



## RESEARCH PAPER

# EPIDEMIOLOGY OF EMERGENCY PEDIATRIC HOSPITALIZATIONS AT A TERTIARY CARE CENTRE IN NORTH INDIA

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**ABSTRACT**

**Background:** Epidemiological data assessment is an important tool for measuring the burden of disease in population. Demographic profile, geographical distribution and outcome of the disease can vary in pediatric emergencies.

**Material and Methods:** Retrospective study was conducted in the pediatric emergency department(ED) on children 14 years or less in a tertiary care hospital of North India. Data was collected from inpatient registers and from the medical record section and divided into gender, geographical distribution, age group, number of days of hospital stay and disease frequency.

**Results:** Out of the total patients, 57.7% were males and 42.3% were females. Majority of the patients were from rural areas (66.6%). The most common presented illnesses were involving the respiratory system.

**Conclusions:** This study concludes that the rural pediatric population is more affected as compared to urban. Respiratory system involvement was the leading cause of hospital admissions.

**KEY WORDS :** pediatric emergencies, epidemiology, respiratory illnesses

**INTRODUCTION**

For social and economic progression of any population, knowing the Child mortality rate is one of the important determinant.<sup>1</sup> India accounts for approximately 21% child mortality globally.<sup>2</sup> United Nations Children's Fund (UNICEF) states that, most common causes of child mortality are acute respiratory infections (ARI), diarrhoea, malnutrition, measles and malaria.<sup>3</sup>

Burden of these pediatric diseases is much higher in India. So, urgent interventions are required for the prevention and control of such diseases. Timely planning of appropriate measures and interventions are required to reduce the mortality rates in children. Understanding the epidemiology of diseases, plays a crucial role in effectively managing and treating conditions like pneumonia, diarrhoea and malaria at community level, where patient's first exposure with health care system occurs when disease is in early.<sup>4</sup> Further, to lessen the morbidity and mortality in India, due to common causes like ARI, diarrhoea, malnutrition, malaria and measles, Integrated management of neonatal and childhood illnesses (IMNCI) was launched. In IMNCI, community and health care workers underwent training regarding the detection and first line management of these illnesses at the regional level.<sup>5</sup> All these measures were done to reduce the burden of disease in the community.

To implement this, epidemiological data containing paediatric emergency admissions is needed which is scarcely available in India<sup>(6,7,8)</sup>. According to the need of an hour, this data is essential for healthcare planners and providers for the cost effective allocation of limited health resources. Also, in developing countries like India, there are many deficiencies present which further put burden on the scarce healthcare resources, like, large population of pediatric patients presenting to emergencies, non availability of adequate drugs, resuscitation equipments and trained staff. Epidemiological data, further helps in conducting clinical programs and implementing future research for improving the quality of treatment, and it is an important step in reducing morbidity and mortality in low and middle income countries (LMICs).<sup>(9)</sup>

Our primary aim of conducting this retrospective study was to know

the pattern of pediatric diseases presenting in the emergency department of a tertiary care hospital in Northern India. The secondary outcomes were to know the distribution of diseases according to the age group, geographical areas (rural/urban) and also the length of hospitalization for particular disease so as to further strengthen the healthcare services.

**MATERIAL AND METHODS:-**

This is a retrospective study, conducted in the emergency department(ED) on pediatric patients (14 years or less) in a tertiary care hospital of North India over a period of 12-months from 1st January 2018 to 31<sup>st</sup> December 2018. Data was collected from in patient registers and from the medical record section.

In our hospital, there is assigned emergency room for the pediatric assessment. As it's a tertiary care centre, all types of emergencies are seen. For the study purpose, Children of age group 1 to 14 years were included. Pediatric emergencies were categorised based on primary system involved (Gastrointestinal system, respiratory, cardiovascular, central nervous system, haematological system) and illnesses like gastroenteritis, pneumonia, urinary tract infections, pyrexia of unknown origin, seizures etc. Further, to know the distribution of disease according to age, children were divided in 3 groups (Group 1) <5 years, 5-10years (Group 2), 10-14 years (Group 3). Data regarding gender (male/ female), geographical background (rural/ urban), and length of hospital stay was also noted.

Statistical Analysis:-After collecting the data, it was entered in MS-Excel sheet and analysis was done by using SPSS software version 16. All the data available was expressed in percentages.

**RESULTS:-**

A total of 721 patients presented to pediatric emergency were enrolled in the study over a period of 12 months. Demographic profiles of the entitled pediatric patients are given in Table 1. Out of the total patients, 57.7% were males and 42.3% were females. Among these, 58.7% were falling in the age group less than 5 years, 32.45% in 5-10 years and 8.7% patients above 10 years of age. Furthermore, majority of the patients were from rural areas (66.6%), as compared to 33.3% from urban areas.

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Table 1

| Variables                        | Percentages (%) |
|----------------------------------|-----------------|
| <b>Gender</b>                    |                 |
| Male                             | 57.8            |
| Female                           | 42.1            |
| <b>Age Group (yrs)</b>           |                 |
| <5                               | 58.77           |
| 5-10                             | 32.45           |
| 10-14                            | 8.7             |
| <b>Geographical Distribution</b> |                 |
| Rural                            | 66.66           |
| Urban                            | 33.33           |

In our study, illnesses involving respiratory system were responsible for majority of the pediatric emergency admissions. Among these, pneumonia was the most common followed by bronchiolitis, asthma and respiratory distress syndrome. Gastrointestinal system (GI) involvement and neonatal sepsis were the two next most common illnesses. 9.6% of children were admitted with gastroenteritis. Urinary tract infections and fever without focus each were diagnosed in approximately 7% of the total emergencies. Head injury, septicaemia, neonatal jaundice, seizures accounted for 5% each.

Table 2

| Diseases                       | Percentages (%) |
|--------------------------------|-----------------|
| <b>Respiratory System</b>      |                 |
| pneumonia                      | 13.15           |
| bronchiolitis                  | 1.7             |
| asthma                         | 0.8             |
| Resp. distress synd.           | 0.8             |
| <b>Gastrointestinal system</b> |                 |
| gastroenteritis                | 9.6             |
| hepatitis                      | 1.7             |
| <b>Renal system</b>            |                 |
| uti                            | 7               |
| Nephrotic synd.                | 1.7             |
| hydronephrosis                 | 0.8             |
| <b>Neonatal illnesses</b>      |                 |
| Neonatal sepsis                | 9.6             |
| Neonatal jaundice              | 4.3             |
| Preterm with hypocalcemia      | 0.8             |
| <b>CNS</b>                     |                 |
| seizures                       | 2.6             |
| Medulloblastoma                | 0.8             |
| Hydrocephalus                  | 1.7             |
| Febrile seizures               | 1.7             |
| meningoencephalitis            | 1.7             |
| Meningitis                     | 0.8             |
| Hypoglycemic seizures          | 0.8             |
| <b>Infections</b>              |                 |
| Fever without focus            | 6.1             |
| septicemia                     | 5.2             |
| Enteric fever                  | 2.6             |
| Dengue fever                   | 1.7             |
| Cerebral malaria               | 0.8             |
| <b>Trauma</b>                  |                 |
| Head injury                    | 5.2             |
| Blunt abd. trauma              | 0.8             |
| <b>Surgical emergencies</b>    |                 |
| appendicitis                   | 1.7             |
| epididymitis                   | 0.8             |
| Transverse colon perforation   | 0.8             |
| Gastric fistula                | 0.8             |
| Abd. distension                | 0.8             |
| <b>Skin Diseases</b>           |                 |
| pyoderma                       | 2.6             |
| <b>Others</b>                  |                 |
| Hodgkin's lymphoma             | 1.7             |
| Anaemia                        | 1.7             |
| Type 1 DM with DKA             | 2.6             |

On further evaluating the data, it was found that respiratory system

and gastrointestinal systems were commonly involved in children of less than 5 years age, whereas, urinary tract infections were common in both <5years and 5-10 years of age group. Majority of the patients admitted with respiratory illness and urinary tract infections had a hospital stay of 10-15 days, whereas, in patients having gastrointestinal illness it was 5-10 days.

#### DISCUSSION:-

In primary and referral hospitals, according to the previous studies from India, acute respiratory infections and gastroenteritis were the most common reasons for utilization of pediatric emergency resources.<sup>(10-13)</sup> Therefore, keeping the patient's record at regular intervals can help us in the assessing the changing pattern of disease frequencies, health care needs and its burden on a community.<sup>(10)</sup> In this retrospective study, data from 721 admitted patients in pediatric emergency of a tertiary care centre in North India was collected. It was observed that, number of male children (57.7%) admitted was higher as compared to females (42.3%). Similar to this, male preponderance was noticed by other studies.<sup>(10,14,15,16)</sup> In developing countries like India, the reason for male predominant hospital admissions can be attributed to preferential care given to male child.<sup>(10)</sup> Another reason could be due to males having only one x chromosome which is probably regulating the synthesis of gammaglobulins.<sup>(17)</sup>

Our study revealed that, out of all the pediatric emergency admissions, majority were from the age group <5years (58.7%), followed by 5-10years (32.4%) and >10years (8.7%). Similarly, in <5years (71%) and >5years (21%) hospital admission rates were documented by Singhi S et al.<sup>(10)</sup> Furthermore, 66.6% patients were from rural background as compared to 33.3% from urban area. In concordance to our study, higher prevalence of illness among the rural patients was observed by Rashmi K et al.<sup>(18)</sup> Our patients were classified in terms of organ involved and associated illness. Respiratory system involvement was the most frequent cause of hospital admissions among all the pediatric emergencies. We noticed that pneumonia was the most frequent among the respiratory disorders. Similar to our findings, higher percentages of admissions due to respiratory cause involved was found by Rashmi K et al.<sup>(18)</sup> Possible explanation may be based on the fact that, pneumonia is the leading cause of death in children < 5years of age. Contrary to these findings, diarrheal illnesses were the most common presentation seen in study conducted by Singhi S et al.<sup>(10)</sup>

Gastrointestinal system involvement was the second most common cause of hospitalizations among the children in our study. Rashmi et al observed the concordant findings to our study.<sup>(18)</sup> In contrast, Singhi et al<sup>(10)</sup> reported that the gastrointestinal illness in pediatric patient was the leading cause for attending the emergency department. Significant percentage of neonates presenting to emergency department with sepsis was observed in our results. This might be because of limited or inadequate availability of health care services at the primary level and lack of utilization of available resources in the community.<sup>(19)</sup>

This study concludes that the rural pediatric population is more affected as compared to urban children and males are more commonly affected than females in carrying a disease. Furthermore, respiratory system involvement was the leading cause of hospital admissions in pediatric emergencies in a tertiary care hospital of North India. Optimum resource allocation can be done by knowing the epidemiology of pediatric emergencies, which will further decrease the burden of disease on society and health care providers.

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