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Original Research Article

Frequency and pattern of respiratory diseases in children

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ABSTRACT

Background: Respiratory tract infections are a major cause of morbidity and mortality in children. Therefore, it is imperative that research studies be conducted to determine the pattern of respiratory diseases in the pediatric age group. Present study was done to determine the outcome, frequency and pattern of respiratory infections in children admitted in a tertiary care hospital.
Methods: This prospective, cross-sectional study was conducted from September 2014 to February 2016. Data was analyzed on SPSS 20.0. P value of <0.05 was observed noteworthy.
Results: A total of 286 children were admitted with respiratory diseases. Out of these there were 180 cases of Pneumonia. Peak occurrence of Pneumonia was observed in first trimester of the year.
Conclusions: Efforts are required to devise strategies to decrease the burden of respiratory diseases in children.

Keywords: Children, Pattern, Respiratory diseases

INTRODUCTION

Respiratory diseases are a common cause of morbidity and mortality in the pediatric age group particularly in children younger than five years.[1-3] Each year approximately 10.6 million children younger than five years of age die due to acute respiratory infection (ARI). According to World Health Organization (WHO) 19% of the total number of these deaths are due to Pneumonia.[4] A study from Malawi observed that out of a 1000 admission in the pediatric age group, 298 cases were due to respiratory diseases in children.[5]

In the developing parts of the world Pneumonia is considered to be a major contributor to childhood respiratory disease burden.[2,5,6] However, only a few published research studies are available on the collective pattern of respiratory tract infections in children as most of them are on specific respiratory diseases and there is especially a dearth of local data in this regard.[7,8]

Research studies to estimate the burden of various categories of respiratory illnesses are needed for proper resource utilization. This will help in evolving interventional strategies at the institutional and national level.

Continuous research studies need to be conducted in order to provide latest statistics on respiratory tract infections to prevent and control these illnesses in children.[9]

This research study was done to determine the outcome and pattern of respiratory infections among children presenting to the Pediatric Department of Ziauddin University hospital. This study will help to design other research studies on the epidemiology and pattern of pediatric respiratory diseases in the developing part of the world where the bulk of hospital admissions are due to infectious diseases. Therefore, it will contribute towards

evolving interventional strategies to lower the burden of respiratory diseases in the pediatric age group.

METHODS

This prospective, cross -sectional study was done using information regarding the type of respiratory illness, demographic details, length of hospital stay, vaccination status and outcome of children with respiratory illnesses admitted to the Ziauddin University Hospital of Karachi.

Information was collected for a period of 18 months from September 2014 till February 2016.

286 patients admitted to the Pediatrics Department of Ziauddin Hospital with respiratory signs and symptoms were included. Non-probability purposive convenience sampling technique was used.

Inclusion criteria

Included all children aged 3months to 12 years admitted to the pediatric intensive care unit, emergency and ward.

Exclusion criteria

Children with congenital anomalies and co-morbid conditions e.g. congenital heart disease were excluded.

Keeping in view the inclusion criteria, relevant information was obtained and compiled after thorough review of history and physical examination by the clinician and the diagnosis based on the clinical signs, symptoms and radiological reports. Parameters considered included the month of presentation, age, gender, types of respiratory disease, length of stay, the month of presentation, vaccination status and weight of the child.

Statistical analysis

Data was collected using case notes. As the respiratory illnesses affect mostly children less than five year old, so further categorization of age was done from 0-6month, 6-12months, 1-5 years and 5 to 12 years. Data was analyzed using SPSS version 20. The results were expressed as percentages and frequencies for qualitative data and mean and standard deviation for quantitative analysis. Chi-square test was applied for categorical variables, responses between groups were considered statistically significant at p-value <0.05.

RESULTS

A total of 286 patients with respiratory illnesses were admitted to the Paediatric Unit. Out of these 61.1% males and 38.9% females suffered from Pneumonia (shown in Table 1).

Table 1: Relationship between gender and diagnosis.

Gender	Pneumonia	Hyper reactive airway disease	Upper respiratory tract infection	Pulmonary tuberculosis
Male	61.1%	54.5%	62.5%	100.0%
Female	38.9%	45.5%	37.5%	0.0%

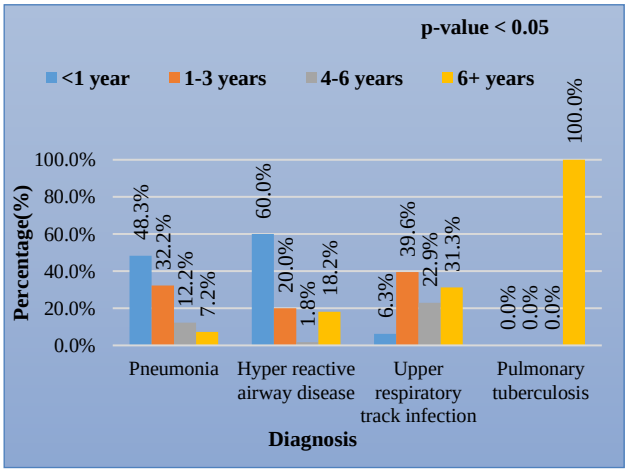

Figure 1: Relationship between age of children and diagnosis.

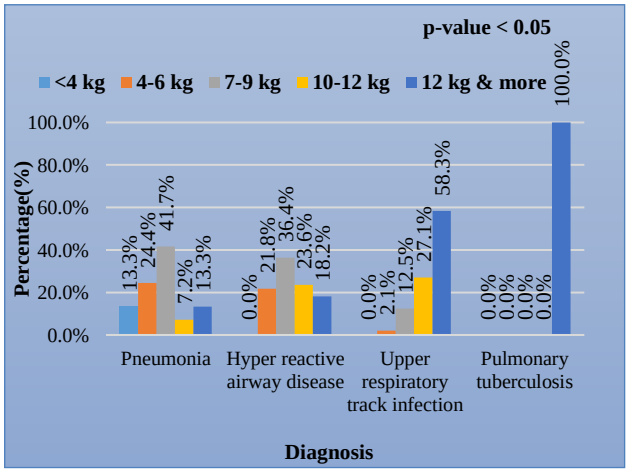

Figure 2: Relationship between weight of children and diagnosis.

Pneumonia and hyper reactive airway disease was predominantly seen in children ≤ 3year old as shown in Figure 1 (p-value<0.05). Figure 2 shows a significant relationship between the nutritional status of children and frequency of respiratory infections (p-value <0.05). Pneumonia and Pulmonary Tuberculosis were mainly seen in unimmunized children (shown in Table 2).

Table 2: Relationship between status of completion of immunization and diagnosis.

Immunization status	Pneumonia	Hyper reactive airway	Upper respiratory tract	Pulmonary tuberculosis
Not done	78.9%	25.5%	43.8%	100.0%
Incomplete	21.1%	1.8%	0.0%	0.0%
Complete	0.0%	72.7%	56.3%	0.0%

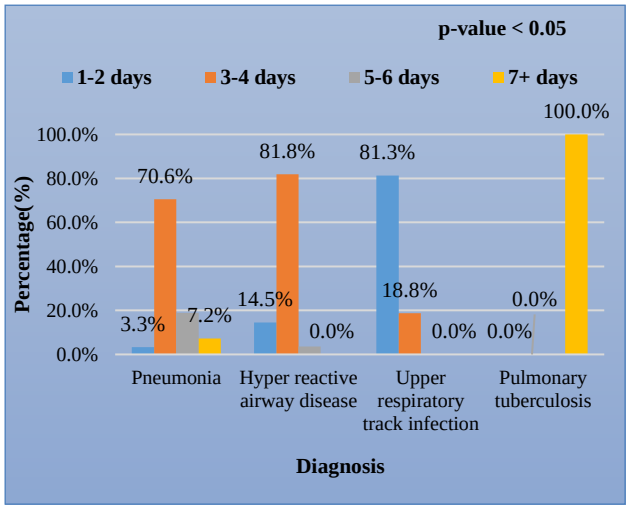

Figure 3: Relationship between length of hospital stay and diagnosis.

Figure 3 shows the maximum length of stay to be 3-4 days for Pneumonia and hyper reactive airway disease whereas >7 days of hospital stay was observed due to Pulmonary Tuberculosis.

Table 3 shows Pneumonia to be predominantly present in the first trimester of the year whereas hyper reactive airway disease and upper respiratory infection were more common in the third trimester.

DISCUSSION

Pneumonia is a life-threatening disease commonly affecting children less than 12 year of age. Every child on an average has five episodes of acute respiratory infections per year, accounting for 30-50% of the total number of outpatient visits and 20-30% of the paediatric admissions in developing countries.[3]

According to a population-based study from Pakistan, one in five children under two years of age suffer from Acute Respiratory tract Infection.[8] In India, more than 4 lac deaths per year occur due to Pneumonia accounting for 13%-16% of all expiries in the paediatric hospital admissions.[9]

Table 3: Relationship between trimester of the year and diagnosis.

Trimester	Pneumonia	Hyper reactive airway disease	Upper respiratory tract infection	Pulmonary tuberculosis
1st trimester	43.3%	30.9%	31.3%	0.0%
2nd trimester	16.7%	12.7%	6.3%	33.3%
3rd trimester	16.7%	34.5%	37.5%	66.7%
4th trimester	23.3%	21.8%	25.0%	0.0%

The prevalence of Pneumonia and other respiratory illnesses among children are influenced by many factors. In this study age was found to be the most powerful risk factor for upper and lower respiratory tract infections. The highest risk observed was among children >1year to 60 months of age. Age has also been considered as a significant causative factor for admissions due to respiratory illnesses in other studies as well. Chang et al in Australia reported a median age of 1.8 years, which is quite similar to the results of our study.[10]

In Netherlands, Uijen et al and Ugwu and co-workers in Niger-Delta region of Nigeria both showed respiratory diseases to be predominantly present in male children and in those younger than five year of age.[5,11] Present results revealed a similar pattern. This is because children have

less compliant lungs and less mature immune system so, making them more vulnerable to airway diseases and other infections and thus increasing the morbidity and mortality.[12] The predominance of males might be because of being more vulnerable to infections secondly, in developing countries like our, the society pays more attention to the health of male children and seek early medical help for their survival.

In present study, the greatest number of admissions (62.9%) were due to Bronchopneumonia. Similarly, in a study from Nigeria, the commonest cause of respiratory illness amongst children was found to be Bronchopneumonia, accounting for 71.6% of admissions due to respiratory diseases.[13]

Left side lobar pneumonia was less prevalent than the right-sided one, possibly because of the anatomical position of the right bronchus which supports the passage of infectious organisms.

In present study, no mortality due to pneumonia was observed. However, in a study from Nigeria by Ezeonu et al a mortality of 7.5% (18/239) was noted amongst children 1-5 years mostly admitted due to Bronchopneumonia.[13] In this study as well, the highest morbidity was mainly due to Bronchopneumonia amongst children aged >1 and 5 years old.

It was interesting to find that in most of the cases chest X-ray was performed. A local study by Nizami et al however, observed that chest X- ray has little value in the diagnosis of respiratory infections in children.[14] Therefore, a chest X- ray is not a mandatory requirement for treating respiratory illnesses. Though its use is not discouraged but a sharp clinical acumen and judgment is required where such investigations may not be affordable or easily accessible. We observed in our study that the mean duration of hospital stays in children admitted due to respiratory illnesses was 3-4 days. This is comparable to a study from Bangladesh by Naheed et al where the mean duration of hospital stay was also 3-4 days.[15]

The peak time of respiratory illnesses was observed to be between January and March, and then again between July and September. Also, in a study by Walke et al the peak occurrence of illnesses of respiratory tract in children was observed in the month of February and to a lesser degree in November.[16] This implies that caregivers should adopt preventive strategies during these seasons by getting their children vaccinated.[17] Therefore, information gained from research studies about the frequency, mode of presentation, seasonal trends and response to treatment of respiratory infections in children helps to guide utilization of hospital resources especially in resource limited countries in order to reduce the morbidity and mortality from these diseases.

Pneumonia, Upper respiratory infections and Pulmonary Tuberculosis are common in unvaccinated children. It was noted in present study that Pneumonia was not present in fully immunized children. Therefore, improving the vaccination status of children will contribute towards decreasing the load of severe respiratory infections.

Limitations

Although a hospital-based study provides necessary information about diseases in the general population, it does not exactly represent the assessment of the disease state and mortality in the out of hospital setting. Therefore, it lacks the exact representation of the subjects being studied. Therefore, being a cross–sectional study, the results of this study cannot be generalized. However, the objective of the study will still serve as the foundation for further studies in this regard. However, the data on the outcome of pediatric respiratory diseases may be biased as it is affected by lack of data on the comorbidities associated with the respiratory illnesses.

CONCLUSION

Respiratory tract illnesses are a major cause of morbidity and mortality in children especially in developing countries like ours. They contribute significantly to the disease burden therefore, preventive strategies and utilization of hospital resources for early and intensive management of these diseases are imperative. The results of this study will contribute towards evolving interventional strategies to combat these illnesses in the paediatric age group.

Keeping in view the dearth of local data in this regard, the need for further research studies on paediatric respiratory diseases cannot be underestimated.

Recommendations

The increase in awareness regarding vaccination plays a very important role in decreasing the morbidity and mortality among children from respiratory infections. Also, campaigns regarding good hygiene practices should be arranged. High-risk children should not attend childcare centers during RSV season and exposure to tobacco smoke should be eliminated. Haemophilus Influenza B and pneumococcal vaccines should be administered to children. Furthermore, influenza vaccine should be given before the start of winter season. So, the mainstay of treatment is parental education, immunization strategies and chemoprophylaxis for a patient with recurrent respiratory tract infection. Comprehensive studies on paediatric respiratory diseases should be undertaken in the population in order to find the prevalence of these common illnesses and to plan and implement timely interventions.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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