

Study of prevalence and risk factors associated with respiratory illness in children admitted in a teaching hospital in rural Telangana

Gopal Singh Khetavath¹, Vanagondi K. Kavitha^{2,*}

^{1,2}Associate Professor, Dept. of Paediatrics, Government Medical College, Nizamabad, Telangana, India

*Corresponding Author: Vanagondi K. Kavitha

Email: kavitacv04@gmail.com

Abstract

Introduction: Acute respiratory tract illness is common in children especially under 5 years of age. Poor hygiene, poor sanitation, over-crowding are the major risk factors for respiratory infections in paediatric age group.

Aim of the Study: To study the prevalence and risk factors associated with respiratory illness in children admitted in a teaching hospital in rural Telangana.

Materials and Methods: This was a hospital based cross sectional descriptive study done for duration of 2 years from August 2016 to July 2018 in the department of paediatrics at Government Medical College, Nizamabad, Telangana. About 3678 children with respiratory illness aged 2 months to 12 years were included in the study.

Results: The prevalence of respiratory illnesses is about 30.65%. Of the 3678 children admitted with respiratory illness majority were among 2 months to 12 months, 38.8% (1428/3678) followed by 35.6% (1312/3678) among 1 year to 5 years. Boys comprised 68.7% (2527/3678) and girls were 31.2% (1151/3678). Based on clinical symptoms, 86.7% of children with respiratory illness had cough. In the present study most common respiratory illness was acute bronchiolitis (38.4%) followed by bronchopneumonia (28.2%), and bronchial asthma in 13.9% cases. Others were 1.7% of foreign body aspirations, 2.7% of bronchiectasis, 7.9% of pleural effusions, 1.1% of aspiration pneumonitis, and 5.7% of pulmonary tuberculosis. Over-crowding and poor sanitation were present in 88.8% of cases.

Conclusion: In the present study the prevalence of respiratory illness among children aged 2 months to 12 years was about 30.6% and risk factors associated with respiratory illnesses were poor sanitation, overcrowding, and low socioeconomic status.

Keywords: Respiratory illnesses, Prevalence in children, Risk factors for respiratory illness.

Introduction

Respiratory diseases remain a major cause of morbidity and mortality in children¹⁻³ especially among children less than five years old.¹ The spectrum of respiratory illnesses is wide and includes diseases of upper and lower airways, communicable and non-communicable types. The variations in pattern of morbidity and mortality of respiratory illnesses may be affected by different home/environmental and climatic variations in different parts of the world.^{4,5} The World Health Organization (WHO) estimates that approximately 10.6 million children under five years of age die each year and acute respiratory infection (ARI), especially pneumonia¹ contributes to approximately 19% of the total number of deaths.

Diagnostic Criteria of ARI: History of nasal discharge, cough, fever, sore throat, breathing difficulty, any discharge from ear alone or in combination is often used in the recognition of an episode of ARI.⁶ Respiratory rate >60/minute (among <2 month infants), >50 (2-11 months) and >40 (1-5 years) in a child with cough, cold or fever, singly or in combination are the criteria for recognition of pneumonia.⁶ Also the presence of chest in-drawing, cyanosis, loss of consciousness, inability to drink water and convulsions suggest severe pneumonia in a child.⁶ Nilanjan et al⁷ also used another criterion of absence of symptoms for three days or more to differentiate one episode from another.

Most common organisms known to cause ARI among children include bacteria such as *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pneumococci*, *Haemophilus influenzae* and *Klebsiella pneumoniae*. Among viruses,

Respiratory syncytial virus, Influenza A, Rhinovirus, Adenovirus are the common etiological agents.⁶ Infection of any part of the respiratory tract and related structures is known as ARI. All infections less than 30 day duration are included. However, in case of middle ear infections, an acute episode is considered when the duration is less than 14 days.⁷

Recurrent episodes of acute respiratory illness particularly lower respiratory tract infections (LRTIs) can lead to the development of chronic suppurative lung disease and bronchiectasis.⁸ ARIs are mainly self-limited, but can lead to complications requiring hospitalisation due to severe acute respiratory infections (SARI) which can be fatal at times.⁸ These infections cause substantial morbidity and mortality in developing countries and also similar effect in the vulnerable population in developed countries.^{9,10}

Thus, prevention, early identification and management of ARI with cough are important public health and clinical goals. ARI poses a major challenge to the health system in developing countries because of high morbidity and mortality.¹¹

The severity of the disease depends on the type and virulence of infecting agent and predisposing factors such as age, immune status of the host and single or mixed infections.¹¹

Aim of the Study

To study the prevalence and risk factors associated with acute respiratory infections in children admitted in a teaching hospital in rural Telangana.

Materials and Methods

No ethical issues were involved in the study. Informed consent was taken from the parents of the patients. The cross sectional descriptive study was done for a duration of two years from August 2016 to July 2018 in the department of paediatrics at Government Medical College, Nizamabad, Telangana.

Children aged 2 months to 12 years admitted for respiratory infections were included based on selected criteria.^{6,7} The patient demographics and signs and symptoms of respiratory illness were noted. A thorough clinical history was taken including duration of cough, shortness of breath and fever. All cases were thoroughly examined for any chest in-drawing and auscultated for wheeze, rhonchi and stridor.

The patient samples were sent for laboratory investigations including complete blood count, ESR, C-reactive protein, complete urine examination. Radiological investigations were done which included chest X-ray. All collected data was tabulated and statically analysed.

Inclusion Criteria:

1. Age groups of two months to 12 years
2. Both genders
3. All children admitted with signs and symptoms of respiratory illness

Exclusive Criteria:

1. More than 12 years
2. The cases who were not interested to participate in the study or who took discharge against medical advice.
3. Past history of respiratory infections
4. Children admitted with illnesses other than respiratory system

Observations and Results

In the present study, the total number of children admitted in paediatric ward during the two years study period was 12000. Among these 12000 cases, about 3678 cases were admitted due to respiratory illnesses during the study period.

Hence prevalence was calculated as:

$$\frac{\text{Total no. of cases with respiratory illness}}{\text{Total no. of cases admitted}} \times 100$$

$$= \frac{3678 \times 100}{12000} 30.65\%$$

Hence, prevalence of respiratory illnesses in our study was 30.65%

Table 1: Age wise distribution of cases

| Age (in years) | Number of cases | Percent (%) |
|---------------------|-----------------|-------------|
| 2 months -12 months | 1428 | 38.8% |
| 1year - 5years | 1312 | 35.6% |
| 6 years -10 years | 421 | 11.4% |
| 10 years - 12 years | 517 | 14.0% |
| Total | 3678 | 100% |

Of the 3678 children admitted with respiratory illness, majority were among 2 months -12 months, that is, 38.8% (1428/3678) followed by 35.6% (1312/3678) among 1 year – 5 years. 11.4% (421/3678) in 6-10 years and 14.0% (517/3678) among 10 – 12 years.

Table 2: Gender wise distribution of cases

| Gender | Number of cases | Percent (%) |
|--------|-----------------|-------------|
| Boys | 2527 | 68.7% |
| Girls | 1151 | 31.2% |
| Total | 3678 | 100% |

In our study majority of children affected with respiratory illness were boys [68.7% (2527/3678)] and about 31.2% (1151/3678) were girls.

Table 3: Clinical presentation and symptoms

| Symptoms | Number of cases | Percent (%)* |
|---------------------|-----------------|--------------|
| Cold | 2358 | 64.1% |
| Nasal discharge | 2358 | 64.1% |
| Cough | 3190 | 86.7% |
| Shortness of breath | 2521 | 68.5% |
| Poor feeding | 818 | 22.2% |
| Fast breathing | 1515 | 41.1% |
| Fever | 1515 | 41.1% |

*Many patients had more than one symptom.

Based on clinical symptoms, 86.7% of children with respiratory illness had cough, 68.5% has history of shortness of breath, 64.1% had nasal discharge and cold, 41.1% had fever and fast breathing and 22.2% had poor feeding.

Table 4: Clinical category of respiratory illness

| Clinical diagnosis | Number of cases | Percent (%) |
|-------------------------|-----------------|-------------|
| Acute bronchiolitis | 1413 | 38.4% |
| Bronchopneumonia | 1040 | 28.2% |
| Bronchial asthma | 512 | 13.9% |
| Foreign body aspiration | 64 | 1.7% |
| Bronchiectasis | 102 | 2.7% |
| Pleural effusion | 293 | 7.9% |
| Aspiration pneumonitis | 43 | 1.1% |
| Pulmonary tuberculosis | 211 | 5.7% |
| Total | 3678 | 100% |

In the present study most common respiratory illness was Acute bronchiolitis (38.4%) followed by bronchopneumonia (28.2%).

Table 5: Age wise distribution of clinical diagnosis

| Clinical diagnosis | Number of cases | Age group |
|-------------------------|-----------------|---------------------|
| Acute bronchiolitis | 1413 | 6 months – one year |
| Bronchopneumonia | 1040 | 1 - 2 years |
| Bronchial asthma | 512 | 2 - 5 years |
| Aspiration pneumonitis | 43 | 1 month – 6 months |
| Foreign body aspiration | 64 | 6 - 10 years |
| Bronchiectasis | 102 | 6 - 10 years |
| Pleural effusion | 293 | 9 - 12 years |
| Pulmonary tuberculosis | 211 | 9 - 12 years |
| Total | 3678 | - |

In the present study majority of the cases were clinically diagnosed as acute bronchiolitis in 6 months to 1 year age group followed by bronchopneumonia in 1-2 years and bronchial asthma in 2-5 years age group. All cases of acute bronchiolitis were treated with supportive treatment and nebulisation. All cases of bronchopneumonia were treated with intravenous antibiotics such as Amoxyclav. All cases of Bronchial asthma were treated with nebulisation and bronchodilators.

Based on the socioeconomic status of the patients, 88.5% (3258/3678) were in Low socioeconomic status and about 12.5% (462/3678) belonged to high socioeconomic status.

Overcrowding and poor sanitation was present in 88.8% of cases.

According to seasonal variation: Most of the children with respiratory illness were admitted during the months of June, July and October, i.e., during winter and rainy seasons.

Based on occupational status of fathers: 23% were farmers, 41% were labourers, 14% were teachers, 11% were maintaining business and 12% were unemployed. Among mothers, 85% were housewives.

History of parental smoking was present in 62.3% of houses.

In 2 cases mortality was registered due to sudden aspiration among 1 - 2 months age group.

Cases of foreign body aspiration were referred to higher centres for appropriate management.

Discussion

Prevalence of respiratory diseases in our study was 30.65% whereas, in the study by Nagaraj et al¹² prevalence of respiratory diseases was 18.1% and in the study by Goel et al¹³ the overall prevalence of ARI was 52%.

In the present study total number of children admitted in paediatric ward during 2 years duration was about 12000. Among 12000 cases, about 3678 cases were admitted due to respiratory illnesses. In the study by Oguonu et al¹⁴ there were a total of 8974 paediatric admissions to the emergency unit during the period of review from January 2007 to December 2012. Of these admissions, 2214 (24.7%) were due to respiratory illnesses. In the study by Goel et al¹³ a total of 234 ARI cases were found during their study period.

Comparative Studies Based on Age Distribution: In the present study among the 3678 children admitted with respiratory illness, majority were among 2 months to 12

months i.e., 38.8% (1428/3678) followed by 35.6% (1312/3678) among 1 year to 5 years, 11.4% (421/3678) in 6 to 10 years and 14.0% (517/3678) among 10 to 12 years.

Nagaraj et al¹² in their study observed that the most commonly affected age group was less than 6 months (25.4%) followed by 1-2 years (22.9%). In the study by Oguonu et al¹⁴ age distribution showed 75.2% less than five years old, 13.7% between 5 and 9.9 years old, while 9.8% were 10 years and above. In the study by Goel et al¹³ about 47.55% (214) cases were in between 1-4 years, 39.33% (177) were below 1 year age and 13.11% (59) were in between 4-5 years of age. In the study by Suguna et al¹⁵ of the 397 cases, 199 (50.1%) belonged to 5-9 years age group and 198 (49.9%) belonged to 10-14 years age group. In the study by Zaman et al¹⁶ the highest incidence of ALRI was in the first 6 months of life which is similar to our study.

In our study majority of children affected with respiratory illness were boys i.e., 68.7% (2527/3678) and 31.2% (1151/3678) were girls. This compares well with the study by Oguonu et al¹⁴ in which 61% of study participants were males and with the study by Goel et al¹³ (n=450) that had 52% males and 48% females. Our findings are contrary to that observed by Suguna et al¹⁵ where females were comparatively slightly higher in number (203, 51.1%) than males (194, 48.9%).

Comparative Studies Based on Clinical Diagnosis of Respiratory Illness: In the present study most common respiratory illness was acute bronchiolitis (38.4%) followed by bronchopneumonia (28.2%) and bronchial asthma in 13.9% cases. Others were 1.7% as foreign body aspiration 2.7% as bronchiectasis, 7.9% as pleural effusion, 1.1% as aspiration pneumonitis and 5.7% as pulmonary tuberculosis.

In the study by Nagaraj et al¹² the most common respiratory illness was acute bronchiolitis (33%) followed by pneumonia (25.3%) and asthma (16.3%). Some of the patients (4.9%) with respiratory illness also had respiratory failure.

In the present study majority of the cases were clinically diagnosed as acute bronchiolitis in 6 months to 1 year age group, followed by bronchopneumonia in 1-2 years and bronchial asthma in 2-5 years. In the study by Oguonu et al¹⁴ the three common respiratory illnesses admitted during the period were pneumonia (34.0%), acute bronchial asthma (27.7%) and rhinosinusitis (14.6%), and these were more prevalent among the under-five age group.

In the present study, overcrowding and poor sanitation was observed in 88.8% of cases. Similar findings were reported in other studies too.¹² Overcrowding, poor sanitation, poverty are main risk factors for bronchopneumonia. In the study by Goel et al¹³ overcrowding was present in more than half of the houses (56%).

Based on Occupational Status: In our study, the most common occupation of fathers was farmers, and as daily labourers (23% farmers, 41% labourers). Among the mothers, 85% were housewives. In the study by Goel et al¹³ the occupational status of parents was 46% of fathers were labourers and 71% mothers were housewives.

Based on clinical symptoms, present study showed 86.7% of children with respiratory illness had cough, 64.1% had nasal discharge, 41.1% had fever and also rapid breathing and 2.22% had poor feeding.

Similar findings were observed by Goel et al¹³ who reported cough in 71% of children nasal discharge in 60% cases, fever in 30% cases, rapid breathing in 16% cases and cessation of feeding in 2% cases.

Suguna et al¹⁵ reported features of allergic rhinitis symptoms in nearly half of their patients (183, 46.1%). These symptoms included nasal discharge, nasal block and lacrimation.

In the present study most of the children with respiratory illness were admitted during the months of June, July and October i.e during the winter and rainy seasons. Similar seasonal variation was observed by Nagaraj et al¹² in which most of the cases of respiratory illness were seen in the winter season. But Oguonu et al¹⁴ observed a near equal presentation of cases in the rainy and dry seasons: 51.9% and 48.1% respectively.

In the present study, 88.5% (3257/3678) cases belonged to low socioeconomic status and about 12.5% (462/3678) belonged to high socioeconomic status.

Goel et al¹³ in their study observed that one-fifth (19%) of their cases belonged to upper social class (I, II) and remaining (79%) were in low social class (III, IV, V) and 42% of children were living in proper houses. Contrary to this, Zaman et al¹⁶ did not find any association between low socioeconomic status and family size with the occurrence of URI or ALRI. Oguonu et al¹⁴ in their study observed that 11.1% children were from high income families while 44.9% and 44.1% were from middle, low-income families respectively and 29.4% were unspecified.

Conclusion

In the present study prevalence of respiratory illness among children aged 2 months to 12 years was about 30.65% and risk factors associated with respiratory illnesses were poor sanitation, overcrowding, and low socioeconomic status. Symptomatic treatment, antibiotics and nebulisation are the mainstay of treatment. Education and counselling to parents regarding awareness of respiratory illnesses and about hygienic measures can reduce the morbidity among children with respiratory illnesses.

Conflict of Interest: Nil.

References

1. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. WHO Child Health. Epidemiology Reference Group. WHO estimates of the causes of death in children. *Lancet* 2005;365:1147–1152.
2. Akanbi MO, Ukoli CO, Erhabor GE, Akanbi FO, Gordon SB. The burden of respiratory disease in Nigeria. *Afri J Resp Med* 2009;4:10–17.
3. Rudan I, Boschi-Pinto C, Biloglav Z, Mulholland K, Campbell H. Epidemiology and etiology of childhood pneumonia. *Bulletin, World Health Organisation*. 2008;86:408–416.
4. Otters HB, van der Wouden JC, Schellevis FG, van Suijlekom-Smit LW, Koes BW. Changing morbidity patterns in children in Dutch general practice: 1987–2001. *Eur J Gen Pract* 2005;11:17–22.
5. Brunekreef B, Dockery DW, Speizer FE, Ware JH, Spengler JD, Ferris BG. Home dampness and respiratory morbidity in children. *Am Rev Respir Dis* 1989;140:1363–1367.
6. Park K. Textbook of Preventive and Social Medicine. 18th Ed. Jabalpur: Banarsidas Bhanot publishers; 2005. Pp- 350.
7. Nilanjan MK. A longitudinal study on ARI among rural under-fives. *Indian Journal of Community Medicine*. 2001;26:8–11.
8. Singleton RJ, Valery PC, Morris P, Byrnes CA, Grimwood K, Redding G, et al. Indigenous children from three countries with non-cystic fibrosis chronic suppurative lung disease/bronchiectasis. *Pediatr Pulmonol* 2014;49(2):189–200.
9. McCallum GB, Binks MJ. The epidemiology of chronic suppurative lung disease and bronchiectasis in children and adolescents. *Front Pediatr* 2017;5:27.
10. Redding GJ, Singleton RJ, Valery PC, Williams H, Grimwood K, Morris PS, et al. Respiratory exacerbations in indigenous children from two countries with non-cystic fibrosis, chronic suppurative lung disease/ bronchiectasis. *Chest* 2014;146(3):762-74.
11. Frese T, Klauss S, Herrmann K, Sandholzer H. Children and adolescents as patients in general practice- the reasons for encounter. *J Clin Med Res* 2011;3:177-82.
12. Nagaraj N, Subramanian R, Berwal PK, Agrawal R, Solaria S, Saini T. A study of prevalence and frequency of respiratory illness in hospitalized children in North West part of Rajasthan. *Indian J Immunol Respir Med* 2016;1(1):5-8.
13. Goel K, Ahmad S, Agarwal G, Goel P, Kumar V. A Cross Sectional Study on Prevalence of Acute Respiratory Infections (ARI) in Under-Five Children of Meerut District, India. *J Community Med Health Educ* 2012;2:176.
14. Oguonu T, Ayuk CA, Edelu Bo, Ndu IK. Pattern of respiratory diseases in children presenting to the paediatric emergency unit of the University of Nigeria Teaching Hospital. *BMC Pulm Med* 2014;14:101.
15. Suguna E, Ganeshkumar S, Roy G. Prevalence and Risk Factors of Acute Respiratory Infection among School Children in Coastal South India. *J Glob Infect Dis* 2014;6(3):95–98.
16. Zaman K, Baqui AH, Md. Yunus, Sack RB, Bateman OM, Chowdhury HR, Black RE. Acute Respiratory Infections in Children: A Community based Longitudinal Study in Rural Bangladesh. *J Trop Pediatr* 1997;43(3):133-137.

How to cite this article: Khetavath G. S, Kavitha V. K. Study of prevalence and risk factors associated with respiratory illness in children admitted in a teaching hospital in rural Telangana. *Int J Med Paediatr Oncol*. 2018;4(4):157-160.