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Original Research Article

Clinical profile and outcome of acute lower respiratory tract infection in children aged between 2 months to 5 years

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ABSTRACT

Background: Acute respiratory infection is a leading cause of morbidity and mortality in under five children in developing countries. Hence, the present study was undertaken to study the clinical profile and factors predicting the outcome.
Methods: Hospital based case series study conducted at HSK hospital & Research centre. The study conducted from 01 March 2014 to 31 August 2015. 200 ALRI cases in the age group of 2 months to 5 years as per WHO criteria for pneumonia fulfilling the study criteria were evaluated for clinical profile and outcome as per predesigned proforma. Data collected was analyzed using chi square test.
Results: We found higher incidence of ALRTI cases among infants (53.5%) and male (58%) children. Majority had PEM (60.5%) and anemia (73.5%). Parental smoking, period of EBF and gestation at delivery were significantly associated with severity of pneumonia ($p < 0.05$). 1.5%, 77.5% and 21% had pneumonia, severe and very severe pneumonia with mean duration of hospital stay of 5, 7.43 and 10.36 days. Need of change in antibiotics and duration of stay were significantly associated with pneumonia severity ($p < 0.05$). 56.5% cases required oxygen and 4.5% required mechanical ventilation. Bronchopneumonia (33.5%) was the most common diagnosis and sepsis (6%) was the most frequent complication. Mortality was 3%.
Conclusions: Present study has identified prevalence of various risk factors among ALRI cases and predictors of severity and outcome. ARI burden and severity can be reduced by promoting EBF and immunization, effective management of malnutrition, improving the living standards and educating parents about hazards of smoking.

Keywords: ALRTI, ARI, Outcome, Pneumonia, Risk factors, WHO

INTRODUCTION

Acute lower respiratory tract infections (ALRTI) are leading cause of morbidity and mortality in young children.[1] Acute respiratory infections (ARI) is the most commonchildhood illness. Recent estimates from the world health organization (WHO) suggest that ALRTI is responsible for 20% of deaths in under five children which account for more than 2 million under five children dying of acute respiratory infection annually, of which 90% occur in developing countries.[2]

ALRTI is the leading cause of under-5 childhood morbidity in the world, with nearly 156 million new episodes each year, of which India accounts for a bulk of 43 million. It was estimated that worldwide, 7-13% of

156 million yearly pneumonia cases might progress to severe disease and warrant admission.[3] There were about 12 million episodes of hospital admissions for severe and 3 million for very severe ALRI which resulted in about 0.3 million deaths in-hospitals in young children. 99% of these deaths were in developing countries, and in-hospital deaths were about 19% of the estimated total number of ALRI deaths in young children in 2010.[4]

Of the 7.6 million children who died in the first five years of life in 2010, 4.9 million (64%) died of infectious conditions. Pneumonia caused 1.4 million deaths (18.3%) of all mortalities in children under five, and 4% of 18.3% mortalities were in the neonatal period. In India an estimated 4 lakh pneumonia deaths occurs annually, which is highest among all the countries in the world.[5] The aim was to study the clinical profile of ALRTI in children aged 2 months to 5 years, to study the risk factors associated with ALRI in these children, to study the outcome and its predictors.

METHODS

A case series study of ALRTI in children aged 2 months to 5 years over a period of 18 months from 01 March 2014 to 31 August 2015 admitted at Hanagal Shri Kumareshwara Hospital and Research Centre, Bagalkot, Karnataka, India. Children admitted in our hospital with clinical diagnosis of ALRTI as per WHO criteria. The children enrolled in the study will be evaluated at The Department of Pediatrics, HSK Hospital and Research Centre, S. Nijalingappa Medical College, Bagalkot, Karnataka, India.

Age group of 2 months to 5 years diagnosed with ALRTI as per the WHO guidelines were included in the study.[17] Those children with congenital heart diseases, tuberculosis, bronchial asthma, hospital acquired illness, and those who were admitted outside for the same illness were excluded from the study. Informed verbal consent will be obtained from all parents/Guardians of the cases enrolled in the study.

RESULTS

In the present study out of 200 cases admitted with ALRI 3 had Pneumonia, 155 had severe pneumonia and 42 had very severe pneumonia according to WHO ARI programme.

Table 1: Cases as per who ARI classification.

WHO classification	No of cases	Percentage
Pneumonia	3	1.5
Severe pneumonia	155	77.5
Very severe pneumonia	42	21

Table 2: Cases as per Socio demographic factors.

Variables	Number of cases	Percentage
Age <12months	107	53.5
Male sex	116	58
SES ≥3	153	76.5
Birth order ≥3	57	28.5

Table 3: Frequency of radiological findings on chest X-ray.

Chest X-ray findings	Number of cases	Percentage
U/l Infiltrates	16	8
B/linfiltrares	67	33.5
Consolidation	52	26
Hyperinflation	50	25
Collapse	32	16
Effusion/ empyema	8	4
Pneumatocoele	2	1
Steeple sign	6	3
Normal	32	16

Table 4: Final clinical diagnosis.

Diagnosis	Number of cases	Percentage
Bronchiolitis	42	21
Bronchopneumonia	67	33.5
Lobar pneumonia	28	14
Croup	10	5
WALRTI	49	24.5
Others	4	2

Table 5: Outcome variables and pneumonia severity.

Variabilty		Pneumonia	Severe	Very severe	Total	P- value
Change of antibiotic	Yes	0	33	24	57	0.0001
	No	3	122	18	143	
Oxygen	Yes	2	82	29	113	0.129
	No	1	73	13	87	
Duration of stay	≤7	3	92	16	111	0.004
	8-14	0	58	19	77	
	>14	0	5	7	12	
Outcome	Improved	3	148	37	188	0.094
	Death	0	2	4	6	
	DAMA	0	5	1	6	
Total		**3**	**155**	**42**	**200**	

Among 200 cases most common clinical diagnosis was Bronchopneumonia 67 (33.5%) followed by WALRTI 49 (24.5%) and bronchiolitis 42 (21%) cases. Lobar Pneumonia accounted for 28 (14%) cases. Croup was diagnosed in 10 (5%), empyema in 4 (2%) cases. Change in antibiotics and duration of stay were significantly associated in relation to pneumonia severity.

DISCUSSION

In the present study, 200 ALRI cases were studied for the risk factors, clinical and laboratory profile, complications and outcome.

Age distribution: Young age (infants <12 months) was found to be risk factor for poor prognosis.[6] In our study ALRI among infants was 53.5% which in accordance with previous studies by Savitha et al, Broor et al and Sehgal et al where infants with ALRI accounted about 52-62%.[7,8,11] This age group is particularly susceptible due to waning of maternally conferred immunity towards the latter half of infancy. Other contributing factors are narrow airways, relatively short bronchial tree and incomplete development of lungs. However there was no significant association between age and ALRI severity.

Sex distribution

In our study it was observed that male (58%) outweighed females (42%). This was in comparison with studies done by Savitha et al (64.4%), Broor et al (73.1%), Sehgal et al (58.25%) and Drummond et al (58%).[7,8,11,12] This probably can be explained by the importance of cultural factors, such as preference in seeking medical care for boys. No significance was found between sex and pneumonia severity in our study.

Risk factors

In present study, 76.5% were of lower social status (class III-V) and 28.5% cases are of birth order ≥3.42% were living in overcrowded house, 67% were exposed to indoor pollution and 66.5% were practicing open air defecation. Only 23.5% were living in pucca housing condition. Parental smoking was noted in 43.5% cases. Only parental smoking was significantly associated with pneumonia severity.

In our study, 18% cases were home delivery, 16% were preterm births and 21.5% had low birth weight. 20.5% cases received pre lacteal feeds and 26.5% were with partial/incomplete immunization. Only gestation was significantly associated with pneumonia severity. This could be explained by higher incidence of malnutrition, anemia among preterms.

Savitha et al found parental illiteracy, low socioeconomic status, overcrowding and partial immunization were significant socio demographic risk factors for ALRI.[7]

Acharya et al found higher incidence among children of poor housing with smoke producing conditions. Hamid et al found lack of breast feeding; low socio economic status, illiteracy and malnutrition were the significant risk factors.[18,19]

In our study 60.5% cases had PEM, 17% had features of Rickets and 16% had micronutrients like zinc, Vit A, Vit-B12 and others. 73.5% cases had Hb less than 11 gm/dl. 31% were not exclusively breast fed and inappropriate weaning was found among 33.5% cases. EBF was significantly related with pneumonia severity.

Broor S et al in their study found lack of breast feeding, URTI in mother or in siblings, severe malnutrition, cooking fuel other than LPG, in appropriate immunization for age and history of ALRTI in family as significant risk factor for severe ALRTI.[8]

Savitha et al found that administration of prelacteal feeds, early weaning, anemia, malnutrition, use of kerosene lamps, biomass fuel pollution, lack of ventilation, partial immunization, overcrowding and malnutrition were significant risk factors.[7]

Clinical profile

In our study majority presented with cough and fever which was found in 96.5% and 92% respectively. 42% had hurried breathing, 25.5% had noisy breathing, 16% had refusal of feeds and 14.5% altered sensorium. 18% had associated vomiting/diarrhea. Among signs tachypnea and chest retractions was seen in 98% and 93% cases. Wheeze (64.5%) and crepitations (63.5%) were other predominant signs. 38% cases had leucocytosis.

These findings were comparable with other studies like Kabra et al, Kumar et al. Fatmi et al in their study found cough and fever in 95% and difficult breathing in 38% cases. Vomiting and diarrhea was seen in 32% and 33% cases respectively.[9,110]

Out of 200 cases 1.5%, 77.5% and 21% were pneumonia, Severe and very severe pneumonia respectively. In the study by Savitha et al 12.51% were pneumonia, 82.69% were severe and 4.8 % were very severe pneumonia.[7] Yousif et al graded 23.4% as no pneumonia, 48.2% as pneumonia, 19.6% as severe and 8.8% as very severe pneumonia.[14]

Among 200 cases most common clinical diagnosis was bronchopneumonia 33.5% followed by WALRTI 24.5% and bronchiolitis 21% cases. Lobar pneumonia was diagnosed in 14%, Croup in 5% and empyema 2% case. In a study by Reddaiah et al, bronchopneumonia was diagnosed in 64%, lobar pneumonia in 6.4% and post measles bronchopneumonia in 4.0% of cases.[15]

Outcome

In present study IV fluids and nebulization was given in 89.5% and 84.5% cases respectively. 8% needed blood/blood component transfusion. Oxygen was required by 56.5% cases, CPAP administration in 10.5% and mechanical ventilation in 4.5% cases.

Sepsis was the frequent complication occurred in 6% cases followed by empyema in 4% cases. VAP complicated in 3 out of 9 who required mechanical ventilation. 2 developed Meningitis and 1 was complicated by pneumothorax. 4.5% required ICD insertion and 1% required decortications. 28.5% cases required change in antibiotic. Duke et al reported that change in antibiotics was required in 11% of patients.[16]

44.5% had hospital stay of more than 7 days. Mean stay for pneumonia, severe and very severe pneumonia being 5, 7.4 and 10.3 days. 92% improved and 3% got discharged against advice. Mortality in our study was 3% i.e, 6 cases out of which 4 died due to sepsis and 2 due to congestive cardiac failure. Mishra et al noted a mortality of 7.7% was seen in case of very severe pneumonia.[13] The duration of stay in hospital was significantly less in cases of severe pneumonia 4.21±1.59days as compared to very severe pneumonia which was9.35±1.59days. Sehgal et al reported case fatality rate of 10.45%.[11]

CONCLUSION

Acute lower respiratory tract infection remains pneumonia is one of the major causes of morbidity and mortality in children and frequent cause of health care seeking both on outpatient and inpatient basis. Infants and male children are affected frequently.

Among the studied risk factors parental smoking, period of exclusive breast feeding and gestational age were significantly associated with pneumonia severity and majority belonged to lower socio economic group and were living in poor housing condition. Majority of the cases were anemic and malnourished with incomplete immunization for the age in up to one fourth cases.

Symptoms and signs mentioned in the WHO ARI control programme are very sensitive in detecting the ALRI cases. Routine hematological investigations and blood culture will not give much information regarding severity or etiology of illness.

Duration of stay and requirement of antibiotic change was significantly associated with pneumonia severity. Early diagnosis and treatment helps improve the morbidity and mortality profile. Training of local health personnel in early recognition, treatment and referral of sick and at-risk children helps in decreasing the morbidity and mortality.

Young age, malnutrition, poor housing condition, overcrowding, Indoor pollution and poor socioeconomic status continues to be an important predisposing factor in the childhood respiratory disorders. Breaking this vicious circle is essential in decreasing the morbidity and mortality due to respiratory infections.

Effective utilization of under-five clinics to ensure availability of proper nutrition to combat malnutrition and anemia, and increasing the immunization coverage and promoting exclusive breast feeding can reduce the disease burden. Improving the living standards and educating hazards of smoking can help in preventing the ARI burden.

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REFERENCES

1. Liu L, Johnson HL, Cousens S. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. Lancet. 2012;379:2151-61.

2. Kumar A, Saha E, Patra D, Chakraborty S. Outcome of acute lower respiratory tract infection in children. Indian Medical Gazette. 2011:394-9.
3. Rudan I, Pinto BC, Biloglav Z, Mulholland K, Campbell H. Epidemiology and etiology of childhood pneumonia. Bull World Health Organ. 2008;86:408-16.
4. Nair H. 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.
5. The inter-agency group for child mortality estimation (IGME). Estimates of under-five mortality rates by country, the 2011 release. Available at www.childmortality.org. Accessed on 12 January 2013.
6. Jroundi I. Risk factors for a poor outcome among children admitted with clinically severe pneumonia to a university hospital in Rabat, Morocco. Int J Infectious Dis. 2014;28:164-70.
7. Savitha MR, Nandeeshwara SB, Pradeep MJ, Farhan H, Raju CK. Modifiable risk factors for acute lower respiratory tract infections. Indian J Pedia. 2007;74:477-82.
8. Broor S, Pandey RM, Ghosh M, Maitreyi RS, Rakesh L, Tanu S, et al. Risk factors for severe acute lower respiratory tract infection in under five Children. Indian Pediatrics. 2001;38:1361-9.
9. Kabra SK, Verma IC. Acute lower respiratory tract infection. The Forgotten Pandemic. 1999;66:873-5.
10. Kumar N, Singh N, Locham KK, Garg R, Sarwal D. Clinical evaluation of acute respiratory distress and chest wheezing in infants. Indian Pediatr. 2002;39:478-83.
11. Sehgal V, Sethi GR, Sachdev HPS, Satyanarayana V. Predictors of mortality on subjects hospitalized with acute lower respiratory tract infections. Indian Pediatr. 1997;34:213-9.
12. Drummond P, Clark J, Wheeler J, Galloway A, Freeman R, Cant A. Community acquired pneumonia-a prospective UK study. Arch Dis Child. 2000;83:408-12.
13. Mishra S, Kumar H, Anand VK, Patwari AK, Sharma D. ARI control programme: result in hospitalized children. J Trop Pediatr. 1993;39:288-92.
14. Yousif TK, Khaleq BANA. Epidemiology of acute lower respiratory tract infections among children under five years attending Tikrit general teaching hospital. Middle Eastern J Fam Med. 2006;4(3):48-51.
15. Reddaiah VP, Kapoor SK. Acute respiratory infections in under five: experience at comprehensive rural health services project hospital Ballabgarh. Indian J Community Med. 1995;20:1-4.
16. Duke T, Poka H, Dale F, Michael A, Mgone J, Wal T. Chloramphenicol versus benzyl penicillin and gentamicin for the treatment of severe pneumonia in children in Papua New Guinea: a randomised trial. Lancet. 2002;359:474-80.
17. Izadnegahdar R, Cohen AL, Klugman KP, Qazi SA. Childhood pneumonia in developing countries. Lancet Respir Med. 2013;1:574-84.
18. Acharya D, Prasanna KS, Nair S, Rao RS. Acute respiratory infections in children: a community based longitudinal study in south India. Indian J Public Health. 2003;47(1):7-13.
19. Hamid M, Qazi SA, Khan MA. Clinical, nutritional and radiological features of pneumonia. J Pak Med Assoc. 1996;46:95-9.

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