

FREQUENCY OF PNEUMONIA IN CHILDREN PRESENTING WITH WHEEZE

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ABSTRACT

Objective: To find out the frequency of Pneumonia in children presenting with wheeze.

Material & Method

Study Design: Descriptive case series

Study place and & Duration: Department of pediatrics Saira Memorial Hospital Lahore from 1-January-2025 to 30-June-2025.

Data Collection: After meeting selection criteria 150 patients were enrolled. All children who presented with wheezing were included. A chest X-ray was obtained for each patient and sent to the on-duty radiologist to assess for any signs of infiltration. The respiratory rate was measured over a 60-second period in calm and awake patients. All patients were diagnosed with pneumonia based on the operational definition.

Results: In this study, the mean age of the participants was 1.92 ± 1.40 years. Among the 150 patients, 91 (60.7%) were male and 59 (39.3%) were female. The mean respiratory rate was 33.36 ± 4.11 breaths per minute, the mean heart rate was 113.93 ± 10.63 beats per minute, and the average body temperature was $100.81 \pm 1.25^\circ\text{F}$. Pneumonia was diagnosed in 104 (69.33%) of the patients who presented with wheezing.

Conclusion: The frequency of pneumonia is 69.33% in children presenting with wheeze in pediatric emergency. The frequency is quite high in the local population that needs quick management.

KEYWORDS: Pneumonia, Wheeze, Children, Respiratory Tract Infections

INTRODUCTION

Children frequently experience acute wheezing episodes, especially preschoolers (5 years of age or less)¹. A continuous melodic whistling sound produced by chest auscultation during expiration is known as wheezing². Increased, turbulent airflow via blocked intrathoracic airways is the source of the sound. Any space-occupying lesion, edema, or bronchospasm might result in intrathoracic blockage^{3, 4}. Children who have a viral respiratory infection frequently have fever with wheeze, a common pediatric emergency⁵. About 1 to 2% of afflicted newborns require hospitalization for respiratory distress, despite one-third, or 3.33 percent, of children experiencing at least one wheezing episode during their childhood⁶.

Over 2 million children under the age of five die from childhood pneumonias each year, making them a significant source of illness and mortality.⁶ According to estimates from the World Health Organization (WHO), 156 million children under the age of five have pneumonia annually, with up to 20 million of those cases being severe enough to necessitate hospitalization⁷. According to estimates, the yearly incidence of pneumonia in the industrialized world is 14.5 per 10,000 for children aged 0 to 16 and 33 per 10,000 for children under five⁸.

According to the current acute respiratory infection case management recommendations, children who have wheezing are likely to be classified as having pneumonia or severe pneumonia because they may have quick breathing or lower chest indrawing⁹. Infection of the lower respiratory tract under the larynx by microorganisms by inhalation, aspiration, invasion of the respiratory epithelium, or hematogenous dissemination is known as pneumonia. Among the defenses against infection include humoral and cellular immunity as well as anatomical features such as cilia, turbinates, epiglottis, and nose hairs. Once these barriers are broken, infection—either by nasopharyngeal colonization (mainly bacterial) or fomite/droplet transmission (usually viral)—causes inflammation and damages or kills the alveoli and

surrounding epithelium. Eventually, this is followed by the migration of inflammatory cells to the infection site, which results in an exudative process that reduces oxygenation. The most frequent cause is viral etiology, and the microorganism is not recognized in most instances^{10, 11}.

This study is designed to see frequency pneumonia in patients with wheeze as pneumonia becomes severe; Among the many difficulties that children may encounter include lower chest wall indrawing, unconsciousness, hypothermia, convulsions, and the inability of very sick newborns to feed or drink. The reported prevalence of pneumonia in individuals with wheeze varies greatly, according to worldwide statistics, and no local study has been published as of yet. So we will evaluate all the children presenting with wheeze to find frequency of pneumonia according to WHO classification, so we can start treatment for pneumonia along with wheeze on prior bases to save the children from different morbidities (unconsciousness, hypothermia and convulsions, etc) and from mortality as they are on higher risk. So, the objective of this study was to find out the frequency of Pneumonia in children presenting with wheeze.

MATERIAL & METHODS

“After obtaining approval from ethical review committee, this descriptive case series was carried out in the department of pediatrics Saira Memorial Hospital Lahore from 1-January-2025 to 30-June-2025. In this study Pneumonia was labeled positive or yes when including inflammation of the parenchyma of the lung (that is, the alveoli) and abnormal alveolar filling with fluid (consolidation and exudation) on chest x-rays. The sample size of this study was 150 patients, using expected frequency of pneumonia in wheeze as 4.9%⁹ with 95% confidence level and 3.5% level of precision.

Inclusion: All children presented with wheeze, having age from 2 months to five years with either gender were fall in inclusion criteria.

Exclusion: Children with known cardiac disease, chronic pulmonary disease and strider, complicating acute non-pulmonary or chronic illness were fall in exclusion criteria. All the patients were enrolled in this study by applying non-probability purposive sampling technique.

After taking their basic information regarding their names, age, gender and then their clinical history was noted. The chest x-ray was obtained to all patients and then x-ray was sent to the radiologist on duty to find out any infiltration. The respiratory rate was counted in 60 seconds in calm and awake patients. All patients were labeled as pneumonia as per operational definition. All data was collected by the researcher herself on the attached proforma.

All the collected data was entered and analyzed using SPSS version 20. Frequency and percentages were calculated for gender and pneumonia. Mean $\pm$ S.D was calculated for age. Stratification with respect to age and gender was done to see the effect of this outcome variable. Post stratification Chi-Square test was applied for age group, and gender vs. pneumonia. $p \leq 0.5$ was taken as significant.

RESULTS

This study enrolled a total of 150 patients presenting with wheezing. The mean age of the participants was 1.92 ± 1.40 years, with the youngest and oldest patients being 0.16 and 5 years old, respectively. Of the 150 patients, 91 (60.7%) were male, and 59 (39.3%) were female, resulting in a male-to-female ratio of 1.5:1. The duration of wheezing varied among patients: 60% (n=90) experienced wheezing for 1–3 days, while 40% (n=60) had symptoms lasting 4–7 days. Regarding clinical symptoms, lower chest in drawing was observed in 26.7% (n=40) of patients, nasal flaring in 20.7% (n=31), cyanosis in 4.7% (n=7), and convulsions in 2.7% (n=4). Additionally, 22% (n=33) of patients were unable to drink, and grunting was noted in 16.7% (n=25). The mean respiratory rate was 33.36 ± 4.11 breaths per minute, the mean heart rate was 113.93 ± 10.63 beats per minute, and the mean body temperature was $100.81 \pm 1.25^\circ\text{F}$. (**Table-I**)”

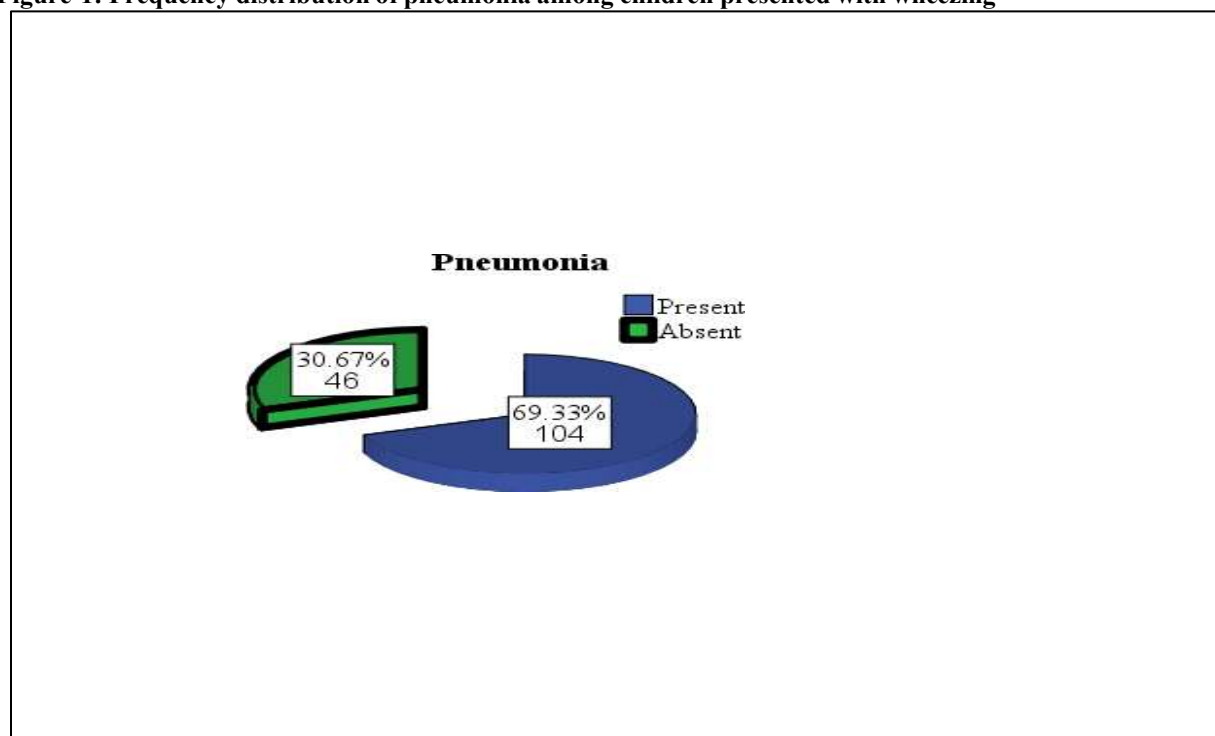
Table-I: Descriptive statistics of demographic variables and symptoms of the patients;

		Frequency	Percent
Age (years)		1.92 $\pm$ 1.40 (0.16-5.0)	
Gender	Male	91	60.7
	Female	59	39.3
Duration of wheezing (Days)	1-3	90	60.0
	4-7	60	40.0

Lower chest in drawing	Yes	40	26.7
	No	110	73.3
Nasal Flaring	Yes	31	20.7
	No	119	79.3
Cynosis	Yes	7	4.7
	No	143	95.3
Convulsion	Yes	4	2.7
	No	146	97.3
Inability to drink	Yes	33	22.0
	No	117	78.0
Grunting	Yes	25	16.7
	No	125	83.3
Respiratory rate		33.36±4.11 (25-40)	
Heart Rate		113.93±10.63 (100-140)	
Temperature		100.81±1.25 (99-103)	

Among the 150 patients with wheezing, pneumonia was observed in 104 cases (69.33%). (Figure-1)

Figure-1: Frequency distribution of pneumonia among children presented with wheezing



The frequency of pneumonia significantly increased with age: 54.2% (26/48) in infants under 1 year, 73.1% (57/78) in children aged 1–3 years, and 87.5% (21/24) in those over 3 years (p-value = 0.009). Additionally, pneumonia was more common in males (83.5%, 76/91) than females (47.5%, 28/59) (p-value < 0.001). (**Table-II**)

Table-II: Comparison of pneumonia among children presented with wheezing between age groups and gender

		Pneumonia		Total	p-value
		Present	Absent		
Age Groups	< 1	26	22	48	0.009
		54.2%	45.8%	100.0%	
	1-3	57	21	78	
		73.1%	26.9%	100.0%	
	>3	21	3	24	
		87.5%	12.5%	100.0%	
Gender	Male	76	15	91	<0.001
		83.5%	16.5%	100.0%	
	Female	28	31	59	
		47.5%	52.5%	100.0%	

DISCUSSION

In this study among 150 patients with wheezing, pneumonia was observed in 104 cases (69.33%). In our study male dominance was observed. In underdeveloped nations, acute respiratory infections are a leading cause of illness and death among children. Acute respiratory illnesses are thought to claim the lives of 3.9 million children each year, the majority of whom reside in underdeveloped nations. In severe circumstances, wheezing is linked to pneumonia¹². Young children frequently appear with wheeze. At least 40% of children under the age of six experience at least one wheezing episode, and 20% of newborns wheeze throughout infancy. According to the study conducted by Iqra et al., (2025) upper respiratory tract infections (URTIs), which include common colds, pharyngitis, sinusitis, and laryngitis, are among the most widespread infectious conditions affecting both children and adults globally¹³. A lower respiratory tract infection known as pneumonia is usually accompanied by fever, respiratory symptoms, and physical examination or chest x-ray indications of parenchymal involvement^{14, 15}.

A study reported that children with wheezing has frequency of pneumonia 4.9%¹⁶. According to a different study, wheezing is linked to up to 75% of children who have "pneumonia" or "severe pneumonia," as defined by the WHO⁹. According to Pandwar U's research, 767 (27%) of the 2,847 youngsters who were hospitalized with a diagnosis of pneumonia also had wheezing. The majority of children with wheezing pneumonia are between the ages of two and twelve months. Children who are male are more impacted than those who are female. Wheezing is linked to pneumonia in a considerable proportion of children, particularly those between the ages of 2 and 12 months. It is also prevalent in kids between the ages of one and five. Consequently, one of the main causes of morbidity in children is pneumonia. When pneumonia is linked to wheezing, morbidity may rise much more¹⁷.

One study by Sonal N. Shah et al resulted that fifteen percent of children with wheeze undergoing CXR had pneumonia. Findings associated with radiographic pneumonia included temperature $\geq 38.4^{\circ}\text{C}$ (positive likelihood ratio [LR+] 2.1, 95% CI 1.2–3.6, specificity 85%), oxygen saturation $< 92\%$ (LR+ 3.6, 95% CI 1.4–8.9, specificity 89%), and grunting (LR+ 2.7, 95% CI 1.6–4.4, pooled specificity 91%). Factors associated with the absence of radiographic pneumonia included lack of fever (negative likelihood ratio [LR–] 0.67, 95% CI 0.52–0.85) and oxygen saturation $\geq 95\%$ (LR– 0.64, 95% CI 0.42–0.98). Tachypnea and auscultatory findings were not associated with radiographic pneumonia¹⁸.

In the industrialized world, pneumonia has a better prognosis and fewer fatalities, but the illness burden remains high, with around 2.5 million cases each year. Between one-third and one-half of these instances result in hospitalization. The risk of pneumonia in the US has considerably decreased since the pneumococcal vaccination was introduced¹⁹. With the exception of low birthweight, which remains a persistent issue, the prevalence of the majority of important risk factors for pneumonia, such as non-exclusive breastfeeding, crowding, malnutrition, indoor air pollution, and pediatric HIV infection, declined across all low- and middle-income regions. This report's overall estimates give guidance for future worldwide coordinated action and are marginally higher than, but generally consistent with, those of the 2016 Global Burden of Disease research²⁰.

The author Shahzad Ahmed et al. found that the most common risk factors for pneumonia in children aged 2 to 59 months were inadequate breastfeeding, inappropriate immunization, malnutrition, and upper respiratory tract infections in the mother, which accounted for 77.7%, 73.9%, 64.3%, and 15.3% of cases, respectively. The prevalence and duration of pneumonia in children can be significantly increased by improper vaccinations, malnourishment, upper respiratory tract infections in the mother, and non-breathing or absence of nursing during the newborn period.²¹

Since our study's results contradicted those of a few previously published studies, it is recommended that future research be conducted with a bigger sample size and data collected from a multicenter setting in order to confirm our findings. As the sample size of our study was small, the results of this study cannot be inferred to the whole population.

CONCLUSION

The frequency of pneumonia is 69.33% in children presenting with wheeze in the pediatric department. The frequency is quite high in the local population that needs quick management.

CONFLICT OF INTEREST

None.

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