

Original Research Article

Clinical profile of children aged 2 months to 60 months presenting with wheeze in a tertiary medical centre

Arup Ratan Mondal, Ch Shyamsunder Singh, Moirangthem Meenakshi Devi,
Cindy Laishram, T. Kambiakdik*

Department of Pediatrics, RIMS, Imphal, Manipur, India

Received: 01 March 2020

Accepted: 30 March 2020

*Correspondence:

Dr. T. Kambiakdik,

E-mail: tkambiakdik80@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Wheezing is common throughout infancy and childhood except in the neonatal period where it is relatively rare. By 10 years of age, about 19% of children experience wheezing with an average onset at 3 years of age. This study was aimed to identify the diverse factors associated with wheezing in children aged 2 months to 60 months and to study clinical profile along with short term outcome of the same.

Methods: It was a hospital based cross-sectional study carried out in the Department of Paediatrics, Regional Institute of Medical Sciences Hospital (RIMS), Imphal, Manipur. The Study population consisted of randomly selected 131 children aged 2 months to 60 months who were admitted in Paediatrics ward with the symptom of wheezing.

Results: Authors found that age below 12 months, male sex, low socioeconomic conditions and artificial breastfeeding practices were important risk factors for wheeze.

Conclusions: Wheezing is accountable for a high demand of medical consultations and emergency care services with relatively high rates of hospitalization. Along with ARI, it plays an important role in infant mortality. In Manipur, it is being observed that increasing number of children with wheezing are attended by paediatricians in ED, OPD and ward, thereby proving an added burden to the younger age group. Therefore proper health education and counselling of parents, promotion of exclusive breast feeding and improvement of socioeconomic status can play a vital role in preventing occurrence of wheeze among the children.

Keywords: Allergy, Artificial breast feeding, Malnutrition, Pneumonia, Wheezing

INTRODUCTION

Wheezing is the production of musical and continuous sound that originates from oscillations in narrowed airways which is heard mostly on expiration as a result of critical airway obstruction.

Monophonic wheeze refers to a single-pitch sound that is produced in the larger airways during expiration, as in distal tracheomalacia or bronchomalacia. Wheeze is

polyphonic when there is widespread narrowing of the airways, causing various pitches as air moves through different levels of obstruction to flow, as seen in asthma. When obstruction occurs in the extrathoracic airways during inspiration, the sound is referred to as stridor.¹

Wheeze during infancy is often a mixture of all causes of noisy breathing that includes nasal obstruction in the first 2 years of life. The main causes are infection, allergy and anatomical abnormalities.

Every year, Acute Respiratory Tract Infection (ARI) in young children is responsible for an estimated 3.9 million deaths worldwide. In India, during the year 2011, about 26.3 million cases of ARI were reported which gives an incidence rate of about 2,719 cases per lakhs population.² Lower Respiratory Tract Infection (LRTI) is the infection below the level of the larynx. When it is associated with wheeze it is called as Wheeze Associated Lower Respiratory Tract Infection (WALRI) and may be taken to include bronchiolitis, bronchitis, pneumonia, laryngotracheobronchitis (croup).³

WALRI in children is a leading cause of death and constitute a substantial burden of disease in developing countries. A significant proportion of children with ALRI presenting to emergency may also have concurrent wheezing of varying severity.⁴ In Manipur, it is being observed that increasing number of children are frequently attending paediatrics ED, OPD and ward. The present study purpose to explore the clinical profile and diverse variable factors associated with wheezing in children.

Aims and objective of this study was to identify diverse variable factors associated with wheezing in children aged 2 months to 60 months and to study the clinical profile along with short term outcome of wheezing in children aged 2 months to 60 months.

METHODS

It is Hospital based Cross sectional study. Study was carried out in the Department of Pediatrics, Regional Institute of Medical Sciences, RIMS, Imphal. Study duration was from October 2014 to September 2016. Study population involves 2 months to 60 months aged children admitted in Pediatrics ward with symptom of wheezing. Sample size was 131.

Inclusion criteria

Among 131 randomly selected children aged 2 months to 60 months admitted in Pediatrics ward, presenting with wheeze, during study period.

Exclusion criteria

- Infants aged below 2 months and children aged above 60 months of age.
- Children who were in shock, severe sepsis, respiratory failure, CVS disease, structural anomalies of the airways or any other severe illness.
- Children whose parents were not willing to participate in this study.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 21

Ethical approval was obtained from the institutional ethics committee, RIMS, Imphal before beginning the study.

RESULTS

There were 131 cases enrolled in the study during the study period that extends from October 2014 to September 2016, of which 34(26%) of them were of the age group of 2-6 months, 42(32%) in 7-12 months, 29(22.2%) in 13-24, 12(9.2%) in 25-36 months age groups, While in the age groups of 37-48 and 49- 60 months, there were 7(5.3%) cases each. This study showed that wheezing peaks around the second half of infancy and decreases gradually as the patients grow in age as shown in Table 1. Approximately two-third of the cases were males (64.8%) while females constitute only 35.2% (Table 2).

Table 1: Age wise distribution of cases.

Age in months	Number of cases	Percentage (%)
2-6	34	26
7-12	42	32
13-24	29	22.2
25-36	12	9.2
37-48	7	5.3
49-60	7	5.3
Total	131	100

Table 2: Sex wise distribution of cases.

Sex	Case	Percentage (%)
Male	85	64.8
Female	46	35.2
Total	131	100

Table 3: Religion wise distribution of cases.

Religion	Case	Percentage (%)
Hindu	105	80.1
Muslim	12	9.1
Christian	14	10.6
Total	131	100

Taking religion into account, the vast majority of the cases were from the Hindu community of the region. The breakup showed 105 (80.1%) out of the total 131 cases were Hindu by religion, 14(10.6%) were Christians while only 12 (9.1%) were Muslims (Table 3) Location or rather, the area from where the cases came from, doesn't seem to have much impact on the status of the patient. In this study, of the 131 cases, 67 (51.1%) of them were from rural areas while 64 (48.9%) of them are from the urban areas. (Table 4) Passive smoke inhalation had a great impact on the findings in this study. 76 (58.1) cases have at least one smoker in the family while 55 (41.9%) do not have smokers in the household (Table 5).

Table 4: Location wise distribution of cases.

Location	Case	Percentage (%)
Rural	67	51.1
Urban	64	48.9
Total	131	100

Table 5: Distribution with relation to smoking habit of family members.

Smoking habits	Case	Percentage (%)
Non smoker	55	41.9
Smoker	76	58.1
Total	131	100

Table 6: Distribution with relation to type of cooking fuel.

Type	Case	Percentage (%)
Wood/Coal	50	38.1
Kerosene	46	35.1
Others	35	26.8
Total	131	100

Table 7: Distribution with relation to literacy status of father.

Education of father	Cases	Percentage (%)
Literate	98	74.8
Illiterate	33	25.2
Total	131	100

Table 8: Distribution with relation to literacy status of mother.

Education of mother	Cases	Percentage (%)
Literate	58	44.2
Illiterate	73	55.8
Total	131	100

Table 9: Gestational age-wise distribution.

Gestational age	Case	Percentage (%)
Term	104	79.3
Preterm	27	20.7
Total	131	100

Smoke producing cooking fuels are the predominant cooking fuels in our region and this seem to have a great impact on the cases. In this study, we found that 96 (73.2%) cases were from homes that used either firewood/coal or kerosene as the primary fuel for cooking. Only 35 (26.8%) used other cooking fuels like LPG or electric cooking stoves (Table 6). Literacy of the parents helps in deciding the child's clinical condition, especially those illnesses that are preventable. 98(74.8%) cases have literate fathers while 58(44.2%) have literate mothers. (Table 7 and 8)

Strangely, in our study, it was found that neonates who are born at term gestation constitutes about four-fifth of the total. 104(79.3%) were born at term while 27(20.7%) were born preterm. (Table 9) Formula fed infants predominate our study population. 60(45.8%) were exclusively formula fed, 22(16.8%) on mixed feeds while 49(37.4%) were exclusively breast fed (Table10).

Table 10: Distribution with relation to different feeding practice.

Feeding practice	Case	Percentage (%)
Exclusive breastfeeding	49	37.4
Partially breast fed	22	16.8
Artificial feeding	60	45.8
Total	131	100

Table 11: Immunization status-wise distribution.

Immunization status	Case	Percentage (%)
Immunization as per schedule	120	91.6
Unimmunized	11	8.4
Total	131	100

Table 12: Distribution with relation to housing condition.

Housing condition	Case	Percentage (%)
Kutchha	77	58.7
Pukka	54	41.3
Total	131	100

Table 13: Distribution with relation to overcrowding.

Overcrowding	Case	Percentage (%)
Yes	78	59.6
No	53	40.4
Total	131	100

Table 14: Nutritional status wise distribution according to IAP classification.

Nutritional status	Case	Percentage (%)
Healthy	113	86.2
Grade I malnutrition	14	10.6
Grade II malnutrition	3	2.4
Grade III malnutrition	1	0.8
Grade IV malnutrition	0	0
Total	131	100

Of the 131 cases under our study, 120 (91.6%) of them were immunized according to the National Immunization Schedule while 11 (8.4%) did not receive any vaccines. (Table 11). Type of housing condition had a great impact on the status of the cases. Of them 77 (58.7%) lived in kutchha houses while 54 (41.3%) lived in concrete houses. (Table 12) 78 (59.6%) came from overcrowded living

conditions while 53(40.4%) got enough per capita space in the household (Table 13). Of the 131 cases under our study, 113 (86.2%) were nutritionally healthy, while 14 (10.6%), 3 (2.4%), 1 (0.8%) were of Grade I, Grade II and Grade III respectively. None of them had grade IV malnutrition according to IAP classification (Table 14).

DISCUSSION

Authors have found that most of the wheezers are < 1 year of age with the predominant age group between 7 months to 12 months (32%). As the age increases, the percentage of the children presenting with wheeze reduces. This finding corroborate other studies viz., Shay DK et al, Broor S et al, Mallol J et al, Sabitha MR et al, Azad K, Patra S et al, where < 1 year children were more prone to develop wheeze.⁵⁻¹⁰

Male dominance was observed among the cases with the male to female ratio of 1.8:1. This data is comparable with those of Kwon JE et al, Sherriffa A et al, Broor S et al, Mandhane PJ et al, Marcos L et al, and Bessa OA et al, where all of them found male dominancy in their respective studies.^{6,11-15}

Maximum cases were from Hindu families (80.1%) followed by Christians (10.6%) and Muslims (9.1%). This may be due to the load of patients being attended at the hospital where the local populace is dominated by Hindus while Christians and Muslims are the minority. On the contrary, the practice of burning incense sticks, prevalent in certain religions may have contributed to the symptomatology.

It was observed that those children who are from the rural areas (51.1%) wheezes more frequently than those from urban (48.9%), which is comparable with the study of Prajapati B et al where prevalence was higher in rural as compared to urban areas.¹⁶

The possible explanation could be that, the rural populace in our study setting were economically more backward and the parental level of education were lower, besides the affordability of optional vaccines.

According to this study, smoking habit of the family members had significant impact on children presenting with wheeze. In 58.1% of the cases, family members were found to be smokers. This result is comparable to study of Tariq S et al, Hermann C et al, Goksor E et al, Marcos L et al and Bessa OA et al where pre and postnatal smoking habit of family members specially mother, were found for increasing the risk of asthma in early adulthood.^{14,15,17-19}

It was observed that smoke producing cooking fuels such as wood, coal and kerosene increases the chance of wheeze associated lower respiratory tract infection among the cases. Most of the families of the children who presented with wheeze used wood/coal (38.1%) and

kerosene (35.1%) as their major cooking fuel. This finding is corroborative with study of Boor S et al, and a study conducted by Savitha MR et al, where wood, coal and kerosene were found as major cooking fuel among the families of the cases.^{6,8}

It was observed that the educational status of the parents had a correlation with wheezing. Illiterate fathers percentage was 25.2, where illiterate mothers predominantly constituted 55.8%. This result is comparable to a study by Boor S et al where there was high instance of illiterate mothers (34.8%) as compared to the controls [19.6%; (p <.000)] and a study by Azad K who have shown significant association (p=.000) between wheeze in children and maternal illiteracy.^{6,9} Similar studies conducted by Marcos L et al and Bessa OA et al also concluded that the mother's low educational status was a substantial cause of increased wheeze prevalence.^{14,15}

Our study showed children who presented with wheeze predominantly were term according to their gestational age (79.3%), but in a study done by Sherriffa A et al, prematurity was a significant risk factor for wheezing. This could be due to other environmental conditions where the cases lived in, like the socio economic and the parental educational status. Wrong gestational age determination could not be ruled out amongst the rural populace of the study.¹²

Artificial feeding was the predominant feeding practice among the children who presented with wheezing (45.8%), followed by exclusive breastfeeding (37.4%) and incomplete breast feeding (16.8%). This result is comparable with a study done by Kwon JE et al, and Sherriffa A et al, where children presenting with wheeze predominantly were artificial fed.¹¹ There has been a reasonable evidence that formula feeds using cow milk based infant formulas predisposed the child to develop allergies and intolerance.¹²

In this study, children who are immunised as schedule comprises 91.6%, while the unimmunized were 8.4%. But in the studies conducted by Boor S et al, and Savitha MR et al, inappropriate immunization for age was a significant risk factor for wheeze and ALRI.^{6,8} The reason could be that, in our setting, we follow only the immunization guidelines listed under the National immunization schedule where optional vaccines are not listed. Besides, the economically disadvantaged group do not afford the optional vaccines. It was observed that mud (kutcha) house have a very significant impact of wheezing among the children. 58.7% of the cases were residents of kuccha house as compared to 41.3% who reside in pukka houses. This result can be compared with study by Savitha MR et al, where they found 61.54% of cases had either mud/cowdung flooring in their house.⁸

Overcrowding has a strong association with wheeze and ARI among <5 years children. 59.6% of the cases were

from overcrowded environment. This finding is comparable with a study by Savitha MR et al, where overcrowding was significantly associated with wheeze and ALRI.⁸ Besides overcrowding, inadequate ventilation, smoking habits as well as the type of fuels used for cooking compounded the problem.

In this study 86.2% children were healthy and well-nourished followed by children with Grade I malnutrition (10.6%), Grade II malnutrition (2.4%) and Grade III malnutrition (0.8%) according to IAP classification. Formula fed infants often look better nourished than the breast-fed ones even though the predisposition to wheeze is higher. This could have a say amongst the wheezers who are predominantly better nourished.

CONCLUSION

Wheezing, a very common symptom in under five-year-old children, is usually accountable for a high demand of medical consultations and emergency care services with relatively high rates of hospitalization. Along with ARI, it plays an important role in infant mortality. In Manipur, it is being observed that increasing number of children with symptom of wheezing are frequently attended by paediatrics in ED, OPD and ward, thereby proving an added burden to the younger age group.

In this study it was found that age below 12 months, male sex, low socioeconomic condition and artificial breastfeeding practice were important risk factors for wheeze. Therefore proper health education and counselling of parents, promotion of exclusive breast feeding and improvement of socioeconomic status can play a vital role in preventing occurrence of wheeze among the children.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee RIMS, Imphal

REFERENCES

- Coates BM, Camarda LE, Goodman DM. Wheezing, Bronchiolitis and Bronchitis. In: Kliegman RM, Stanton BF, St Game JW, Schor NF, Behrman RE, editors. Nelson Textbook of Paediatrics. 20th ed. Philadelphia: Elsevier Saunders; 2016:2044-2049.
- Park K. Acute Respiratory Infections. In: Park K, editors. Text book of preventive and social medicine. 21st ed. India: Bhanot; 2011:157-167.
- Lavanya KB, Vasundhara TL, Pasha SZ, Veeramanil G, Chidambaranathan S. Comparison of effect of nebulisation with different combination of medications in paediatrics patients with WALRI. World J Pharmacy Pharmaceutical Sci. 2014;3(8):669-79.
- Bada C, Carreazo NY, Chalco JP, Huicho L. Inter-observer agreement in interpreting chest X-rays on children with acute lower respiratory tract infections and concurrent wheezing. Sao Paulo Med J. 2007;125(3):150-4.
- Shay DK, Holman RC, Newman RD, Liu LL, Stout JW, Anderson LJ. Bronchiolitis associated hospitalizations among US children. J o Am Med Asso. 1999;282(15):1440-6.
- Broor S, Pandey RM, Ghosh M, Maitheyi RS, Lodha R, Singhal T, et al. Risk factors for severe acute lower respiratory tract infection in under five children. Indian Pediatr. 2001;38(12):1361-9.
- Mallol J, Andrade R, Auger F, Rodriguez J, Alvarado R, Figueroa L. Wheezing during the first year of life in infants from low-income population. Allergol Immunopathol. 2005;33(5):257-63.
- Savitha MR, Nandeswara SB, Pradeepkumar MJ, Haque F, Raju CK. Modifiable risk factors for acute lower respiratory tract infection. Indian J Pediatr. 2007;74(5):477-82.
- Azad K. Risk factors of acute respiratory infection among children under 5 years in Bangladesh. J Sci Res. 2009;1(1):72-81.
- Patra S, Singh V, Kumar P, Chandra J, Dutta A, Tripathi M. Demographic and clinical profile of children under two years of age with recurrent wheezing. J Coll Physicians Surg Pak. 2011;21(11):715-7.
- Kwon JE, Yoon JH, Lee JO, Kang IJ. A clinical study on wheezing of Mycoplasma pneumoniae pneumonia in children. Korean J Pediatr. 1993;36(10):1366-74.
- Sherriffa A, Petersb TJ, Hendersonc J, Strachand D. Risk factor associations with wheezing patterns in children followed longitudinally from birth to 3 1/2 years. Int J Epidemiol. 2001;30(6):1473-84.
- Mandhane PJ, Greene JM, Cowan JO, Taylor DR, Sears MR. Sex differences in factors associated with childhood and adolescent onset wheeze. Am J Respir Crit Care Med. 2005;172(1):45-54.
- Marcos L, Mallol J, Sole D, Brand PLP. International study of wheezing in infants risk factors in affluent and non-affluent countries during the first year of life. Pediatr Allergy Immunol. 2010;21(5):878-88.
- Bessa OA, Leita AJ, Sole D, Mallol J. Prevalence and risk factors associated with wheezing in the first year of life. J Pediatr. 2014;90(2):190-6.
- Prajapati B, Talsania N, Sonaliya KN. Epidemiological profile of acute respiratory tract infections in under five age group of children in urban and rural communities of Ahmedabad District, Gujarat. Int J Med Sci Public Health. 2011;1(2):52-8.
- Tariq S, Hakim E, Matthews S, Arshad S. Influence of smoking on asthmatic symptoms and allergen sensitisation in early childhood. Postgrad Med J. 2000;76(901):694-9.

18. Hermann C, Westergaard T, Pedersen BV, Wohlfahrt J, Host J, Melbye M. A comparison of risk factors for wheeze and recurrent cough in preschool children. *Am J Epidemiol* 2005;162(4):345-50.
19. Goksor E, Amark M, Alm B, Gustafsson PM, Wennergren G. The impact of pre- and post-natal smoke exposure on future asthma and bronchial hyper-responsiveness. *Acta Paediatr.* 2007;96(7):1030-5.

Cite this article as: Mondal AR, Singh CS, Devi MM, Laishram C, Kambiakdik T. Clinical profile of children aged 2 months to 60 months presenting with wheeze in a tertiary medical centre. *Int J Contemp Pediatr* 2020;7:1117-22.