Original Article**Impact of Covid 19 preventive measures on hospital admission due to respiratory illness in children at Professorial Paediatric unit Teaching Hospital Jaffna.****Umasankar N¹**¹*Department of Paediatrics, Faculty of Medicine, Jaffna***Abstract**

Respiratory diseases are common causes of hospital admission in children. Droplet transmission is the primary route of transmission in respiratory infections. The objective was to assess the burden of respiratory diseases on hospital admission of children during this Covid 19 pandemic and to assess the impact of Covid 19 preventive measures on it.

An institutional based retrospective descriptive study based on secondary data was carried out at Professorial Paediatric unit Teaching hospital Jaffna. The data was extracted from the electronic patient management system. All the records of children who were primarily diagnosed with respiratory disease during the period of June 2020 to May 2021 were extracted. This data was compared with that of 2017.

The total hospital admission has reduced from 4127 to 1049 during the pandemic. There was a significant decrease in total hospital admission during the covid 19 pandemic compared to before the pandemic $\{t(11.488) = 8.015 \text{ } p < 0.001\}$. Similarly, there was a significance decrease in the admissions due to respiratory diseases during the covid 19 pandemic $\{t(11.355) = 5.982 \text{ } p < 0.001\}$. The percentage of respiratory admission has significantly reduced during the pandemic $\{t(21.997) = 5.173 \text{ } p < 0.001\}$.

Hospital admission due to respiratory illness has significantly reduced when compared to total admission during this pandemic. This may be

attributed to social distancing, wearing mask and good hand hygiene.

Keywords

Children, Covid 19, Hospitalisation, respiratory disease

Introduction

Respiratory diseases are common causes for hospital admission of children in Sri Lanka as well as worldwide. In Sri Lanka, in 2017, respiratory illness accounted for 233,154 hospital admission in children below the age of 16 years, of which pneumonia was responsible for 9484 hospital admissions. [1]

Most of the respiratory infections are caused by viruses in children. [2] Droplet and aerosol transmission are the two major routes of transmission of respiratory tract infections. [3] Covid 19 preventive measures such as reducing non-essential activities outside the home, wearing masks in public, frequent hand washing and using hand sanitizers can greatly block the transmission of respiratory tract infections.

The purpose of this study was to investigate the influence of changed behavioural habits on respiratory tract infections in children through a retrospective study during the period of COVID-19 outbreak (June 2020- May 2021). For comparison, the corresponding data in the year 2017 from the same ward was used.

This study was carried out to assess the burden of respiratory diseases on hospital admission of

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children during this Covid 19 pandemic and to assess the impact of Covid 19 preventive measures on it.

Methodology:

This was an institutional based retrospective descriptive study based on secondary data. The study was done in Professorial Paediatric unit Teaching hospital Jaffna. All the records of children who were primarily diagnosed with respiratory disease by the caring consultant during the period of June 2020 to May 2021 were extracted from the database. As the Covid 19 pandemic started mainly in March 2020 in Jaffna a three-month period was allowed to see the protective action to be effective on the respiratory disease hence data was extracted from June 2020. The data were compared with the data of similar months in the year 2017 to see the pre covid admission burden and spectrum.

The data were analysed using the SPSS version 20.0. Percentages and frequencies was used for quantitative data. Student t test was done to compare the mean and p of < 0.05 was taken as significance. Ethical clearance was not requested for this study as it was based on secondary data.

Results:

Total hospital admission to the professorial paediatric ward during this pandemic (June 2020 to May 2021) was 1049. Mean monthly admission during the pandemic was 87.4 ± 16.3 . The total admission before the pandemic (2017) was 4127 with mean monthly admission of 360.6 ± 135.8 . There was a significant decrease in total hospital admission $\{t(11.488) = 8.015 p < 0.001\}$.

Figure 1 demonstrates the total hospital admission both before and during the pandemic.

The graph shows there are two significant peaks in admission in March and November before pandemic but there is no obvious rise in hospital admission during this pandemic period.

Figure 1 – Total hospital admission before and during pandemic

Figure 2 demonstrate the hospital admission due to respiratory illness. The total children admitted with respiratory illness before pandemic is 1286 with a monthly mean of 107.2 ± 53 . But the total children admitted with respiratory illness during pandemic was 174 with a mean of 15.5 ± 6.8 per month. There was a significance decrease in the admission due to respiratory illness $\{t(11.355) = 5.982 p < 0.001\}$.

Figure 2 Admission due to respiratory illness before and during pandemic

Before pandemic respiratory illness contributed to 31.1% (1286 among 4127) of the total hospital admission. But during pandemic it was responsible for 16.6% (174 among 1049) of the hospital admission. Percentage of respiratory admission has significantly reduced during the pandemic $t(21.997) = 5.173 p < 0.001$.

The demographic details and the disease spectrum of the study population is given in table 1.

Table 1 Characteristic of children admitted to the ward

Feature	Before pandemic	During pandemic	Chi square value	P value
Sex of the child				
Male	743(57.8%)	114 (65.5%)	3.768	0.052
Female	543(42.2%)	60(34.5%)		
Age of the child				
Less than 12 months	394(30.6%)	47 (27%)	6.930	0.327
13-24 months	236 (18.4%)	28 (16%)		
25-36 months	145 (11.3%)	20 (11.5%)		
37-48 months	105 (8.2%)	21(12.1%)		
49-60 months	82 (6.4)	17(9.8%)		
61-120 months	247(19.2%)	33 (19%)		
More than 120 months	77(5.9%)	8 (4.6%)		
Duration of hospital stay				
Less than 3 days	745 (57.9%)	58 (33.3%)	62.407	<0.001
3 -5 days	331 ((25.8%)	95 (54.6%)		
6-10 days	193 (15%)	19 (11%)		
More than 10 days	17 (1.3)	2 (1.1%)		
Diagnosis				
Lower respiratory infection	464 (36%)	26 (14.9%)	98.551	<0.001
Upper respiratory infection	344 (26.7%)	36 (20.7%)		
Bronchiolitis	163 (12.8%)	24 (13.8%)		
Asthma	95 (7.4%)	41 (23.6%)		
Viral induced wheeze	69 (5.4%)	11 (6.3%)		
Pneumonia	64 (5%)	6 (3.4%)		
Tonsillitis	56 (4.4%)	23 (13.2%)		
Acute otitis media	20 (1.6%)	5 (2.9%)		
Bronchiectasis	01 (0.1%)	02 (1.1%)		
Treatment needed				
Antibiotics	940 (73%)	101(58%)	16.962	<0.001
Nebulisation	669 (52%)	93 (53%)	0.125	0.724
Oxygen	122 (9.5%)	28 (16%)	7.254	0.007
Follow up needed	482 (37.5%)	97 (55.7%)	21.370	<0.001

There was no significant difference in age and sex distribution of the children admitted to the hospital before and during pandemic.

The condition needing hospital admission showed a significant difference during the pandemic ($p<0.001$). Lower respiratory tract infections have contributed to 36% of the respiratory illness before pandemic which has reduced to 14% during the pandemic. The incidence of Tonsillitis has increased from 4.4% before pandemic to 13.2% during pandemic, and the asthma has increased to 23.6% from 7.4%. There is no significant change in the incidence of other respiratory conditions like bronchiolitis, pneumonia and upper respiratory tract infection, acute otitis media and viral induced wheeze during this pandemic when compared to before pandemic.

Around 73% of the children were treated with antibiotic before the pandemic and the need of antibiotic has reduced to 58% during this pandemic which is statistically significant ($p<0.001$). There was no significant change in the need for nebulisation but the need for oxygen has increased from 9% before pandemic to 16% during pandemic (P value <0.001).

The children needing follow up management also increased during this pandemic to 55.7% from 37.4% before pandemic ($p<0.001$).

Discussion.

This study highlights that there was a significant reduction in total hospital admission as well as admissions due to respiratory illness to the paediatric ward. This is supported by other studies done in other parts of the world like China, Brazil and US. The study done in China identified that out-patient visit had decreased by 57-59 % and admission due to respiratory infection had reduced by 59-67% during February to April 2020 when compared with same period in 2018 and 2019. [4]

Published studies have documented community preventive measures such as social distancing travel restriction, hand hygiene and wearing mask has effectively decreased the burden of COVID-19 cases. Similarly, a reduction in hospital admission during the pandemic may be explained in part by several other factors, including changes in health care-seeking behaviours and limited access to medical care due to lack of transport. However, it is less likely that such factors explain the reduction in the proportions of respiratory condition when compared to the total hospital admission. Our study results are consistent with the hypothesis that community preventive measures can slow down the spread of respiratory infection similar to prevention of covid 19.

Several studies confirm the occurrence of a seasonal peak in respiratory diseases and point to an association with environmental factors such as humidity and temperature. Our study also shows two peaks in the admission due to respiratory diseases before pandemic in March and November. But the social isolation measures adopted during the covid-19 pandemic dramatically interfered with the seasonality of childhood respiratory diseases. This is reflected that there is no obvious peak during the pandemic.

Our study highlighted that even though there was no significant difference in the age and sex of the children admitted to the ward before and during pandemic, there was a significant difference in the diseases needing hospital admission. The increase in tonsillitis during the pandemic may be attributed to the fact that tonsillitis is usually treated on out patient basis may be admitted due to suspicious of covid 19.

The study done in United States, to identify the frequency of respiratory syncytial virus (RSV) and influenza acute respiratory infections (ARI) before and during the coronavirus disease 2019 pandemic,

concluded that between March and April 2020, there was a rapid declines in acute respiratory infection cases and the proportions of RSV and influenza in children were consistently low across 7 US cities, And they concluded that it could be attributable to community preventive measures against severe acute respiratory syndrome coronavirus. [5]

The children with Asthma needing hospital treatment have increased when compared before pandemic in our study. This is against the study published in British Medical journal where the asthma control had improved with this covid pandemic. [6] This may be due to lack of access to health care and lack of supply of drugs that are needed to prevent asthma.

The need for antibiotic has reduced from 73% to 58% during pandemic, this may be due to the increase percentage of conditions like asthma which is managed without antibiotics. Similarly, the need for Oxygen during the pandemic has increased from 9.5% to 16% which also could be explained with admission of increased number of children with asthma.

Duration of hospital stay had decreased (mean 3.73 to 3.54) during this pandemic in our study and it is similar to the study done in Brazil also showed a reduction in the hospital stay. [7] This explains the early discharge with ward follow-up as parents prefer to be at home once the diagnosis is established because of fear of covid spread.

Conclusion

This study indicates that hospital admission due to respiratory diseases has significantly reduced when compared to total admission during the pandemic.

Limitation:

As this study is the retrospective secondary data study, we were not able to relate the cause and effect of the preventive measures.

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