



# University of Jaffna

**Dr. Arunasalam Sivapathasundaram**

**Memorial Lecture – 2024**

*(Former Consultant Paediatrician,  
Teaching Hospital, Jaffna)*



**“Young Lungs, Big Challenges:  
Impact of Respiratory Disease  
in Children of Northern Sri Lanka”**

by

**Dr. N. Umasankar**

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on

**Tuesday 22<sup>nd</sup> October 2024 at 3.00 p.m**

at

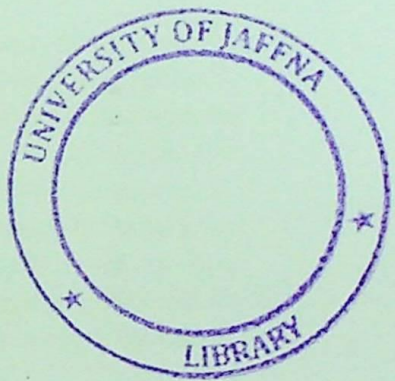
**Hoover Auditorium, Faculty of Medicine,  
University of Jaffna.**



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**Dr. Arunasalam Sivapathasundaram  
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Impact of Respiratory Disease in  
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## Message from the Vice Chancellor

Dr Arunasalam Sivapathasundaram was a dedicated clinician and paediatrician known for his exemplary qualities and contributions. His dedication to patient care was unparalleled, always prioritizing the well-being of his patients. He was punctual, disciplined, meticulous, and kind, with excellent clinical skills. He advocated for hospital infrastructure development, notably championing the expansion of the Teaching Hospital for Jaffna. He actively engaged with the Jaffna Medical Association, conducting clinical lectures and case discussions to mentor junior doctors and medical students.

Elected as the Secretary of the Jaffna Medical Association, he served with efficiency and dedication until his tragic demise during the 1987 conflict, where he lost his life on duty, demonstrating his unwavering commitment to his profession and community.

We are immensely proud to have Dr. Nirubaa Umasankar as an esteemed member of our faculty at the Faculty of Medicine, University of Jaffna. A distinguished alumna of this institution, Dr. Umasankar graduated with an Upper Second Class, securing distinctions in both Paediatrics and Surgery. Her exceptional academic performance, earning a series of prestigious awards, including the Subramaniam Gold Medal for Best Performance in Surgery, the Vaithyanathar Nadarajah Memorial Prize, the University Prize for Best Performance in the Final MBBS Examination, and the Nannthi Gold Medal for Best Overall Performance throughout her medical studies, is truly impressive.

Dr. Umasankar pursued her passion in Paediatrics, obtaining a Diploma in Child Health in 2008 and an MD in Paediatrics from the Postgraduate Institute of Medicine, Colombo, in 2009. Her career at the University of Jaffna began in 2013 when she joined the Department of Paediatrics as a lecturer, and she was subsequently promoted to Senior Lecturer in 2017. Between 2017 and 2022, she served as the Head of the Department of Paediatrics, playing a pivotal role in shaping the department's academic and clinical excellence.

Beyond her administrative roles, Dr. Umasankar has made significant contributions to medical education. She served as the Secretary of the Curriculum Development and Evaluation Committee and took on the

important responsibilities of coordinating postgraduate courses and the Advanced Life Emergency in Rural Medicine (ALERM) course. Her dedication to the advancement of medical education has left a lasting impact on both undergraduate and postgraduate students.

Dr. Umasankar is also an accomplished researcher. Her studies on childhood respiratory diseases, allergies, and asthma are widely recognized in national and international scientific circles. Her work, published in peer-reviewed journals and presented at conferences worldwide, has greatly advanced our understanding of these pressing health issues. Her research has provided crucial insights into respiratory health, particularly in the context of Northern Sri Lanka, shedding light on the challenges faced by children in the region.

It is with great honor that we announce Dr. Nirubaa Umasankar as the distinguished speaker for the Late Dr. A. Sivapathasundaram Memorial Oration in 2024. Her oration, titled "Young Lungs, Big Challenges: Impact of Respiratory Disease in Children of Northern Sri Lanka," promises to offer invaluable insights into the pressing issue of childhood respiratory diseases. Her knowledge and expertise will undoubtedly inspire and inform our collective efforts to address these challenges, enriching the region's scientific community and healthcare practices.

We look forward to her oration with great anticipation and extend our heartfelt gratitude to Dr. Umasankar for sharing her expertise. May this event be a source of knowledge, reflection, and inspiration for all attendees.

All glory to the Almighty for this occasion.

**Professor Sivakolundu Srisatkunarajah,**  
Professor in Mathematics,  
Vice Chancellor,  
University of Jaffna.

# Young Lungs, Big Challenges: Impact of Respiratory Diseases in Children of Northern Sri Lanka

Manuscript for Dr.Arunasalam Sivapathasundaram  
Memorial Lecture: 2024

**Dr. N. Umasankar**

Department of Paediatrics/Faculty of Medicine, Jaffna

It is my great privilege to deliver Dr Arunalsalam Sivapathasundaram Memorial Lecture, and I would like to thank the Faculty of Medicine, University of Jaffna, for granting me this opportunity. Unlike many other memorial lectures, this lecture is dedicated to someone who tragically lost his life at a relatively young age, and in a violent manner. Unfortunately, I never had the chance to work with or meet him in person. However, I have heard of his remarkable dedication to the field of paediatrics.

I take this moment to honour his unwavering commitment during a critical time in October 1987, when doctors in Jaffna were unable to reach the hospital due to the intense fight with the Indian Peacekeeping Forces. Dr. Sivapathasundaram, determined to serve during such a desperate time, was tragically shot and killed by the Indian Peace Keeping Force on October 22, 1987, within the hospital grounds. He was unarmed, with his hands raised, shouting, "We are innocent doctors and nurses." His sacrifice will forever be remembered.

Dr. Sivapathasundaram was born to Somasundarampillai Arunasalam, a schoolmaster, and Valliammai on November 23, 1939, in Puloly, Point Pedro. He was named after his granduncle, the late S. Sivapathasundaram, a former principal of Victoria College, affectionately known as "Saiva Periyar." He had two brothers and three sisters. Dr. Sivapathasundaram received his primary education at Vadamaradchi Hindu Girls' College and his secondary education at Hartley College. He won several prizes for oratory and actively participated in various dramas.

He earned a Diploma in Child Health (Sri Lanka) in 1970, then went on to London where he obtained a Diploma in Child Health (London) in 1975 and became a Member of the Royal College of Physicians in 1977. Throughout his career, he served in various locations including Ratnapura, Balangoda, Ragama, Kuliypitiya, Matara, Lady Ridgeway Hospital for Children in Colombo, and Chilaw, before assuming duties as Consultant Paediatrician at the Base Hospital in Point Pedro on June 1, 1974. After nine years in Point Pedro, he was appointed as a Consultant Paediatrician at the Teaching Hospital in Jaffna in February 1983. Tragically, his period of service was cut short, as his outstanding qualities ultimately led to his untimely demise.

As a paediatrician, he was known for his punctuality, discipline, meticulousness, kindness, and skill. He was friendly with both staff and patients. He took a keen interest in the activities of the Jaffna Medical Association and was elected as Secretary in July 1987. He served efficiently in this role for a brief period before his untimely demise.

As an individual, he was known for his deep religious faith and honesty. As a devoted husband to Mangaleswary and a father to four daughters, he fulfilled his family responsibilities with utmost dedication and care. His tender and loving nature brought great happiness to his family.

We have lost a remarkable individual, but I am confident that his grateful patients, their families, and the community will remember him fondly and forever.

In heartfelt tribute to the memory of this remarkable paediatrician, who devoted his life to serving his community during their most challenging times, I am honoured to present a topic that plays a pivotal role in the daily practice of general paediatrics: Respiratory Diseases in Children

## **Young Lungs, Big Challenges: Impact of Respiratory Diseases in Children of Northern Sri Lanka**

### **Introduction:**

#### **Respiratory system**

The respiratory system's primary function is to transport gases in and out of the body. To achieve this, it consists of three main components: the upper airway, the conducting airway, and the alveolar airway. The upper airway includes the nose, larynx, and pharynx. The conducting airway starts at the trachea and extends to the lungs, while the alveolar airway is made up of lung parenchyma or acinar tissue.

#### **Young lung, Big challenges:**

Children are not simply small adults, especially when it comes to the respiratory system. Several developmental differences in respiratory anatomy and physiology make infants and young children more susceptible to respiratory diseases, decompensation, and respiratory failure.

#### **Anatomical differences in the respiratory system**

1. Smaller nares and nasal cavities - limit the inflow of air - it is estimated that the nose contributes up to 50% of total airway resistance in younger children

Challenge: Even a mild nasal obstruction due to swelling or mucus production increases the work of breathing in infants and may cause respiratory distress.

2. The pharynx is shorter, has shorter cross-sectional diameters and consists of an increased mass of lymphoid tissue

Challenge - Contributes to increased risk of airway obstruction

3. The Eustachian tube which opens on the lateral wall of the nasopharynx is shorter, floppier and more horizontal

Challenge - Facilitating mucus stagnation, and increased risk of ear infections in children

4. The larynx is located in a more cephalic and anterior position; Epiglottis lies more horizontally, allowing the infant to breathe and suckle simultaneously without aspirating  
Challenge: Infants have been considered "obligate nose breathers"
5. The trachea is shorter and narrower also angled posteriorly and composed of more tracheal rings  
Challenge: Respiratory resistance is higher and work of breathing is greater
6. Neonates have 17 to 71 million alveoli, whereas adults have 200-600 million. 85% of alveoli are added postnatally. The volume of the lung doubles by 6 months of life, triples by 1 year and increases by a factor of approximately 13 between the ages of 1 month and 7 years  
Challenge - Less available surface for gas exchange
7. Cilia – poorly developed at birth  
Challenge - Ineffective mucociliary clearance – more risk of secretion retention and airway obstruction in neonates
8. In newborns and infants, the ribs have a typical horizontal orientation, and the transverse chest section is almost circular, rather than oval:  
Challenge: Makes it challenging for younger children to elevate them with the normal "bucket handle" effect to enlarge the rib cage and the thoracic volume- contributes to fixed tidal volume (TV) during childhood so that ventilation is primarily diaphragmatic and respiratory dynamics are less efficient
9. Ribs consist mainly of cartilage, which makes the rib cage highly compliant,  
Challenge: Further reducing respiratory pump efficiency
10. The diaphragm has a more horizontal position, being flatter than in adults;  
Challenge: Its ability to contract is limited
11. External and internal intercostal muscles are not well developed in children, especially in infants  
Challenge: Contraction of these muscles cannot contribute to the enlargement of the chest wall so their contribution to respiratory effort and tidal volume is minimal.

12. In infancy, respiratory muscles are mainly composed of type II fibres (fatigue-susceptible) since type I fibres (fatigue-resistant) develop later in life  
Challenge: Children have greater susceptibility to ventilator muscle fatigue when the respiratory rate is increased. [1]

Physiological differences in the respiratory system make respiration more challenging in children include:

1. Higher metabolic rate - increased oxygen consumption at rest;
2. Immature respiratory control in infants - prolonged central apnoea and periodic breathing
3. The supraglottic airway is small and soft - vulnerable to inspiratory collapse.
4. The lung volume at end-expiration is similar to the closing volume - increasing the tendency for small airway closure and hypoxia.
5. Functional residual capacity is maintained by sustained tonic diaphragmatic activity during an entire respiratory cycle – increased work of breathing
6. The number of alveoli is fewer in early childhood - increasing the susceptibility to ventilation-perfusion mismatch
7. Ventilation is directed toward the non-dependent part of the lungs or variable during breathing - V/Q matching is weaker
8. The pulmonary vascular bed is relatively muscular - increased tendency for pulmonary vasoconstriction, right to left shunting, ventilation-perfusion mismatch and further hypoxia
9. Compliant chest wall offers less resistance to the lung's inward recoil - relaxation volume is reduced – leading to atelectasis
10. Respiratory muscles are relatively inefficient- Respiratory muscle fatigue can develop rapidly and result in respiratory failure and apnoea.
11. Paradoxical inhibition of respiratory drive, in the early neonatal period - results in apnoea or hypoventilation, rather than the usual respiratory distress.
12. During hypoxia due to dominant parasympathetic activity causing bradycardia, oxygen release decreases – worsening the tissue hypoxia [2,3].

*With these challenges in mind, let us look at the global, national, and local burden of respiratory diseases.*

## **BURDEN OF RESPIRATORY DISEASE IN CHILDREN**

### **Global burden of respiratory diseases in children**

Respiratory diseases are a common issue in children and are a leading cause of mortality and morbidity worldwide, particularly in infants and young children. The range of diseases varies from acute infections to chronic non-communicable conditions. Globally, respiratory tract infections rank among the top three causes of death and disability in both children and adults. [4]

Lower respiratory infections cause four million deaths annually and are a leading cause of death among children under five. [4]. Acute lower respiratory tract infections in children also increase their risk of developing chronic respiratory diseases later in life. In 2019, there were 33 million cases of acute lower respiratory infections worldwide, leading to 3.6 million hospital admissions and 101,400 deaths in children younger than five years due to Respiratory Syncytial Viral infection. [5]

Pneumonia remains the leading cause of childhood mortality, responsible for nearly 1.3 million deaths annually. It accounts for 14% of all deaths among children under five, claiming 740,180 lives in 2019 alone. Each day, pneumonia kills around 2,000 children, with at least one child dying every 43 seconds from the disease. [6] Pediatric TB constitutes up to 20% of the TB caseload in high-incidence countries. [7]

Despite the large reductions in under-five lower respiratory infection mortality since the 1990s, the progress for lower respiratory infections has generally lagged behind that of other childhood infectious diseases. [6]

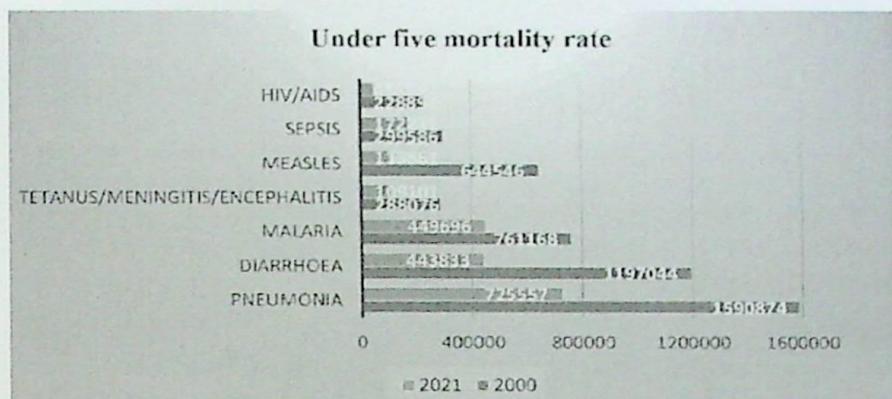


Figure 1 – Under-five mortality rate

Globally, according to Phase III of the ISAAC study, the prevalence of current asthma was 14.1% in children aged 13–14 years and 11.7% in those aged 6–7 years.[8] A recent report from the World Health Organization (WHO) indicates that one in ten children experiences asthma symptoms.[9]

#### National burden of respiratory diseases in children

According to the Annual Health Statistics, in Sri Lanka, respiratory illnesses are in the 4th rank both in hospital admissions and in mortality. [10]

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 admissions pneumonia contributed to 16% of deaths of under-5-year-old children [10]

In Sri Lanka, a study done in the Western Province showed that 20.4% of teenagers were diagnosed with bronchial asthma and wheezing. [11] 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% [12]

As there were no detailed studies from the northern region, we looked at the burden of respiratory diseases on hospital admissions.

## Respiratory Diseases in Children of Northern Sri Lanka

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

### Objective

A study was carried out to assess the burden of respiratory diseases on hospital admission of children under 14 years and to evaluate the spectrum of the diseases needing hospital admission

### Setting

It was a prospective cross-sectional study done in the Professorial Paediatric Unit of the Teaching Hospital Jaffna. All the children primarily diagnosed with the respiratory disease were recruited into the study. Data were collected from 1st January 2017 to 31st December 2017 by an interviewer-administered questionnaire.

### Results

During the calendar year 2017 (January 1st to December 31st) 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, 55.75% (706) were males and 44.3% (516) were females. Figure 2 demonstrates the age distribution of the study population.

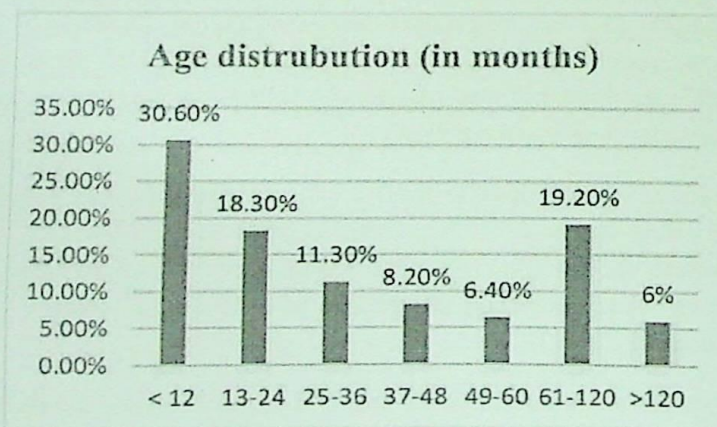


Figure 2 Age distribution of the study population

The mean age of the study population was 42 months with a standard deviation of 39 months. Infants contributed 30.6% (394), and the frequency of respiratory illness gradually decreased as the child grew older.

The most common diagnosis was unspecified lower respiratory tract infection (LRTI), followed by upper respiratory tract infection (URTI). Infectious diseases accounted for 92% of admissions. Asthma, bronchiolitis, and viral-induced wheezing together contributed to approximately one-quarter (25.4%) of hospital admissions. Figure 3 demonstrates the primary diagnosis of the study population

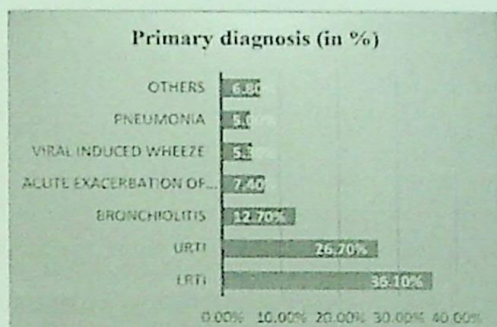


Figure 3 Primary diagnosis of the study population

Hospital stays ranged from 1 to 19 days, with an average duration of 3.73 days and a standard deviation of 2.03 days. Most children required only a short hospital stay, with 31.5% needing 2 days or less. In contrast, only 2.4% of children required a stay of 10 days or more.

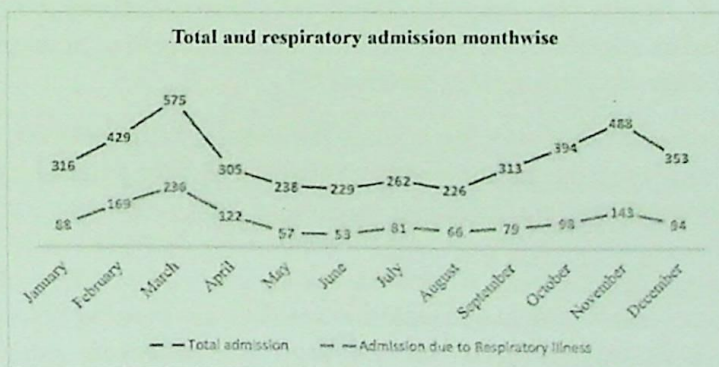


Figure 4 Total admission and admission due to respiratory illness

There were two distinct peaks in total admissions: the main peak occurred in March, with a smaller peak in November. Although admissions were higher in November, respiratory illnesses primarily peaked in March.

#### Conclusion

- The study identified the burden of respiratory illness on hospital admission as 31% which is nearly one-third of the total admission
- Most (92%) respiratory illnesses needing hospital admission were due to infectious diseases.
- The respiratory illness has a seasonal variation [13]

#### Seasonal Variability of Diseases

It is well known that the frequency, severity, and mortality of many diseases vary with the seasons. Infectious diseases often thrive in cold weather when people are confined indoors, while they tend to decrease in warmer weather when people spend more time outside and ventilate their homes. The underlying mechanisms of these fluctuations remain poorly understood. Are these variations due to the cold weather, dry air, or the increased crowding indoors during winter remain unclear.

The peak in acute respiratory infections during late winter months, with a smaller peak in late autumn, is attributed to decreased local resistance to infection from the often-unidentified viruses of "common colds" and known pathogenic bacteria. However, there is no satisfactory explanation for why exposure to cold lowers resistance.[14]

Traditional sources cite seasonal patterns for common infectious diseases, often based on microbiologic data, but little is known about cyclical trends in clinically diagnosed infectious conditions [15]

A study using the Nationwide Emergency Department Sample database in the United States, covering the period from 2009 to 2013, found that over 20% of paediatric visits were for infectious conditions. Many of these conditions exhibited seasonal patterns. So, a large administrative database can be used to track seasonal disease patterns, with the advantage that they reflect clinician diagnoses beyond microbiologic confirmation. This methodology could aid in resource planning, infection control, and public health educational initiatives.[15]

As the first study showed a seasonality pattern and the literature suggests the administrative data can be utilised for the seasonality study the following research was planned using the administrative database

### **Influence of seasonality in paediatric respiratory tract infections: A hospital-based retrospective study in Jaffna**

#### Objective

A hospital-based retrospective study was conducted to assess the Influence of seasonality in paediatric Respiratory tract infections

#### Setting

A descriptive study was conducted at the University Paediatric Unit, Teaching Hospital Jaffna. All children below 12 years admitted with respiratory tract infections were included from 2016 to 2020. The diagnoses were defined according to the ICD-10 classification of WHO. Data were extracted from the Patient Management System(PMS) maintained at Professorial Paediatric Unit Jaffna. The seasonal changes of the Jaffna district were obtained from the website of the meteorological department. The pattern of infections was analysed for each infection and major season. Statistical significance was analysed with ANOVA test and post hoc test.

#### Results

Out of 10, 923 total admissions in the five years, 2924 (26.7%) were admitted with respiratory tract-related infections. Among them 50.5% were male and 49.5% were female. Highest number of admissions was noticed among younger children (0-5yrs).

Season	Duration	Rainfall
First Inter Monsoon (FIMS)	March – April	50-100 mm
South-West Monsoon (SWMS)	May – September	Northeast 200-300 mm Southeast 100-200 mm
Second Inter Monsoon (SIMS)	October- November	500-750 mm Strong wind+ Wide spread rain
North East Monsoon (NEMS)	December – February	300-500 mm Dry cold wind

Table 1 Four seasons of the Jaffna peninsula

Climate is the sum of atmospheric elements and their variations, solar radiation, temperature, humidity, clouds and precipitation, atmospheric pressure, and wind. With that, the seasons of Sri Lanka are divided into four seasons: First inter-monsoon, Southwest Monsoon, Second inter-monsoon, and Northeast monsoon.

Season	Gender	URTI	LRTI	Bronchiolitis	Viral Induced Wheeze
FIMS	M	148	150	51	15
	F	108	173	34	13
SWMS	M	126	159	121	37
	F	122	152	76	31
SIMS	M	88	117	81	22
	F	100	92	58	18
NEMS	M	178	189	78	39
	F	156	130	68	27
Age	0-5	817	921	558	168
	6-12	197	221	09	34
Total		1026	1162	567	202

Table 2: Number of admissions of respiratory tract infections throughout the seasons

The highest number of cases was reported in the North East monsoon (December to February) and the lowest number was observed in the South West monsoon season (May to September).

The analysis revealed a statistically significant association between seasonal variation and the number of admissions [ $F(3,56) = 5.8, p = 0.002, CI = 95\%$ ]. The results indicated a positive association between rainfall and cold windy weather. Admissions for respiratory infections were notably higher during the wettest months on the Jaffna Peninsula, from October to February.

The study acknowledged the limitation as a lack of virological data to identify specific pathogens. [16]

### Aetiology of respiratory infection in children

Viruses account for a significant proportion of acute respiratory tract infection-related morbidity and hospitalizations worldwide. Approximately 50% to 90% of lower respiratory tract infections in young children are caused by

respiratory syncytial virus (RSV), human metapneumovirus (hMPV), influenza viruses, human bocavirus (hBoV), parainfluenza viruses (PIVs), adenoviruses, rhinoviruses, human coronavirus (hCoV), and enteroviruses.[17]

Respiratory syncytial virus (RSV) is a major cause of acute lower respiratory infection (ALRI) in children under five years old. In 2019, there were 33.0 million episodes of RSV-associated ALRI, 3.6 million RSV-associated ALRI hospital admissions, and 101,400 deaths among children under five worldwide. Over half of the severe cases occurred during the first year of life.[18]

As the previous study identified, lack of virological data is a limitation and respiratory syncytial virus is the common cause of lower respiratory tract infection in children the following research was planned.

**To identify the disease burden of respiratory syncytial virus (RSV) among children with bronchiolitis and to determine the relationship between the severity of bronchiolitis and RSV positivity**

**Objective**

To identify the disease burden of respiratory syncytial virus (RSV) among children with bronchiolitis and to determine the relationship between the severity of bronchiolitis and RSV positivity

**Setting**

A prospective cross-sectional descriptive institutional-based study was conducted in paediatric wards at Teaching Hospital Jaffna. Children under 2 years and clinically diagnosed with bronchiolitis were recruited. An interviewer-administered questionnaire, a data extraction sheet and a nasopharyngeal aspirate were collected from each study participant.

Respiratory Syncytial virus and Adenovirus were detected from nasopharyngeal aspirate by Vitassay RSV+Adenovirus Resp, a rapid immune chromatographic one-step assay for the simultaneous qualitative detection of RSV and Adenovirus.

The severity of the diseases was assessed using the Respiratory Distress Assessment Instrument (RADI) score. The association of severity and RSV

positivity was calculated by using the Chi-square test and the P value of <0.05 was considered as significant.

**Results**

Thirty-one infants with a mean age of  $5.1 \pm 3.8$  months were recruited and the majority (67.7%) were males. Sever Bronchiolitis (RADI score of more than 8) was seen in 58.1%. Oxygen was required in 90.7% out of which 9.7% required heated, humidified high-flow nasal cannula oxygen. The mean duration of oxygen requirement was 52.42 hours and the mean hospital stay was  $5 \pm 3.36$  days (range 2-19 days). Viruses were identified in 41.9% of children. (Figure 5)

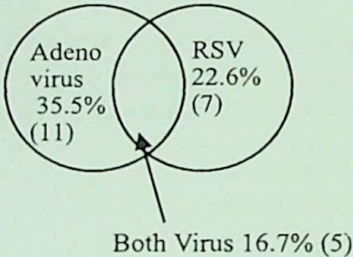


Figure 5: Identified virus in Nasopharyngeal aspirate

There was no significant association between viral positivity and the severity of bronchiolitis { $X^2 (1, N=31) = 0.111, p=0.739$ }, and viral positivity and oxygen need { $X^2 (1, N=31) = 0.101, p=0.751$ }. One-way ANOVA reveals the association between viral positivity and RADI score (1,29  $F=1.709, p=0.201$ ), duration of oxygen requirement (1,29  $F=2.529, p=0.123$ ) and duration of hospital stay (1,29  $F= 1.735, p=0.198$ ) were not significant.

**Conclusion:**

Adenovirus was the most common aetiological agent identified in our study and no significant association was identified between viral positivity and severity [19].

**Transmission of the respiratory diseases**

Respiratory diseases, arising from diverse aetiologies, vary in both transmissibility and modes of transmission. Even for the same organism, transmissibility can be heterogeneous. Respiratory infections are transmitted through four primary modes: direct (physical) contact, indirect contact (via

fomites), large droplets, and fine aerosols. Among these, droplet and aerosol transmission are the two main routes for the spread of respiratory tract infections.[20]

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Preventive measures for COVID-19, such as minimizing non-essential activities outside the home, wearing masks in public, frequent handwashing, and using hand sanitizers, help not only to prevent the spread of COVID-19 but also the transmission of other respiratory tract infections.

To assess the effectiveness of the COVID-19 preventive measures on respiratory infection the following study was planned

#### **Impact of COVID-19 preventive measures on hospital admission due to respiratory illness in children at Professorial Paediatric Unit Teaching Hospital Jaffna.**

##### Objective

A study was carried out 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

### Setting

It was an institutional-based retrospective descriptive study based on secondary data. The study was done in the Professorial Paediatric Unit Teaching Hospital Jaffna. All the records of children with primary diagnoses of respiratory disease from June 2020 to May 2021 were extracted from the database. The data were compared with the data of similar months in the year 2017 to see the pre-COVID admission burden and spectrum.

### Results

Total hospital admissions to the professorial paediatric ward during the pandemic (June 2020 to May 2021) is 1049 with a monthly mean of 87.4 (SD±16.3) when compared to before the pandemic (2017) it was 4127 with monthly mean admission of 360.6(SD135.5)

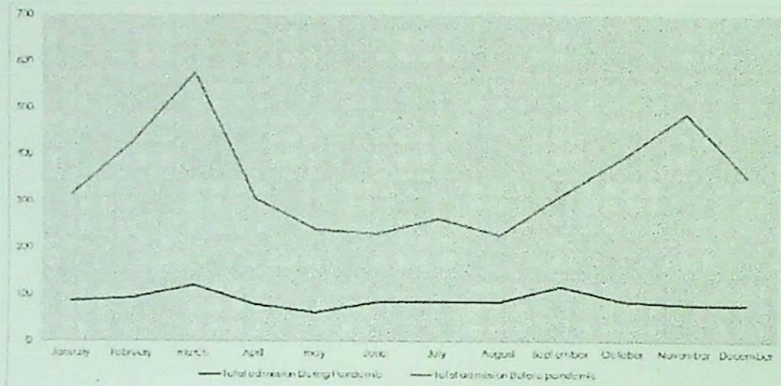


Figure 6: Total hospital admissions before and during the pandemic

The graph shows two significant peaks in admissions in March and November before the pandemic, but no noticeable increase in hospital admissions during the pandemic period.

There was a significant decrease in the average monthly total hospital admissions during the COVID-19 pandemic (mean = 107.2, SD = 53) compared to the period before the pandemic (mean = 360.6, SD = 135.8),  $t(11.488)=8.015, p<0.001$ .

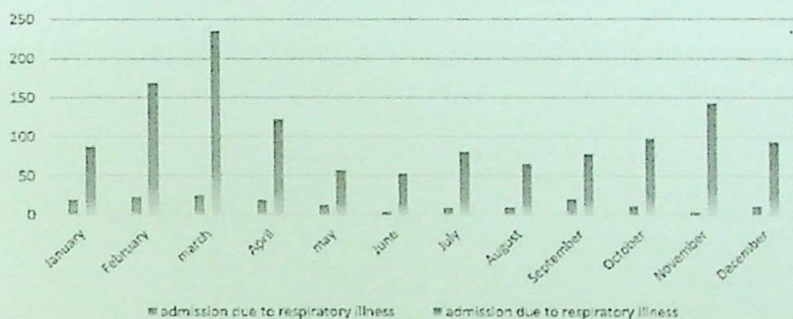


Figure 7: Admissions due to respiratory illness during and before the pandemic

The total number of children admitted with respiratory illness before the pandemic is 1286 with a monthly mean of 107.2 and a standard deviation of 53. But the total number of children admitted with respiratory illness during the pandemic was 174 with a mean of 15.5 per month and a standard deviation of 6.8. There was a significant decrease in admissions due to respiratory illness during this covid 19 pandemic (mean SD 15.5, 6.8) compared to before the pandemic (mean and SD 107.2, 53)  $t(11.355) = 5.982 p < .001$ .

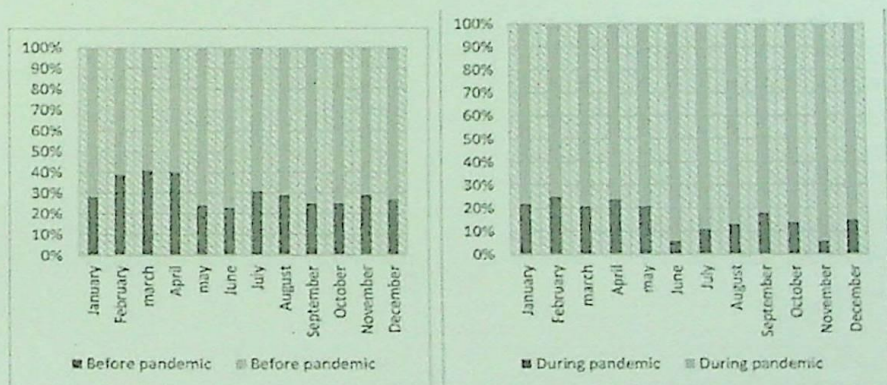


Figure 8: Percentage of respiratory admission to total admission before the pandemic and during the pandemic

Before the pandemic respiratory illness contributed to 31.1% (1286,4127) of the total hospital admissions. But during the pandemic, it was responsible for only 16.6% (174,1049) of hospital admissions. Compared to the total admission respiratory admission as a percentage has significantly reduced during this pandemic;  $t(21.997) = 5.173 p < 0.001$ .

Feature	Before pandemic	During pandemic	Chi square value	P value
<b>Sex of the child</b>				
Male	743(57.8%)	114(65.5%)	3.768	0.052
Female	543 (42.2%)	60(34.5%)		
<b>Age of the child</b>				
up to 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%)		
<b>Duration of hospital stay</b>				
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%)		
<b>Diagnosis</b>				
Lower respiratory infection	464 (36%)	26 (14.9%)	98.551	<0.001
Upper respiratory infection	344 (26.7%)	36 (207%)		
Bronchiolitis	163 (12.7%)	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%)		
<b>Treatment needed</b>				
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

Table 3: Characteristics of children admitted to the ward before and during the pandemic

There was no significant difference in the age and sex distribution of children admitted to the hospital before and during the pandemic. However, the conditions requiring hospital admission showed a significant change during the pandemic ( $p < 0.001$ ). Antibiotic use decreased significantly ( $p < 0.001$ ), while conditions requiring oxygen ( $p < 0.001$ ) and follow-up management ( $p < 0.001$ ) increased significantly.

#### Conclusion:

Hospital admissions due to respiratory diseases have significantly reduced compared to total admissions during the COVID-19 pandemic.

Limitation: Since this study was a retrospective analysis of secondary data, it was not possible to establish a cause-and-effect relationship for the preventive measures. [21]

*So far, we have covered the burden, aetiology, and transmission of the diseases. Now, we will move on to the management aspect, focusing specifically on bronchiolitis, as there is no definitive treatment for it.*

#### **Management of the disease- Bronchiolitis**

Acute viral Bronchiolitis is the most common lower respiratory tract infection and the most frequent cause of hospitalization in infancy. There is no specific treatment for the management of bronchiolitis. Oxygen supplementation remains the cornerstone of medical treatment in children with severe bronchiolitis. Current guidelines of the American Academy of Paediatrics and the NICE (National Institute for Clinical Excellence), United Kingdom recommend supportive management with oxygen supplementation for hypoxia, respiratory support, hydration and nutritional support, close monitoring for children with severe bronchiolitis [22,23,24]

In the recent past, heated humidified high-flow nasal cannula oxygen has emerged as a promising approach for infants with severe bronchiolitis A phase 4 RCT conducted in New South Wales, Australia reported a significantly lower rate of treatment failure in infants who received high-flow oxygen therapy (14%) compared to standard oxygen therapy

So, a study was planned to compare the humidified high-flow nasal cannula oxygen therapy and conventional oxygen treatment in infants with bronchiolitis.

## **Comparison of humidified high-flow nasal cannula oxygen therapy and conventional oxygen treatment in infants with bronchiolitis: A randomized controlled clinical trial**

### **Objective:**

To compare the effectiveness of heated humidified high-flow nasal cannula (HHHNC) oxygen therapy against the standard oxygen treatment in infants with bronchiolitis

### **Setting:**

It was an open-label randomized parallel group (1:1) clinical trial, conducted in the university paediatric unit of the Teaching Hospital, Jaffna in 2019. The study population was infants with bronchiolitis who required oxygen therapy

The primary outcome of the study was treatment failure that required escalation of treatment and the secondary outcomes were improvement in heart rate and respiratory rate, and Respiratory Distress Assessment Instrument (RADI) score at 1,2 and 4 hours after initiation of treatment, duration of oxygen requirement, and duration of hospital stay.

Infants in the test arm received heated humidified high-flow oxygen through the Optiflow system with an age-appropriate Optiflow Junior cannula and the Airvo 2 High flow system (Fisher & Paykel Healthcare) at a flow rate of 2L/Kg/min. The inspiratory oxygen fraction (FiO<sub>2</sub>) was adjusted to obtain oxygen saturation above 94%. Infants in the control arm received conventional oxygen therapy through a conventional nasal cannula with a rate of 2 l/min to maintain the oxygen saturation above 94%.

Heart rate respiratory rate, oxygen saturation and RADI score were monitored hourly for the first 4 hours and then 4 hourly until the cessation of oxygen therapy.

A data record form was used to record the basic information and monitoring. The chi-square test was used to compare the categorical variables and the independent t-test was used to compare continuous variables. A p-value of <0.05 was considered significant.

## Results

During enrolment, 112 infants with bronchiolitis were admitted to the university paediatric unit of Teaching Hospital, Jaffna. Of them, 36 met the criteria for enrolment when the trial was terminated. Figure 9 shows the flow chart of the trial participants

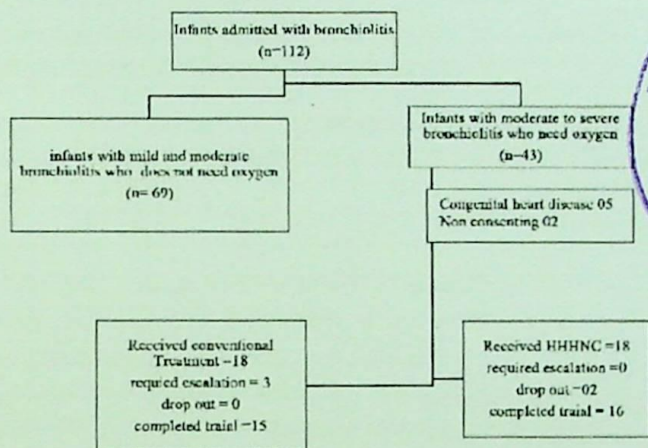


Figure 9 - flow chart of the study participants

The mean age of the test arm was 6.19 months, the control arm was 6 months, and the mean maturity of both arms was 37 weeks. Neither group had a statistically significant difference in the heart rate, respiratory rate, or RADI score before the intervention (Table 4)

	HHHNC group	Control group	Mean difference and (95% confidence interval of the difference)	P value
<b>Patients' characteristics (n)</b>	16	15		
Age in months	6.19 ± 3.35	6.00 ± 3.79	0.19(-2.44- 2.82)	Ns
Maturity at delivery (gestational age in weeks)	37.38 ± 2.83	37.47 ± 3.29	-0.0 (-2.34-2.16)	Ns
Prematurity at birth (<37 weeks)	4	3		
Heart rate on admission	175 ± 14	165 ± 17	10 (-2 - 22)	Ns
Respiratory rate on admission	70 ± 12	63 ± 10	7 (2-15)	Ns
Oxygen saturation(spO2) on admission	89 ± 3	91 ± 4	2 (-4 -1)	Ns
RADI score on admission	14.94 ± 1.6	13.6 ± 2.23	1.34(-0.09-2.76)	Ns

Table 4 Basic characteristics and vital parameters of the study participants according to group randomization (before the intervention)

	Test arm	Control arm	Mean difference and (95% confidence interval of the difference)	P value
<b>At 1 hour</b>				
heart rate	161 ± 19	155 ± 21	-9 - 21	Ns
Respiratory rate	60 ± 12	59 ± 11	-8 - 9	Ns
RADI score	14.3 ± 1.8	13.6 ± 2.2	-0.75 - 2.18	
Improvement in heart rate	13 ± 2	3 ± 1	4 - 14	<b>0.001</b>
Improvement in respiratory rate	11 ± 6	6 ± 6	1 - 10	<b>0.015</b>
Improvement in RADI score	0.63 ± 1.0	0.07 ± 0.3	0.001 - 1.12	<b>0.05</b>
<b>At 2 hours</b>				
heart rate	149 ± 12	153 ± 16	-15 - 6	Ns
Respiratory rate	55 ± 12	58 ± 10	-12 - 4	Ns
RADI score				
Improvement in heart rate	27 ± 14	13 ± 6	6 - 22	<b>0.002</b>
Improvement in respiratory rate	16 ± 11	5 ± 4	4 - 16	<b>0.002</b>
Improvement in RADI score	2.94 ± 1.69	0.53 ± 0.92	1.39 - 3.41	<b>&lt;0.001</b>
<b>At 4 hours</b>				
heart rate	152 ± 22	148 ± 18	-11 - 19	Ns
Respiratory rate	54 ± 11	58 ± 10	-13 - 3	Ns
RADI score				
Improvement in heart rate	26 ± 16	19 ± 17	-6 - 19	Ns
Improvement in respiratory rate	17 ± 13	6 ± 5	4 - 18	<b>0.003</b>
Improvement in RADI score	3.56 ± 2.55	2.4 ± 1.99	-0.53 - 2.85	Ns

Table 5: Secondary outcomes- Heart rate, Respiratory rate, RADI score, improvement in heart rate, and respiratory rate at 1 hour, 2 hours, and 4 hours after intervention according to group

The improvement in heart rate respiratory rate and RADI score were significantly high in the high-flow group in one hour and two hours after initiation of the intervention. However, after 4 hours of initiation of treatment, the difference in the improvement was not significant.

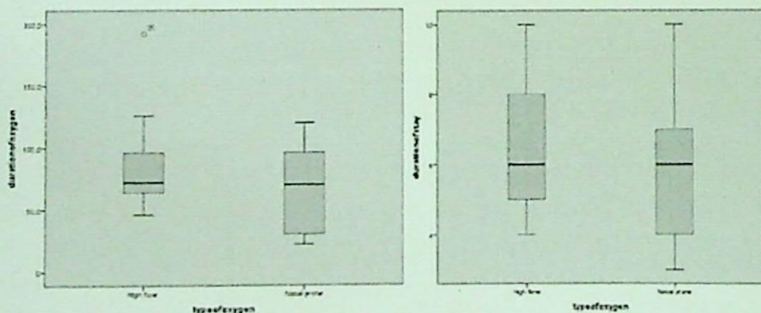


Figure 10 Duration of oxygen requirement and duration of hospital stay

The mean duration of oxygen needed in HHHNC arm was  $85.63 \pm 7.10$  hours and in the conventional oxygen arm was  $64.9 \pm 33.4$  hours. The difference in oxygen need between the two groups was not statistically significant. (  $F = 0.046$   $p = 0.832$ )

The mean duration of hospital stay in HHHNC arm was  $6.3 \pm 2.1$  days and in the conventional treatment arm  $6.07 \pm 2.2$  days. The difference between the two groups was not statistically significant.

In both arms, all the babies were discharged without any consequences. None of the infants needed PICU admission or endotracheal intubation due to bronchiolitis.

#### Conclusion:

Our randomized controlled trial involving infants with moderating bronchiolitis showed a significant short-term respiratory improvement in the form of improvement in heart rate and respiratory rate when using high-flow oxygen, but there was no significant difference in the duration of oxygen need, need for escalation treatment or duration of hospital stay when compared with standard oxygen treatment.

#### Limitation:

It was not possible to mask the oxygen delivery mode. So no blinding

After commencing the trial the High-flow oxygen therapy was used as a recognized escalation mode of treatment when standard treatment failed, so it was not ethical to continue without escalating when they continued to have respiratory distress for a certain period. Thus the trial was discontinued with a smaller sample size.[25]

Patient perception of management is crucial, as their satisfaction and trust significantly impact the effectiveness of treatment.

#### **Patient's perspective on management**

Patient satisfaction is a key indicator in evaluating the effectiveness of medical care during hospitalization. Therefore, assessing the satisfaction of parents during their child's hospitalization is both important and highly relevant.

Patient satisfaction is a valuable metric for measuring overall healthcare quality. It helps in delivering high-quality patient services, evaluating staff performance, identifying dissatisfied patients and the reasons behind their dissatisfaction, enhancing the patient care experience, and increasing patient retention rates.

Patient satisfaction is correlated with important outcomes, such as good compliance, decreased utilization of medical services, less malpractice litigation and better prognosis [26]

To assess the parents' satisfaction following study was planned.

### **Assessment of parents' or guardians' satisfaction of in-patient health care provided to their children in a single unit at a tertiary care hospital.**

#### **Objective:**

To assess the parents' or guardians' satisfaction of in-patient health care provided to their child and to identify the factors associated with the level of satisfaction.

#### **Setting:**

A prospective cross-sectional study was done in the Paediatric Units, at Teaching Hospital Jaffna (THJ). The sample size was calculated using  $N = Z^2p(100-p)/d^2$ , here P was taken as 10.4 using the previous literature and the total needed sample was 159. Patients were selected by systematic random sampling. Data were collected by data collectors using an interviewer-administered questionnaire just before the discharge.

#### **Results:**

The total number of participants enrolled was 165, out of which 91% were mothers, 3% were fathers, 3% were others, and 41% had studied above grade 11. The mean age of participants was  $33.45 \pm 7.2$  years (range 17 to 60). The mean age of the children was  $4.23 \pm 3.75$  years, 54% of them were males and the mean duration of hospital stay was  $3.64 \pm 2.4$  days (range 1 - 15 days)

When the parents rated their overall satisfaction with the hospital services, 93.9% (n=155) were very satisfied and the other 6.1% were satisfied. The mean score for global satisfaction was  $4.93 \pm 0.23$ , which indicates the parents were highly satisfied with the care provided during the hospital stay.

Item tested	Mean score with SD
Communication with the nursing officers	4.85 ± 0.57
Communication with the medical officers	4.87 ± 0.58
Method of history taking by doctors	4.88 ± 0.52
Information given regarding investigation results	4.77 ± 0.70
Information given regarding the disease of the child	4.84 ± 0.56
Information regarding treatment given to the child	4.72 ± 0.64
Opportunities given to discuss regarding illness of the child	4.75 ± 0.66
Cleanliness around the bed	4.72 ± 0.59
Cleanliness of the bathroom	4.47 ± 0.93
Silence and dim light at night	4.74 ± 0.65

Table 6: Different components of the parent's satisfaction

Table 6 shows the different components of items tested for satisfaction against their mean score and standard deviation (the maximum possible score is 5)

Most of the study participants (96.4%) said they would definitely recommend this hospital to others, while 3.6% said they might recommend it sometimes.

Variable	Frequency	Chi square	P value
Sex of the child			
Males	90	2.165	0.106
Females	75		
Age group of the child			
0-1 year	36	2.611	0.625
1 - 3 years	51		
4 -5 years	24		
6 - 10 years	38		
>10 year			
Duration of hospital stay			
1 day	19	12.237	0.007
2 - 5 days	117		
6 - 10 days	25		
>10 days	4		
Condition on discharge			
Fully cured	126	0.078	0.781
Less symptoms but not fully cured	39		
Age of the participant			
<20 years	5	6.575	0.160
21- 30 years	63		
31 - 40 years	74		
41- 50 years	20		
>50 years	3		
Relationship to the child			
Mother	155	2.251	0.522
Father	5		
Relatives	4		
Caregiver	1		

Highest educational level of the participant			
Up to grade 5	5	16.408	0.003
Grade 6- O/L	93		
Advanced level	63		
Graduate	4		
Postgraduate	1		

Table 7: Factors associated with satisfaction

Table 7 demonstrates that there was no significant association between parents' satisfaction with age and sex of the child, whether the child was fully cured on discharge or symptomatic on discharge, and the participant's age.

There was a significant association between parents' satisfaction and duration of hospital stay  $X^2(3, N=165)=2.237$   $p=0.007$  and the parents' educational level  $X^2(4, N=165)=16.408$ ,  $p=0.003$ .

Difficulty in maintaining the child alone was a main problem identified in 29.1% ( $n=48$ ) of the mothers.

#### Conclusion:

This study identified that the parents and caregivers were highly satisfied with the health care provided to their child during the hospital stay. The level of satisfaction was high when the duration of stay was short and the participants' educational level was low.[27]

Though management is crucial in controlling the disease, we must also recognise the profound impact it has on a child's overall development and quality of life, beyond just the medical aspects.

#### Impact of the disease on child life

Children with chronic health conditions may have some activity limitations, frequent pain or discomfort, abnormal growth and development, more hospitalizations, outpatient visits, and medical treatments. Children with severe disabilities may be unable at times to participate in school and peer activities.[28]

#### Impact of bronchial asthma on lifestyles in children with bronchial asthma in a tertiary care unit.

##### Objective

To evaluate the impact of bronchial asthma on lifestyles in bronchial asthmatic children and to analyse the relationship between the severity of asthma and lifestyle restriction.

## Setting

A prospective cross-sectional descriptive institution-based study was conducted at the Paediatric Respiratory Clinic of the Professorial Unit Teaching Hospital Jaffna.

All the children who were diagnosed as Bronchial Asthma and on inhaled corticosteroids for more than 3 months duration were recruited for the study. The study was conducted from April 2015 to March 2016. Data was collected by using a structured interviewer-administered questionnaire.

## Results

Sixty children were included in the study, out of that twenty-seven per cent (27%) were in the age group of 2-5 years and 70% were between 5-12 years. The mean age of the study population was  $6.8 \pm 3.2$  years. Females represented 55% and males were 45%. Only 27% of the study population had exercise-induced asthma. The mean duration of steroid use is  $15.5 \pm 1.5$  months. Figure

**Duration of inhaled steroid use (%)**  
■ <1 year ■ 1-2 years ■ 2-3 years ■ >3 years

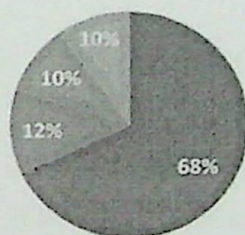


Figure 11 Duration of inhaled steroid use of the study participants

Month before the study	Well controlled	Poorly controlled	Very poorly controlled
Last month	68%	27%	5%
Previous month	68%	22%	10%
Month before the previous months	68%	28%	7%

Table 8: Asthma control for the previous 3 months

Nearly two-thirds (65%) of the children had good asthma control over the entire 3-month period. Thirty-seven percent (37%) experienced no acute exacerbations during these 3 months, while 8% had more than three exacerbations. Among those with acute exacerbations, 58% did not require any hospital admissions, whereas nearly 10% needed more than four hospital admissions for exacerbations during the same period.

Ninety per cent (90%) of the study population had no school absenteeism during the entire 3-month period.

Sixty-two percent (62%, n=37) of mothers restrict ice cream consumption, with 22% (n=13) imposing restrictions even though their children remain symptom-free and have good control. These restrictions are enforced by the parents in 95% of cases, and by a medical practitioner in 5% of cases.

Restriction of chilled food items is noted in 60% (n=36), and other food items like milk, banana and crabs were seen in 33%, 38% and 43% respectively.

Outdoor play activities were restricted for 14 children (23%), of whom only 6 (43%) had exercise-induced asthma. Competitive sports and visits to crowded places were restricted for 18% of the children. Bathing was restricted for 38% of the children, and 48% were restricted from bathing during an acute exacerbation.

There was no significant association between asthma control and the restriction of ice cream(p=0.68), play activity (p=0.3), competitive sports (p=0.07) and crowded places(p=0.7).

### Conclusion

This study brought to light that there is a significant limitation of daily activities enforced by their parents in children with bronchial asthma despite good asthma control.[29]

### Quality of life of children

Quality of life (QOL), as defined by the World Health Organization, is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns." [30] It is essential to measure the quality of life of

children with chronic diseases such as asthma because it provides a comprehensive view of a person's overall well-being rather than just their disease status.

Asthma profoundly impacts various aspects of children's quality of life. Recurrent symptoms such as wheezing, coughing, and breathlessness limit physical activities and disrupt sleep patterns and academic performance, thereby impeding overall well-being. Moreover, the psychosocial ramifications of living with a chronic condition, including feelings of anxiety, social isolation, and stigma, further compound the challenges faced by children with asthma.

Health-Related Quality of Life (HRQoL) is a complex, multidimensional concept, including social, emotional, and physical functioning or well-being, related to the patient's health state [31].

### **Quality of Life Among Children with Asthma: A Study at a Single Tertiary Care Centre in Northern Sri Lanka**

#### **Objective**

This research aimed to explore the quality of life of children with asthma and to determine the association between asthma control and quality of life.

#### **Setting**

An institutional-based cross-sectional descriptive study was conducted at paediatric clinics Teaching Hospital Jaffna for one year period starting from January 2023 to December 2023. Children more than six years old were diagnosed with asthma and on long-term inhaled corticosteroids for more than 3 months and their caregivers were recruited.

Data were collected using an interviewer-administered questionnaire. Asthma control was assessed using the childhood asthma control test (C-ACT). It consists of 9 questions. The maximum possible score is 27 and the minimum possible score is 0. Scores above 20 indicates well-controlled asthma and scores between 12-19 indicates partially controlled asthma and scores below 12 indicates poorly controlled asthma.

Quality of life was assessed using the Paediatric Quality of Life Questionnaire (PedsQL) Tamil version for India 4.0 by separately from the child and parents.

A 5-point Likert response scale (0–4) was used for scoring responses from study participants. All items were reverse-scored and linearly transformed to a 0–100 scale (0=100, 1=75, 2=50, 3=25, 4=0) for better interpretation. The maximum possible score is 100 and the minimum possible score is zero. Higher scores indicate a better quality of life.

## Results

A total of 99 children (6-16 years old) and their caregivers, fulfilled the eligibility criteria and completed the study. Table 9 demonstrates the socio-demographic characteristics of the study participants.

Sociodemographic characteristics	Number	Percentage
Age group of the child		
72- 96 months	36	36.4
97 – 120 months	23	23.2
121- 168 months	34	34.3
>168months	6	6.1
Sex of the child		
Males	54	54.5
Females	45	45.5
Main respondent		
Mother	82	82.8
Father	9	9.1
Siblings	3	3
Other relatives	4	4
Guardian	1	1
Family history of asthma		
Presence of family history of asthma	73	73.7
Absence of family history of asthma	26	26.3

Table 9: Socio-demographic characteristics of the study participants.

The mean age of asthmatic children was 115.5 (SD 31.6) months, with a male-to-female ratio of 1.2 :1. The main respondents are the parents (92%). About three-fourths (73.7%) of the asthmatic children had a family history of asthma.

Asthma control	Males	Females	Total
Well controlled asthma (score >20)	26	25	51(51.5%)
Partially controlled asthma (score between 19-12)	23	19	42 (42.4%)
Poorly controlled asthma (score <12)	5	1	6(6.1%)

Table 10: Asthma control according to the Childhood Asthma Control Test

The mean score for the childhood asthma control test was 19 with a standard deviation of 4.05. The minimum score recorded was 4 and the maximum was 27. Table 10 demonstrates the asthma control according to the childhood asthma control test.

Asthma scores were higher for females (M=19.53 SD3.23) when compared with males (M18.56 SD4.59). There was a significant effect of sex on asthma score (t (97) F=4.509, p= 0.036.) There was no significant effect of family history (t (97) F=0.499 p=0.482) despite children with a positive family history (M=19.36, SD =4.13) attaining higher scores than those without a family history of asthma (M= 18 SD=3.69)

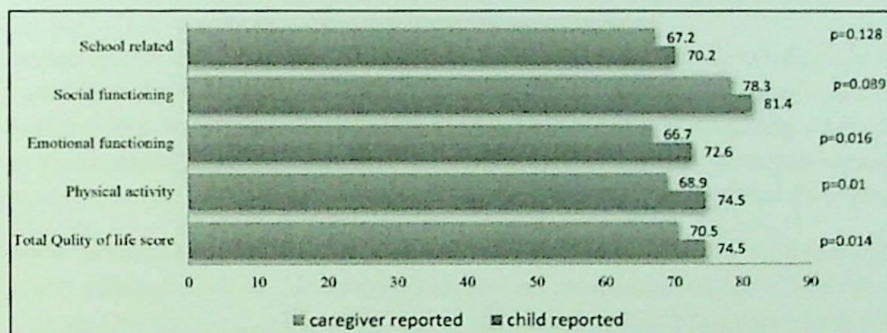


Figure 12: Child-reported and Caregiver reported Quality of life scores for total and different domains

Figure 12 illustrates the quality of life of different domains for children based on both child-reported and caregiver-reported scores. The mean total quality of life score reported by the children was  $74.47 \pm 10.05$ , while the caregiver-reported score was  $70.87 \pm 12.56$ . A strong positive correlation was found between the child-reported and caregiver-reported total quality of life scores ( $r = 0.724, p < 0.001$ ). However, there was a significant average difference between the two sets of scores ( $t(196) = 2.48, p = 0.014$ ).

Variable	Quality of life domains				
	Physical function	Emotional function	Social function	School activity	Quality of life total score
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Controlled asthma	76.76(13.06)	79.31(13.86)	81.25(12.73)	72.84(11.32)	77.38(9.83)
Uncontrolled asthma	72.07(14.90)	65.52(16.28)	81.46(12.46)	67.29(11.48)	71.37(9.43)
Student t-test P value	0.09	<b>0.000</b>	0.936	<b>0.017</b>	<b>0.003</b>
Male	75.04(14.09)	75.74(16.06)	81(12.72)	70.65(12.48)	75.42(9.9)
Female	73.82(14.26)	68.89(16.48)	81.78(12.44)	69.56(16.77)	73.33(10.22)
Student t-test P value	0.67	<b>0.039</b>	0.76	0.65	0.30

Table 11 Factors associated with the quality of life of asthmatic children

Overall, the quality-of-life scores were lower in children with uncontrolled asthma compared to those with controlled asthma, and this difference was statistically significant ( $p = 0.003$ ). Children with controlled asthma had higher scores on the emotional and school-related components compared to those with uncontrolled asthma.

While gender did not affect the total quality of life score, it did influence the emotional function. Girls scored lower on the emotional component than boys, which was also statistically significant ( $p = 0.039$ ).

#### Conclusion:

This study shows that the quality-of-life scores were low for children with asthma. Children's perceptions were better about their quality of life than their caregivers. The emotional component was more affected in girls than in boys, and both school and emotional activities were significantly impacted when asthma was not well-controlled.

#### Disease impact on family

Asthma can affect the Quality of Life (QOL) of both children and caregivers.[32] Care for a child with asthma is a difficult and complex task. This involves monitoring of symptoms, medication supplementation, and visits to health care facilities for follow-up and in emergency situations. Due to the chronicity of asthma, caregivers could suffer from long-term stressors that affect their decision-making, work responsibilities and productivity[33]

Moreover, caregivers frequently suffer from poor quality sleep because they need to be vigilant to observe any child's symptoms, especially at midnight. They easily get stressed and wake many times to check on the child and provide care if needed [34]

### **Quality of life of the caregivers of asthmatic children- A single cantered study in Northern Sri Lanka**

#### **Objectives**

To assess the quality of life of the caregivers of children with asthma and to identify the association between asthma control and the quality of life of the caregivers.

#### **Setting:**

An institutional-based cross-sectional descriptive study was conducted at paediatric clinics in Teaching Hospital Jaffna for one year period starting from January 2023 to December 2023. Caregivers of children with asthma who are on long-term inhaled corticosteroids for at least three months were included in the study.

Asthma control was assessed using the childhood asthma control test (C-ACT). The quality of life of caregivers was assessed using the Paediatric Asthma Caregivers Quality of life questionnaire (PACQLQ) Tamil version for India. A 7-point Likert response scale (1–6) was used to score the responses from study participants. Higher scores indicate a better quality of life

#### **Results:**

A total of 99 caregivers participated in the study, with 82.8% being mothers, 9% fathers, 3% siblings, and 5% from other categories.

	All of the time	Most of the time	Quite often	Some of the Time	Once in a while	Hardly any of the time	None of the time	Mean score	SD
Did you feel helpless or frightened when your child experienced cough, wheeze, or breathlessness?	1%	1%	4%	19.2%	17.2%	12.1%	45.5%	5.69	1.45
Did your family need to change plans because of your child's asthma	2%	1%	1%	28.3%	18.2%	19.2%	30.3%	5.38	1.42
Did you feel frustrated or impatient because your child was irritable due to asthma?	0	2%	0	2%	13.1%	16.2%	66.7%	6.4	1.02
Did your child's asthma interfere with your job or work around the house?	1%	2%	1%	25.3%	18.2%	18.2%	34.3%	5.49	1.40
Did you feel upset because of your child's cough, wheeze or breathlessness?	1%	7.1%	16.2%	28.3%	10.1%	4%	33.3%	4.85	1.76
Did you have sleepless nights because of your child's asthma?	1%	7.1%	11.1%	24.2%	12.1%	5.1%	39.4%	5.12	1.77
Were you bothered because your child's asthma interfered with family relationships?	1%	1%	3%	17.2%	14.1%	13.1%	50.5%	5.84	1.42
Were you awakened during the night because of your child's asthma	4%	4%	8.1%	29.3%	10.1%	7.1%	37.4%	5.08	1.79
Did you feel angry that your child has asthma?	0	2%	1%	6.1%	13.1%	18.2	59.6%	6.23	1.16
About your child's performance of normal daily activities?	0	4%	8.1%	10.1%	21.2%	18.2%	38.4%	5.57	1.49
About your child's asthma medications and side effects?	2%	3%	8.1%	14.1%	20.2%	33.3%	19.2%	5.24	1.46
About being over protective of your child?	2%	6.1%	5.1%	15.2%	17.2%	25.3%	29.3%	5.32	1.60
About your child being able to lead a normal life?	3%	4%	7.1%	12.1%	18.2%	25.3%	30.3%	5.35	1.62

Table 12: Frequency of response by the study participants

The mean quality of life score for caregivers of children with asthma was  $5.51 \pm 1.13$  (range 2-7). The physical component score was slightly lower (mean  $5.28 \pm 1.44$ , range 1.5-7) compared to the psychosocial component score (mean  $5.59 \pm 1.07$ , range 2.22-7). A one-way ANOVA showed no significant difference between quality-of-life scores and asthma control (df 2, 96;  $F=2.298$ ,  $p=0.106$ ).

#### Conclusion:

The quality of life of the caregivers of children with asthma is low even with good control of asthma.

*With these studies in mind, let us look at the lessons learned from the studies*

#### **Lessons learned from the studies and implemented till now for better outcomes for children**

1. Heated humidified high-flow nasal cannula oxygen therapy for children with moderate to severe bronchiolitis has shown significant short-term respiratory improvement- in the form of improvement in respiratory distress quickly

The policy was taken to start heated, humidified high-flow oxygen when infants admitted with moderate to severe bronchiolitis as first-line.

2. Caregiver satisfaction during hospital stay has identified when the hospital stay is prolonged; mothers find it difficult to look after the infants alone. Arrangements were made to keep support for mothers when the hospital stay is prolonged

3. Quality-of-life scores were low for children with asthma and it is significantly impacted when asthma was not well-controlled.

4. A significant limitation of daily activities enforced by their parents in children with bronchial asthma despite good control.

5. The quality of life of the care givers of children with asthma is low even with good control of asthma.

A book on asthma was published to educate both the child and the care givers and asthma control was closely monitored with a regular asthma diary with an action plan for a better quality of life



### **Lessons learned from the studies which need future implementation**

1. Studies have clearly shown a seasonal variation in respiratory infections.  
This necessitates careful anticipation and effective resource management, including the availability of necessary medications, to ensure the delivery of high-quality care in future.
2. Out of hospital admissions due to respiratory illness, more than 75% are attributed to infectious origin. Clear evidence has shown that basic hygiene measures, such as hand hygiene and wearing masks, significantly reduced the spread of these infections during the COVID-19 pandemic. Health education for the public is essential, especially during the peak period of respiratory illnesses from October to February. Promoting hand hygiene, avoiding crowded places, and using face masks to prevent the spread of respiratory infections, particularly among children.
3. Need further studies to evaluate the economic burden of respiratory illness and to evaluate the aetiology of respiratory infections.

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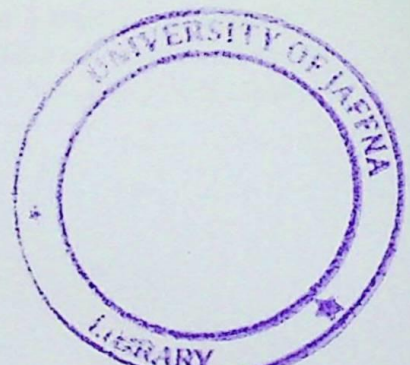
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Nirubaa Umasankar, born in Point Pedro, Sri Lanka, began her primary education at J/Kurumbasiddy Pon Paramanather Maha Vidyalayam before continuing her secondary studies at Hindu Ladies College, Jaffna. She later attended the Faculty of Medicine, University of Jaffna, where she graduated with an upper second class and distinctions in Paediatrics and Surgery. Her outstanding academic achievements earned her numerous prestigious awards, including the Subramaniam Gold Medal for best performance in Surgery, the Vaithiyanathar Nadarajah Memorial Prize, the university prize for best performance in the final MBBS examination, and the Nanthi Gold Medal for best overall performance throughout the medical course.

Following her internship at the Teaching Hospital, Peradeniya, and a brief tenure at Base Hospital, Navalapitiya, Dr. Umasankar began postgraduate training in Paediatrics in 2006. She was awarded the Diploma in Child Health in 2008 and obtained her MD in Paediatrics in 2009 from the Postgraduate Institute of Medicine, Colombo.

In 2013, Dr. Umasankar joined the Department of Paediatrics at the University of Jaffna as a lecturer and was promoted to senior lecturer in 2017. She served as the Head of the Department of Paediatrics from 2017 to 2022. Dr. Umasankar has also made significant contributions as a member of the Board of Study in Paediatrics in Sri Lanka and continues to be actively involved as a trainer and examiner for postgraduate students in Paediatrics.

Dr. Umasankar's extensive contributions to medical education include her role as secretary of the Curriculum Development and Evaluation Committee and as a coordinator for postgraduate courses and the ALERM course at the Faculty of Medicine.

An active member of the Jaffna Medical Association, she currently serves as its senior vice president. Dr. Umasankar is a member of the research and development committee and a long-standing member and vice chairperson of the Ethical Review Committee of the Faculty of Medicine. She is also a member of the Forum of Ethics Review Committees in Sri Lanka, representing Jaffna.

As a passionate researcher, Dr. Umasankar's work focuses on childhood respiratory diseases, allergies, and asthma. She has published in peer-reviewed journals and presented her work at both national and international scientific conferences. Her research has earned the prestigious Professor Sri Sabaratnam Arulkumaran prize in 2019 and 2022. Her research has been recognized through University Research Grants in 2015 and 2019. Dr. Umasankar is also the author of *Asthma: A Guide for Parents and Children*, further contributing to paediatric education and healthcare in Sri Lanka.