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A Study Of Assessment Of Risk Factors Associated With Lower Respiratory Tract Infection (Lrti) In Children Aged Less Than 24 Months

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Abstract

Background: *Acute lower respiratory tract infections (ALRIs) are the substantial cause of morbidity and mortality in children, especially in developing countries. Different factors were identified for the increased risk of LRTIs in children. Some of them include low birth weight, malnutrition, lack of breastfeeding, maternal literacy, smoking, low socio-demographic status etc. It is therefore crucial to identify the potential risk factors contributing to LRTI in children to suggest appropriate prevention strategies. So, a cross-sectional study was done to assess the risk factors associated with these Lower Respiratory Tract Infections.*

Methods: *A Cross Sectional was conducted among 88 study subjects from 1 to 24 months diagnosed with Lower Respiratory Tract Infection. The risk factors associated with these hospitalisations were assessed.*

Results*: It was observed that 67% were male and all belonged to lower socio-economic status. 58 individuals (65.9%) were unique children and never been admitted before. All were immunized as per age. 47.7% were pre term babies, 56.8% were low birth weight babies i.e less than 2.5kg, 44.3% had a history of NICU admission, around 13.6% were not exclusively breast fed and 35.2% individuals had a history of anaemia. Family history of atopy was found in 34.1% of the infants.*

Conclusions: *Hence, we conclude that a family history of atopy, history of anaemia, not exclusively breast fed, pre term gestations, low birth weight and admission to NICU can be risk factors associated with admissions to hospital with Lower Respiratory Tract Infections (LRTI).*

Keywords: *Pneumonia, Respiratory tract infections, Breast feeding, Immunization,*

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I. Introduction:

Acute lower respiratory tract infections (ALRIs) are the substantial cause of morbidity and mortality in children, especially in developing countries [1,2]. Pneumonia and bronchiolitis are most common among children and globally, 150 million new episodes of pneumonia are identified per year worldwide, more than 90 % of which occur in developing countries [2-4]. Viruses are the most common cause of pneumonia in infants and young children, and the most frequent symptoms and signs are coughs, increased respiratory rate, fever, breathing difficulty, runny nose, and indrawn chest wall in more severe disease [3–5].

Viruses primarily infect and replicate in the airway epithelium, causing injuries in the proximal (conducting) and distal airways (alveoli and parenchyma), where gas exchange occurs. Viral infection can have multiple clinical manifestations, such as pneumonia, defined as an inflammation of the lung parenchyma. This condition is often associated with visible changes on chest X-rays, CT scanning, or gallium scanning and with abnormalities in alveolar gas exchange. The presentations of viral pneumonia vary considerably depending on the age and immunological competence of the host, as well as the viral pathogen. Viral pneumonia is an important cause of morbidity and mortality in immune compromised individuals and children [6]. The clinical presentation depends on the specific causative agent but typically includes fever and lower respiratory tract symptoms, such as tachypnoea, nonproductive cough, wheeze, and increased breath sound [6, 7].

Different factors were identified for the increased risk of LRTIs in children. Of these, poverty, restricted family income, low parental education level, low birth weight, malnutrition, lack of breastfeeding, maternal literacy, smoking, low socio-demographic status, solid fuels for cooking and heating, immune impaired populations, improved toilet facilities, season, and residence [8-11]. Most studies confirm a protective

role of breastfeeding against respiratory infections in the long term, as the outcomes are often measured after 6 months of age, or even at 1, 2, or 6 years, showing a persistent protective effect even after breastfeeding has been stopped [12].

It is therefore crucial to identify the potential risk factors contributing to LRTI in children to suggest appropriate prevention strategies. So, a cross-sectional study was done to assess the risk factors associated with these Lower Respiratory Tract Infections**.**

Objective Of The Study:
To assess the risk factors associated with these Lower Respiratory Tract Infections.

II. Methodology

Study design: cross-sectional study

Study duration: 12 months (may 2022 to may 2023)

Study area: adichunchanagiri institute of medical sciences b.g.nagara.

Study participants: all children with lower respiratory tract infection attending the department of paediatrics, adichunchanagiri institute of medical sciences, mandya district.

Inclusion criteria
Children aged 2 months to 2 years diagnosed with lower respiratory tract infections.

Exclusion criteria
Congenital heart disease
Associated congenital anomaly
Hypotonia babies/ floppy infant

Estimation Of Sample Size:

On the basis of statistics obtained from Department of paediatrics, Hassan institute of Medical Sciences, an average of 8 cases per month fitting the criteria of the study with study duration of 12 months, we can expect to have N=96. Based on this population size, using YAMANE equation, for a known population size sample size (n) equal to
$n = N/1+Ne^2$
n=sample size
N=population size
e= margin of error (for 95% of confidence level, margin error =0.05)
n=96 /1+96 *0.05*0.05 = 96 /1.24 = 77.41
A minimum sample size of 77 is required for the present study.

Method Of Collection Of Data:

Children aged 2 months to 2 years diagnosed with Lower Respiratory Tract Infections attending the paediatrics OPD/IPD of Adichunchanagiri Institute of Medical Sciences, Mandya were included in the study. Clearance from the institutional ethical committee was taken before starting the study. Study participants were included in the study by Purposive Sampling technique.

The study participants were included in the study, till the sample size was reached. Written informed consent was taken from the parents before collecting the data. A pre-tested, semi-structured questionnaire was used to collect information on socio-demographic variables and clinical history related to Lower Respiratory Tract Infections by interview method. Relevant Laboratory and Radiological investigations were done. The factors contributing to acute respiratory illness that were considered in our study were Previous history of hospital admission, Immunization history, Family history of atopy, Gestational age at birth, Birth weight, History of NICU admission, History exclusive breast feeding and History of anaemia.

Statistical Analysis:

The data was collected and compiled in MS Excel. Descriptive statistics has been used to present the data. To analyse the data SPSS (Version 26.0) was used. Significance level was fixed as 5% ($\alpha = 0.05$). Qualitative variables are expressed as frequency and percentages and Quantitative variables are expressed as Mean and Standard Deviation. To compare the mean values between groups chi-square test was applied

III. Results:

Eighty-eight children who were admitted to our hospital with Lower Respiratory Tract Infections were studied. 46.6% of the infants were of the age group of 6-11 months. 67% of the infants were males. All the parents of the infants belonged to lower socio-economic status. 77.3% of the infants were residing in rural areas.

58 (65.9%) infants did not have previous history of admission. 18.2% of the infants had history of admission for 2 times. All of the infants in the present study were immunized as per age. 47.7% of the infants were pre term babies, 56.8% were low birth weight babies i.e less than 2.5kg, 44.3% had a history of NICU admission. 13.6% of the infants were not exclusively breast fed and 35.2% individuals had a history of anaemia. Family history of atopy was found in 34.1% of the infants. 25% of the infants had family history of on the mother's side and 9.1% of the infants had family history of atopy on the father's side.

IV. Discussion:

Lower Respiratory Tract Infections is a multifactorial causative disease which is prevalent in children less than children less than 2 years. Our study was an attempt to assess the trends of this respiratory illness. We assessed around 9 risk factors.

In the present study, 46.6% of the infants were of the age group of 6-11 months. In a study done by Seth S et al [13], majority of the infants were between 2 months to 1 year of age. In a study done by Ahire N et al [14], 48% of the infants were less than 1 year of age.

In the present study, 67% of the infants were males. In a study done by Seth S et al [13], 62% of the infants were males. In a study done by Ahire N et al [14], 55% of the infants were males. In a study done by Dagvadorj A et al [15], 52.2% of the infants were males.

In the present study, All the parents of the infants belonged to lower socio-economic status. In a study done by Seth S et al [13], 82% of the infants belonged to lower and upper-lower socio-economic status. In a study done by Ahire N et al [14], 69% of the infants belonged to lower and upper-lower socio-economic status. In a study done by Agarwal PK et al [16], 94.3% of the infants belonged to lower socio-economic status.

In the present study, 77.3% of the infants were residing in rural areas. In a study done by Seth S et al [13], 65% of the infants were residing in rural areas. In a study done by Ahire N et al [14], 75% of the infants were residing in rural areas.

In the present study, all of the infants in the present study were immunized as per age. In a study done by Seth S et al [13]. 97% of the infants had age-appropriate immunization history. In a study done by Ahire N et al [14], only 40% had age-appropriate immunization history. In a study done by Agarwal PK et al [16], 42.7% of the infants did not have age-appropriate immunization history.

In the present study, 47.7% of the infants were pre term babies. In a study done by Seth S et al [13]. 17% of the infants were delivered pre-term.

In the present study, 56.8% were low birth weight babies i.e less than 2.5kg. In a study done by Ahire N et al [14], 53% of the infants were low-birth weight babies. In a study done by Dagvadorj A et al [15], 4.2% were born with a low birthweight. In a study done by Agarwal PK et al [16], 29.7% of the infants were low-birth weight babies.

In the present study, 44.3% had a history of NICU admission. In a study done by Dagvadorj A et al [15], 38.9% of the infants had an LRTI-related hospital admission.

In the present study, 13.6% of the infants were not exclusively breast fed. In a study done by Seth S et al [13]. 29% of the infants were not exclusively breastfed. In a study done by Ahire N et al [14], 51% of the infants were not exclusively breastfed. In a study done by Dagvadorj A et al [15], 93.6% of the infants were exclusively breastfed in their first 4 months of life.

In the present study, 35.2% of the infants had a history of anaemia. In a study done by Agarwal PK et al [16], 64.3% of the infants had anaemia.

In the present study, Family history of atopy was found in 34.1% of the infants. 25% of the infants had family history of on the mother's side and 9.1% of the infants had family history of atopy on the father's side.

This study has demonstrated that the identified risk factors were previous hospitalisations, history of atopy in family, history of anaemia, history of not exclusively breast feeding, lower socio-economic status, significant birth history of pre term gestations, lower birth weight and history of NICU admissions contribute to further Acute Respiratory Illness in these children.

These risk factors can me modified with simple strategies such as adequate nutrition, immunizations, avoiding indoor pollution, exclusively breast feeding up to 6 months of age, good parental education, maintaining a good hygiene may reduce the mortality and morbidity of these Lower Respiratory Tract Infections. Public awareness program can be conducted to educate the population. Primary Health Care services must be emphasized with particular reference to its essential components such as Nutrition, Immunization and Environmental Management.

V. Conclusion:

A family history of atopy, history of anaemia, not exclusively breast fed and a significant Birth History with pre-term gestations, low birth weight and admission to NICU can be risk factors associated with admissions to hospital with Lower Respiratory Tract Infections (LRTI).

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Table 1: Sociodemographic Factors

SOCIODEMOGRAPHIC FACTORS		Frequency	Percentage
AGE	**2-5 months**	29	33.0
	6-11 months	41	46.6
	1-2 years	18	20.5
GENDER	**Male**	59	67.0
	Female	29	33.0
SOCIOECONOMIC STATUS	**BPL**	88	100.0
RESIDENCE	**RURAL**	68	77.3
	URBAN	20	22.7

Table 2: Factors Contributing To Ari

FACTORS CONTRIBUTING TO ARI		Frequency	Percentage
Previous history of admission	**Nil**	58	65.9
	1 admission	7	8.0
	2 admissions	16	18.2
	3 or more admissions	7	8.0
Immunization history	**Immunized as per age**	88	100.0
Gestation Age	**< 37 weeks**	42	47.7
	> 37 weeks	46	52.3
Birth weight	**< 2.5 kg**	50	56.8
	> 2.5 kg	38	43.2
NICU admission	**YES**	39	44.3

	NO	49	55.7
EBF	**YES**	76	86.4
	NO	12	13.6
Anemia	**Present**	31	35.2
	Absent	57	64.8
Family H/O atopy	**Present**	30	34.1
	Absent	58	65.9
Family history	**FATHER- ATOPY**	8	9.1
	MOTHER-ATOPY	22	25
	Nil	58	65.9