

Original Article**Wheezing in Children Under 5 Years****Basant Rai *, Sagun Khanal, Shipra Chaudhary**

Department of Pediatrics and Adolescent Medicine, BP Koirala Institute of Health Sciences, Dharan, Nepal

Article Received: 17th January, 2026; Accepted: 26th March, 2026; Published: 30th June, 2026**DOI: <https://doi.org/10.3126/jonmc.v15i1.96110>****Abstract****Background**

Wheezing is a common characteristic feature of lower respiratory tract infection in children. This study was to assess the clinical characteristics, diagnostic pattern, treatment modalities and outcome of children presenting with wheezing.

Materials and Methods

The data were collected retrospective from hospital records. We reanalyzed by using the Statistical Package for the social Sciences (SPSS) version 21. Children with wheeze associated lower respiratory tract infection among children between 2 to 60 months of age over a period of one year. Data were analyzed using descriptive and inferential statistics.

Results

The prevalence of wheezing in children admitted in hospital with lower respiratory infection was 77.05%. Among 272 cases, 73.16% were male and infants were 66.91%. Cough and fever were most common presenting symptoms. Common risk factors were prior history of wheezing, caesarean delivery at birth, underweight and lack of exclusive breast feeding. Twenty five percent cases had crepitations/crackles along with wheezing. Antibiotics were used in 91.54% and supplemental oxygen was needed in 41.91%. Most common final diagnosis was acute bronchiolitis and wheeze associated lower respiratory infection followed by pneumonia. Outcome was improved in 96.69% patients.

Conclusion

Wheezing was the common clinical finding among children. Infant and male had significant wheezing. There was a significant conformity association between a recurrent wheezing phenotype. Children with wheezing had short hospital stay with the good outcome.

Keywords: Age of onset, Wheezing, Prognosis

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Introduction

Wheezing, a sign of airway obstruction, is a continuous high pitched, widespread, and polyphonic musical sound emitted from the chest during expiration. Studies have shown that approximately one in three children has at least one episode of wheezing before their third birthday, and the cumulative prevalence of wheeze reaches 50% at the age of 6 years [1].

Wheeze associated lower respiratory infection may be associated with fever, cough, noisy breathing and respiratory difficulty [2]. Interactions between viral virulence factors, personal risk factors (e.g. genetics, prematurity, breastfeeding, obesity) and environmental exposures (e.g. airway microbiome) are known to be associated with development of childhood asthma [3].

Parents may sometimes misinterpret various other sounds such as upper airway congestion or noise breathing as wheezing. Thus, it is important to confirm the presence of true wheezing by the physician for the management and preventing long-term respiratory complications.

This study thus tries to identify the prevalence of wheezing and its associated factors among under-five children with lower respiratory tract infection at a tertiary care hospital in eastern Nepal.

Material and Methods

This is a retrospective descriptive study carried out in the department of pediatrics and adolescent Medicine, B.P Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. The data of the patient were retrieved from discharge summary kept under institute record section. Ethical approval was taken from Institutional Review Committee of BPKIHS. All children aged 2 months to 60 months admitted with wheeze associated lower respiratory tract infection from January 2022 to December 2022 were included in the study. Children diagnosed with aspiration of foreign body, severe sepsis, shock, CVS disease, suppurative lung disease, structural anomalies of the airways, genetic disorders, HIV, malignancy, or on immunosuppressive drugs were excluded. Census sampling was done and all children aged 2-60 months admitted in the year 2022 with wheezing were taken as sample. Detailed clinical information and treatment data after the diagnosis were recorded in a self-designed proforma along with other

relevant demographic profile. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21. Data were analyzed using descriptive and inferential statistics.

Results

There were 353 children admitted with lower respiratory tract infection during the study period; among which physician diagnosed wheezing was present in 272 cases (77.05%). The median age of children with wheezing was 8 months (IQR: 4-13 (2-60)). Numbers of infants admitted with wheezing were more than toddler and pre-school children. More than two-third of cases (73.16%) were male. Khas-Aryan was the majority ethnic group (45.95%). Most patients (76.83%) were from terai region. Cough and fever were the most common presenting symptoms followed by noisy breathing and fast breathing. Table 1 shows the socio-demographic characteristics of children with wheezing.

Table 1: Socio-demographic and clinical characteristics of children admitted with wheezing (n=272)

Characteristics	Category	Number (n)	Percentage (%)
Age in months	2 to <=12 (infants)	182	66.91
	12 to <=36 (toddler)	62	22.79
	36 to <=60 (pre-school)	28	10.29
Gender	Male	199	73.16
	Female	73	26.83
Ethnicity	Khas-Aryan	125	45.95
	Janajati	90	33.08
	Madhesi	38	13.97
	Newar	14	5.14
	Others	5	1.83
	Terai	209	76.83
Geographical Region	Hill	55	20.22
	Mountain	8	2.94
Symptom(s)			
Fever		191	70.22
Cough		245	90.07
Noisy breathing		166	61.02
Fast breathing		97	35.66
Running Nose		21	7.72
Others symptoms	Diarrhea	11	4.04
	Poor feeding	4	1.47
	Vomiting	6	2.20
Duration of illness prior to admission in days	Median (IQR) (min-max)	4 (3-6) (1-45)	

Among the admitted children, 76 cases (27.94%) had past history of wheeze; out of which 68 (25%) had wheezing $\leq$ 2 times in a year while 8 (2.94%) had $\geq$ 3 times wheezing per year. Seven



(2.57%) had family history of bronchial asthma. History of preterm delivery at birth was 5.14% and 22.42% had caesarean delivery. Twenty eight (10.29 %) had history of lack of exclusive breast feeding till 6 months of age. Immunizations as per NIP schedule were delayed or incomplete in 18 (6.61 %) cases. In our study, according to weight for age WHO (z-score) growth chart, 212 (77.94%) were normal weight for age, 41 (15.07%) and 14(5.14%) had moderate and severe underweight respectively; 2(0.73%) were overweight and 3 (1.10%) were obese. Table 2 demonstrates the known risk factor for wheezing.

Table 2: Distribution of risk factors in children with wheezing (n=272)

Risk factors	Number (n)	Percentage (%)
Past history of wheezing episode	76	27.94
≤2 times	68	25.00
Past wheezing episode per year	8	2.94
≥3 times	8	2.94
Family history of Bronchial asthma	7	2.57
Prematurity at birth	14	5.14
Caesarean delivery at birth	61	22.42
Lack of Exclusive breast feeding up to 6 months	28	10.29
Cow's milk feeding	4	1.47
Delayed/ incomplete immunization	18	6.61
Nutritional Status		
Moderate under-weight	41	15.07
Severe underweight	14	5.14
Overweight	2	0.73
Obese	3	1.10

On auscultatory findings of children with wheezing, crepitation/crackles were also present in 69 cases (25.36%). First line injectable antibiotics (ceftriaxone) was prescribed in 249 (91.54%) of cases and 28 (10.29%) needed upgrade to 2nd line antibiotics (vancomycin or piperacillin-tazobactam). Oral azithromycin as additional antibiotics was prescribed in 46 (16.91%). Antitubercular therapy was started in 1 case after diagnosing pulmonary tuberculosis. Salbutamol 183 (67.27%), Adrenaline 95 (34.92%), 3 % Normal saline 97 (35.66 %) were the common nebulization done during hospital stay. Supplemental oxygen was needed in 114 (41.91%) via face mask, infant oxygen hood, bubble CPAP and mechanical ventilator. Acute bronchiolitis with or without secondary infection 112 (41.17%) and wheeze associated lower respiratory tract infection 104 (38.23) were the common final diagnosis. The median duration of hospitalization

was 3 days (IQR: 2-5 (1-14)). Among admitted children, 263 (96.69%) were discharged after improvement whereas 9 (3.30%) were not improved. Among not improved cases, 5 cases were referred (4 due to unavailability of PICU bed and 1 referred on request), 2 cases left against medical advice and 2 patients expired. Table 3 illustrates treatment and outcome of wheezing children.

Table 3: Treatment and outcome of children with wheezing admitted to BPKIHS (n=272)

Treatment	Number (n)	Percentage (%)
Nebulization		
Salbutamol	183	67.27
Adrenaline	95	34.92
3% Normal Saline	97	35.66
Ipratropium	63	23.16
Budesonide	25	9.19
Antibiotic		
Inj Ceftriaxone	249	91.54
Inj Vancomycin/ Piptaz	28	10.29
Oral Azithromycin	46	16.91
Oral ATT	1	0.36
Supplemental Oxygen		
Face Mask	61	22.42
Hood box	41	15.07
Bubble CPAP	9	3.30
Mechanical ventilation	3	1.10
Final Diagnosis		
Acute bronchiolitis with/without secondary infection	112	41.17
Pneumonia	55	20.22
Wheeze associated lower respiratory infection	104	38.23
Pulmonary Tuberculosis	1	0.36
Duration of hospitalization in days	Median (IQR) (min-max)	3 (2-5) (1-14)
Outcome		
Improved	263	96.69
Not improved	9	3.30

Discussion

Wheeze is common characteristic feature in children. Wheezing is commonly associated with viral etiology. Physician documented wheeze is essential for the diagnosis and management of wheezing in children. In our study, more than two third of the children admitted with lower respiratory tract infection had wheezing 272 (77.05%), and 25.36% had wheeze with crackles. This result is comparable with the study done by Shrestha SR et al [4]. Infant with the predominant age group belonging to 2-11 months 182 (66.91%)



were found to present with wheezing. Wheezing finding reduced as the age increases. These findings were similar to a study done by Shrestha SR et al, Vishwanath Gowraiah et al and T Hazir et al [4-6].

Male dominance was observed among in our study with 73.16%. Other study also showed male predominance in their study [7-9]. The higher incidence in males may be attributed to reduced immune system activation resulting to early seeking of medical advice [10]. Our study show Khas-Aryan from terai was being admitted the most which corroborate to National population census 2021[11]. However, Janajati and Dalit ethnic population admitted were contradictory to census. This could be due to economic growth, urbanization, migration, improved education and hospital accessibility. However, our result matches to local census 2021 which may be the reason supporting the local census 2021. As per text definition in acute respiratory tract infection cough and fever were the common symptoms present during the admission.

Our study showed children who presented with wheeze 14 (5.14%) were preterm and 61 (22.42%) were delivered via lower section caesarean section. In a systematic review and meta-analysis study done by Been JV et al preterm birth was associated with increased risk of childhood wheezing disorders [12]. Lack of exclusively breastfeeding 10.29% and delayed or incomplete immunization were 6.61 % in our study, which were comparable with the studies conducted by Jackson S et al and Yadav S et al, delayed schedule for age were risk factors for acute respiratory infection [13, 14].

There is a significant conformity association between a recurrent wheezing phenotype, parental asthma and development of childhood asthma. Our study showed past history of wheezing was in 76 (27.94%) and 8 (2.94%) had wheezing ≥ 3 times/year which were the similar results to studies done [15]. Our study shows 20.21% underweight (moderate and severe) which corroborate with 19% underweight NDHS 2022 report [11]. However, the prevalence of overweight is in line with 0.73% NDHS 2022 report but it's in contrast to study done by Radha Bhurtel et al where overweight was prevalent with 2.5% [11, 2]

Clinicians caring for children make their decision to use, nebulization drugs therapy, antibiotics and supplemental oxygen on an individu-

al basis. Salbutamol nebulization was done in 67.27% children stating that wheeze in less than 5 years as one of the common presentations during admission. In a study done by K.M Binu et al showed 63.2% use of salbutamol nebulization respectively [16].

In our study, majority 91.54% were treated with ceftriaxone as a first-line antibiotic. This result was similar to study done by Rebecca Nantanda et al where 95.3% received antibiotics [17]. The reason being the probable bacterial etiology of pneumonia in our setup. However, this fact alarms us towards potential misuse of antibiotics in patients with acute bronchiolitis wherein the etiology is viral, and antibiotic have no role in its management. Two third of children with wheeze are not identified by current WHO ARI guidelines [6]. Hence, the morbidity associated with the etiology and difficulty in diagnosis due to limitation of rapid tests, leading to misuse of antibiotic and high cost remains a big challenge to the treating physician. Therefore, irrational use of antibiotics prior to or during hospital admission can contribute to antibiotic resistance. In a study done by B Pokhrel et al. 30 % had already taken antibiotic before admission [18].

Majority 41.91% needed non-Invasive supplemental oxygen while 1.10% children were kept under ventilatory support. However, our result is contradictory to the study done by V. Nandimall et al where 80.6% needed supplemental oxygen. This difference in need of supplemental oxygen could be attributed to the fact that this observational study done by V. Nandimall et al admitted more severe lower respiratory tract infection children [19].

This study observed that patients with acute bronchiolitis with or without secondary infection, pneumonia and wheeze associated lower respiratory tract infection were had with a short hospital stay of 3 days. The possible reason for this could be that these patients had mild to moderate severity, while those with severe illness were lesser in number. This result is similar to study done by Shrestha SR et. al., where the average hospital stay was 5.6 days in children having wheeze [4]. Our study showed that 96.69% children were discharged improved whereas 2 cases expired in our PICU.

Conclusion

Wheezing was the commonest clinical finding among children under five years admitted with



lower respiratory tract infections. Infant with wheezing was the leading morbidity with male being relatively high rates of hospitalization. There was a significant conformity association between a recurrent wheezing phenotype. However, premature birth and parental asthma did not have statistically significant association among wheezing children. Wheezing patients had short hospital stay with the good outcome.

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Conflict of interest: None

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