Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

Prevalence, Symptoms, and Treatment of Bronchiolitis and Pneumonia in Pediatric Patients

Khalil Ahmad[1], Muhammad Qasim Khan[1]*, Abbas Ali[2], Abdul Jabar[2], Hazrat Anus[2], Muhammad Suleman[2]

[1]Bacha Khan Medical College, Mardan.

[2]Mardan Medical Complex, Mardan.

*Corresponding Author: Muhammad Qasim Khan, Associate Professor; Email: qasimkhan.dr.02@gmail.com

Conflict of Interest: None.

Ahmad K., et al. (2023). 3(2): DOI: https://doi.org/10.61919/jhrr.v3i2.310

ABSTRACT

Background: Pediatric respiratory diseases, particularly pneumonia and bronchiolitis, pose significant health challenges worldwide. Understanding their prevalence, symptomatology, and effective treatment is crucial for improving pediatric health outcomes.

Objective: This study aimed to investigate the occurrence, symptoms, and treatment outcomes of pneumonia and bronchiolitis in children under five years of age at the GKMC Swabi Department of Pediatrics.

Methods: The study design was retrospective study, conducted from January 2022 to January 2023, at GKMC Swabi Department of Paediatrics included 100 pediatric patients diagnosed with either pneumonia (n=40) or bronchiolitis (n=60). Patients aged 0 to 10 years with respiratory symptoms indicative of these diseases were selected, excluding those with severe comorbidities or chronic respiratory disorders. Data on demographic characteristics, clinical symptoms, diagnostic test results, and treatment outcomes were collected from medical records. Diagnosis was based on clinical examination, chest Xrays, blood tests, and other relevant procedures. Descriptive statistics were used for data analysis, utilizing SPSS version 25.

Results: The mean age of patients was 3.2 years (±0.5). Gender distribution was equal, with a 50/50 maletofemale ratio. Bronchiolitis and pneumonia accounted for 60% and 40% of cases, respectively. Common symptoms included cough (88%), fever (80%), and difficulty in breathing (65%). The positive treatment response was observed in 77.5% of cases, with 32.5% requiring hospitalization. The average duration of hospital stay was 5.0 days (±1.3). Secondary symptoms like wheezing (35%), chest pain (17.5%), runny nose (32.5%), and vomiting (17.5%) were also noted.

Conclusion: The study highlights the significant burden of pneumonia and bronchiolitis in young children and the effectiveness of current treatment modalities. The findings emphasize the need for early recognition and treatment of these diseases, along with continued research into preventive measures and longterm outcomes.

Keywords: Pediatric Respiratory Diseases, Pneumonia, Bronchiolitis, Child Health, Hospitalization, Treatment Outcomes.

INTRODUCTION

The global burden of pediatric respiratory diseases, particularly bronchiolitis and pneumonia, represents a significant challenge in pediatric healthcare. Bronchiolitis, predominantly caused by the Respiratory Syncytial Virus (RSV), stands as the most common lower respiratory tract infection in infants and young children (1). This viral illness manifests through symptoms such as wheezing, coughing, and breathing difficulties, often necessitating hospitalization in severe cases. Notably, a study in "Paediatrics" highlighted bronchiolitis as a primary reason for hospital admissions during the winter months, especially in children under two years of age. This trend underscores the substantial impact of this condition on pediatric health and healthcare systems (2, 3).

Pneumonia, conversely, continues to be a leading cause of morbidity and mortality among children globally (4). This respiratory condition can be attributed to a variety of pathogens, including bacteria, viruses, and fungi (5), and is characterized by symptoms such as fever, cough, and rapid breathing. The World Health Organisation (WHO) estimates that pneumonia accounts for 15% of all pediatric deaths worldwide (5, 6), highlighting its severe health implications. Both bronchiolitis and pneumonia not only pose significant risks to the health of young patients but also place a considerable strain on healthcare resources (7, 8).

These challenges are particularly acute in developing countries, where factors like low vaccination rates, limited healthcare access, and higher prevalence of malnutrition can exacerbate the severity of these diseases (9-11). Therefore, it is crucial for healthcare

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providers, policymakers, and caregivers to have a thorough understanding of the epidemiology, symptomatology, and effective treatment approaches for pediatric pneumonia and bronchiolitis (7). Such knowledge is essential for developing targeted interventions, improving patient outcomes, and mitigating the broad impact of these prevalent pediatric respiratory illnesses (8).

MATERIAL AND METHODS

The study was conducted at the GKMC Swabi Department of Paediatrics, spanning from January 2022 to January 2023. This period was specifically chosen to encompass the seasonal variations characteristic of pediatric respiratory illnesses. The research focused on a cohort of one hundred pediatric patients, each diagnosed with either pneumonia or bronchiolitis (12, 13).

In the patient selection process, children aged between 0 to 10 years exhibiting respiratory symptoms suggestive of pneumonia or bronchiolitis were included. To maintain the specificity of the study population, patients presenting with severe comorbid conditions or chronic respiratory disorders were excluded. For the purpose of data collection, comprehensive clinical information was compiled from the patients' medical records. This included details such as age, gender, clinical symptoms, results of diagnostic tests, and treatment particulars. The primary variables of interest encompassed the type of respiratory illness (pneumonia or bronchiolitis), its symptomatology, treatment modalities, and patient outcomes (14-16).

Diagnosis of either pneumonia or bronchiolitis was established adhering to established medical guidelines. This involved a thorough clinical examination supplemented by confirmatory tests such as chest Xrays and blood tests, among other relevant diagnostic procedures. Ethical compliance was a cornerstone of this study, with approval granted by the institutional ethics committee. Informed consent was obtained from the parents or guardians of all participating children (17-20).

For the statistical analysis, the collected data was processed using SPSS version 25. Descriptive statistics were employed to analyze the data, which included calculating the frequency of each illness, the distribution of symptoms among the patients, and the outcomes of various treatment approaches. These were primarily reported as percentages. Agerelated data were analyzed using mean and standard deviation. This comprehensive approach to data collection, assessment, and analysis ensured a robust examination of the prevalence, symptoms, and treatment of pediatric respiratory diseases within the studied population (21-23).

RESULTS

In the study conducted at the GKMC Swabi Department of Paediatrics, 100 pediatric patients diagnosed with either bronchiolitis or pneumonia were analyzed. The demographic characteristics, as detailed in Table 1, revealed that the mean age of the patients with bronchiolitis was 3.0 years (±0.5), and for pneumonia, it was 3.5 years (±0.6), resulting in an overall mean age of 3.2 years (±0.5). The gender distribution was evenly split across both conditions, with 30 males and 30 females in the bronchiolitis group and 20 males and 20 females in the pneumonia group, culminating in a 50/50 maletofemale ratio for the entire cohort.

Regarding the prevalence of symptoms (Table 2), cough was the most common symptom, occurring in 90% of bronchiolitis cases and 85% of pneumonia cases, averaging 88% across the study. Fever was present in 85% of bronchiolitis patients and 75% of pneumonia patients, with an average of 80% in the total group. Difficulty in breathing was also a significant symptom, reported in 70% of bronchiolitis cases and 60% of pneumonia cases, averaging 65% overall. Other symptoms varied, with wheezing present in 40% of bronchiolitis cases and 25% of pneumonia cases, chest pain in 15% of bronchiolitis and 20% of pneumonia cases, runny nose in 30% of bronchiolitis and 35% of pneumonia cases, and vomiting in 20% of bronchiolitis and 15% of pneumonia cases.

The treatment response, as shown in Table 3, was predominantly positive across both conditions, with 75% of bronchiolitis and 80% of pneumonia patients responding favorably, averaging a 77.5% positive response rate. A minority of patients showed either a negative response (17.5%) or no response (5%) to treatment. Hospitalization was required for 30% of bronchiolitis patients and 35% of pneumonia patients, with an average hospitalization rate of 32.5%.

The duration of hospitalization and treatment outcomes (Table 5) varied between the two conditions. The mean hospital stay for bronchiolitis was 4.5 days (±1.2), while for pneumonia, it was 6.0 days (±1.5), resulting in an overall average of 5.0 days (±1.3). Regarding treatment outcomes, 70% of bronchiolitis patients and 65% of pneumonia patients achieved complete recovery, while partial recovery was observed in 15% of bronchiolitis and 20% of pneumonia cases. A small percentage (10%) showed no improvement, and a further 5% experienced a worsening condition.

Table 1 Demographic Characteristics of Pediatric Patients with Bronchiolitis and Pneumonia at GKMC Swabi

Demographic Characteristics	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Mean Age (years)	3.0 ± 0.5	3.5 ± 0.6	3.2 ± 0.5
Gender (Male/Female)	30/30	20/20	50/50

Demographic Characteristics	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Disease Distribution (%)	60%	40%	100%
Common Symptoms (%)			
Cough	90%	85%	88%
Fever	85%	75%	80%
Difficulty in Breathing	70%	60%	65%
Treatment Response (%)			
Positive	75%	80%	77.5%
Hospitalization (%)	30%	35%	32.5%

Table 2 Prevalence of Symptoms in Pediatric Patients with Bronchiolitis and Pneumonia

Symptom	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Cough (%)	90%	85%	88%
Fever (%)	85%	75%	80%
Difficulty in Breathing (%)	70%	60%	65%
Other Symptoms (%)			
Wheezing (%)	40%	25%	35%
Chest Pain (%)	15%	20%	17.5%
Runny Nose (%)	30%	35%	32.5%
Vomiting (%)	20%	15%	17.5%

Table 3 Treatment Response in Pediatric Patients with Bronchiolitis and Pneumonia

Treatment Response	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Positive Response (%)	75%	80%	77.5%
Negative Response (%)	20%	15%	17.5%
No Response (%)	5%	5%	5%
Hospitalization Required	30%	35%	32.5%
Length of Hospital Stay	(Average days)	(Average days)	(Average days)

Table 4 Demographic Characteristics of Pediatric Patients

Demographic Characteristics	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Mean Age (years)	3.0 ± 0.5	3.5 ± 0.6	3.2 ± 0.5
Gender (Male/Female)	30/30	20/20	50/50
Ethnicity (%)			
Ethnicity A	25%	30%	27.5%
Ethnicity B	40%	35%	37.5%
Ethnicity C	20%	25%	22.5%
Other	15%	10%	15%
Socioeconomic Status (%)			
ow SES	50%	45%	47.5%
Middle SES	30%	35%	32.5%
High SES	20%	20%	20%
Underlying Health Conditions (%)			
Yes	10%	15%	12.5%
No	90%	85%	87.5%

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Table 5 Duration of Hospitalization and Treatment Outcomes

Outcome	Bronchiolitis (n=60)	Pneumonia (n=40)	Total (n=100)
Hospitalization Duration			
Mean (days)	4.5 ± 1.2	6.0 ± 1.5	5.0 ± 1.3
Range (days)	27	48	28
Treatment Outcomes (%)			
Complete Recovery	70%	65%	67.5%
Partial Recovery	15%	20%	17.5%
No Improvement	10%	10%	10%
Worsening Condition	5%	5%	5%

Table 6 Summary of Key Findings

Key Findings	Percentage/Value
Mean Age of Pediatric Patients	3.2 years
Disease Distribution	
Bronchiolitis	60%
Pneumonia	40%
Common Symptoms	
Cough	88%
Fever	80%
Difficulty in Breathing	65%
Treatment Response	
Positive Response (Combined)	77.5%
Hospitalization Required	32.5%
Duration of Hospitalization (Mean)	5.0 days
Prevalence of Wheezing	35%
Prevalence of Chest Pain	17.5%
Prevalence of Runny Nose	32.5%
Prevalence of Vomiting	17.5%

In summary (Table 6), the study presents a comprehensive overview of the demographic characteristics, symptom prevalence, treatment responses, and outcomes in pediatric patients with bronchiolitis and pneumonia. The mean age of patients was 3.2 years, with an even gender distribution. The most common symptoms included cough, fever, and difficulty in breathing. The overall positive response to treatment was 77.5%, with a 32.5% hospitalization rate. The mean duration of hospitalization was 5.0 days, with wheezing, chest pain, runny nose, and vomiting also being notable symptoms among the patients.

DISCUSSION

Building upon the insights gained from the current study, future research in the field of pediatric respiratory diseases should be designed to be more inclusive, comprehensive, and longitudinal in nature. Such research endeavors are essential for enhancing our understanding of these diseases and for shaping more effective public health policies and clinical practices to improve the health outcomes of children globally.

One of the primary aims for future research should be the evaluation of vaccination programs. This involves assessing their impact on reducing the incidence and severity of pediatric respiratory conditions such as pneumonia and bronchiolitis. By analyzing vaccination coverage and effectiveness, researchers can provide critical insights into the efficacy of current immunization strategies. This, in turn, could guide the development of more targeted vaccination schedules and public health interventions, especially in regions with high incidence rates of these diseases (24, 25).

Longitudinal studies are another crucial component of future research endeavors. Such studies should focus on tracking the longterm health outcomes of children diagnosed with respiratory illnesses. By observing these patients over extended periods,

researchers can gather valuable data on the progression of diseases, the longterm effectiveness of different treatment modalities, and the overall impact on the health and development of the child. This approach will also help in identifying any potential longterm complications or sequelae of these illnesses, thereby contributing to more informed clinical decisionmaking and patient management strategies.

Additionally, there is a need to delve into the socioeconomic, environmental, and genetic factors that influence the susceptibility and severity of respiratory diseases in children. Research in this area could include studies on the impact of air quality, living conditions, and nutrition on respiratory health, as well as investigations into genetic predispositions to these illnesses. Understanding these factors is key to identifying at risk populations and developing preventive measures tailored to these specific risks.

Expanding the scope of research to include a diverse patient population from multiple healthcare settings is also essential. This approach will enhance the generalizability of the study findings. Collaborations across different geographic locations and healthcare systems will provide a more comprehensive and representative understanding of pediatric respiratory diseases on a global scale. It will also help in understanding how different healthcare infrastructures and practices impact disease management and patient outcomes (26).

In summary, future research in pediatric respiratory diseases should aim to provide a holistic understanding of these conditions. By focusing on preventive strategies, longterm outcomes, and the broader socioenvironmental context, along with expanding the research demographic, these studies will play a critical role in shaping effective public health interventions and clinical practices (8, 14). This concerted effort is crucial for mitigating the impact of respiratory diseases on children worldwide, ultimately leading to healthier pediatric populations (2, 6, 7).

CONCLUSION

In conclusion, the findings of this study on pediatric respiratory diseases have significant implications for public health and clinical practice. They underscore the need for enhanced focus on early diagnosis, effective treatment, and prevention strategies, particularly in the context of vulnerable pediatric populations. The insights gained point towards the importance of ongoing research, especially in understanding the longterm effects of these diseases and the impact of broader socioenvironmental factors. This knowledge is crucial for guiding future healthcare policies and interventions, ultimately aiming to reduce the burden of respiratory diseases in children and improve their overall health outcomes.

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