

Prevalence of Pneumonia Associated with Measles among Infants and Children Hospitalized in Healthcare setups of Pakistan

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ABSTRACT

Background: Pneumonia in children is the primary cause of morbidity in developing countries and one of the risk factor for Pneumonia is measles.

Objective: The aim of this study was to find out the Prevalence of pneumonia associated with measles among infants and children hospitalized in Pakistan.

Materials and method: The contemporary cross-sectional study was carried out at the pediatric department of Sifwat Ghayour Shaheed Memorial Hospital, Peshawar and HBS General Hospital, Islamabad from November 2022 to April, 2023, after taking the permission from the ethical boards of the institutes. A total of 154 individuals, infants and children of less than 5 years of both genders hospitalized and diagnosed with measles were enrolled in this study. After obtaining informed written consent, the patients' comprehensive demographic information was documented. Detailed demographic information about the patients, including height and weight, was recorded following the authorities' informed written consent. The prevalence of pneumonia and its symptoms in each patient were evaluated. The SPSS 22.0 version was used to analyze the data. Frequencies and percentages were used to evaluate categorical variables.

Results: A total of 154 individuals were enrolled in this study out of which 62(40.2%) were infants and 92 (59.7%) were children. 32 (20.7%) individuals had a high socioeconomic position, 50 (32.4%) had an average socioeconomic status, and 72 (46.75%) had a poor socioeconomic status. 87 56.4% participants resided in a rural area. On the basis of severity 36 (23.3%) of the patients had mild measles, 46 (20.8%) had moderate measles, and 72 (46.7%) had severe measles. Pneumonia was found to be prevalent in 97 (65%) participants. 42 individuals (27.3%) had received a measles vaccine.

Conclusion: In this study, we came to the conclusion that children with measles had a noticeably high rate of pneumonia(65%).

Keywords: Children; Measle; Pneumonia.

INTRODUCTION

The diseases that are most common in the world are acute respiratory (ARIs) which is caused by pneumonia. Pneumonia in children below five years old is the primary cause of morbidity in developing nations.¹ Acute lower respiratory tract infections (ALRTI) account for around 31% of deaths in children under the age of five worldwide, affecting four million of them.² Deaths from lower respiratory tract infections include half a million cases of measles and a quarter (¼) of a million cases of pertussis and prenatal causes, respectively. Since the mortality rate from pneumonia is 10–50 times higher in destitute countries, a significant improvement is acceptable. Initiating the cessation of pneumonia is a reasonable approach to the issue of high mortality with ARI.³ Though, epidemiological data on the risk elements for ARI in emerging nations are limited.² In many undeveloped countries, exposure to both indoor and outdoor air pollutants has been associated to an increased risk of acute lower respiratory tract infections.⁴⁻⁵ Approximately half (½) of the world's population relies on coal, firewood, and biomass fuel, all of which contribute to air pollution; China and India utilize 80% of the world's wood.⁵ In developing countries, the death ratio has decreased by 42% as a result of healthcare providers treating acute lower respiratory tract infections.⁶⁻⁷ Due to barriers and bias, sensitivity assessments of vaccination efficacy have decreased, raising the risk of spreading infection despite the efficacy and effectiveness of vaccines internationally.⁸ Following a measles epidemic in Pakistan's Northern Village, a vaccination campaign was started.⁹⁻¹⁰ Developing nations have measles outbreaks even if there is a safe and effective vaccination available.¹¹ According to severity, pneumonia can be classified in to chronic and acute form. When there is exudate formation in the alveoli and fibrin is constantly present in large quantities is considered acute. While in the case of chronic pneumonia there is interstitial bronchitis with notable

alterations in the interstitial tissue and no exudate in the alveoli. This kind was more likely to result in emphysema and lung suppuration. Hemolytic Streptococcus is the causative agent causing pneumonia.¹² 15% of all pediatric infections are caused by pneumonia, with 2% of those infections occurring in neonates.¹³ The incidence of pneumonia is associated with a number of risk factors including overcrowding, air pollution, Using charcoal for cooking, Co-occurring conditions like viral infections, its nutritional health, and exclusive breastfeeding.¹⁴ Treatment for measles and measles-associated pneumonia in hospitalized patients is dependent on the severity and complications of the patient's disease. To control and lessen the severity of pneumonia and measles complications, supportive care is mostly needed.¹⁵ Therefore this study was carried out to find out the Prevalence of pneumonia associated with measles among infants and children hospitalized at hospitals of Pakistan.

MATERIALS AND METHOD

The contemporary cross-sectional study was carried out at the pediatric department of Sifwat Ghayour Shaheed Memorial Hospital, Peshawar and HBS General Hospital, Islamabad from November 2022 to April, 2023, after taking the permission from the ethical boards of the institutes. A total of 154 individuals, infants and children of less than 5 years of both genders hospitalized and diagnosed with measles were enrolled in this study. While children other than measles, older than five years and with additional medical conditions were excluded. Data from patients was gathered using realistic non-probabilistic sampling methods. After obtaining informed written consent, the patients' comprehensive demographic information was documented. Detailed demographic information about the patients, including height and weight, was recorded following the authorities' informed written consent. The prevalence of pneumonia and its symptoms in each patient were evaluated. The SPSS 22.0 version was used to analyze the data. Frequencies and percentages were used to evaluate categorical variables.

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RESULTS

A total of 154 individuals were enrolled in this study out of which 102(66.2%) were males and 52(33.7%) were females. 62(40.2%) were infants and 92 (59.7%) were children. A total of 72 individuals (46.75%) were born weighing more than three kilograms. 32 (20.7%) individuals had a high socioeconomic position, 50 (32.4%) had an average socioeconomic status, and 72 (46.75%) had a poor socioeconomic status. 87 56.4% participants resided in a rural area as shown in **Table 1**. On the basis of severity 36 (23.3%) of the patients had mild measles, 46 (20.8%) had moderate measles, and 72 (46.7%) had severe measles as presented in **figure 1**. Pneumonia was found to be prevalent in 97 (65%) participants. 42 individuals (27.3%) had received a measles vaccine.(**Table 2**).

Table 1: Demographic features of the study population N= 154

Features	N (%)
Infants	62(40.2%)
Children	92 (59.7%)
Sex	
Female	52(33.7%)
Male	102(66.2%)
Weight at birth greater than 3kg	
No	82(53.2%)
Yes	72(46.75%)
Socio economic status	
High	32(20.7%)
Middle	50(32.4%)
Poor	72(46.75%)
Residency	
Urban	67(43.50%)
Rural	87(56.4%)

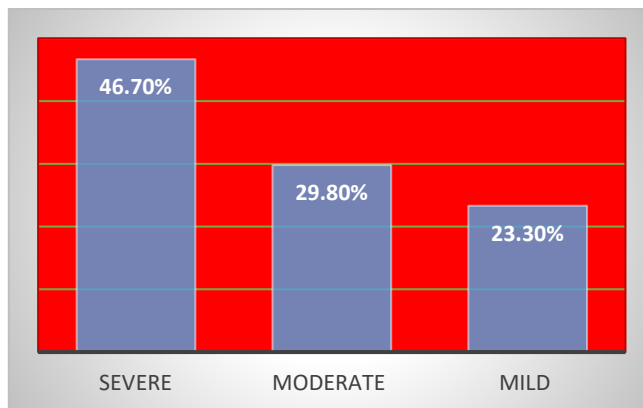


Figure 1: Relationship between measles severity

Table 2: Pneumonia prevalence and vaccination status of the participants

Features	Frequency (percentage)
Pneumonia	
No	57 (35%)
Yes	97(65%)
Immunization	
No	112(72.7%)
Yes	42 (27.3%)

DISCUSSION

Measles-related lung infections carried a statistically significant risk of mortality. Mongolian study found that measles may represent a "second punch" for neonates with acute respiratory illnesses like influenza and for children who have already been sick.¹⁵In both cases and controls, neurologic sequelae including encephalitis and seizures also served as predictors of the severity of the disease. About 0.1% of measles cases are affected by this unusual results.¹⁶ Post infectious myelitis or encephalitis (PIE), which develops after a measles infection and frequently develops two

weeks after the rash, is thought to be mainly caused by an inflammatory process.¹⁶ A total of 154 individuals were enrolled in this study out of which 102(66.2%) were males and 52(33.7%) were females. 62(40.2%) were infants and 92 (59.7%) were children. Our results were similar to those of the former research.¹⁷ A total of 72 individuals (46.75%) were born weighing more than three kilograms. 32 (20.7%) individuals had a high socioeconomic position, 50 (32.4%) had an average socioeconomic status, and 72 (46.75%) had a poor socioeconomic status. Other writers also reported similar findings.¹⁸⁻¹⁹ On the basis of severity we found that 36 (23.3%) of the patients had mild measles, 46 (20.8%) had moderate measles, and 72 (46.7%) had severe measles. These findings are similar with the previous study.²⁰ Pneumonia was found to be prevalent in 97 (65%) participants in the present research. According to a Peshawar study, the most prevalent consequence among participants was pneumonia, which accounted for 68% of cases.²¹ A Swedish research found that pneumonia affected 75% of infants less than one year. Males are 40 percent more likely than females to have pneumonia.²² we determined that 42 individuals (27.3%) had received a measles vaccine. The WHO advises administering vitamin A once day for two consecutive days to children who have measles (50,000 international units (IU) for babies under six months, 100,000 IU for children between six and eleven months, & 200,000 IU for children older than one year).²³ Vitamin A deficiency may be associated with higher morbidity and lower measles-specific antibody levels. When a malnourished child has measles, vitamin A deficiency can lead to a shortage of hepato vitamin A stores.²⁴ To stop the transmission of the nosocomial measles virus, infection prevention and control measures should be implemented in all hospitals. Health care personnel should adhere to standard and airborne measures, and individuals with suspected or confirmed measles should be immediately identified and separated²⁵ since there is a safe and efficient vaccine to prevent measles, its deaths are "preventable tragedies which could have been prevented via vaccination."²⁶The prevalence of pneumonia is higher in this research than in previous ones. The most probable cause for the issue might be a high immunization rate. Despite the fact that 60% of children have severe pneumonitis, under nutrition is still a risk factor for mortality from the illness.²⁷

CONCLUSION

In this study, we came to the conclusion that children with measles had a noticeably high rate of pneumonia. The reason for this was that participants with lower socioeconomic level had less vaccinations. It may be managed by educating parents about vaccinations for their children.

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