

Burden of respiratory disease on hospital admission of children: Experience from a tertiary care centre

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Abstract

Introduction: Respiratory disease is a common cause of hospital admission in children.

Objectives: To assess the burden of respiratory diseases on hospital admissions of children under 14 years at Teaching Hospital Jaffna (THJ), Sri Lanka

Method: A prospective cross-sectional study was carried out at the Professorial Unit of THJ, Sri Lanka. All the children diagnosed with the respiratory disease were recruited into the study. Data were collected from 1st January to 31st December 2017 by interviewer-administered questionnaire. The data were analysed using SPSS version 20.0. Results were expressed as percentages and frequencies for qualitative data and mean and standard deviation for quantitative data.

Results: Out of a total of 4127 admissions 1286 (31%) children were admitted with respiratory illness. There was male predominance (55.7%). Mean age of the study population was 42 ± 39 months. Infectious diseases contributed to 92% of hospital admissions. During the previous six-month period 79.6% had no respiratory illness, and 80% had no hospital admission. The mean distance from home to the hospital was 2.3 ± 1.5km. During the ward stay oxygen was needed in 9.5% of children. Mean duration of hospital stay was 3.73 ± 2.03 days. Seasonal variations were seen with a peak incidence in March.

Conclusions: Respiratory illness contributes to a significant burden on hospital admission of children.

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(Key words: Respiratory illness, Hospital admission, Burden)

Introduction

Respiratory diseases are common causes of hospital admission in children in Sri Lanka as well as worldwide. In Sri Lanka, in 2017, respiratory illness accounted for 233,154 hospital admissions in children below the age of 16 years, of which pneumonia was responsible for 9484 hospital admissions¹. Pneumonia is a leading cause of death in under-5-year-old children². Globally, pneumonia contributes to 15.6% of mortality in under-5-year-old children³. Under-5 mortality in Sri Lanka was 8.8 in 2017 and pneumonia contributed to 16% of deaths of under-5-year-old children⁴. Acute lower respiratory tract infections not only cause immediate problems to children but also predispose them to chronic respiratory disease later on in life⁵. Globally, death rates from asthma in children range from 0.0 to 0.7 per 100, 000⁶. In Sri Lanka, a study done in the Western Province showed that 20.4% of teenagers were diagnosed with bronchial asthma and wheezing⁷. Another study done in the Colombo Municipal Council area in children aged 3-5 years showed an 'ever' wheezing prevalence of 38% and a 'current' wheezing prevalence of 21.3%⁸.

Objectives

This study was carried out to assess the burden of respiratory diseases on hospital admission of children under 14 years, to evaluate the spectrum of the diseases needing hospital admission and their seasonal variation and to evaluate the management and the outcomes of respiratory diseases.

Method

This prospective cross-sectional study was carried out in the Professorial Paediatric Unit of the Teaching Hospital Jaffna (THJ). All the children who were primarily diagnosed with respiratory disease by the caring consultant were recruited into the study. Data were collected from 1st January 2017 to 31st December 2017. The data were collected by an interviewer-administered questionnaire by data collectors. Information regarding demographic details, duration of hospital stay, number of respiratory illnesses in the past 6 months and the outcome of the children, were collected.

Ethical issues: Study approval was obtained from Ethical Review Committee of the Faculty of Medicine, University of Jaffna (No. J/ERC/16/74/NDR/0153). Written informed consent was obtained from the parents of the children involved in the study.

Statistical analysis: The data were analysed using SPSS version 20.0. The results were expressed as percentages and frequencies for qualitative data and mean and standard deviation for quantitative data.

Results

During the calendar year 2017 (January 1st to 31st December 2017) a total of 4127 children were admitted to the professorial paediatric ward. Of this, 1286 children were diagnosed with respiratory illness which contributed to 31.1% of hospital admissions. Among the study population, 706 (55.7%) were males and 516 (44.3%) were females. Figure 1 demonstrates the age distribution of the study population.

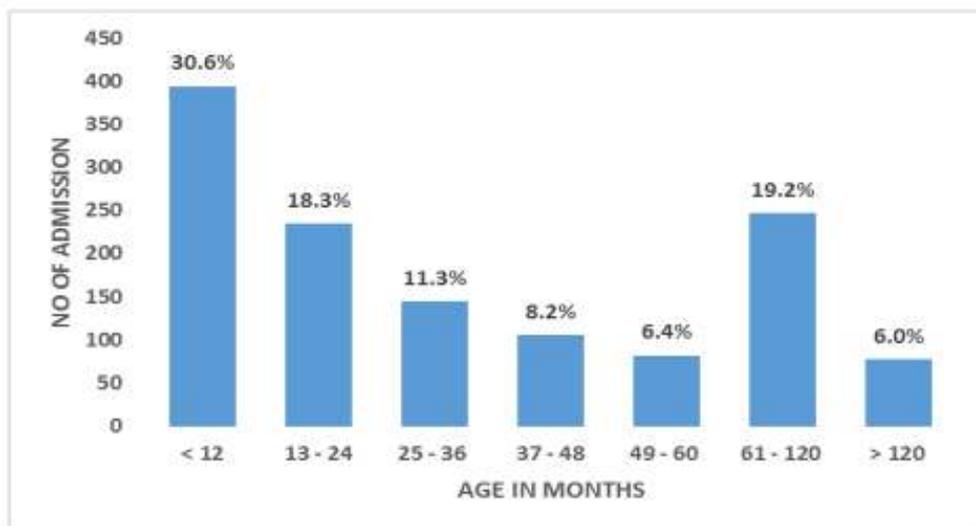


Figure 1: Age distribution of the study population

The mean age of the study population was 42 months with a standard deviation of 39 months. There were 394 (30.6%) infants. The frequency of respiratory illness progressively decreased as the child grew older.

Most (90%) of our study populations were born at term, 9% were born between the gestational ages of 32 and 36 weeks and only 1% were born below the gestational age of 32weeks. Figure 2 shows the distribution of primary diagnoses of the study population.

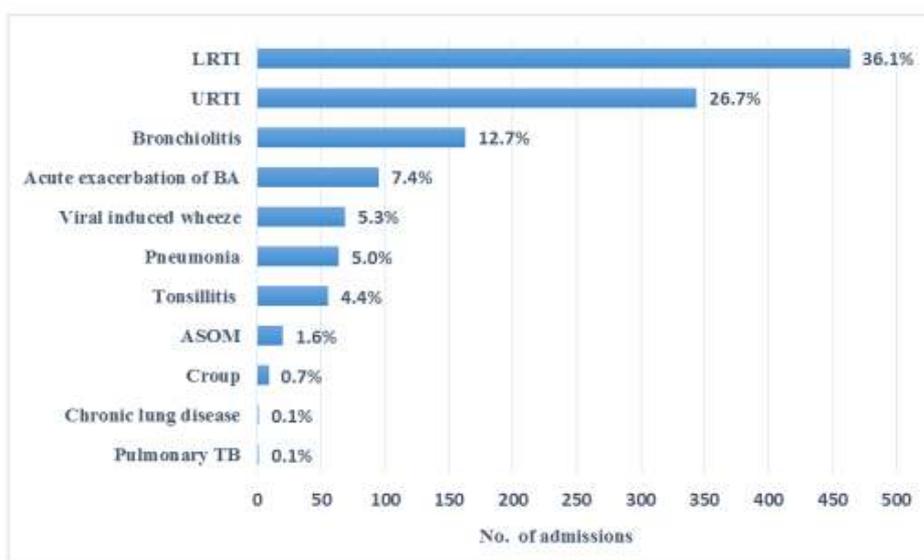


Figure 2: Distribution of the primary diagnosis of the study population

LRTI: Lower respiratory tract infection, URTI: Upper respiratory tract infection, ASOM: Acute suppurative otitis media, BA: Bronchial asthma, TB: Tuberculosis

Unspecified lower respiratory tract infection (LRTI) was the most common diagnosis followed by upper respiratory tract infection (URTI). When a child presented with fever, cough and increased respiratory rate with few lung signs, but the chest X-ray or blood investigation was not compatible with a diagnosis of bronchopneumonia or lobar pneumonia, a diagnosis of unspecified LRTI was made. However, according to WHO criteria these children would fit into the category of mild pneumonia. Infectious diseases contributed to 92% of admissions and asthma was responsible for only 7.4% of hospital admissions.

Evaluation of respiratory tract infection in the previous six months revealed that 79.6% had no respiratory illness in the previous six months, 10.7% had one episode, 5.8% had two episodes and 3.9% had three or more episodes. For 80% of the study population, this was the first hospital

admission during the previous six month period. However, 12.4% had one previous hospital admission, 4% had two hospital admissions and 3.6% had three or more hospital admissions during the previous six month period.

Distance from home to hospital varied from 1-275km with a mean distance of 2.3 ± 1.5 km. The analysis of distance from home to hospital revealed that 37.9% of children came from the vicinity of 1-5 km, 22.1% from 6-10 km, 21.2% from 11-15 km, 17% from 16-50 km and 1.8% from more than 50 km. Further evaluation of distance to hospital in those admitted due to URTI showed that 35% of the children with URTI came from within 5 km vicinity, 25% from 6-10km, 34% from 10-20km distance and 7% from more than 20km.

Table 1 demonstrates the children treated with antibiotics and nebulisation

Table 1: Children treated with antibiotics and nebulisation

Condition	Total number of cases	Children treated with antibiotics n (%)	Children treated with nebulisation n (%)
Lower respiratory tract infection	464	464 (100)	288 (62)
Upper respiratory tract infection	344	103 (30)	04 (0.01)
Bronchiolitis	163	124 (76)	157 (96)
Acute exacerbation of asthma	95	58 (61)	95 (100)
Viral induced wheeze	69	45 (65)	65 (100)
Pneumonia	64	64 (100)	52 (81)
Tonsillitis	56	56 (100)	0 (0)
Acute suppurative otitis media	20	20 (100)	0 (0)
Croup	09	04 (44)	07 (78)
Chronic lung disease	01	01 (100)	01 (100)
Pulmonary tuberculosis	01	01 (100)	0 (0)
Total	1286	940 (73)	669 (52)

All (100%) children with pneumonia, LRTI tonsillitis, acute suppurative otitis media chronic lung disease and pulmonary tuberculosis received antibiotics; 76% children with bronchiolitis, 65% children with viral induced wheeze and 30% children with URTI also received antibiotics. All (100%) children with acute exacerbation of asthma, viral induced wheeze and chronic lung disease and 96% children with bronchiolitis received nebulisation; 78% children with croup, 62% children with LRTI and 81% children with

pneumonia also received nebulisation. During the ward stay only 9.5% of children needed oxygen.

Figure 3 demonstrates the duration of hospital stay which ranged from 1-19 days with a mean of 3.73 days and a standard deviation of 2.03 days. Most of the children needed only short stay in the hospital. Only 2.4% needed a hospital stay of 10 days or more and 31.5% needed a hospital stay of 2 days or less.

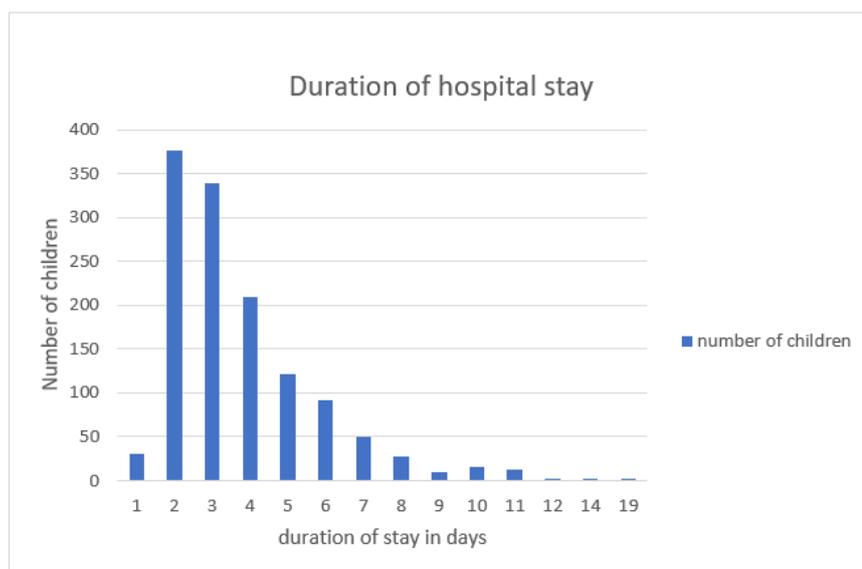


Figure 3: Duration of hospital stay

Figure 4 shows the total admissions and the respiratory admissions throughout the year.

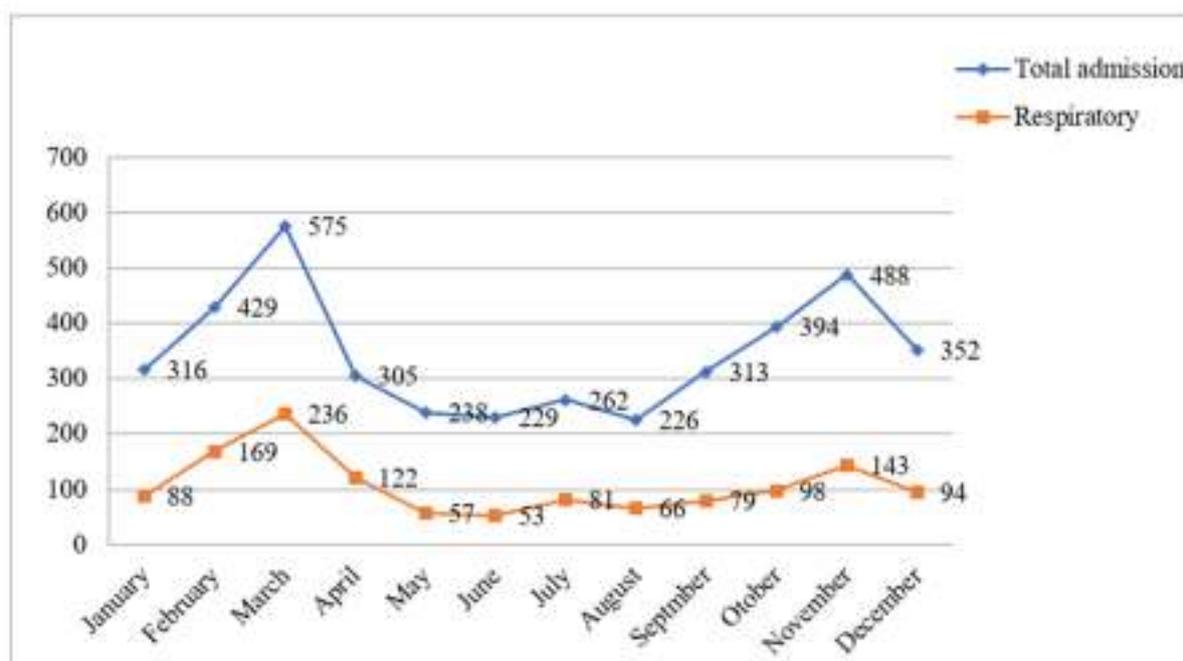


Figure 4: Total admissions and the respiratory admissions throughout the year

There were two peaks seen in total admissions. The main peak was seen in March and a smaller peak was seen in November. The respiratory illnesses mainly peaked in March and even though there was a peak in total admissions in November, the increase in respiratory illness in November was less.

During the study period only one death occurred due to pneumonia that is 0.07% in the total study population. Majority of the children (62.4%) were discharged without any disease sequelae, and 482 (37.5%) were discharged with follow up.

Discussion

Admissions due to respiratory illness accounted for 31% of hospital admissions. This is similar to studies done in other areas of Sri Lanka as well as worldwide where the admissions due to respiratory illness ranged from 25-35%⁹⁻¹⁹. According to the 2017 Annual Health Statistics, Sri Lanka, respiratory illnesses are in the 4th rank both in hospital admissions and in mortality¹. Globally, too, respiratory tract infection is among the top 3 causes of death and disability among children as well as adults⁵. Pneumonia contributes to 15.6% of under-5 year old child mortality and it is the second

common cause next to prematurity which contributes to 17.9%. Even in adolescents 10-14 years, next to HIV/AIDS, road injury and drowning, LRTI is the leading cause of death³. In our study, other diseases responsible for hospital admission comprised other infectious disease (23.9%), diarrhoeal illness (9.6%), central nervous system disorders (6.2%), renal system disorders (3.8%), cardiovascular disease (0.4%) and miscellaneous diseases (25%). This indicates that one third of hospital admissions are due to respiratory illnesses and if we need to reduce the burden on hospital admission the focus should be on respiratory illnesses.

Our study revealed a slight male predominance (54%) and infants were the vulnerable population for respiratory illness which is in keeping with other studies⁹⁻¹⁹. This may be due to less mature immune system making the infant more susceptible to respiratory infections. Thus, our preventive strategies should be mainly focused on infants.

Communicable diseases were responsible for 92% of hospital admissions out of which non-specified LRTI was 36.1%, URTI was 26.1% and pneumonia was 5%. This study also revealed that 34% of URTI were admitted from 10-20km distance and 7% from more than 20km. This indicates the need for improvement of the services of peripheral hospitals to reduce the congestion in the tertiary care centres. Improvement in the outpatient services and development of a short stay ward can also reduce the overcrowding in the paediatric wards due to respiratory illness. The observed seasonal variation in hospital total admissions, as well as admission due to respiratory illness, may be attributed to environmental factors related to factors such as rainfall and cold weather.

This study has some limitations. It was done only in a single unit, and neonatology admissions were not included as they were directly admitted to the neonatal intensive care unit and not to the general paediatric ward. Thus, the burden of respiratory illness due to neonatology case mortality, mainly due to surfactant deficiency lung diseases and pneumonia are not included in this study.

Conclusions

This study highlights the burden of respiratory illness on hospital admission in children. Even though the mortality in this study is very low (0.07%) the morbidity is very high (31%).

Acknowledgments

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