International Journal of Clinical Science and Medical Research

ISSN(print): 2770-5803, ISSN(online): 2770-582X

Volume 04 Issue 07 July 2024

DOI: https://doi.org/10.55677/IJCSMR/V4I7-06/2024, Impact Factor: 7.606

Page No : 270-277

Risk Factors Associated with Acute Respiratory Tract Infection Among Under 16 Age Group Children in Hospital, Jalal-Abad

Shila Acharya[1], Shivam Singh[2], Swanand Deshmane[3], Chitranjan Sharma[4], Pratap Pokhrel[5]

[1]Lecturer, Jalal-Abad State University,

[2,3,4]Medical Student, Jalal-Abad State University,

[5]MD Dermatology Resident, S. B Daniyarov South Branch of Kyrgyz State Medical Institute

ABSTRACT

Published Online : July 19, 2024

Introduction

Acute respiratory tract infections (ARTIs) are a significant health concern among children, contributing to high rates of morbidity and mortality, especially in developing regions.

Objective

To identify the risk factors associated with acute respiratory tract infections among children under 16 years of age in a hospital in Jalal-Abad, Kyrgyzstan. The present study was undertaken to know the various types of ARTIs in children under 16 years of Age and analyze factors influencing the morbidity and mortality of those cases. Prospective cross-sectional study for 243 infected children with ARTIs was conducted in a Jalal-Abad City Hospital, using secondary data from hospital records.

Methodology

This cross-sectional study analyzed secondary data from the medical records of children admitted with ARTIs at Jalal-Abad City Hospital, Jalal-Abad. Various Socio-demographic and health-related factors were examined using descriptive and inferential statistical methods.

Results

The analysis revealed that younger children, particularly those under 1 year of age, had the highest incidence of ARTIs. Significant risk factors included immature immune system, breastfeeding practices and under lying health conditions play. Male children were more frequently affected than females. Additionally, incomplete vaccination and low immunization status were associated with higher ARTI rates.

Conclusion

Addressing the identified risk factors through targeted public health interventions, such as enhancing immunization coverage, improving nutrition, and reducing exposure to Environmental pollutants (specially male Children those who are suffering with ARTIs), can significantly reduce the incidence of ARTIs among children in Jalal-Abad.

KEYWORDS:

Acute respiratory tract infection, Children, Microbiology, Pediatrics

INTRODUCTION

The Respiratory tract is divided as upper respiratory tract and lower respiratory tract. The upper respiratory tract includes Nose, Ethmoidal air cell, Frontal Sinuses, Maxillary sinus, Sphenoidal Sinus and Larynx. The lower respiratory tract includes the Trachea, Lungs, Air ways (bronchi and bronchioles) and the air sacs (alveoli). Together with all these organs the respiratory tract is responsible to give the breath that keeps a human alive. If infection occurs in Upper Respiratory Tract called Upper Respiratory Tract Infection & in lower respiratory tract called Lower Respiratory Tract Infection [1]. Both of them are major cause of pediatric

Corresponding Author: Shila Acharya

Cite this Article: Shila Acharya, Shivam Singh, Swanand Deshmane, Chitranjan Sharma, Pratap Pokhrel (2024). Risk Factors Associated with Acute Respiratory Tract Infection Among Under 16 Age Group Children in Hospital, Jalal-Abad. International Journal of Clinical Science and Medical Research, 4(7), 270-277

emergency and mortality among children in both developed and developing countries [2-3]

Upper Respiratory Tract Infection: Nasopharyngitis specifically to refer to swelling and inflammation of the nasal passages and the block of the throat. Most common occurs in Babies and children because virus is so easily spread and also Children having weakened immune system. It occurs as the result of an inflammatory reaction or an infection from virus, bacteria, or fungus. Sinusitis specifically refers to swelling and inflammation of the Sinuses. Babies and children have a higher risk for Sinusitis because Sinuses are fully developed until after age 12. It occurs as the result of an inflammatory reaction or an infection from virus, bacteria, or fungus. Most common sinusitis are maxillary and ethmoid sinuses.[4] Tonsillitis specifically refer to swelling and infection of the Tonsils . Tonsils are the two small lumps of soft tissue one on either side at the back of your throat & tonsils are part of your immune system. Tonsillitis is most common in children and adolescents, but it can also affect people of all ages. [5]

Causative agents of upper respiratory tract infections are virus or bacterial. The most common virus is rhinovirus. Other viruses also include influenza virus, adenovirus, enterovirus, and respiratory syncytial virus. Bacteria may cause roughly 20-40% of sudden onset pharyngitis [6]. The most common bacteria is S. pyogenes, a Group A streptococcus. [7]. Initial symptoms of Upper Respiratory Tract Infection are runny, stuffy nose and sneezing, usually without fever. Children with Nasopharyngitis may have difficulty in breathing, muffled speech, drooling (saliva flowing out of your mouth unintentionally) and stridor (an abnormal, high-pitched respiratory sound). Children with serious laryngotracheitis (croup) may also have tachypnea (rapid and shallow breathing), stridor and cyanosis (bluish color in the skin, lips, and nail). Major precautions to be followed is to wear a mask in public places, cover your nose and mouth when you cough or sneeze, wash your hands often with clean, running water and soap. Viral infections are treated symptomatically. Nasopharyngitis caused by Haemophilus influenzae are treated with antibiotics and also Haemophilus influenzae type b vaccine is commercially available [8].

Lower Respiratory Tract Infection: Bronchitis is a common type of lower respiratory tract infection. It is defined as inflammation of the large airways of the lung. Bronchitis happens most of the time in older children and adults, but bronchitis can affect all ages. Pneumonia is an infection of the air sacs of the lungs. Pneumonia affects people of any age but can be more serious in babies, older people, and those with weakened immune systems. There are various causes of pneumonia, and pneumonia can have a wide range of symptoms. Bronchiolitis is inflammation of the small airways of the lungs. This illness is more common in infants and toddlers under 2 years old. Bronchiolitis is one of the top reasons for hospitalization in small children during the fall and winter months.[9]

Causative agents of lower respiratory infections are viral or bacterial. Viruses cause most cases of bronchitis and bronchiolitis. The most common virus is influenza virus and respiratory syncytial virus (RSV) and other viruses also include parainfluenza virus (PIV) (90% serotype III), influenza A virus, and coronavirus[10]. In community-acquired pneumonias, the most common bacterial agent is Streptococcus pneumoniae. Atypical pneumonias are cause by Mycoplasma pneumoniae, Chlamydia spp, Legionella & Coxiella burnetti. Initial symptoms of lower Respiratory Tract Infection are cough, fever, chest pain, tachypnea and sputum production. Patients with pneumonia may also exhibit non-respiratory symptoms such as headache, myalgia (muscles pain), abdominal pain, nausea, vomiting and diarrhea. Some precautions must be taken such avoiding touching the face with unwashed hands, staying away from people with respiratory symptoms, cleaning and disinfecting surfaces regularly. Viral infections are treated symptomatically. Bacterial pneumonias are treated with antibacterials. A polysaccharide vaccine against 23 serotypes of Streptococcus pneumoniae is recommended for individuals at high risk [11].

In Global Data, according to the 2022 survey, National Library of Medicine reported that the highest age group to suffer from Respiratory tract infection were >5 years which was nearly 89%, in the age group between 18 to 30 years which was nearly 22% and in older patients >70 years which was nearly 3% had experience a respiratory Tract Infection [12]. A child dies of pneumonia every 43 seconds. Pneumonia kills more children than any other infectious disease, claiming around 2,000 every day in the age group of below 5 years [13].

According to the survey 2020 Ministry of Health, Kyrgyz Republic respiratory tract infections (RTIs) are the most common in Kyrgyzstan. In 2020, respiratory diseases accounted for 49.7% of child morbidity in children aged 0-14 years [14].

In India according to the 2022 survey, National Library of Medicine reported that the Highest age group to suffer from respiratory tract infection were 0 to 12 months which was nearly 63.2%, in the age group between 2 to 5 years which was nearly 59.5% and in the age group 1 to 2 year which was nearly 63.5%had experience a Respiratory Tract Infection. Higher proportions of boys (62.9%) were reported to have acute Respiratory Tract Infections compared with girls (55.1%) [15]

METHOD AND METHODOLOGY

A cross-sectional study design was used to assess the Risk factors associated with acute respiratory tract infections (ARTIs) among children under 16 years of age. The study was relied on secondary data obtained from hospital records at City Hospital in Jalal-Abad. The research was conducted at City Hospital, which was a major primary healthcare facility

in Jalal-Abad. Patients who were admitted to the Department of Pediatrics and Pulmonology in the hospital during the time period of one year (January 2023 to December 2023) were recorded in the hospital data base from where information was collected. SPSS software version 27 was used to do the analysis of the result from the data they were collected. This hospital provides comprehensive pediatric healthcare services and maintains detailed medical records, making it an ideal setting for this study. Ethical clearance was obtained from the Institutional Ethics Committee. The study met the inclusion and exclusion Criteria.

The Inclusion Criteria were

- •Children aged 0-16 years that were diagnosed with ARTIs and admitted to the hospital during the study period.
- •Records from January 2023 to December 2023.

The Exclusion Criteria were:

- •Children with chronic respiratory conditions or immunocompromised states.
- •Records with incomplete data on key variables.

RESULT

A total of 243 patients admitted to the Jalal-Abad City Hospital, Jalal-Abad during the study period were analyzed according to the study parameter. The results are displayed in the tabular format.

Table 1: Distribution of respondents according to their socio demographic information

RESPONSES	FREQUENCY	PERCENTAGE
GENDER		
Male	128	52.7
Female	115	47.3
Age		
Below 1 Year	88	36.2
Below 5 Years	41	16.9
Below 10 Years	68	28.0
Below 15 Years	46	18.9
Parents Qualification		
Educated	99	40.7
Uneducated	144	59.3
Parents Occupation		
Private And Self Employed	225	92.6
Educational Sector	10	4.1
Government Employees	1	0.4
Medicine And Pharmaceuticals Sector	7	2.9
Immunization Status		
Immunized	233	95.9
Unimmunized	10	4.1

Of the total number of patients included in the study, 128 (52.7%) were males and 115 (47.3%) were females. The above table shows of the patients age group, 88(36.2%) were under the age group of below 1 year, 41(16.9%) were in the age group below 5 years, 68 (28.0%) were in the age group below 10 and 46 (18.9%) were in below 15 years patients admitted in the hospital. The data shows that out of 243 patients, 144 (59.3%) patient's parents were uneducated and 99 (40.7%) patient's parents are educated. From the above data it shows, 225 (92.6%) were private and self employed, 10 (4.1%) were educational sector, 1 (0.4%) were government employee and 7 (2.9%) were Medicine and Pharmaceutical Sector. When looking into patients' immunization status, most of patients are 233 (95.9%) immunized and 10 (4.1%) are unimmunized [TABLE 1]

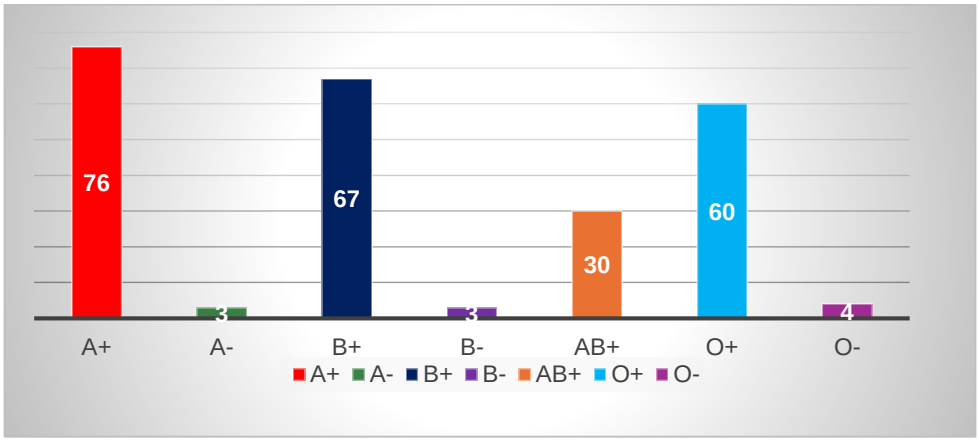

Figure 1: Distribution of respondents according to their blood group.

When patients Blood Groups was taken into the account, 7 categories were categorized such as Blood Group A+ 76 (31.3%), Blood Group A- 3(1.2%), Blood Group B+ 67 (27.6%), Blood Group B- 3(1.2%), Blood Group AB+ 30(12.3%), Blood O+ 60(24.7%), and Blood Group O- 4(1.6%). [FIGURE 1]

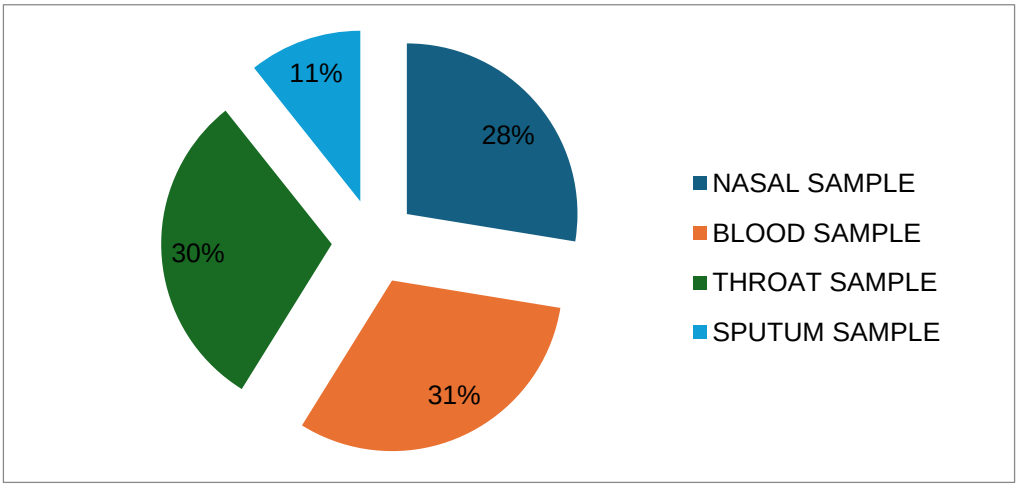

Figure 2: Distribution of respondents according to their Sample taken for Diagnosing.

Above figure shows the diagnosis method used by respondents, majorly used Blood Sample 76 (31.3%) and Throat Sample 74 (30.5%) in the hospital to make the diagnosis, whereas 67 (27.6%) cases were diagnosed with the help of Nasal Sample. Only few cases 26 (10.7%) were diagnosed with Sputum Sample. [FIGURE 2]

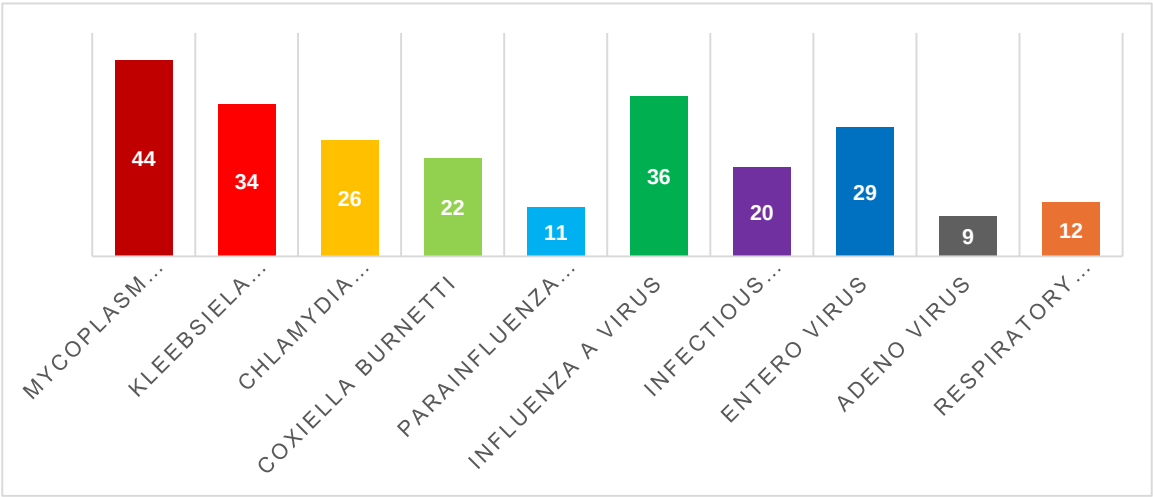

Figure 3: Distribution of respondents according to their organism after being diagnosed.

Among 243 blood tests analyzed, 126 cases of bacterial infections were diagnosed, with MYCOPLASM PNEUMONIAE being the most commonly identified organism. Viral infections were less frequent, with 117 cases of viral infections were diagnosed with INFLUENZA A VIRUS being the most commonly detected organism. These findings highlight the importance of blood sample, throat sample, nasal sample and sputum sample testing in diagnosing infectious diseases and guiding appropriate treatment strategies.Of the total number of patients, 44(18.1%) Mycoplasma Pneumoniae, 36(14.8%) Influenza A Virus, 34(14.0%) Kleebsiela Pneumoniae, 29(11.9%) Enterovirus, 26(10.7%)Chlamydia Pneumoniae, 22 (9.1%) Coxiella Burnetti, 20(8.2%) Infectious Bronchitis Virus, 12(4.9) Respiratory Syncytial Virus, 11 (4.5%) Parainfluenza Virus and 9 (3.7%) Adeno Virus were recorded. [FIGURE 3]

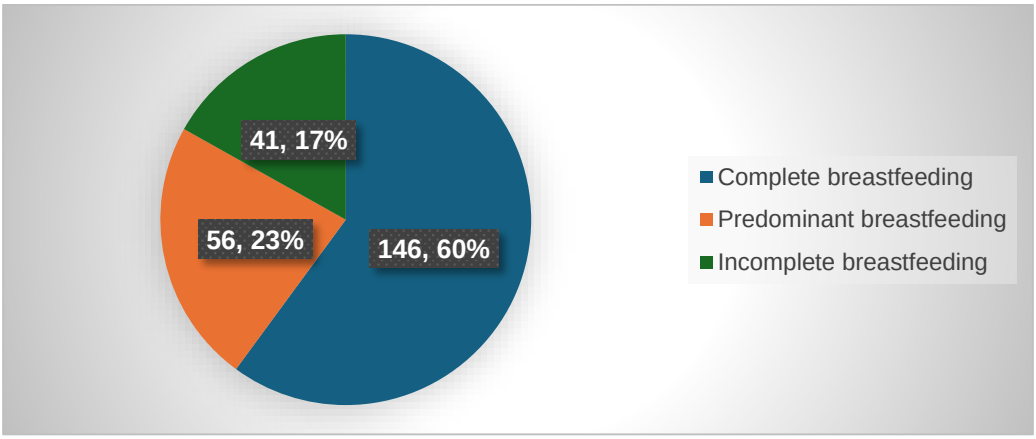

Figure 4: Distribution of respondents according to type of Breastfeeding to infant

When we took patient history we took breastfeeding into consideration, 3 categories were classified complete breastfeeding n = 146 (60%), predominant breastfeeding n = 41 (17%) and incomplete breastfeeding n = 56 (23%)[Figure 4].

DISCUSSION

When we conducted the study about Risk factors associated with acute respiratory tract infection (ARTI) among under 16 age group children, we came across lots of information regarding the (ARTI). The gender of the patients has significant role in the causes of (ARTI). In our research, out of the total patient counts, male n=128 (52.7%) was affected, which is more comparing to the female n=115 (47.3%) patients. When we look into the similar researches done in the different countries, we are almost getting the similar results. In the research done in Jaamnagar, Gujrat, out of the 150 patients with ARTI, n=63 (42%) were female and n=87 (58%) were male [16]. Similarly in a research done in Wuhan, China out of the 39,756 patients n=26747 (67.3%) were male and n=13,009 (32.7%) were female, [17] the incidence of ARTI in males was higher as compared to that in females. This may happen due to the fact that children, especially younger ones, may exhibit different behavioural patterns based on gender. For instance, boys might engage in more risky behaviours or activities that increase exposure to respiratory pathogens, such as playing outdoors or being in close contact with other children who are sick.

The age group getting affected more is below 1 year old which is n = 88 (36.2%) of the patients were affected in our study. Similarly research done in Thane, Maharashtra also had the similar results which shows the similar finding the most of the people getting affected were below 1 year with n = 60 (60%) patients out of 100 [18]. Similarly in a research done in Jaamnagar, Gujrat out of the 150 patients, n= 60 (45.3%) are below 1 year[16]the incidence of ARTIS in below 1 year was higher as compared to other ages. There are several facts why ARTI are more common in this age group than others one among the reason is due to immature immune system, Breastfeeding Practices and Underlying Health conditions also play a significant role in determining an individual's risk of experiencing a problem of ARTI. Other reasons for the ARTI maybe even due to Previous Exposure and Ciliary Function.

Immunization status emerged as a significant factor associated with the occurrence of (ARTIs) among children under 16 years of age in our study, out of the total patient counts, immunized n= 233 (95.9%) and Unimmunized n= 10 (4.1%). Similar Research done in Tigray regional state, Northern Ethiopia, out of the 986 patients with ARTIs, immunized n= 664 (67.3%) and Unimmunized n= 322 (32.7%)[19] the incidence of ARTIs in immunized was higher as compared to that in Unimmunized. If the overall vaccination coverage in the population is high, it is expected that a higher number of children with ARTIs would be from the immunized group simply because there are more immunized children in the population. This reflects the general demographic distribution rather than an indication of vaccine failure and may be some children recorded as immunized may not have completed the full vaccination series, reducing the effectiveness of their immunization

status. Partial immunization provides less protection compared to full immunization.

In this study, we found that M. pneumoniae is a major cause of respiratory infections in school-age children and young adults. Recent reports from several European countries have indicated an increase in the detection of M.pneumoniae infection over the past few years, notably in children aged 4–15 years [20-21]. M. pneumoniae infection accounted for n = 44 (18.1%) cases of respiratory infection in Jalal-Abad, Kyrgyzstan. In most studies, RSV was the leading cause of respiratory tract infections; especially in hospitalized infants less than 6 months of age [22-23]. In agreement with these studies, RSV was detected in only. n = 12 (4.5%)of cases in this study. Influenza viral infections were also common, in that n = 36 (14.8%) of cases were caused by these viruses. Similar research is done in Wuhan, China also similar results M. Pneumoniae accounted n = 12841 (32.3%), RSV is n = 795 (2%) and Influenza viral Infection is n = 7986 (18.1%) [17]

It has been suggested that most M. pneumoniae epidemics occur in either summer or autumn, with no obvious explanation for this seasonal variation. [24-25]

In this study, M. pneumoniae was prevalent throughout almost the entire year, with peaks occurring in June and September. An epidemiologic study found that influenza viral infection occurred throughout the year with no seasonal predominance [26].This study showed that influenza viral infection was more prevalent in late autumn and winter.

Breastfeeding of the patients has significant role in the causes of (ARTI). In our research, out of the total patient counts, complete breastfeeding(more then 6 months) n=146 (60%) , which is more compared to incomplete breastfeeding (less than 6 months) n= 41 (17%) patients and predominant breastfeeding (equal to or less then 6 months) n=56 (23%) . Similar research done in Tripoli, Libya, out of the 200 patients with ARTI, n=79(39.5%) were complete breastfeeding, n=67 (33.5%) incomplete breastfeeding and n= 54 (27%) were predominant breastfeeding [27]. Our findings also support that breastfeeding has a protective effect against respiratory infection. Those who were breastfed for <4 months had a higher risk of hospitalization for infectious diseases in the first year of life than those who were breastfed for >4 months [28]. Besides, infants who were breastfed for 4–6 months showed a higher risk of pneumonia and recurrent otitis media than those who were breastfed for 6 months or longer [29].

CONCLUSION

This study aimed to determine the Risk factors associated with acute respiratory tract infections (ARTIs) among children under 16 years of age in a Jalal-Abad city hospital setting in Jalal-Abad, using secondary data from hospital records. The findings indicate a significant prevalence of ARTIs within this population, with certain socio demographic contributing to the likelihood of infection.

Key findings include:

- A high prevalence of ARTIs among children, particularly in those under 1 year of age.
- Male children exhibited a higher rate of infection compared to females.
- Health-related factors, including incomplete vaccination status and poor nutritional status, were significant contributors to the incidence of ARTIs.

These results underscore the critical need for targeted interventions to reduce the burden of ARTIs among children in this region. The study highlights the importance of addressing both medical and Socio-demographic to improve children's respiratory health.

LIMITATIONS

- Secondary data obtained from hospital records may be incomplete or inconsistent, potentially leading to information bias. Some patient records may lack key variables such as detailed immunization history, socioeconomic status, and environmental exposures.
- Some potentially important environmental and socioeconomic factors may not be adequately captured in hospital records, such as detailed information on housing conditions, no. of members in family, family history related to ARTIs, and family income. These unmeasured confounders could influence the study results.
- Immunization data in hospital records may be incomplete or not up-to-date, making it challenging to accurately assess the vaccination status of all children. Children classified as immunized might not have received all recommended doses, affecting the analysis.

RECOMMENDATION

- Strive to use hospital records that are as complete and detailed as possible. This includes demographic information, medical history, immunization records, and socioeconomic data.
- Investigate the specific pathogens responsible for ARTIs in the study population to develop targeted interventions.
- Encourage hospitals to maintain meticulous and standardized record-keeping practices. Detailed notes on patient diagnosis, treatment, and follow-up are crucial.

REFERENCES

1. https://my.clevelandclinic.org/health/articles/4022-upper-respiratory-infection
2. Nair H, Simões EA, Rudan I, Gessner BD, Azziz Baumgartner E, Zhang JS et al et al. Global and regional burden of hospital admissions for severe acute lower respiratory infections in young children in 2010: a systematic analysis. Lancet 2013;381:1380-90.

3. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE et al et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. Lancet. 2012;379:2151-61
4. https://ufhealth.org/conditions-and-treatments/sinusitis
5. https://my.clevelandclinic.org/health/diseases/21146-tonsillitis
6. https://www.medicalnewstoday.com/articles/324144#causes
7. Thomas M, Bomar PA. Upper Respiratory Tract Infection. [Updated 2023 Jun 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan
8. Khattak ZE, Anjum F. Haemophilus influenzae Infection. [Updated 2023 Apr 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan
9. Worrall G. (2008). Bronchiolitis. Canadian family physician Medecin de famille canadien, 54(5), 742–743.
10. Dasaraju PV, Liu C. Infections of the Respiratory System. In: Baron S, editor. Medical Microbiology. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 93. [11]
11. https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/vaccine-standardization/pneumococcal-disease#:~:text=The%20polysaccharide%20vaccine%20consists%20of,%2Ddependent%20and%20serotype%2Ddependent
12. Loosen, S. H., Plendl, W., Konrad, M., Tanislav, C., Luedde, T., Roderburg, C., & Kostev, K. (2023). Prevalence of Upper Respiratory Tract Infections Before, During, and After the COVID-19 Pandemic in Germany: A Cross-Sectional Study of 2 167 453 Outpatients. Journal of primary care & community health, 14, 21501319231204436.
13. https://data.unicef.org/topic/childhealth/pneumonia/#:~:text=Pneumonia%20kills%20more%20children%20than,of%20these%20deaths%20are%20preventable
14. https://icars-global.org/projects/kyrgyzstan-rti/
15. Kumar, S. G., Majumdar, A., Kumar, V., Naik, B. N., Selvaraj, K., & Balajee, K. (2015). Prevalence of acute respiratory infection among under-five children in urban and rural areas of puducherry, India. Journal of natural science, biology, and medicine, 6(1), 3–6.
16. https://web.archive.org/web/20220610043108id_/https://www.paediatricjournal.com/article/view/151/5-1-1
17. Liu J, Ai H, Xiong Y, Li F, Wen Z, et al. (2015) Prevalence and Correlation of Infectious Agents in Hospitalized Children with Acute Respiratory Tract Infections in Central China. PLOS ONE 10(3): e0119170
18. Joshi, Shrikant & Shaikh, Kamil & Kulkarni, Vrushali. (2021). Prevalence of lower respiratory tract infection in tertiary care hospital, Thane. International Journal of Contemporary Pediatrics. 8. 1700.
19. Dagne, H., Andualem, Z., Dagnew, B. et al. Acute respiratory infection and its associated factors among children under-five years attending pediatrics ward at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia: institution-based cross-sectional study. BMC Pediatrics 20, 93 (2020)
20. Brunstein JD, Cline CL, McKinney S, Thomas E. Evidence from multiplex molecular assays for complexmultipathogen interactions in acute respiratory infections. J ClinMicrobiol. 2008; 46: 97–102. PMID:17977985
21. Chalker V, Stocki T, Litt D, Bermingham A, Watson J, Fleming D, et al. Increased detection of Mycoplasma pneumoniae infection in children in England and Wales, October 2011 to January 2012. EuroSurveill. 2012; 17: 20081. PMID: 22340973
22. Zamberi S, Zulkifli I, Ilina I. Respiratory viruses detected in hospitalised pediatric patients with respiratory infections. Med J Malaysia. 2003; 58: 681–687. PMID: 15190654
23. Calvo C, García-García ML, Blanco C, Vázquez MC, Frías ME, Pérez-Breña P, et al. Multiple simultaneous viral infections in infants with acute respiratory tract infections in Spain. J ClinVirol. 2008; 42:268–272. doi: 10.1016/j.jcv.2008.03.012 PMID: 18455958
24. Rastawicki W, Kaluzewski S, Jagielski M, Gierczyski R. Epidemiology of Mycoplasma pneumoniae infections in Poland: 28 years of surveillance in Warsaw 1970–1997. Euro Surveill. 1998; 3: 99–100.PMID: 12631756
25. Jacobs E. Mycoplasma pneumoniae: now in the focus of clinicians and epidemiologists. Euro Surveill.2012; 17: 20084. PMID: 22340972
26. Tseng RK, Chen HY, Horng CB. Influenza virus infections in Taiwan from 1979 to 1994. J FormosMedAssoc. 1995; 94 Suppl 2: S126–S136. PMID: 8672941
27. Etrhuni S, Omar R, Hadid I. Risk factors of acute respiratory infections in children in Tripoli, Libya. Ibnosina J Med Biomed Sci 2020;12:200-7.
28. ParicioTalayero JM, Lizán-García M, Otero Puime A, BenllochMuncharaz MJ, Beseler Soto B, Sánchez-Palomares M, et al. Full breastfeeding and hospitalization as a result of infections in the first year of life. Pediatrics 2006;118:e92-99

29. Chantry CJ. Full breastfeeding duration and associated decrease inrespiratory tract infection in US Children. Pediatrics 2006;117:425-32