e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(8); 247-250

Original Research Article

Exploring Risk Factors Linked to Acute Respiratory Tract Infections in Children Aged 1 Month to 5 Years: An Observational Study

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Received: 30-05-2023 Revised: 30-06-2023, Accepted: 30-07-2023
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Conflict of interest: Nil

Abstract:

Background and Objectives: Acute respiratory tract infections represent a significant burden of morbidity and mortality, particularly among children in developing nations. These infections are responsible for a substantial 40% of mortality in children under the age of five. To investigate this matter, we conducted an observational study spanning a 12-month period at G.G. Hospital in Jamnagar. Our primary objective was to identify the risk factors associated with acute respiratory tract infections in children aged between one month and five years.

Materials and Methods: Our study focused on a cohort of 150 pediatric patients aged between one month and five years, selected based on predetermined inclusion and exclusion criteria, and following a standardized format and flow chart. We systematically assessed various potential risk factors associated with acute respiratory tract infections.

Results: Out of the 150 patients included in our study, 58% were male, and 59% hailed from rural areas. A substantial 60% of them were preterm and had low birth weight. A smaller but notable proportion, 7.3%, had a history of meconium aspiration syndrome. Malnutrition was prevalent in 25% of the cases, and 47% of the children had received incomplete immunization. Furthermore, 61% of the participants were found to be anemic, and 33% belonged to a lower socioeconomic class with limited educational backgrounds. Additional observations revealed that 28% were not primarily breastfed, and 28% were exposed to bottle feeding [4].

Conclusion: In conclusion, our study highlights the profound impact of various risk factors, including socioeconomic status, perinatal factors, environmental conditions, and nutritional aspects, on the incidence of acute respiratory tract infections among children. These factors not only contribute to the onset of infections but also influence the prognosis and overall survival of affected patients.

Keywords: Respiratory Tract Infections, Malnutrition, Socioeconomic Factors, Child.

Introduction

Acute respiratory tract infections (RTIs) are a significant contributor to morbidity and mortality, particularly among children in developing countries. They account for approximately 40% of child mortality in those under the age of five. Hospitalizations due to acute respiratory infections place a substantial burden on healthcare services, especially in developing regions. According to the World Health Organization (WHO), acute RTIs are the leading cause of morbidity in children under five globally, with nearly 160 million cases occurring each year. India, in particular, reports a substantial share of these cases, amounting to 45 million annually. Additionally, acute RTIs result in a global mortality burden of 2.1 million deaths per year, with India contributing to about 400,000 of these annual fatalities [1].

The WHO defines acute respiratory tract infection as the sudden onset of respiratory symptoms, such as cough, rhinorrhea, rapid breathing, chest wall retractions, and wheezing, with a duration of less than 14 days. In developing countries, the etiology of acute RTIs is primarily bacterial, in contrast to non-bacterial causes in developed nations. Furthermore, there is considerable variation in the incidence of acute RTIs between rural and urban areas within developing countries. Various risk factors, including socioeconomic status, perinatal conditions, environmental factors, and more, play a substantial role in the occurrence of acute respiratory tract infections. Timely detection and intervention are essential for improving prognosis, and community education initiatives and targeted healthcare programs have proven effective in

preventing numerous respiratory tract infections [2].

The aims and objectives of this study encompass several facets. Firstly, it seeks to identify and analyze the risk factors associated with acute respiratory tract infections in children aged 1 month to 5 years. Secondly, it aims to investigate a range of socio-demographic, environmental, perinatal, and nutritional risk factors and assess their correlation with acute respiratory tract infections. Thirdly, the study intends to categorize the studied risk factors as definite, probable, or possible based on their association with acute RTIs. Lastly, it aims to evaluate the relationship between these risk factors and the outcomes of the disease [3].

Material & Methods

In this cross-sectional study, a total of 150 cases were included, and the research spanned a period of 12 months. The study population consisted of patients aged between 1 month to 5 years who exhibited symptoms indicative of respiratory tract issues. Individuals falling outside the age range of 1 month to 5 years were excluded from the study, as were cases where parents or guardians were unwilling to enroll their child. Additionally, patients displaying respiratory distress attributable to known causes such as metabolic or central nervous system (CNS) disorders were also excluded from the study.

Results

Table 1: Relation of Malnutrition among Different Age Groups in Patients of Acute Respiratory Tract Infection (N=150)

Age group	Malnutrition in RTI Patients		
	Yes	No	Total
1 month to 12 months	10(15%)	58(85%)	68
1 year to 3 years	22(38%)	36(62%)	58
3 years to 5 years	05(21%)	19(79%)	24
Total	37(25%)	113(75%)	150
$\chi 2 = 9.312$ df= 2 p value=.009(significant)			

It is evident from table 1 that in our study relation of malnutrition with lower respiratory tract infection among different age group was found statistically significant ($p<0.05$).

Table 2: Age Wise Distribution of Patients (N=150)

Age Group	No. of patient	Percentage
1 month to 12 months	68	45.3%
1 years to 3 years	58	38.6%
3 years to 5 years	24	16%

Table 2 shows that most common age group (45.4%) of patients in our study is 1-12months i.e. infant age group.

In this age group the prevalence of ARI is maximum as infants more than 6 months are gradually weaned from breast milk and started on family food.

Table 3: Relation of Immunization Status in Patients of ARI (N=150)

Immunization status	Gender		Duration of stay		Total
	Male	Female	< 5days	>5 days	
Complete	50(33)	29(19)	49(62)	30(51)	87
Incomplete	37(25)	34(23)	30(42)	41(70)	63
Total	87	63	79	71	150
$\chi 2 = 5.8$, df= 1 p value=.001(signi□cant)					

Table 3 shows out of 150, Total 79 (53%) of patients are immunized, while 71(47%) are incompletely immunized (Unimmunized and partially immunized). There is significant difference between duration of stay in both groups. Those who are not immunized completely have longer stay in hospital with poor outcome.

Table 4: Natal Risk factors among patients of Acute RTI (N=150)

Risk Factors	Yes	%	No	%
Preterm	30	20%	120	80%
Low Birth Weight	30	20%	120	80%
Meconium Aspiration Syndrome	11	7.30%	139	92.70%
χ 2= 4.3, df= 2, p value= 0.002				

Table 4 shows all natal risk factors for ARI. It is evident from above table that low birth weight (20%) is one of the major risk factors for development of ARI. This finding is statistically significant.

Discussion

In this observational cross-sectional study conducted at a tertiary care hospital, the primary aim was to investigate the association of risk factors with Acute Respiratory Infections (ARIs) in children aged 1 to 60 months. A total of 150 children were enrolled, and their detailed histories were documented regarding various risk factors, encompassing socio-demographic, environmental, perinatal, and nutritional factors, utilizing a pre-designed questionnaire.

Among the 150 patients studied, a tragic outcome was observed, with four patients succumbing during hospitalization. These cases were notably linked to common risk factors including malnutrition, low birth weight, and inadequate immunization. This underscores the critical importance of proper immunization, adequate nutrition, and preterm care in ensuring the survival of hospitalized children.

Furthermore, within this cohort, 62 patients (41%) were found to have varying degrees of anemia, a statistically significant finding (p value<0.05). The study also unveiled a significant statistical association (p value<0.05) between the absence of predominant breastfeeding and the duration of hospital stays. Specifically, among the 42 patients who were not predominantly breastfed, 24 (57%) had hospital stays exceeding 5 days.

An additional significant finding was the presence of malnutrition in 37 patients (25%) within the study group. The analysis demonstrated a statistically significant relationship (p<0.05) between malnutrition and ARI, as well as its associated outcomes.

Moreover, the immunization status of the patients yielded noteworthy results. Of the 150 patients, 79 (53%) had complete immunization, while 71 (47%) were either partially immunized or not immunized at all, with longer hospital stays observed among the incompletely immunized patients, a statistically significant observation (p value<0.05).

Conclusively, this study effectively categorized risk factors as definite, probable, and possible based on their occurrence and statistical significance, providing valuable insights into the factors associated with ARIs in children. In a study conducted by Ramani et al. in Karnataka, it was determined that 37.84% of children in the age group of 2 to 3 years were afflicted with acute respiratory tract infections [4]. Similarly, a study carried out by Munagala et al. in a tertiary care hospital in Andhra Pradesh revealed that 46.67% of children aged 1 to 4 years were affected by acute respiratory tract infections, closely mirroring the findings of our study [5]. Furthermore, Adena H. Greenbaum et al., in their investigation of hospitalizations due to severe respiratory tract infections among children aged 1 to 4 years [6], contribute to the growing body of research on respiratory tract infections in pediatric populations. These studies collectively shed light on the prevalence and impact of acute respiratory tract infections in various regions and age groups.

Conclusion

In our comprehensive study, we explored the associations between various factors and Acute Respiratory Infections (ARIs) in children aged 1 to 60 months. We identified definite risk factors, including anemia, biomass fuel exposure, lack of predominant breastfeeding, passive smoking, malnutrition, preterm delivery, low birth weight, and meconium aspiration at birth. Incomplete immunization emerged as a possible risk factor, while practices like bottle feeding, prelacteal feeding, inadequate birth spacing, and exposure to kerosene lamps were considered probable risk factors. Our study emphasized the importance of parental education, particularly recognizing mothers as primary healthcare providers. We advocate for preventive health policies to reduce these risk factors, thus lessening the burden of ARIs in children and improving their overall well-being.

Source of funding: none

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