



Research Article

PREVALENCE OF RESPIRATORY TRACT INFECTIONS IN PEDIATRIC DEPARTMENT IN TERTIARY CARE HOSPITAL

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ABSTRACT

Respiratory tract infections (RTIs) represent a significant burden on pediatric healthcare systems globally. This study aimed to determine the prevalence of bacterial and viral RTIs and evaluate management patterns in a pediatric care hospital setting. A prospective observational study was conducted over six months, involving 200 pediatric cases. Clinical and demographic data were collected, and laboratory tests were performed to identify the etiology of RTIs. Statistical analysis was conducted using IBM SPSS, employing the chi-square test to compare different groups.

Results revealed a high prevalence of both bacterial and viral RTIs among pediatric patients, with viral infections being more common. Respiratory syncytial virus (RSV) and influenza viruses were the most frequently detected viral pathogens, while *Streptococcus pneumoniae* and *Haemophilus influenzae* were predominant bacterial pathogens. Management patterns varied, with antibiotics commonly prescribed for bacterial RTIs and supportive care for viral RTIs. The findings highlight the need for effective diagnostic strategies and appropriate management protocols tailored to the etiology of RTIs in pediatric populations. Further research is warranted to optimize treatment strategies and reduce the burden of RTIs on pediatric healthcare systems.

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INTRODUCTION

Respiratory airway infection represents a considerable worldwide health burden contributing significantly to both illness and death on a global basis. There is limited understanding of the epidemiology, clinical presentation, and relevance of newly found respiratory viral infections. These infections can progress from mild to fatal if not managed appropriately.

RTIs are common in otherwise healthy newborns and early children. Reportedly, children in the first phase of life, without any underlying medical condition have multiple RTI episodes, which, usually mild and self-correcting, have a substantial negative impact on the child's quality of life². The child is considered prone to RTIs when recurrences occur frequently. Recently, the prevention of recurrent RTIs in otherwise healthy children has become the focus of several clinical studies. Although some of these interventions have proven beneficial

in reducing the burden of RTIs, only a limited amount of progress has been observed.²

The causes of RTIs in children include viruses, bacteria, fungi, and allergens. The most common cause of URTIs is often caused by viral infections, like the common cold, influenza, and adenovirus^{1,2}. In contrast, bacterial infections are responsible for most LRTIs, such as pneumonia and bronchitis. Fungal infections and allergens can also contribute to RTIs, particularly in immunocompromised children.

The symptoms of RTIs in children can differ based on infection. Common symptoms of URTIs include cough, wheezing, rhinorrhoea, inflamed throat, and fever. In contrast, LRTIs can lead to an increase in the severity of symptoms like excess expectoration, shortness of breath, and fever. In severe cases, RTIs can lead to complications such as pneumonia, bronchitis, and asthma exacerbations³.

RTI treatment options in children differ based on the source and severity of the infection. URTIs are frequently reversible and do not require specific medical care. Over-the-counter drugs such as antihistamines, decongestants, and painkillers can help with symptom relief³. In contrast, LRTIs may necessitate antibiotics, antiviral medicines, and supportive care like oxygen therapy and hydration⁵. Children's infections

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of the lung (RTIs) can be prevented by employing effective hygiene measures such as frequent handwashing, covering the mouth while wheezing or coughing, and avoiding contact with sick people. Vaccination against influenza and pneumococcal infections is also suggested for high-risk groups, including young children, the elderly, and people with underlying medical conditions⁴.

MATERIALS AND METHODS

Study Site: The research was conducted at Rainbow Children Hospital located in Banjara Hills, Hyderabad, Telangana (Road No. 2, beside Park Hyatt, Sri Nagar Colony, Kamalapur Colony, 500034).

Study Period: The investigation spanned 6 months, commencing in July 2023 and concluding in January 2023.

Study Design: This research adopted a prospective observational study design to observe and analyze the prevalence of respiratory tract infection bacterial vs viral in the pediatric population. Sample Size: 200 cases

Data Collection:

A prospective observational study was conducted in the Pediatric department at Rainbow Children’s Hospital in Banjara Hills, Hyderabad. A minimum of 200 eligible participants were recruited based on specified inclusion and exclusion criteria. Demographic data, including age and gender, were gathered from patient records. Detailed information on respiratory tract infection.

Before initiation, formal permission and research consent were obtained from the Ethical Committee. Data confidentiality and privacy were strictly maintained, with access restricted solely to the researcher to ensure participant anonymity.

Inclusion Criteria:

1. Pediatric Patients:
 - Age: Children aged 1 month to 18 years.
 - Patients with suspected or confirmed bacterial or viral respiratory tract infections

Exclusion Criteria:

- Geriatric and gestational population.
- Pediatric population below 1 month of age and above 18 years old.

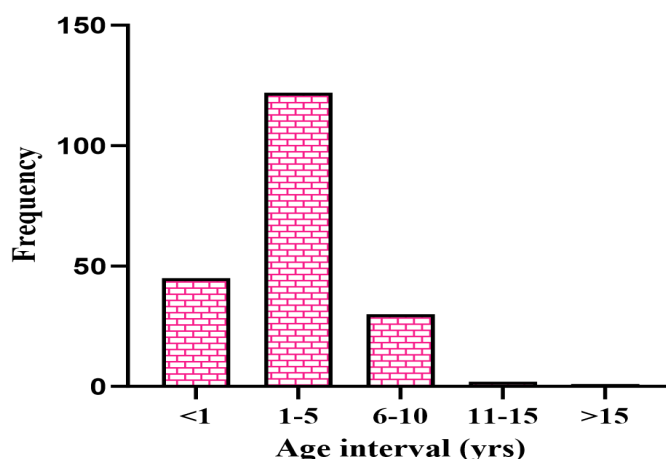
Statistical Analysis:

The statistical analysis employed IBM SPSS. Continuous and discrete variables were presented as Mean+/-

Standard deviation and frequency with percentage (N), respectively. Data were presented as mean with standard deviation for normal distribution/scale data and as frequency with proportion N (%) for categorical data. The Chi-square test was used to test different groups among variables given in different categories. All statistical analyses were conducted at a 5% significance level or 95% confidence interval, considering a P value less than 0.05 as statistically significant.

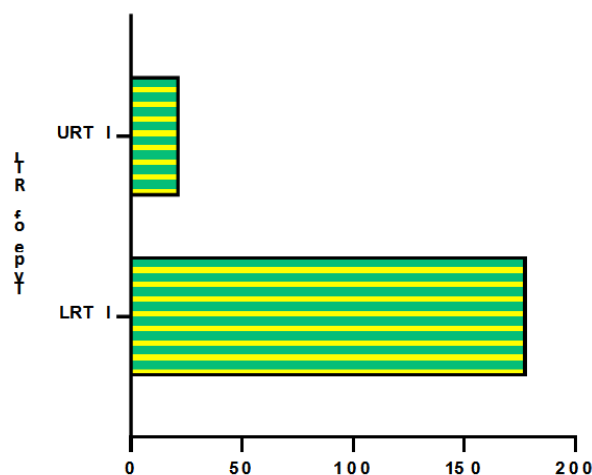
RESULTS

Age distribution



The above table shows the age category and percentage that are affected by RTI in a pediatric population. The age interval 1-5 is recorded with the highest with the percentage count as 61%(N=122). The lowest is found in the age interval 10-18 years of age with their percentage count as less than 1%(N=45).

LRTI/URTI

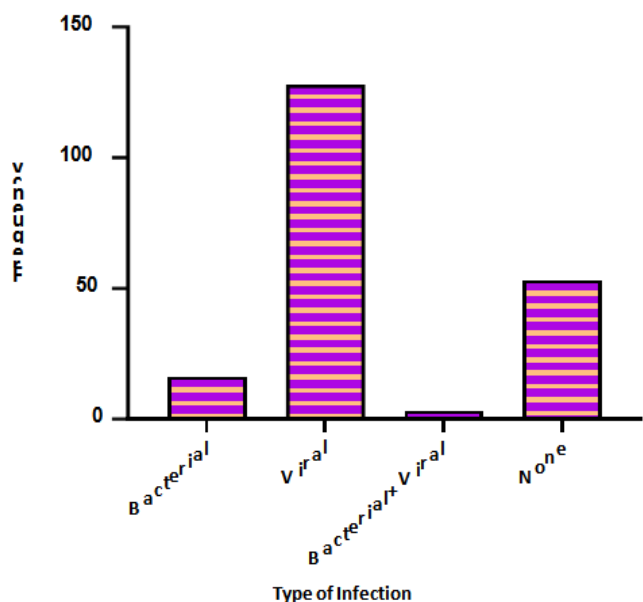


The above table shows the number and percentage of types of respiratory infections caused in the pediatric population. The cases of LRTI in the pediatric population are seen in 89%(N=178) of the collected cases whereas URTI consists of 11%(N=22) of the cases. In the pediatric population the most common type of airway infection is LRTI according to the analyzed data.

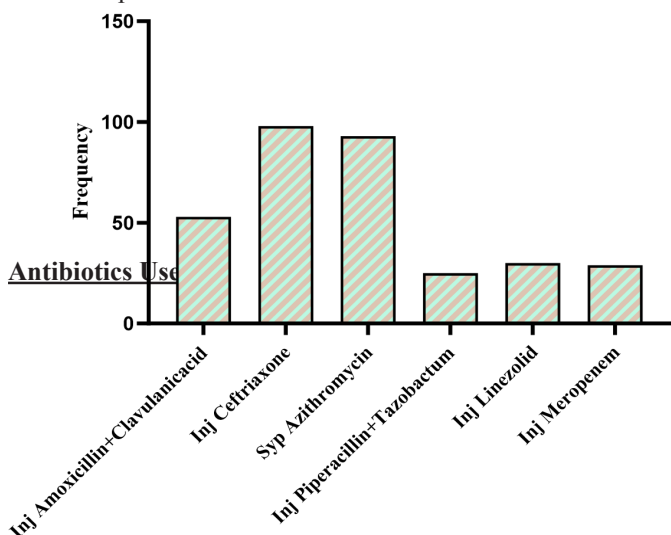
The above bar diagram shows the frequency of lower and upper respiratory infection cases collected in a pediatric population.

Type of Infection

The statistical analysis of the above data gives an insight into the most common type of infection amongst the study population. It shows that viral infection is the most common type of RTI caused in the patients, amassing 64%(N=128) of the cases. Bacterial infection constitutes only 8%(N=16) of the study population.



By this, we can conclude that viral RTI is frequently occurred when compared to bacterial.



From the statistical analysis of our data, we can interpret that the most commonly used antibiotic in pediatric care to treat respiratory infections is Ceftriaxone at 49%(N=98) followed by Azithromycin at 47%(N=93). The least commonly used antibiotic to treat respiratory infections is Inj.Piperacillin + Tazobactam at 13%(N=25).

Duration of Disease Based on Type of Infection

Infection	Duration (days)			P value
	Minimum	Maximum	Mean± SD	
Bacterial	07	21	9.87± 3.79	0.5830
Viral	05	21	10.10± 3.45	
Bacterial+ Viral	05	14	8± 5.19	

The given graph and table show the duration of the disease related to the type of infection. The graph shows the duration of disease in days for each type of infection. The x-axis represents the type of infection, and the y-axis represents

the duration of the disease in days. The graph shows that the duration of disease for bacterial and viral infections is around 10 days, while for bacterial viral infections, it is around 8 days.

However, as per the table, this difference is not statistically significant.

DISCUSSION

Our research study is a meticulous exploration and analysis of the prevalence, characteristics, and management of upper respiratory tract infections (URTIs) and lower respiratory tract infections (LRTIs) within the pediatric population. This encompasses neonates, infants, children, and adolescents with an age range extending from newborns to 18 years old. The focus is on the structural differences between these two types of respiratory diseases, with URTIs primarily affecting the nasal passages, throat, and upper airways, while LRTIs extend their impact to the trachea, bronchi, and lungs.

Infants are highly prone to respiratory infections in their first year due to developing immune systems according to Esposito et al. This enunciates the significance of timely care and vaccinations to protect their health.

The occurrence and spread of respiratory pathogens causing acute respiratory infections in children have been comprehensively characterized and evaluated in this work. Our findings strongly support the widespread presence of viral causes in pediatric patients. The epidemiological exploration delves into understanding the patterns and characteristics of these respiratory pathogens, offering insightful information about the prevalence and impact of viral etiologies among children experiencing acute respiratory infections. This confirmation of a high prevalence of viral involvement emphasizes the significance of targeted measures and interventions, guiding healthcare professionals in the effective management and prevention of respiratory infections in the pediatric population.

The microbial etiology of RTI is a focal point in the study, revealing that viral pathogens constitute the majority, comprising 64% of the collected data. Bacterial pathogens, while contributing to a lesser extent (8% of cases), are still noteworthy. The pharmacological choices for treating RTI in the pediatric cohort are meticulously examined. The study identifies Ceftriaxone as the most commonly prescribed antibiotic, utilized in 49% of cases, followed closely by azithromycin at 47%. This underscores the relevance of these antimicrobial agents in pediatric respiratory care. Moreover, the data highlights oseltamivir as the drug of choice for antiviral treatment (46% of cases) and hydrocortisone as the preferred steroid (19% of cases).

CONCLUSION

In conclusion, this in-depth research study provides a thorough examination of upper and lower RTI in the pediatric population, shedding light on multiple aspects ranging from prevalence and demographic patterns to causative agents and treatment modalities. The results provide insightful information that advances our knowledge of children’s and adolescents respiratory health.

One major observation is the heightened susceptibility of pediatric individuals to LRTI’s compared to URTI’s. The

delineation of age-specific vulnerability, with 1–5-year-olds being the most significantly affected, highlights the importance of considering age-related factors in the assessment and management of respiratory infections. Additionally, the gender disparities highlighted in the study, with a greater frequency in males, suggest the need for more investigation into susceptibilities and risk factors particular to gender.

Some specific considerations, such as duration of recovery, provide clinicians with practical expectations for the management of RTI's in the pediatric population. These insights on how long it takes to recover from various types of infections contribute to a more informed and patient-centred approach to care.

Finally, the exploration of potential correlations between the type of infection and demographic variables such as age and gender yield valuable data, guiding future research goals and potentially informing targeted preventive strategies.

In essence, this research study enhances our comprehension of RTI's in paediatrics, offering a different perspective that integrates epidemiological, clinical, and demographic dimensions. The findings noted from this study can contribute to refinement of clinical practices, the evolution of evidence-based guidelines, and the enhancement of public health strategies aimed at safeguarding the respiratory health of children and adolescents. Further research upon these findings shows the promise of continued advancements in pediatric respiratory care.

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