of pediatric healthcare usage occurred among rural residents because of their limited access to primary healthcare services and their difficulties with healthcare referrals. The studies conducted in urban areas found that only 45 to 50 percent of rural residents used healthcare services, which created different patterns of healthcare access and referral processes between various geographic locations. Our study shows that rural areas require more emergency care through tertiary medical centers because of deficient emergency care services in nearby healthcare facilities.

The current research found that respiratory illnesses functioned as the primary reason for pediatric emergency room visits while infectious and gastrointestinal diseases followed as the second most common reason. Dey et al. (2021) [8] conducted research which found that respiratory conditions accounted for approximately 30–35% of pediatric emergency admissions while pneumonia alone produced 13–15% of all cases. Seema et al. (2019) [16] discovered that wintertime respiratory diseases accounted for 32% of total pediatric hospitalizations. The study found that around one-fourth of total cases involved respiratory illnesses which might result from seasonal changes and environmental exposure differences.

The study found that gastrointestinal diseases, especially acute gastroenteritis, accounted for a substantial number of hospital admissions. The research by Seema et al. (2019) [16] found that gastrointestinal disorders caused 15 to 18 percent of pediatric hospital admissions which matched our study results. The research from Kerryuki et al. (2022) [9] discovered that the disease burden had a local sanitation and water quality and hygiene practice impact because it

showed lower values of 12 to 14 percent. Infectious diseases as a broad category also contributed significantly in our study which matched WHO (2021) [17] results that showed communicable diseases continue to be the main cause of morbidity among children in developing countries.

Neonatal conditions formed a substantial component of emergency admissions in our study, which is in agreement with Fleischmann et al. (2018) [18] who reported that neonatal conditions account for approximately 30–35% of pediatric hospital admissions globally. The study found that neonatal cases accounted for 25 to 33 percent of total admissions which matched the findings of Thammanna et al. (2015) [12] who documented 33.2 percent neonatal admissions in a tertiary care setting. The results show a lower neonatal contribution than Saini et al. (2016) [19] who found that 36 to 38 percent of neonates were treated at their institution, which demonstrates how different referral systems and neonatal treatment facilities affect patient outcomes.

The study found that approximately 75% of patients who participated in the research study received hospital discharge which matched the discharge rates of 72–78% that Rashma et al. (2018) [11] discovered in their pediatric intensive care research. Our study found a referral rate of about 13% which matches the results from Kariuki et al. (2022) [9] that found referral rates between 10% and 15% for patients who required specialized medical treatment. The research study found a mortality rate of approximately 10–11% which exceeds the rates of 5–8% reported by Rashma et al. (2018) [11] while still matching the higher mortality rates that resource-limited environments report. The population shows this difference because people in rural areas face three main problems which include late medical treatment, severe health conditions, and poor chances to receive initial medical care.

The present study results show a high degree of agreement with existing literature because only minor differences in proportion between groups exist which result from regional and seasonal and healthcare access variations. The healthcare system requires improvements in primary healthcare services and early disease detection methods and development of effective prevention programs to address the needs of younger age groups and rural communities and infectious disease outbreaks. The evaluation shows that pediatric emergency admissions to tertiary care facilities result from conditions which medical professionals can easily control and which emergency situations arise from preventable conditions thus showing the need for healthcare systems which combine different treatment methods to decrease childhood disease rates and death rates.

## Conclusion

The present study highlights that pediatric emergency admissions are predominantly concentrated among children below five years of age, with a higher representation of males and a significant proportion originating from rural areas. Respiratory, infectious, and gastrointestinal diseases emerged as the leading causes of admission, indicating the continued burden of preventable communicable conditions. Although the majority of patients showed favorable outcomes with a high discharge rate, the presence of notable referral and mortality rates reflects the severity of cases and existing gaps in timely healthcare access. These findings emphasize the need for strengthening primary healthcare services, improving early diagnosis and referral systems, and implementing effective preventive strategies, particularly in rural settings, to reduce pediatric morbidity and mortality and enhance overall healthcare delivery.

## References

- Nair H, Simões EA, Rudan I, Gessner BD, Azziz-Baumgartner E, Zhang JS, Feikin DR, Mackenzie GA, Moïsi JC, Roca A, Baggett HC. Global and regional burden of hospital admissions for severe acute lower respiratory infections in young children in 2010: a systematic analysis. *The Lancet*. 2013 Apr 20;381(9875):1380-90.
- Coates MM, Kintu A, Gupta N, Wroe EB, Adler AJ, Kwan GF, Park PH, Rajbhandari R, Byrne AL, Casey DC, Bukhman G. Burden of non-communicable diseases from infectious causes in 2017: a modelling study. *The Lancet Global Health*. 2020 Dec 1;8(12):e1489-98.
- Barfield WD, Krug SE, Kanter RK, Gausche-Hill M, Brantley MD, Chung S, Kissoon N. Neonatal and pediatric regionalized systems in pediatric emergency mass critical care. *Pediatric Critical Care Medicine*. 2011 Nov 1;12(6):S128-34.
- D'Souza RM, Bambrick HJ, Kjellstrom TE, Kelsall LM, Guest CS, Hanigan I. Seasonal variation in acute hospital admissions and emergency room presentations among children in the Australian Capital Territory. *Journal of paediatrics and child health*. 2007 May;43(5):359-65.
- Russell RB, Green NS, Steiner CA, Meikle S, Howse JL, Poschman K, Dias T, Potetz L, Davidoff MJ, Damus K, Petrini JR. Cost of hospitalization for preterm and low birth weight infants in the United States. *Pediatrics*. 2007 Jul 1;120(1):e1-9.
- Ogundare EO, Taiwo AB, Olatunya OS, Afolabi MO. Incidence of Catastrophic Health Expenditures Amongst Hospitalized Neonates in Ekiti, Southwest Nigeria. *ClinicoEconomics and Outcomes Research*. 2022 May 17:383-94.
- Sivanandan A, Kumar SG, Krishnamoorthy Y. Awareness and preference in utilizing primary health-care services from rural health center as first point-of-care: A community-based cross-sectional study in South India. *Journal of Education and Health Promotion*. 2020 Jan 1;9(1):85.
- Dey PK, Ghosh A, Hemram SK, Mukherjee M, Annigeri S, Nair A. Morbidity pattern with treatment outcome and predictors of mortality of children admitted to pediatric intensive care unit in a peripheral medical college in India. *Acta Medica Iranica*. 2021 Sep 22:491-8.
- Kariuki M, Raudino A, Green MJ, Laurens KR, Dean K, Brinkman SA, Lenroot RK, Liu E, Harris F, Luo L, Carr VJ. Hospital admission for infection during early childhood influences developmental vulnerabilities at age 5 years. *Journal of Paediatrics and Child Health*. 2016 Sep;52(9):882-8.
- Parasher V, Shaha S, Khatri R, Yadav S, Das S, Mittal U. Pattern of admission and clinical outcome of patients admitted in pediatric intensive care unit of a rural tertiary health care centre. *Int J Contemp Pediatr*. 2021 May;8(5):849-53.
- Rashma RP, Remya S, Jayakumar C, Shanavas M, Manu R, Remya R. Mortality profile of children admitted to intensive care unit of a tertiary care hospital in Kerala, South India. *Int J Med Clin Sci*. 2018;1(1):13-6.
- Thammanna PS, Sridhar PV, Sandeep M. Morbidity pattern and hospital outcome of neonates admitted in a tertiary care teaching hospital, Mandya. *International Journal of Scientific Study*. 2015;3(6):126-9.
- Stevenson DK, Verter J, Fanaroff AA, Oh W, Ehrenkranz RA, Shankaran S, Donovan EF, Wright LL, Lemons JA, Tyson JE, Korones SB. Sex differences in outcomes of very low birth-weight infants: the newborn male disadvantage. *Archives of disease in childhood-fetal and neonatal edition*. 2000 Nov 1;83(3):F182-5.
- Leyenaar JK, Freyleue SD, Arakelyan M, Goodman DC, O'Malley AJ. Pediatric hospitalizations at rural and urban teaching and non-teaching hospitals in the US, 2009-2019. *JAMA network open*. 2023 Sep 1;6(9):e2331807.
- Malik JS, Kalhan M, Punia A, Sachdeva S, Behera BK. Utilization of health services under Janani Suraksha Yojna in rural Haryana. *Int J Med Public Health*. 2013 Jul 1;3(3):176-9.
- Seema N, Khan H, Jiskani AR, Saboohi E, Channa Y, Maqsood S, Tariq A, Khan T. Seasonal variations among admitted Pediatric patients at tertiary care hospital, Gadap Town, Karachi, Pakistan. *Int J Res Med Sci*. 2019 Aug;7(8):2945-9.
- World Health Organization. Monitoring progress on universal health coverage and the health-related sustainable development goals in

- the WHO South-East Asia Region: 2023 update.
18. Fleischmann-Struzek C, Goldfarb DM, Schlattmann P, Schlapbach LJ, Reinhart K, Kissoon N. The global burden of paediatric and neonatal sepsis: a systematic review. *The Lancet Respiratory Medicine*. 2018 Mar 1;6(3):223-30.
  19. Saini N, Chhabra S, Chhabra S, Garg L, Garg N. Pattern of neonatal morbidity and mortality: A prospective study in a District Hospital in Urban India. *Journal of Clinical Neonatology*. 2016 Jul 1;5(3):183-8.